

Simple Nursing

با تشکر از نرس نینوا و سایر همکارانی که در تکمیل مطالب
کمک و همراهی کردند

<https://t.me/iraniannclex>

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دسته بندی، فهرست بندی و تبدیل به کتاب: دکتر بائی

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جهت دانلود مطالب بیشتر، بر روی لینک بالا کلیک کنید

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Anatomy & physiology

Epithelial Tissues

Simple Squamous

- One layer of large, flat cells
- Thin delicate layers for simple filtration, diffusion, with gas exchange osmosis
- Covered with closed body openings
- Located in alveoli and capillaries



Simple Cuboidal

- One layer of cube-shaped cells
- Found in gland ducts and linings of cell



Simple Columnar

- One layer of cells that appear column-like
- Some secrete mucus cells
- Locations: GI tract lining, fallopian tubes, uterus, and bronchi in lungs
 - Ciliated - shifts small substances over the cells/tissues
 - Microvilli - provides larger surface area for secretion and absorption



Pseudostratified Ciliated

- One ciliated layer of cells
- Nuclei appears at various levels
- Goblet cells secrete mucus
- Locations: Lines the upper respiratory tract, the prostate, vas deferens



Stratified Cuboidal

- Many layers of cube-like cells on top
- Locations: sweat and salivary glands and ducts



Stratified Squamous

- Keratinized
 - Outermost layer is filled with keratin
- Locations: respiratory, digestive, skin, excretory, and reproductive systems
- Non-keratinized
 - All living cells
- Locations: mouth, pharynx, esophagus, vagina, anus



Stratified Columnar

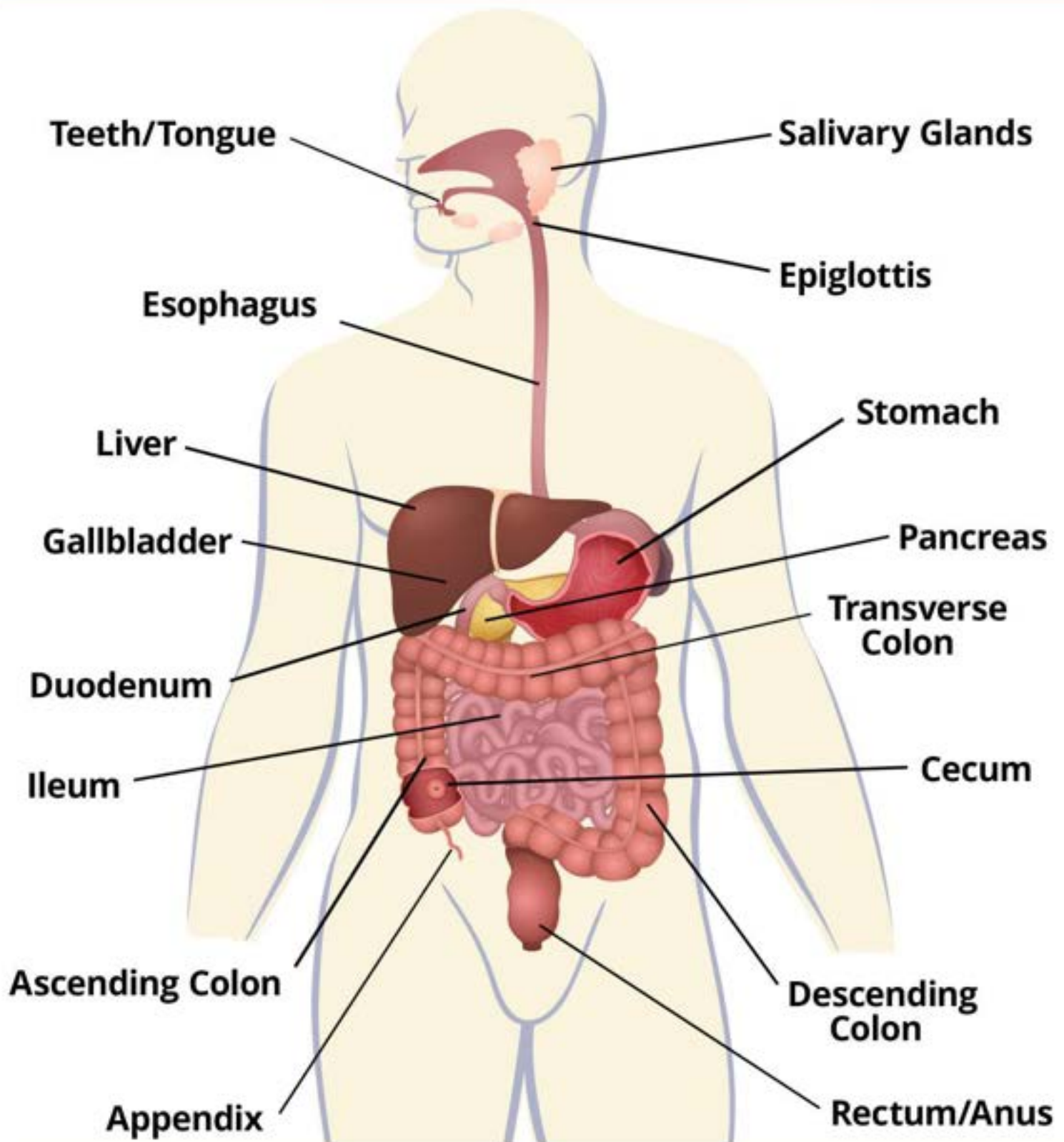
- Several layers with column-like cells on top
- Ciliated Locations: larynx, conjunctiva of eye
- Non-ciliated Locations: sections of male urethra, epididymis, vas deferens



Transitional or Uroepithelium

- Stratified with round shape
- Found in the lower urinary tract, mucosal, lining of ureters, urinary bladder, urethra

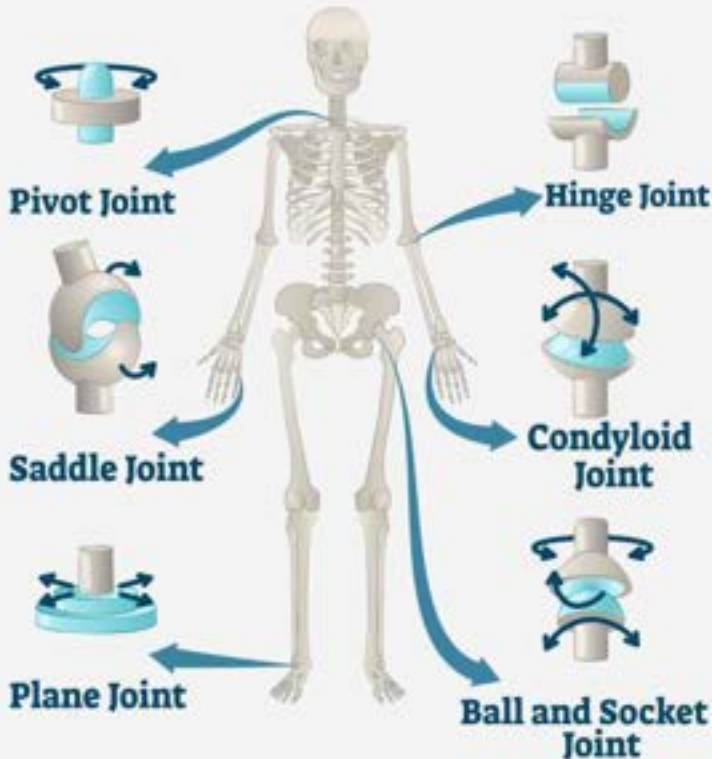




Digestive tract

Mouth - Esophagus - Stomach - Small Intestine - Large Intestine - Anus

Ancillary Organs: Salivary Glands, Gallbladder, Pancreas, Liver



Joint Types

Synarthroses

- Fixed, immovable
- Found in skull, sternum, pelvic bone

Amphiarthroses

- Some slight movement but limited
- Found in spinal intervertebral discs, hip pubic symphysis

Diarthroses

- Freely movable
- Packed with fluid between synovial joints
- Found in the limbs of the skeleton, shoulders, elbow, fingers, hips, knees

Joint Locations

Hinge

- Elbow, knee

Planar

- Wrist, foot (ankle)

Pivot

- The neck between vertebrae C1 and C2, wrist

Condyloid

- Wrist between radial and carpal bones

Diarthrosis Joints

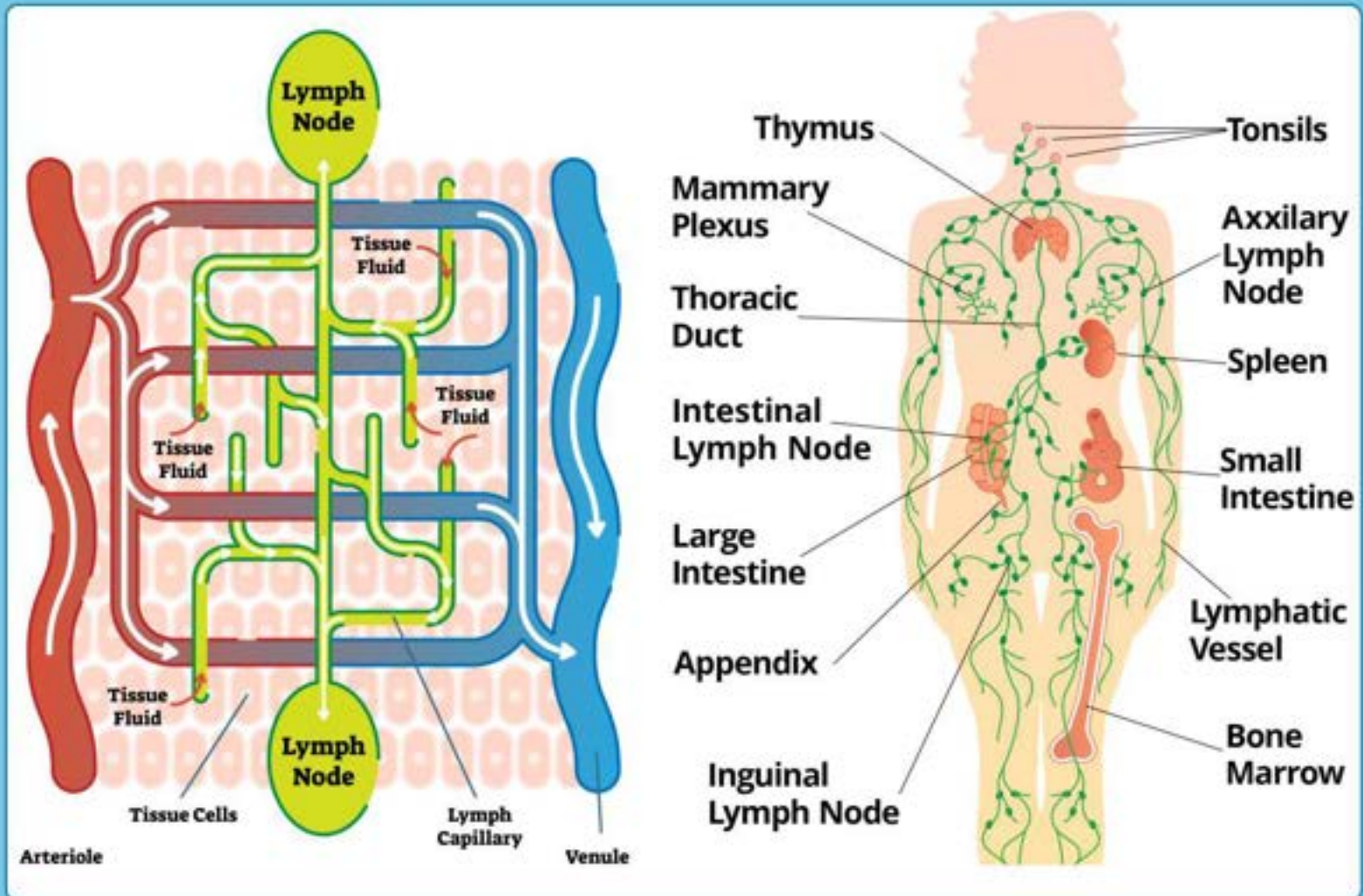
Outer layer

- Contains fibrous membrane
- Fuses with periosteum of bone

Inner layer

- Holds synovial membrane
- No blood or lymph vessels
- Secretes synovial fluid for shock absorption and lubrication

Lymph system anatomy



Lymph vessels

Organ

Function

Lymph-capillaries	<ul style="list-style-type: none"> Responsible for regulation of fluid pressure, prevention of edema, and moves lymph through lymphatic vessels
Lymphatic collecting vessels	<ul style="list-style-type: none"> Has valves that move fluid through the lymph system. Collecting vessels to transport fluid to subclavian veins and back to the body's circulatory system
Lymphatic ducts	<ul style="list-style-type: none"> Right lymphatic and thoracic ducts Cisterna chyli receives lymph drainage from veins and divides into the right and left sides
Lymph Fluid	<ul style="list-style-type: none"> Transports substances clear to white for the lymph system
Lymph Nodes	<ul style="list-style-type: none"> Site for lymphocytes, B-cells, T-cells A lymphatic system filter to kill pathogens that cause infection
Spleen	<ul style="list-style-type: none"> Works to filter blood; storage for white blood cells and platelets Produces cells for immunity Removes and recycles older blood cells (red blood cells) Fights particular bacterias to prevent illness
Thymus	<ul style="list-style-type: none"> Site of maturing T-Cells help with immunity

Muscle Types

**Smooth**

- Involuntary body movement
- Stimulated by Autonomic Nervous System
- Found in hollow organs such as stomach, intestines, bladder, blood vessels, uterus
- Propels fluids in peristalsis

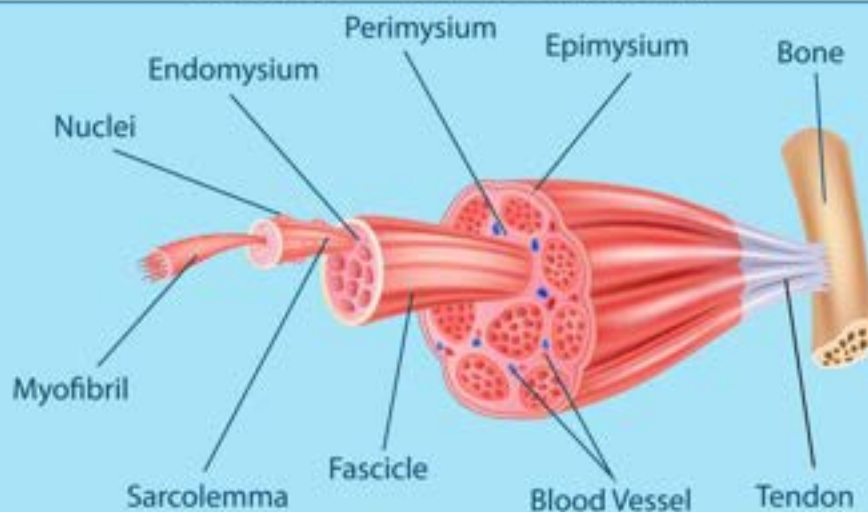
**Cardiac**

- Involuntary body movements
- Stimulated by Autonomic Nervous System
- Site within the heart
- Intrinsically controlled with branches and one nucleus

**Skeletal**

- Voluntary body movements
- Stimulated by Autonomic Nervous System
- Helps maintain posture, generate heat, controls inner movement, supports bones as well as joints

Muscle - Microanatomy

**Arrangement**

- Endomysium - covers exterior of muscle fibers
- Perimysium - covers exterior of fascicles (groups of muscle fibers)
- Epimysium - covers membrane above bundles of fascicles
 - Found between muscle
 - Combines with connective tissue made of tendons

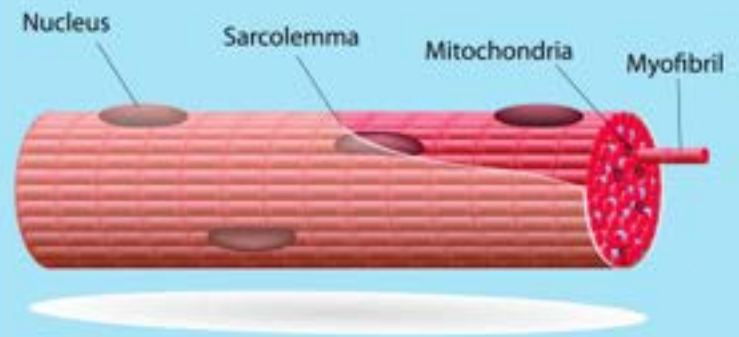
Myofilament Arrangement

- Sarcomere - striated muscle fibers: contains myosin (thick) and actin (thin)
- I-Band - (short, thin band): contains actin filaments
- A-Band - consists of dark thick filaments (myosin)
- H-Zone - the A-Band center with thick filament
- Z-Disc - defines boundaries of sarcomere

Muscle Anatomy

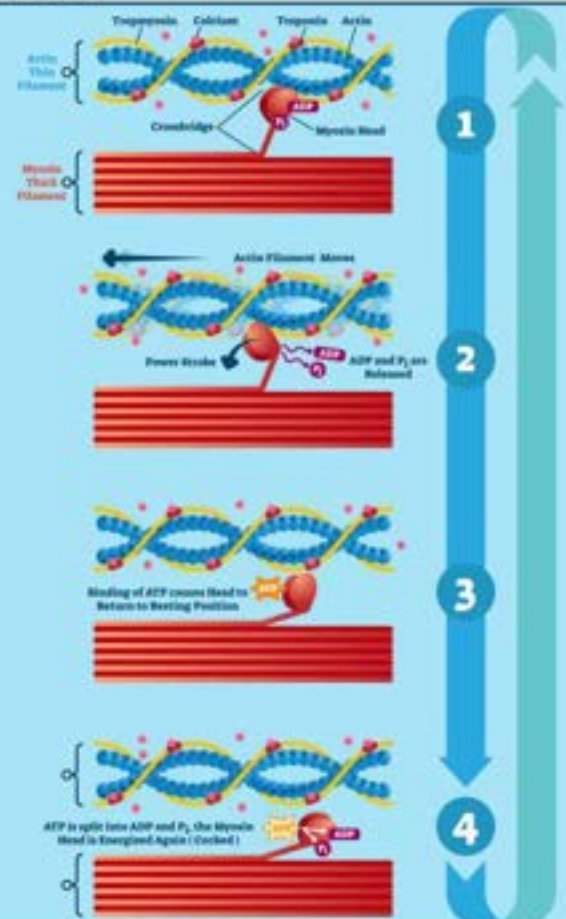
Transport System

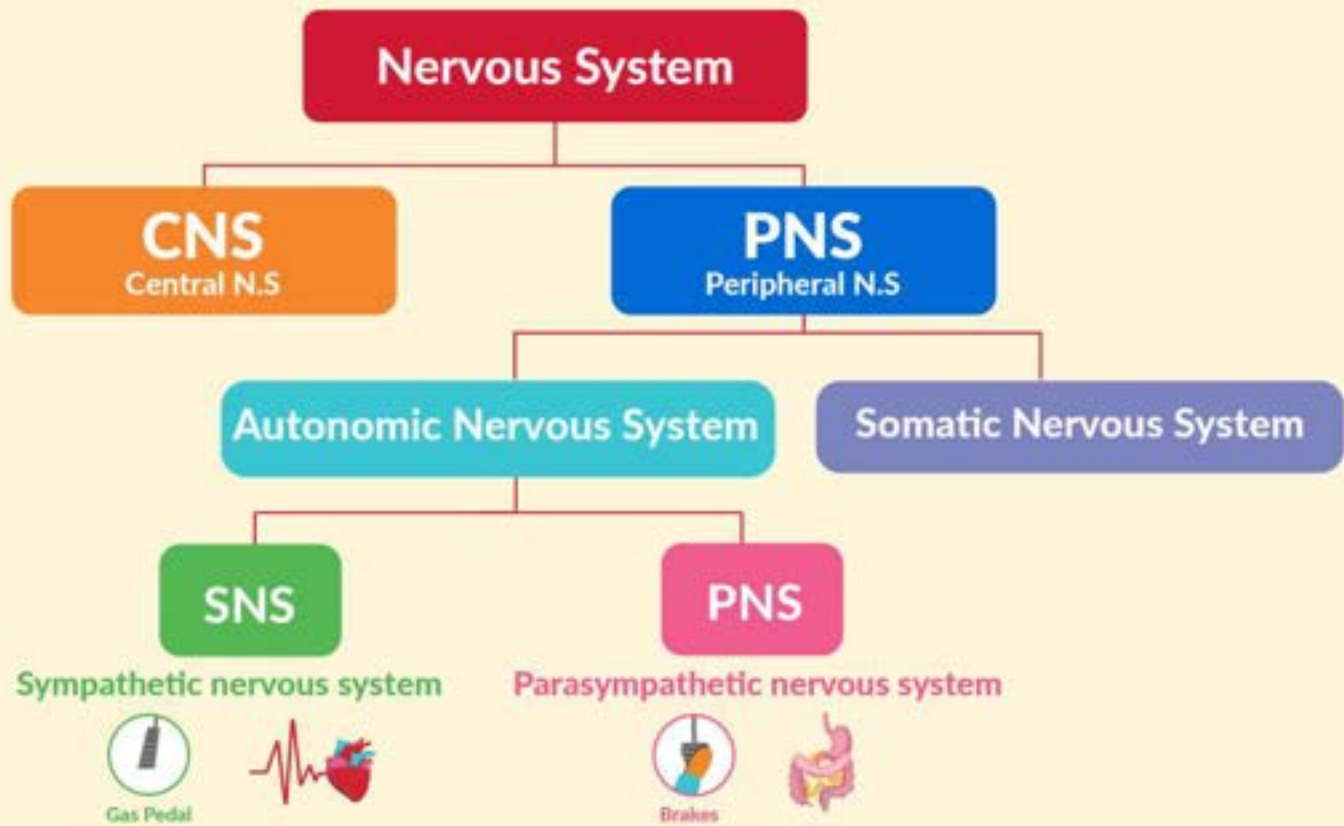
- **Sarcoplasm** - muscle fiber cytoplasm
- **Sarcolemma** - functions as plasma membrane
 - **T-System** (Transverse System) - penetrates into center of cardiac and skeletal muscle cells
- **Sarcoplasmic reticulum**
 - Stores calcium ions
 - Transmits electrical impulses
 - During muscle contraction releases calcium
 - A system of tubules in muscle cells
 - Contains calcium pumps to use energy gained from adenosine triphosphate (ATP)
- **Triad** - Found between A-I junction forming the excitation-contraction connection



Muscle Contraction

1. Action potential is sent to stimulate muscle
2. Release of calcium ions
3. Calcium connects with tropomyosin to reveal active actin sites
4. Myosin is activated and attached to center of actin (ATP is needed)
5. Breakdown of ATP
6. Contraction of muscle





Nervous System

Central Nervous System:

- Controls main functions of mind and body
- Contains the spinal cord and brain

Peripheral Nervous System:

- Contain nerves coming from the brain, spinal cord to all network body parts
- **Somatic Nervous System:** Contains sensory (afferent) and motor (efferent) nerves to perform reflex actions
- **Autonomic Nervous system:** Part of Peripheral Nervous System that controls involuntary physical actions

Sympathetic Nervous System: Fight or Flight response

Memory Tricks

S - Stress nervous system (SNS kicks in during times of stress)
 S - Speeds UP the Vital signs (HIGH heart rate & blood pressure)
 in order to fight or flight in survival mode!
Controls Catecholamines made in the adrenals (Epinephrine & Norepi)
These help to constrict the blood vessels to speed up the vitals

Parasympathetic Nervous system: Rest & Digest

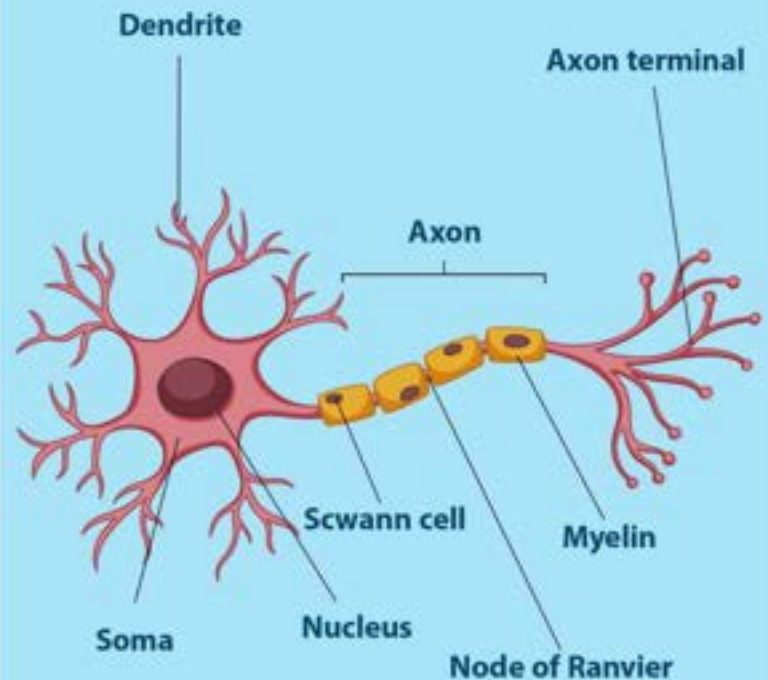
Memory Tricks

P - Puts the Brakes on the Vitals (Low heart rate & blood pressure)
 P - Poop nervous system (PNS is used for times of rest & digesting food)
Controls cholinergic effects, making more secretions in the body
Think cccholinergrics give more secccretions

Neuron Anatomy

Neuron

- **Dendrite**
 - Receives communication from other neurons
 - Sends communication to cell body(axons)
- **Cell body**
 - Site of nucleus
 - All cell functions are controlled here
- **Axon**
 - Long nerve fiber that ends at the axon terminal
- **Axon terminal**
 - End of nerve axon
 - Transmits signal to receiving axon via neurotransmitter
- **Glial Cell**
 - Capable of dividing
 - Sustains homeostasis
 - Creates myelin
 - Provides neuron support and protection



Glial Cells

Oligodendrocyte

- The main function is to produce myelin axons in the CNS

Microglia

- Major player cells of CNS immune response
- Kills bacteria

Astrocytes

- Neurons metabolic and physical support
- Stores and releases nutrition source when help is needed (hypoglycemia)

Ependymal cells

- Produces and regulates cerebrospinal fluid (CSF)

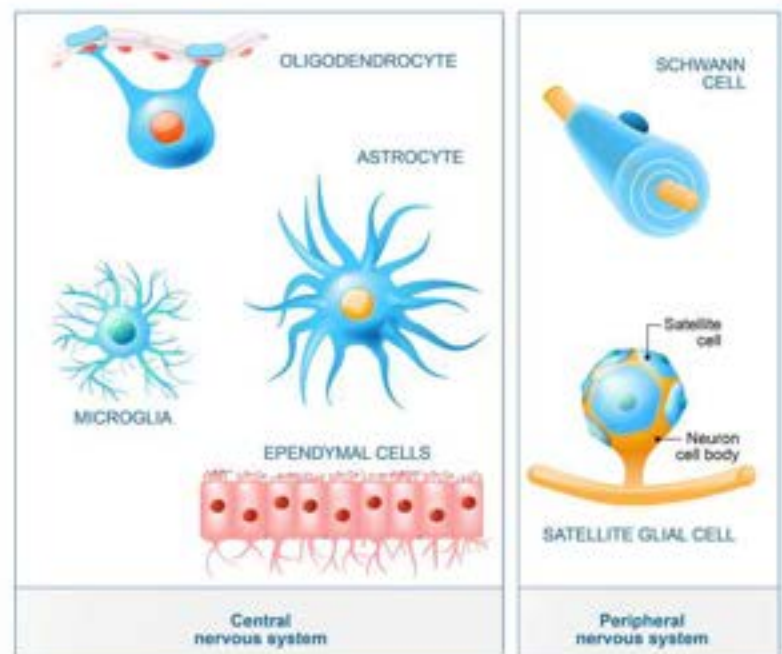
Satellite Cells

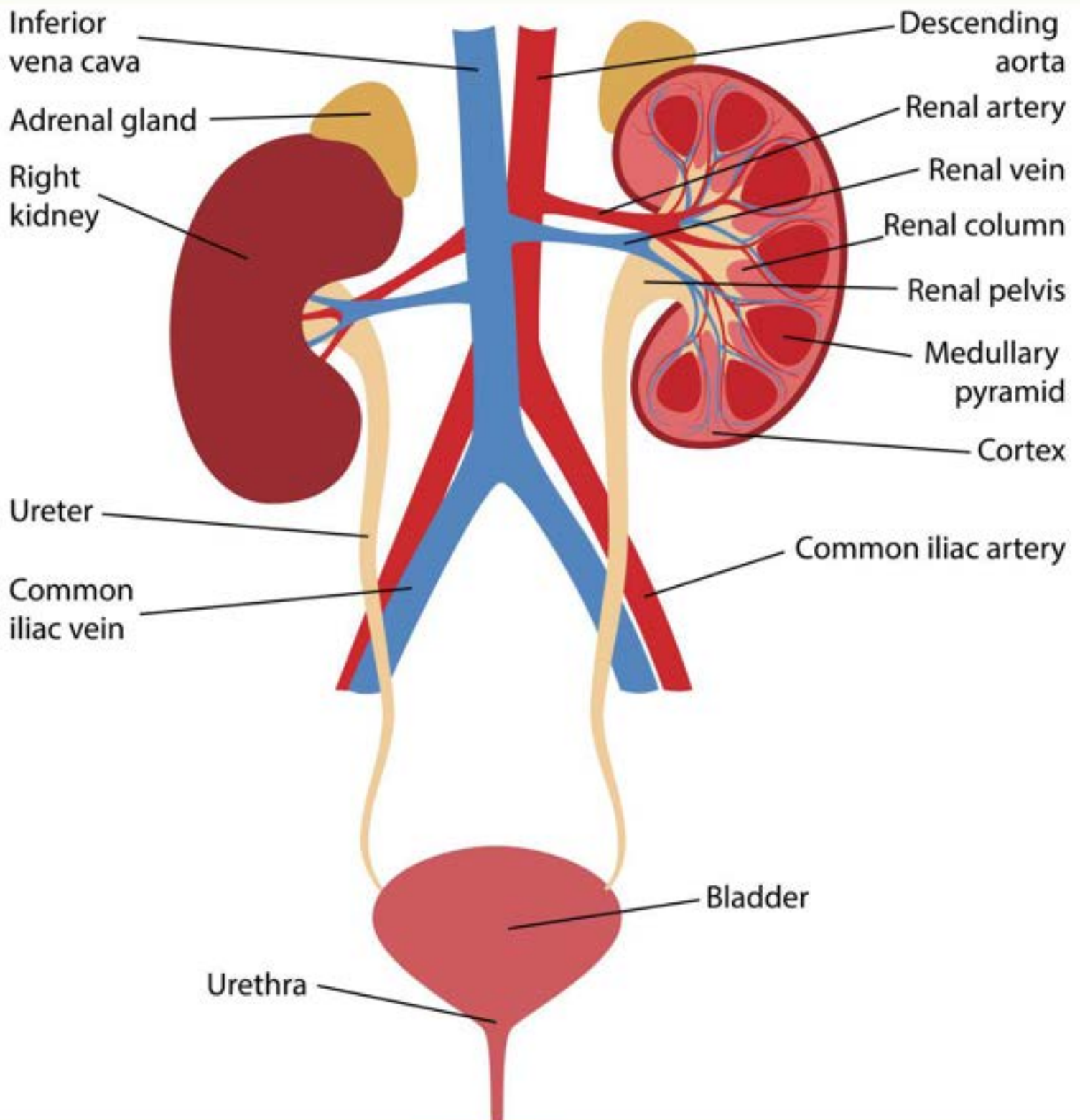
- Acts to protect and cushion cells
- Supplies nutrients to neurons nearby and contain structural function

Schwann Cells

- Required to insulate (myelin)
- Supplies nutrition to PNS neurons

Types of Neuroglia





Urinary Tract

Kidneys - Ureters - Bladder - Urethra

Functions:

- Removes waste from body
- Regulates blood volume and blood pressure
- Controls balance of blood pH

Male Reproductive Anatomy

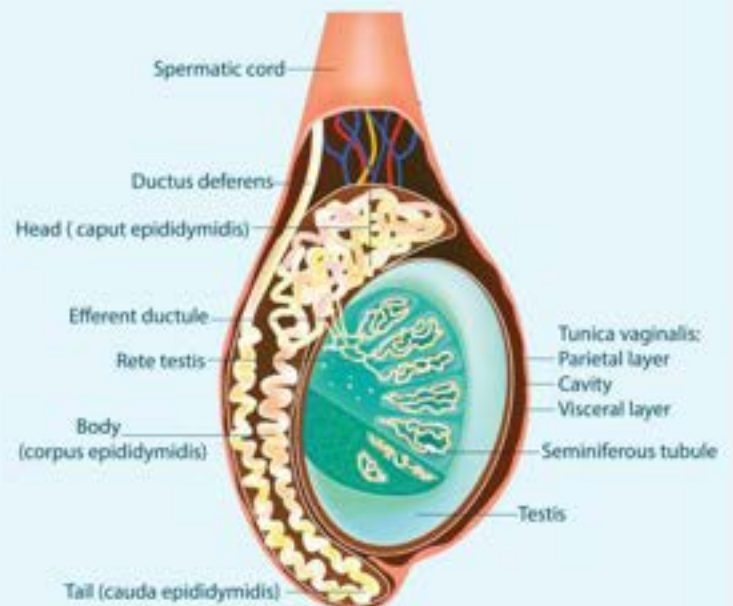
Organ	Function
Testes	<ul style="list-style-type: none"> • Generates sperm for transport • Produces the hormone testosterone
Scrotum	<ul style="list-style-type: none"> • Protects testes and controls temperature
Spermatic Ducts	<ul style="list-style-type: none"> • Carries sperm from testes to outside of urethra • Matures sperm cells
Seminal Vesicles	<ul style="list-style-type: none"> • Secretes yellow thick fluid that stores and creates the majority(70%) of semen
Prostate Gland	<ul style="list-style-type: none"> • Produces and secretes the milky substance to create about 30% of semen
Cowper's Glands	<ul style="list-style-type: none"> • Produces the creamy fluid that lubricates during sexual arousal • Provides sexual function
Penis	<ul style="list-style-type: none"> • Provides route for urination • Deposits yellow-white thick semen into vagina

Male Reproductive System

Male Reproductive Anatomy



Testes

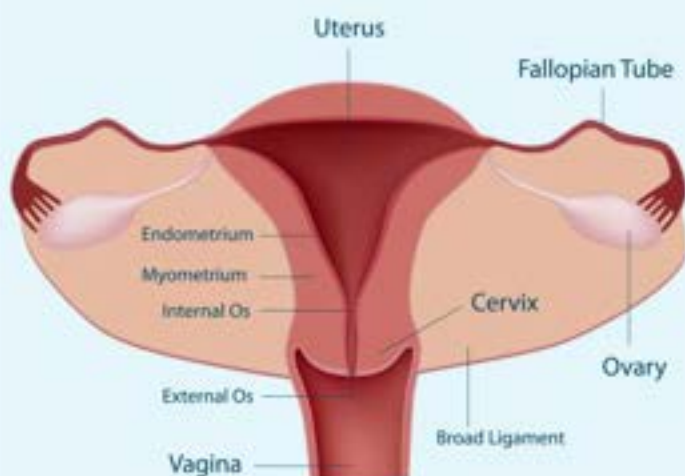


Female Reproductive Anatomy

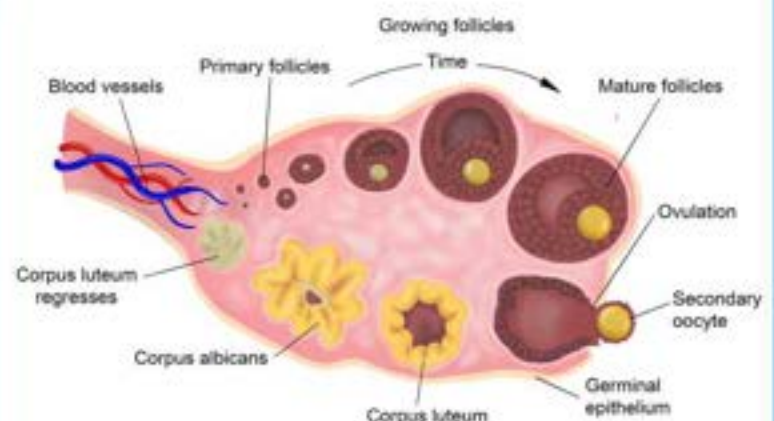
Organ	Function
Ovaries	<ul style="list-style-type: none"> • Produces mature eggs for fertilization • Delivers progesterone and estrogen to establish and maintain pregnancy
Fallopian Tubes	<ul style="list-style-type: none"> • Transports the egg from ovary to uterus
Uterus	<ul style="list-style-type: none"> • Houses fetus during gestation to delivery • Provides nutrition for fetus • During contractions, expels fetus during delivery
Vagina	<ul style="list-style-type: none"> • Pathway for blood & tissue of uterus to outside body during monthly menstrual cycle • Pathway for childbirth, sexual intercourse
Vulva	<ul style="list-style-type: none"> • External female genitalia containing erectile tissue (clitoris) • Bartholin's Glands - secrete mucus to lubricate vaginal canal • Skene's Glands - produce watery lubricant involved with sexual stimulation

Female Reproductive System

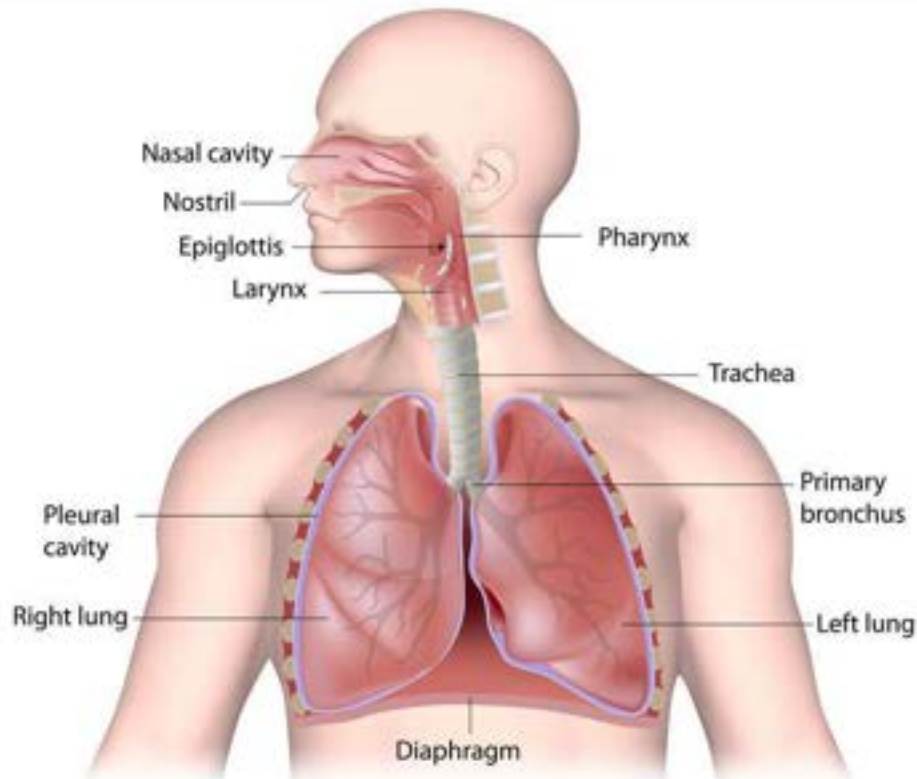
Female Reproductive Anatomy



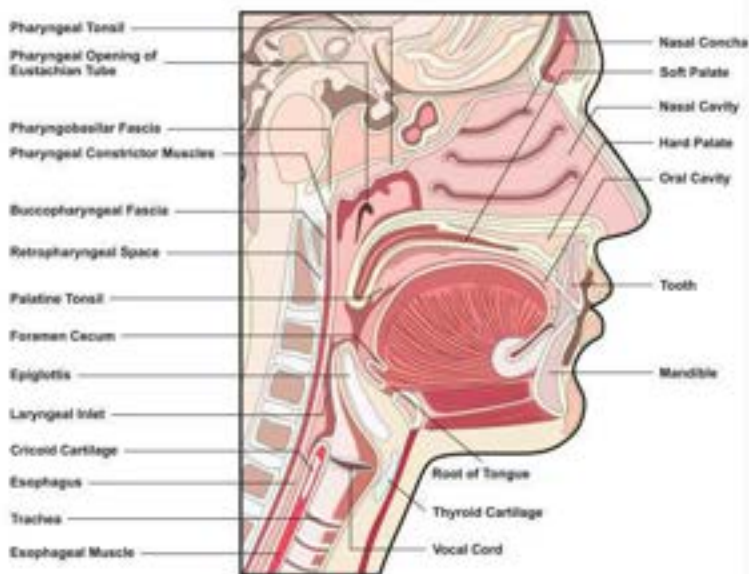
Ovary Anatomy



Respiratory Tract

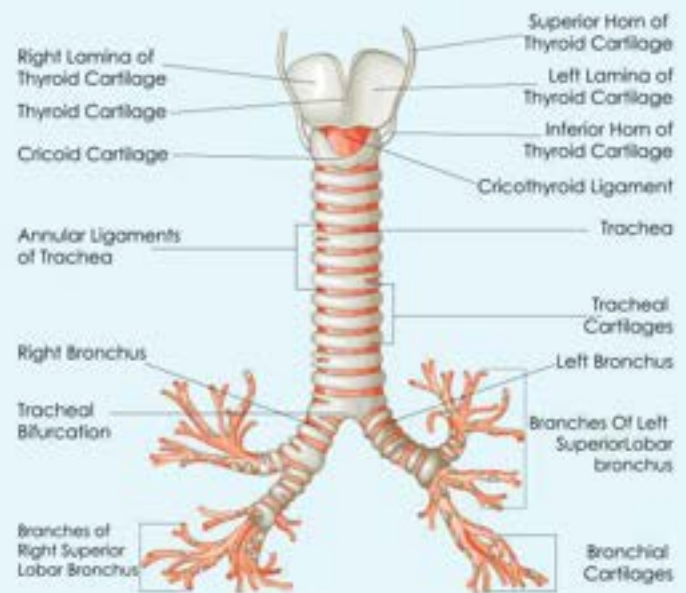


Upper Respiratory Tract



- Provides passage for breathing air in and out of lungs
- Filters air through nasal hair to trap pathogens and foreign intruders
- Involved in speaking, coughing, and swallowing

Lower Respiratory Tract



- Trachea cartilage are C-shaped rings with scattered plates in bronchi
- Separated into primary, secondary, as well as tertiary bronchi
- Then branch off into bronchioles before moving to capillaries and alveoli

Bone Classifications

Long

- Collarbone, limbs, arms, legs, hands, feet, fingers, toes

Short

- Located in wrists & ankles

Flat

- Skull bones
 - Sphenoid ethmoid
 - Frontal, parietal, temporal, & occipital
- Scapula
- Sternum
- Ribs

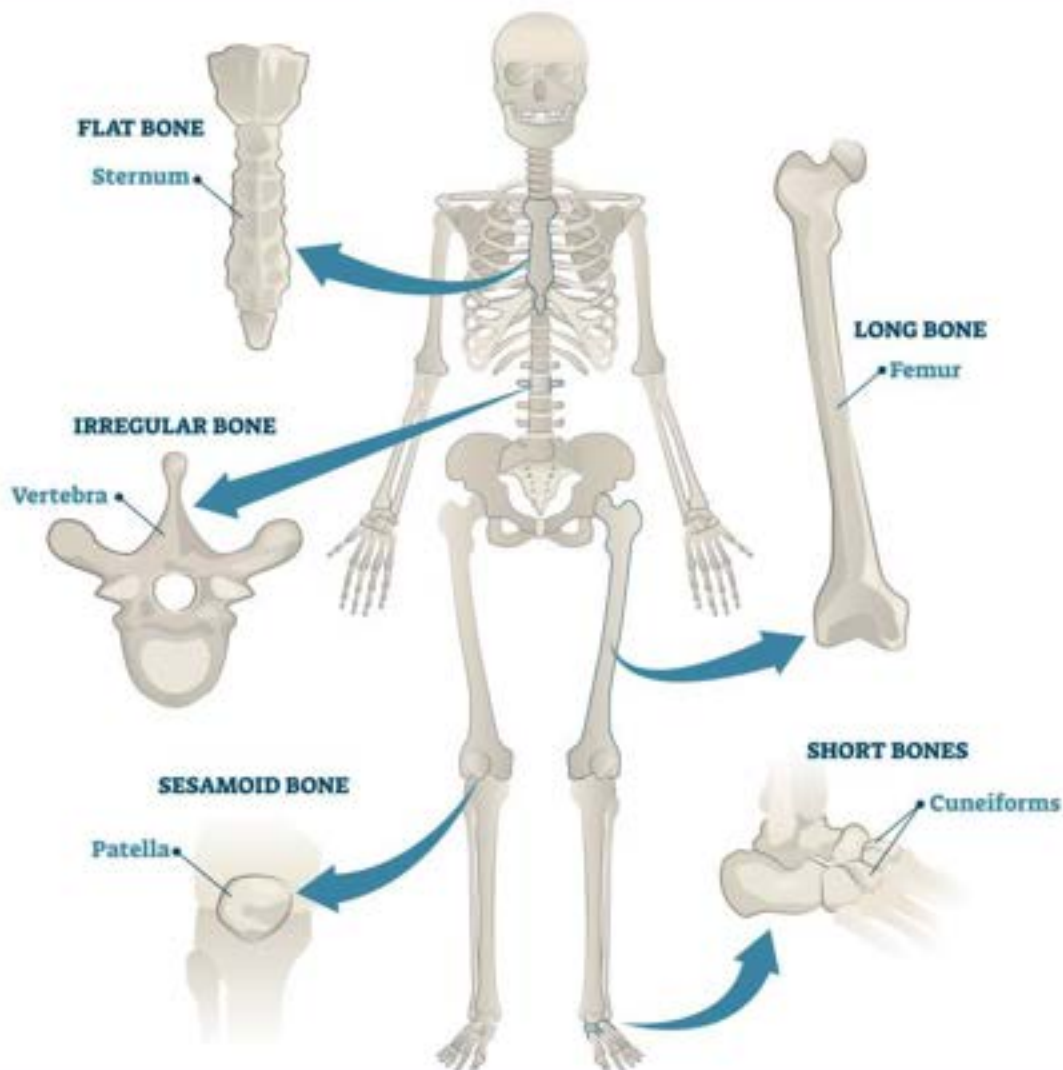
Irregular

- Spine
- Skull bones
 - Zygomatic, sphenoid, ethmoid, maxilla, palatine, nasal hyoid, mandible, & Temporal
- Vertebrae
- Pelvic bone
- Sacrum & coccyx

Sesamoid

- Embedded by tendons
 - Patella or kneecap

Types of Bones



Long Bone Anatomy

Diaphysis

- Shaft and center part of long bone
- Contains fat tissue and bone marrow
- Made of compact bones

Metaphysis

- Grows and hardens near epiphysis & diaphysis
- Supports load to surface of joint that places weight on diaphysis
- Holds growth plate that develops during childhood

Epiphysis

- Spongy end of long bone
- Covered by articular cartilage
- Forms joints through attachment to other bones

Periosteum

- Covers outer surface of bone
- Made of fibrous tissue
- Site of tendon & ligament connection to bone

Cross Section of Bone

Medullary cavity

- Innermost hollow cavity
- Stores bone marrow, both red and yellow

Trabecular bone

- Porous spongy bone
- Formed near edge of hard long bones (femur)

Compact bone

- Forms outer layer of most bones
- Produces hard shell for bones

Compact Bone Anatomy

Osteons

- Consist of mineral matrix and cylindrical structures that contain osteocytes
- Main structure of compact bone
- Contain the Haversian canal with surrounding lamellae

Haversian Canals

- Tunnel cavities containing capillaries & nerves
- Run longitudinally through bone

Volkman's Canals

- Found inside osteons
- Provide nourishment & energy to osteons
- Interconnect Haversian canals to each other
- Transfer blood vessels away from periosteum to bone

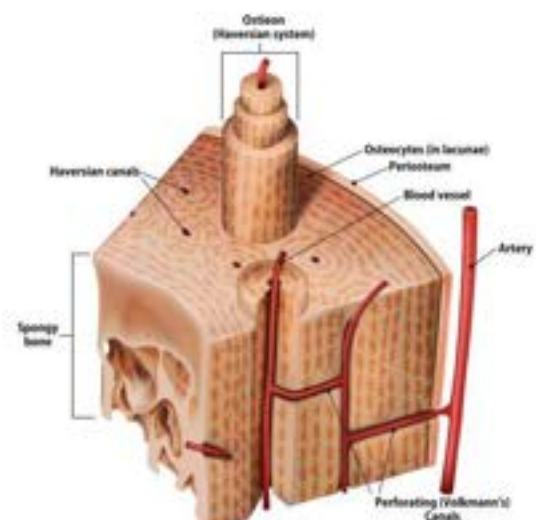
Lamellae

- Concentric layers to make osteons
- Inner & outer layer of compact bone
- Compact matrix surrounding Haversian canal

Bone Anatomy



Bone Structure



Layers

Epidermis

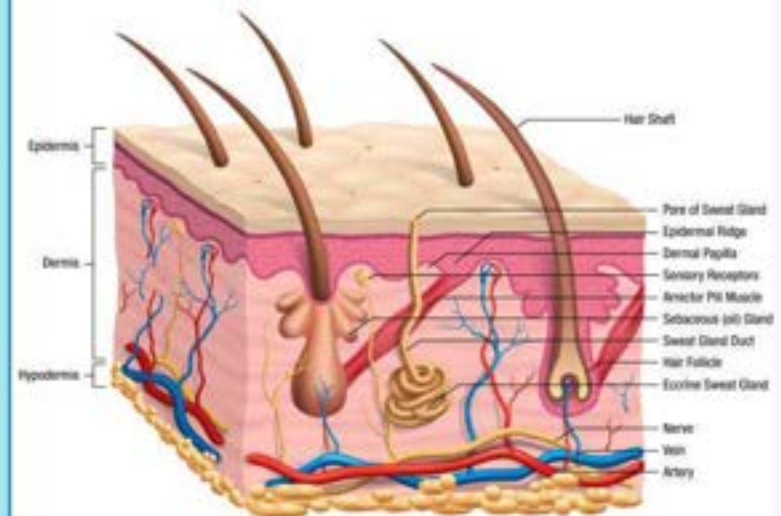
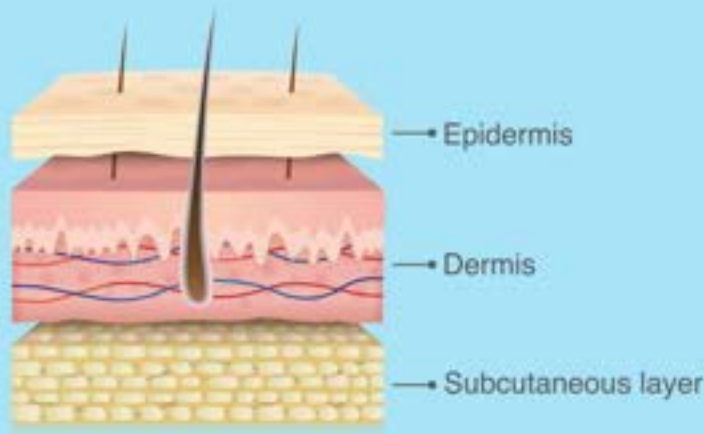
- Outermost layer composed of epithelial tissue
- Regulates water emitted from body
- Provides barrier against infection

Dermis

- Sweat glands
- Protects from stress
- Contains hair follicles
- Provides skin with elasticity
- Nerve endings for heat & touch

Subcutaneous

- Connective and adipose tissue
- Regulates body temperature & insulates
- Passage for blood vessels & nerves
- Joins skin with muscle tissue & bone



Functions

Protection

- Maintains body temperature & fluid balance
- Against infection & harm
- Against outside environment (heat - UV rays & cold)

Sensory Detection

- Senses light touch & sustained pressure by Merkel's disks
- Detects deep tissue by bulbous corpuscles
- Senses environmental changes (temperature)
- Senses pain by nociceptors

Other Functions

- Absorbs sunlight to produce Vitamin D
- Responsible for waste excretion
- Forms unique marks like birthmarks & fingerprints

Thermoregulation

- Helps to maintain core body temperature
- Limits sweat evaporation, thus loss of heat
- Regulates heat loss through vasodilation while retaining heat by vasoconstriction

Fundamentals & Health assessment

AMBULATION: BODY MECHANICS & MOBILITY

The safe practice of coordinated efforts to maintain balance, posture, and body alignment when ambulating, lifting, and moving clients.

VARIABLES THAT LEAD BACK TO INJURY

- Uncoordinated lifts
- Manual lifting
- Lifting when tired
- Repetitive lifting, transferring, repositioning and moving
- Prolonged standing

FACTORS THAT AFFECT MOBILITY

- Age
- Attitudes and family values
- Developmental level
- Neuromuscular disorders and joint disorders
- Lifestyle, stress, environment
- Mental health, medications
- Trauma to the musculoskeletal system



BODY MECHANICS ERGONOMICS

- Arrange for help prior to moving a client.
- Encourage the client to assist.
- Avoid twisting, keep back, neck, pelvis and feet aligned.
- Flex knees, keep feet wide apart.
- Position yourself close to the client or object.
- Use your arms and legs to lift, never your back.
- Slide the client towards yourself, use a pull sheet.
- Tighten abdomen and glutes before the move.
- Person bearing the brunt of the load coordinates the team on the count of three.

RANGE OF MOTION

The full movement potential of a joint, usually its range of flexion and extension.

- **Active:** Patients move their limbs by themselves without assistance.
- **Passive:** Therapist or equipment moves the joint through the range of motion with no effort from the patient.

ASSESSMENT

- **Daily activity levels:** What does your daily activity look like?
- **Endurance:** How much activity makes you tired? What are you doing when you get tired?
- **Exercise goals:** What are your exercise goals?
- **Mobility problems:** Do you have any problems when ambulating such as, pain, SOB, or other discomfort?
- **Physical or mental alterations:** Do you have any physical limitations or mental health limitations affecting your mobility?
- **External factors:** Is there anything else you can think of that may be altering your ability to ambulate?

COMPONENT	NORMAL FINDING	ABNORMAL FINDING
General ease of movement	Body movements should be voluntary, controlled, purposeful, fluid and coordinated.	Involuntary movements, tremors, tics, chorea, dystonia, fasciculations, oral or facial dyskinesias.
Gait	Head should be erect with vertebral straight, knees and feet forward, arms at side with elbows flexed, arms swing freely in alternation with leg swings, while on leg is in the stance phase the other should be in the swing phase.	Spastic hemiparesis, scissor gait, steppage gait, sensor ataxia, cerebellar ataxia, parkinsonian gait, gait of old age, use of assistive devices for ambulation
Alignment	Standing or sitting a straight line can be drawn from the ear to the shoulder and hip.	Abnormal spinal curvatures as seen in scoliosis, inability to maintain normal alignment independently.
Joint structure	Absence of joint deformities and full range of motion.	Limitation of full range of motion, increased joint mobility, swelling, heat, tenderness, crepitation, deformities.
Muscle mass and tone	Adequate mass, tone and strength to complete ADLs.	Atrophy, hypertrophy, flaccidity, spasticity, paralysis.
Endurance	Ability to turn in bed, maintain correct alignment, ambulate, and perform self care activities.	Significantly increased pulse, respirations, BP, SOB, dyspnea, weakness, pallor, confusion vertigo, pain.

Head to toe assessment

Where to start

- Introduce yourself.
- Provide privacy.
- Wash hands.
- Obtain consent.
- Assess for allergies
- Obtain psychosocial assessment

Normal Range Vitals

- **BP** 120/70 - 139/89
- **Pulse:** 60-100 bpm
- **RR:** 12-20 pm
- **Temp:** 98.6 / 37 °C
- **SpO2:** > 95%



Circulation

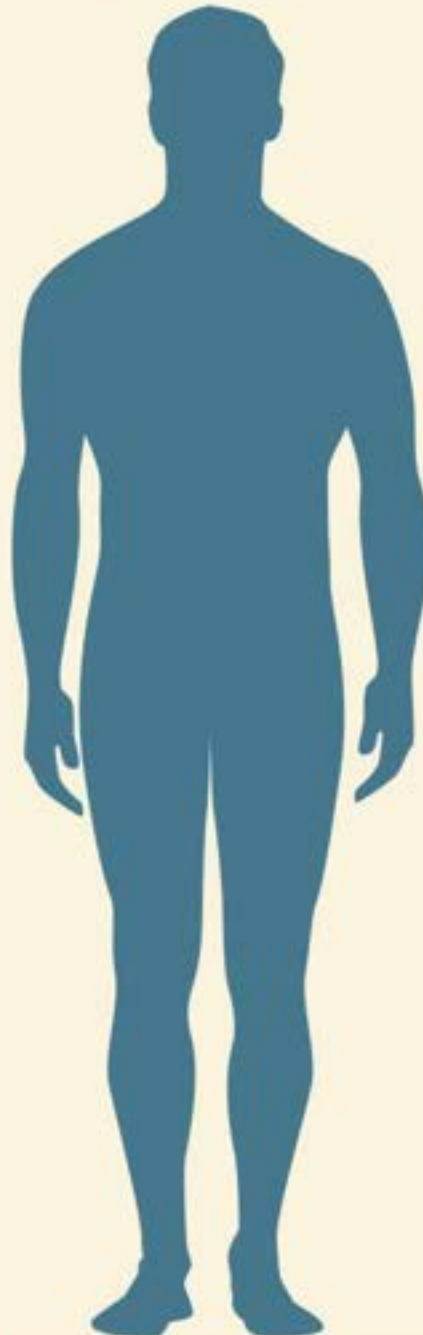
- Peripheral pulses
- **Carotid:** Never check both at the same time
- Radial
- Brachial
- Femoral
- Popliteal
- Dorsalis pedis
- Posterior tibialis

Capillary Refill

- Should be less than three seconds.

Skin Turgor

- Skin should return within three seconds.
- Skin should be warm, dry and intact.
- Temp should be equal in all extremities.



Head / neck

- **Hair:** Is it clean and well kept?
- Assess cranial nerves.
- **Eyes:** PERRLA, sclera white conjunctiva pink and moist, free off any debris or drainage.
- **Nares:** Check for patency by occluding one nare at a time.
- **Mouth:** Is the oral mucosa pink and moist, free of dental caries, and free of redness or lesions? Tongue midline.
- **Jaw and neck:** Are there swollen or painful lymph nodes?

Chest

- **Heart:** "All Pigs Eat Too Much"
A - Aortic
P - Pulmonic
E - Erb's Points
T - Tricuspid
M - Mitral
- **Lungs:** RR should be even & unlabored.
- **Breast:** Check for lumps, drainage, nipple size or color.



Abdomen

- **Bowel sounds:** You should hear sounds in all four quads. If no sounds listen for five minutes. Inspect, auscultate, auscultate, percuss, then palpate and document as active, hyperactive or hypoactive.
- **Shape:** Belly should be flat, no pulsating, and even.

Do they complain of pain upon palpation?



Range of motion in all joints & Deep tendon reflexes

- **Please note that not all programs teach DTR and CN and Breast exams. Please see your school manual and state's practice act.**

Patho

Nociceptors: Pain receptors on nerve endings that respond selectively to painful stimuli.

Nociception: The transmission of pain.

Chemical substances: some increase pain sensitivity some decrease pain sensitivity.

Cox 1: Mediates prostaglandin formation, platelet

formation, provides gut protection from ulcers.

Cox 2: Present in inflammation, pain and fever.

Inhibition will reduce symptoms of fever inflammation and pain. Inhibits substance P.

Decrease pain sensation: Endorphins and enkephalins, act as endogenous opioids.

Factors that influence pain

- Past experience.
- Anxiety: decreases pain threshold.
- Depression: decreases pain threshold.
- Age.
- Gender.
- Culture: different cultures respond to pain differently based on what they were taught to be appropriate.



Types of pain

Chronic: Persistent malignant pain that lasts longer than six months.

Acute pain: Sudden onset of pain, specific to injury. Lasts from seconds to six months.

Effects of pain

Acute: Increased cardiac output, impaired insulin response, immune suppression, increased cortisol production, and increased fluid retention.

Chronic: Immune suppression, depression, disability, fatigue, anger, inability to perform ADLs.



Pharmacologic treatments

Non opioids

- **NSAIDs:** Mild pain. Ketorolac, ibuprofen.
- **Acetaminophen:** Can cause hepatotoxicity can be given with NSAIDs.
- **Ofirmev:** IV acetaminophen, newly approved for short term use IV piggyback.

Opioids

- Tramadol
- Tylenol 3
- Meperidine
- Propoxyphene with tylenol
- Oxycodone
- Fentanyl
- Morphine
- Dilaudid



Other

- PCA pump
- PRN medications
- Multi modal: use of one or more drug
- Routine admin: admin around the clock
- Topical
- Local anesthesia
- Intraspinal

Non-pharmacologic treatments

- Cutaneous stimulation: TENS machine
- Massage
- Thermal therapies: Heat and cold
- Distraction
- Relaxation
- Guided imagery
- Hypnosis
- Music therapy
- Alternative therapy: Acupuncture

Focused pain assessment

- **Scale:** 0-10
- **Timing:** When did the pain start, what was happening when it started?
- **Location:** Where is the pain? Is it radiating?
- **Duration:** How long have you had the pain?
- **Quality:** Is it dull, sharp, or stabbing?
- **Aggravating and alleviating factors:** What makes it worse? What makes it better?

FUNDAMENTALS: POSITIONING

To ensure client comfort and safety, while preventing complications related to the client's condition, treatment, or procedure.

Fowler's position

Includes semi fowler's position which is between 30-40 degrees and high Fowler's which is 90 degrees.

What am I?

A position in which the head and trunk are raised 40-90 degrees.

Indications

Cardiac issues, SOB, or NG tube.



Lateral

Can be right or left sided.

What am I?

Right lateral means the right side of the patient is touching the bed, left lateral indicates the left side of the patient is touching the bed.

Indications

GI issues, and rectal surgery.



Lithotomy

Most commonly seen in OB.

What am I?

Patient is lying flat on their back with knees elevated and hips level, often supported by stirrups.

Indications

Gynecological procedures and childbirth.



Sim's Position

A prone/lateral.

What AM I?

A position in which the patient lies on his side with his upper leg flexed and drawn in towards the chest, and the upper arm flexed at the elbow.

Indications

Administering enemas, perineal examinations, and for comfort in pregnancy



Prone

On your tummy.

What am I?

The patient lies on his stomach with his back up. The head is typically turned to one side.

Indications

Drainage of the mouth after oral or neck surgery. It also allows for full flexion of knee and hip joints.



Supine

You're on your spine.

Supine is considered the most natural "at rest" position.

What am I?

A position where the patient is flat on his back.

Indications

Used in surgery for abdominal, facial, and extremity procedures.



Trendelenburg

"Upside Down."

What AM I?

This position involves a supine patient and sharply lowering the head of the bed and raising the foot.

Indications

Used to treat hypotension, during gynecological and abdominal hernia surgeries, and for placement and removal of central lines.



Reverse Trendelenburg

What am I?

Patient is in the supine position with the head of the bed elevated and the foot of the bed down.

Indications

Used in surgery to help promote perfusion in obese patients. It can also be helpful in treating venous air embolism and preventing pulmonary aspiration.



4 POINTS FOR NCLEX-RN SAFETY AND INFECTION CONTROL

- #1 Standard Precautions
- #2 Contact Precautions
- #3 Droplet Precautions
- #4 Airborne Precautions

DROPLET PRECAUTIONS: SURGICAL MASK WITHIN 3 FEET OF PATIENT

S: Scarlet fever, strep
P: Pertussis, parvovirus,
I: Influenza
D: Diphtheria
E: Epiglottitis
R: Rubella
M: Mumps, meningitis, mycoplasma, meningococcal pneumonia
AN: Adenovirus

- Pharyngeal Diphtheria
- Epiglottitis, (caused by Haemophilus influenzae type b)
- Flu (**contact and droplet**)
- Meningococcal Disease: Meningitis
- Mumps (infectious parotitis)
- Mycoplasma Pneumonia
- Parvovirus B19 (erythema infectiosum or 5th disease)
- Adenovirus (contact and droplet)
- Streptococcal pharyngitis
- Whooping Cough (pertussis)
- Rhinovirus
- Scarlet fever
- Rubella (German Measles)

PPE FOR STANDARD PRECAUTIONS

- Gloves - Use when touching blood, body fluids, secretions, excretions, contaminated items; for touching mucous membranes and non-intact skin
- Gowns - Use during procedures and patient care activities when contact of clothing/exposed skin with blood/body fluids, secretions, or excretions is anticipated



AIRBORNE PRECAUTIONS: N95 respirator

M: Measles
T: TB
V: Varicella

- Chickenpox (varicella) (Airborne and Contact)
- Herpes Zoster (Varicella Zoster(disseminated) Shingles (Airborne and Contact)

CONTACT PRECAUTIONS: Gown and gloves for contact with patient or environment of care (e.g., medical equipment, environmental surfaces)

- In some instances these are required for entering the patient's environment

M: Multidrug resistant organism
R: Respiratory infection
S: Skin infections
W: Wounds
E: Enteric c-diff
E: Eye infection



- Medication-Resistant Organisms: MRSA, VRE.
- Diarrhea infections or of unknown origin: C.diff, norovirus, rotavirus...USE SOAP AND WATER FOR HANDWASHING, NOT hand-sanitizer.
 NOTE: Hepatitis A. (if patient is diapered or incontinent pt)...remember it is spread through stool
- Skin infection: impetigo, lice, scabies, herpes simplex, chickenpox (airborne and contact), skin diphtheria, shingles (airborne and contact)
- Wound infections with excessive drainage or staphylococci
- Pulmonary infections: RSV, parainfluenza
- Eye infection: conjunctivitis

STERILE TECHNIQUE

Purpose: Sterile technique is performed to drastically reduce and hopefully eliminate the threat of bacteria being introduced into a wound, or catheter site, thus reducing the risk for post procedure infections, also called Nosocomial infections, "meaning hospital acquired."

Assessment

- Assess the need to perform the procedure.
- Assess the site you will be working on for presence of current infection.
- Assess for latex allergies, iodine or adhesive allergies.
- Assess pain level, and administer analgesia 30-45mins prior to the procedure for client comfort.

Risks

- Risk for infection.
- Risk for impaired tissue integrity.
- Risk for pain.
- Risk for hypersensitivity reaction

Education

- Educate the client to practice good hygiene.
- Educate the client to ask for analgesia before the pain becomes unbearable.
- Educate the client on the signs and symptoms of infection and when to notify the HCP.

Procedure

- Check expiration date on package and perform hand hygiene.
- Open the kit with the special flap so that you are opening your kit away from you.
- Pinch the other sections on the outside, and pull them back gently. DO NOT touch the inside. Everything inside the pad or kit is sterile except for the 1-inch border around it.
- Throw the wrapper away.
- Get sterile gloves ready
- Wash your hands again the same way you did the first time. Dry with a clean paper towel.
- If the gloves are in your kit, pinch the glove wrapper to pick it up, and place it on a clean, dry surface next to the pad.
- If the gloves are in a separate package, open the outer wrapper and place the open package on a clean, dry surface next to the pad.
- Put your gloves on carefully.
- Wash your hands again the same way you did the first time. Dry with a clean paper towel.
- Open the wrapper so that the gloves are laying out in front of you. But DO NOT touch them.
- With your writing hand, grab the other glove by the folded wrist cuff.
- Slide the glove onto your hand.
- Leave the cuff folded. Be careful not to touch the outside of the glove.
- Pick up the other glove by sliding your fingers into the cuff.
- Slip the glove over the fingers of this hand. Keep your hand flat and do not let your thumb touch your skin.
- Both gloves will have a folded-over cuff. Reach under the cuffs and pull back towards your elbow.
- Once your gloves are on, do not touch anything except your sterile supplies. If you do touch something else, remove the gloves, wash your hands again, and go through the steps to open and put on a new pair of gloves.

Supplies

- Sterile kit
- Running water and soap
- Gloves (sometimes these are in your kit)
- A clean, dry surface
- Clean paper towels



Documentation

- Date and time of procedure.
- Type of procedure.
- Any fluids or exudate on the site you are working with. Also note color of exudate or fluids, amount, and if there is any odor.
- Follow hospital policy on dating, timing and initialing dressing, specimen, or catheter site.
- Document the client's tolerance to the procedure.

VITALS



VITAL SIGN	NORMAL	LOCATION	CAUSE FOR ALTERATION	CLASSIFICATION
Pulse	60-100 BPM	Radial, carotid, brachial, femoral, popliteal, dorsalis pedis, posterior tibialis.	Exercise, increased or decreased cardiac output, fluid volume alterations.	Absent, weak, normal, increased, bounding.

VITAL SIGN	NORMAL	LOCATION	CAUSE FOR ALTERATION	CLASSIFICATION
Respirations	12-20 BPM	Anterior (chest) and posterior (back)	Acid base balance, activity, fluid volume alterations.	Normal, adventitious, absent, diminished.

VITAL SIGN	NORMAL	LOCATION	CAUSE FOR ALTERATION	CLASSIFICATION
BP	Below 120 and below 80	Brachial, radial, popliteal, posterior tibialis.	Acid base balance, activity, fluid volume alterations. Infection, alterations in cardiac output	Systole: Max contraction of the left ventricle. Diastole: Pressure of resting ventricles.

VITAL SIGN	NORMAL	LOCATION	CAUSE FOR ALTERATION	CLASSIFICATION
Temperature	98.6 / 37 °C	Temporal, rectal, oral, axillary	Infection, alterations in fluid balance, hyper/hypothermia, metabolism, thyroid disease.	Febrile, afebrile



ADVENTITIOUS BREATH SOUNDS	DESCRIPTION
Crackles	Crackles can sound like salt dropped onto a hot pan or like cellophane being crumpled or like velcro being torn open.
Rhonchi	Rhonchi are continuous low pitched, rattling lung sounds that often resemble snoring.
Wheezes	Wheezes are continuous, coarse, whistling sound(s) produced in the respiratory airways during breathing. For wheezes to occur, some part of the respiratory tree must be narrowed or obstructed, or airflow velocity within the respiratory tree must be heightened.
Diminished/Absent	Absent or decreased sounds can mean: Air or fluid in or around the lungs (such as pneumonia, heart failure, and pleural effusion).

O ₂	LEVEL OF HYPOXIA
95-100%	Normal
91-94%	Mild hypoxia
86-90%	Moderate hypoxia
<85%	Severe hypoxia

WOUND CARE: WET TO DRY DRESSING CHANGE



PURPOSE

To maintain skin integrity, to prevent infection, provide comfort, maintain a moist environment, remove necrotic tissue if appropriate, and prevention of complications associated with injury or surgery.

ASSESSMENT

- ❖ Assess the wound for color, excoriation, order, exudate or drainage, sinus tracts to tunneling.
- ❖ Assess client's pain level and administer analgesia 30-45 minutes prior to dressing change.
- ❖ Assess for allergies to latex, adhesive and iodine.

RISKS

- ❖ Risk for infection.
- ❖ Risk for impaired tissue integrity.
- ❖ Risk for pain.
- ❖ Risk for hypersensitivity reaction.

EDUCATION

- ❖ Educate the client to practice good hygiene.
- ❖ Educate the client to ask for analgesia before the pain becomes unbearable.
- ❖ Educate the client on the signs and symptoms of infection and when to notify the HCP.

PROCEDURE

Dressing removal

- ❖ Perform hand hygiene.
- ❖ Put on a pair of non-sterile gloves.
- ❖ Carefully remove the tape.
- ❖ Remove the old dressing. If it is sticking to your skin, wet it with warm water to loosen it.
- ❖ Remove the gauze pads or packing tape from inside the wound.
- ❖ Measure the wound in diameter and depth, also note any tunneling and sinus tracts. Document these findings.
- ❖ Put the old dressing, packing material, and your gloves in a plastic bag.

Wound irrigation

- ❖ Put on a new pair of clean gloves.
- ❖ Use a clean, sterile gauze to gently clean the wound with warm water and soap. From the top of the wound to the bottom of the wound and outward from the incision in lines parallel. Wipe from the clean area to less clean area.
- ❖ Gently irrigate wound from top to bottom.
- ❖ Check the wound for increased redness, swelling, or a bad odor.
- ❖ Pay attention to the color and amount of drainage from your wound. Look for drainage that has become darker or thicker.
- ❖ After cleaning your wound, remove your gloves and put them in the plastic bag with the old dressing and gloves.
- ❖ Wash your hands again.

Dressing replacement

- ❖ Put on a new pair of non-sterile gloves.
- ❖ Pour saline into sterile container. Place gauze pads and any packing tape you will use in the container.
- ❖ Apply barrier cream.
- ❖ Squeeze the saline from the gauze pads or packing tape until it is no longer dripping.
- ❖ Place the gauze pads or packing tape in the wound. Carefully fill in the wound and any spaces under the skin.
- ❖ Cover the wet gauze or packing tape with a large dry dressing pad. Use tape or rolled gauze to hold this dressing in place.
- ❖ Put all used supplies in the plastic bag. Close it securely, then put it in a second plastic bag, and close that bag securely. Put it in the trash.
- ❖ Time, date and initial new dressing.
- ❖ Wash your hands again when you are finished.
- ❖ Document.

DOCUMENTATION

- ❖ Date and time dressing change was performed.
- ❖ Why you changed the dressing.
- ❖ Document dressing assessment and wound location.
- ❖ Color, odor, exudate, drainage.
- ❖ Document size of the wound, any tunneling, or sinus tracts, and approximation.
- ❖ Document pain assessment before and after dressing change.



DEBRIDEMENT

- ❖ **Mechanical:** Done during hydrotherapy, with washcloths or sponges to remove eschar. May include wet to dry dressing changes. Painful and may cause bleeding.
- ❖ **Enzymatic:** Application of a topical enzyme ointment such as santyl directly on the wound to remove necrotic tissue.
- ❖ **Surgical:** Excision/ removal of eschar and necrotic tissue, via surgery in a sterile OR.
- ❖ **Tangential:** Excising very thin layers of necrotic skin until bleeding occurs.
- ❖ **Fascial:** Necrotic tissue is removed down to the superficial fascia, usually reserved for very deep and severe burns.



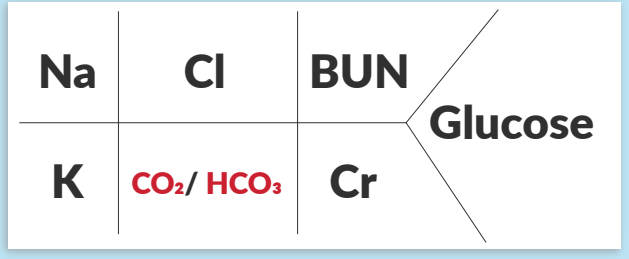
Labs

Labs

BMP Panel & Electrolytes

BMP Basic Metabolic Panel

Sodium (Na+)	Swells the body
Potassium (K+)	Potassium pumps the heart muscles
Chloride (Cl-)	Helps to maintain acid base balance
CO2 (Carbon Dioxide)	Helps to maintain acid base pH balance (too much can put the body in Acidosis) Memory trick: Carbon DiACID
HCO3 (Bicarbonate)	Pushes the body into an alkalotic state Memory trick: Bicarb Base
BUN & Creatinine	2 labs for 2 kidneys. High BUN over 20, usually means dehydration. Creatinine over 1.3 = Bad Kidney (kidney injury)
Glucose	70 - 110 Normal Hyperglycemia (over 120) usually clients with uncontrolled diabetes, Hypoglycemia (60 or less) brain will DIE! Very deadly



Electrolytes Labs

K+ 3.5 - 5.0 mEq/L

P

Potassium

P

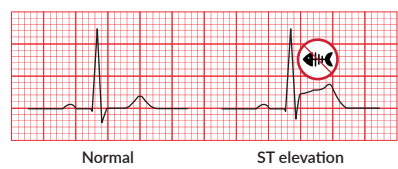
Priority

P

Pumps the heart

NCLEX TIP
LAB: High or Low Potassium (K+) 3.5-5.0 (normal)

HIGH Potassium (5.0+)
HIGH Pump
Peaked T waves, ST elevation



LOW Potassium (Below 3.5)
LOW Pump
Flat T wave, ST depress, U wave



Treatment

Hyperkalemia

- PHARMACOLOGY FOR HIGH K+**
1. IV Calcium Gluconate = Dysrhythmias
 2. IV 50% Dextrose + Regular INSulin
 3. Kayexalate (polystyrene sulfonate)
 4. Dialysis

Hypokalemia

- Potassium IV (Normal 3.5-5.0)**
1. First Action = Heart monitor
 2. Never push = **DEATH**
 3. Only 10-20 mEq MAX per HOUR IV!!! (IV Pump)
 4. Slow infusion (if arm burns)

Common NCLEX Question

Patient with chronic kidney disease missed 3 dialysis sessions... **potassium level of 8.1** ... **wide QRS complexes, heart rate of 58** & lethargy. Which order should the nurse implement first?

- 1. IV 50% Dextrose & regular insulin
- 2. Sodium polystyrene sulfonate
- 3. Hemodialysis
- 4. IV calcium gluconate

End stage renal disease... **potassium 7.2**, BUN 35, **creatinine of 3.8**, and urine output of 300 ml in 24 hours. Which order is the **PRIORITY**?

- 1. IV Regular insulin R & 50% Dextrose
- 2. IV loop diuretic
- 3. Dialysis
- 4. Put in for vacation time?

Na 135 - 145 mEq/L

S

Sodium

S

Swells the body with FLUID

Na 135 - 145 mEq/L

Low Sodium - Low & Slow

- "Mental Status change" = **PRIORITY**
- Seizures & Coma
- Respiratory Arrest

HIGH sodium = Big & Bloated

- Edema (swollen body)
- Increased muscle tone
- Flushed "red & rosy" skin

Ca 9.0 - 10.5 mEq/L

C

Calcium

C

Contracts the muscles

Ca 9.0 - 10.5 mEq/L

Low calcium

- Diarrhea
- 2 dance moves:
- **T & C**
 - **T** - Trousseau's
Twerking arm when BP cuff on
 - **C** - Chvostek's
Cheek smile when stroking face

HIGH Calcium

- Stones, moans & groans
- Kidney Stones
- Constipation

T

Trousseau's
Twerking arm when BP cuff on

C

Chvostek's
Cheek smile when stroking face

Mg+ 1.3 - 2.1 mEq/L

M

Magnesium

M

Mellows the muscles

Mg+ 1.3 - 2.1 mEq/L

Low magnesium

- Torsades De Pointes & V Fib! **NCLEX TIP**
- Hyperreflexia
- Increased DTR

HIGH magnesium

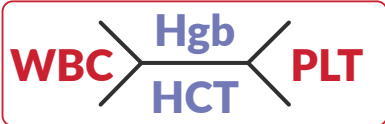
- Decreased DTR
- Hyporeflexia

Torsades de pointes

Ventricular Fibrillation

Labs II

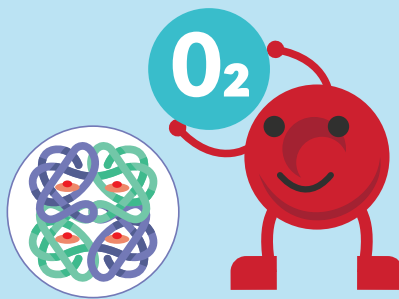
CBC - Complete Blood Count



White Blood Cells (WBC)	Immunity - the defense system of the body to fight infection. Normal: 5,000 - 10,000
Hemoglobin & Hematocrit (H & H)	The whole blood in the blood vessels. Hemoglobin: oxygen carriers on the red blood cells. Hematocrit: the ratio of RBC & total blood volume.
Platelets (PLT)	Blood clotting proteins that help to stop bleeding by forming scabs, but also creates blood clots which can KILL! MEMORY TRICK: Platelets Pl ug the bleeding

Hemoglobin

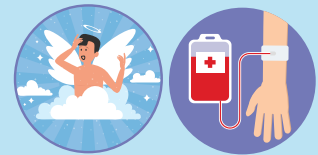
- Normal: 12 - 18
- Risky: 8 - 11
 - REPORT to HCP & Surgeon (if before surgery)
 - Bleeding & Anemia**
 - Malnutrition, Cancers
- Below 7 = Heaven or blood transfusion**
 - Top S/S: NCLEX TIP**
 - Pale skin: pallor, dusky skin tones
 - Cool clammy skin
 - Fatigue, Weakness



Normal 12 - 18

Risky 8 - 11

Below 7



Hematocrit - hemato creek



Hematocrit

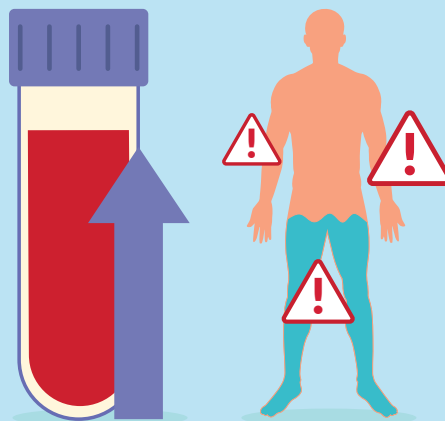
- Normal: 36 - 54%
- Elevated Hct = Dehydration
- Decreased Hct =
 - Fluid Volume Overload
 - Bleeding, Anemia, Malnutrition

H/H: Ratio

1/3 ratio	12/36 ratio	18/54 ratio
1:3	12:36	18:54

RBC - Red blood cell count

- 4 - 6 million
- Low = Anemia, Renal Failure
 - Iron (Fe+)
 - Erythropoietin
- High = Dehydration
 - High Labs = Dry body

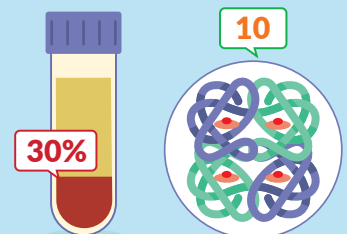


Saunders's

Client with gastrointestinal (GI) bleeding... laboratory results **hematocrit level of 30%**. Which action should the nurse take?

- Report the abnormally low level

Abnormally low level



Labs III

WBC's & Coagulation Panel

WBC - White Blood Cells

1. WBC Total Count

Normal: 5,000-10,000

- Higher = Leukocytosis
 - Infection (Sepsis)
 - Steroids (prednisone)
- Low = "Leukopenia"
 - Chemotherapy
 - Radiation - Bone Marrow Suppression
 - Immunosuppressant Drugs
 - Lupus - Autoimmune Diseases

Neutropenic precautions:

- Low Grade Fever = Priority
- Private Room
- No fresh fruits / flowers
- Avoid crowds & sick people
- NO drinking water pitcher or sitting out

2. CD4 Count

Norm: **Over 200**

- Below = AIDS (active form of HIV)



PRIORITY

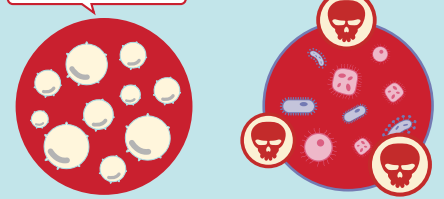


Common Exam Question

Which blood laboratory test results should the nurse **report to the HCP?**
Select all that apply

- 1. Hemoglobin 6 g/dL
- 2. Potassium 6.5 mEq/L
- 3. Sodium 150 mEq/L
- 4. White blood cells, 2,000 mm³
- 5. Platelets 45,000 mm³

5,000 - 10,000



Coagulation Panel

PLATELETS

150k - 400k



PTT

30 - 40

HeParin
46 - 70



INR

0.9 - 1.2

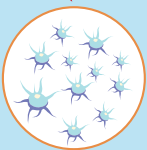
WarfarIN
2 - 3



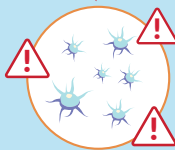
Never be more than these max ranges!



<150k



<50k



NCLEX

SAFETY FIRST!

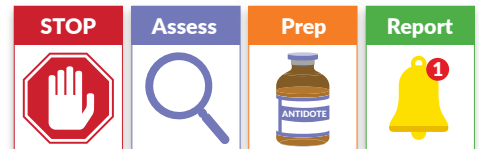
Focus on things that **WILL KILL** the patient **FIRST!**



NCLEX Question

Client is on Warfarin with an INR of 4.5 ...
Client on Heparin PTT of 100

- 1. Stop or Hold drug
- 2. Assess - bleeding
- 3. Prep antidote
- 4. Report to HCP



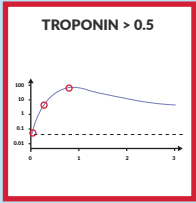
Notes

Labs IV

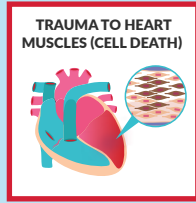
Cardiac Labs & Acid Base ABG

Cardiac Labs

T



T



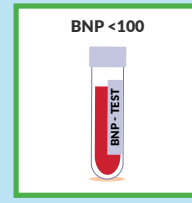
MI (myocardial infarction)

- T - Troponin Over 0.5
- T - Trauma to heart muscles

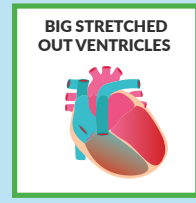
CHF (Congestive Heart Failure)

- B - BNP - Under 100
- B - Big stretched out ventricles

B



B



Acid Base ABG

	pH	A	7.35	B	7.45
Carbon Di-ACID	PaCO₂	B	35	A	45
Alkalosis (Base)	HCO₃	A	22	B	26

Acid "acidosis" pH Base "alkalosis"

Acidotic **NORMAL pH** **Alkalotic**

7.35 pH ↓ 7.35 pH ↔ 7.45 pH 7.45 pH ↑

Respiratory Acidosis = Low & Slow breathing

- Alcohol intoxication **Most Tested**
- Overdose (Low & slow RR)
- Opioids / Benzos (diazepam)
- **C - COPD**
- **C - CO₂ retained**
- Sleep apnea
- Head trauma

Treatment: Hyperventilation, pursed lip breathing to blow off the CO₂
 "Panting like a dog will put you into Alk alk alkalosis"

Kaplan Question

Cause for respiratory alkalosis?

- Hyperventilation

PaCO₂ 35 - 45



Respiratory ALKalosis = FAST breathing

- A - Anxiety Attack (Hyperventilation)
- A - Alkalosis
- **Treatment:** Breathing into a paper bag - slow down breathing & retain CO₂

Severe Acidosis = Hypercapnic respiratory failure

- **Example:**
Client with a **Ph of 6 & CO₂ of 65**
- **Treatment:**
 1. **HyperCap** = Give BiPAP
 2. Intubate & ventilate



Hypoxia earliest sign

Mental Status changes:

1. **Restlessness**
2. Confusion
3. Agitation

PaO₂ 80 - 100%

HIGH CO₂ HyperCapnic

Metabolic ALKalosis

- Vomiting
- NGT suction

Metabolic Acidosis:

- Diarrhea
- Renal Failure

Labs V

Highest Priority - Safety

Who to see first

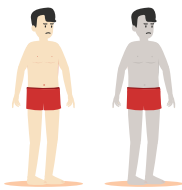
ABCs

Airway, Breathing = Oxygenation

- Low PaO₂ norm: 80 - 100
- High CO₂ **OVER 45**
- Mental changes:** Restless, agitation
- Skin:** Pale, dusky, cool & clammy

Circulation

- Bleeding - High PTT / INR
- Shock - Severe low BP
- Chest pain (any kind)
- HTN crisis (over 180 sys)



PTT & INR

Infection

- Priority: Less than 5,000 WBC "Leukopenia"

Kidney Labs

- Creatinine **OVER 1.3** = Bad kidney!

Pain

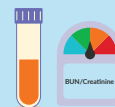
- Lose life or limb**
 - Chest Pain = #1 priority
 - Compartment Syndrome
 - Cast / broken limb pain
- = **Unrelieved with pain meds**

PRIORITY



< 5000
Leukopenia

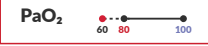
Creatinine > 1.3



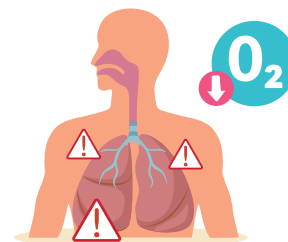
ABGs (not pulse oximeter)

- PaO₂: 80 - 100 normal **60 or less**
= HypOXemic Respiratory failure **LOW O₂**
- PaCO₂: 35 - 45 **50 or MORE**
= HyperCapnic Respiratory failure **HIGH CO₂**
 - HyperCap = Give BiPAP
 - Intubate & ventilate

Abnormal blood gases (ABGs)



ABG	HCO ₃	pCO ₂	pH
Respiratory Acidosis	Normal	↑	↓
Respiratory Alkalosis	Normal	↓	↑



Bleeding

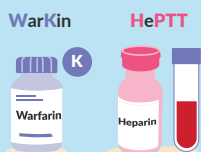
- INR - Over 4
- aPTT - Over 100

- STOP / Hold drug
- Assess - bleeding
- Prep antidote
 - Warfarin - Vitamin K
 - Heparin - Protamine Sulfate
- Report to HCP

INR > 1.3 aPTT > 100



Memory tricks



Infection

- Priority: Less than **5,000 WBC** "Leukopenia"

Low Grade FEVER = KILL!

- Immunocompromised
- Chemotherapy
- Taking Immunosuppressants

PRIORITY



< 5000
Leukopenia

Low Grade **FEVER <100.4 F**



Common NCLEX Question

An emergency room nurse is presented with four clients at the same time. Which of the following clients should the nurse see **FIRST**?

- 1. A client with a low-grade fever, headache, and fatigue for the past 72 hours.
- 2. A client with swelling and bruising to the left foot following a running accident.
- 3. A client with abdominal and chest pain following a large, spicy meal.
- 4. A child with a 10 cm laceration to the chin





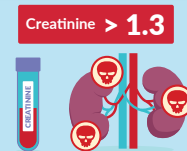
LABS		NORMAL RANGE
Na+	135 - 145	Sodium Swells the body
K+	3.5 - 5.0	Potassium Pumps Heart
Cl-	97 - 107	
Ca	9.0 - 10.5	Calcium Contracts Muscles
Mg+	1.3 - 2.1	Mag. Mellows Muscles
Albumin	3.5 - 5.0	Liver
Creatinine	Over 1.3	Bad Kidney
BUN	10 - 20	Kidney
Glucose	70 - 110	Hypogly = Brain Die
WBC	5,000 - 10,000	High = Infection
RBC	(M) 4.7 - 6.1 (F) 4.2 - 5.4	Low = Anemia
Hgb	(M) 14 - 18 (F) 12 - 16	Below 7 = Blood Trans
Hct	(M) 42 - 52 (F) 37 - 47	
PLTS	150k - 400k	AsaParin, CloPidogrel
PT	11 - 12.5	
aPTT	30 - 40	
INR	0.9 - 1.2	
Therapeutic Range while on Anticoags		
aPTT	46 - 70	
INR	2 - 3	
* 3 x MAX range		

Top 5 Toxic Drug Levels

1. Lithium **1.5 +**
2. Digoxin **2.0 +**
3. Theophylline **20 +**
4. Phenytoin **20 +**
(brand: Dilantin)
5. Kidney Killers:
Creatinine Over 1.3 = dead kidney
 - CT contrast
 - Antibiotics: Vancomycin & Gentamicin

NCLEX TIP

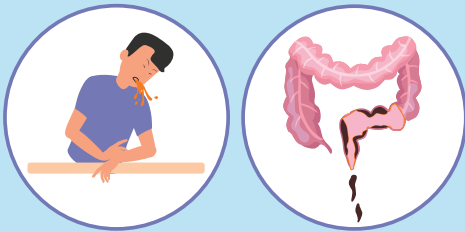
- HIGHEST** risk for toxicity
Decreased **renal** function
Creatinine **Over 1.3** = Bad Kidney
- Renal Failure
 - Older Age



Lithium: **1.5 +**

Top Signs leading to toxicity

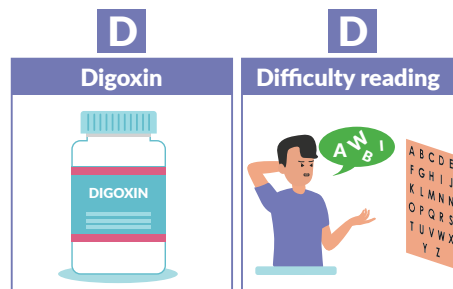
1. Extreme thirst
2. Excessive urination
3. Vomiting / diarrhea



Digoxin **2.0 +**

Top Signs of toxicity

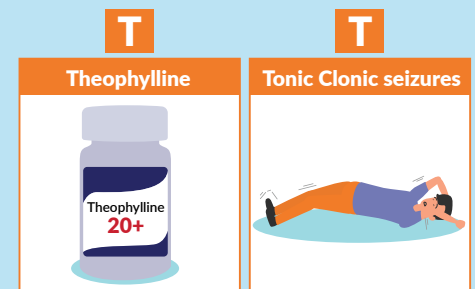
- Nausea & Vomiting
- **Vision** changes
"difficulty reading"
D - Digoxin
D - Difficulty reading



Theophylline **20+**

Top Signs of toxicity

- Seizures
T - Theophylline
T - Tonic Clonic seizures



Phenytoin **2.0 +**

Top Signs of toxicity

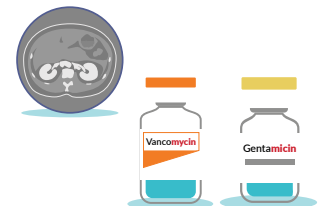
1. Ataxia - unsteady gait
2. Hand tremors
3. Slurred speech



Kidney Killers

(creatinine over **1.3** = bad kidney)

- CT Contrast
- Mycin Antibiotics



Notes

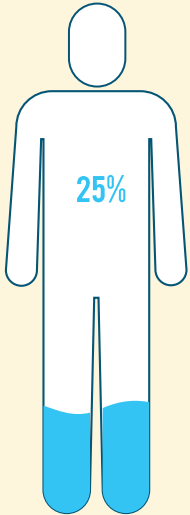
Fluid & Electrolytes Cheat Sheet

Electrolyte	Function	HYPER "HIGH"	Hypo "low"
Potassium 3.5 - 5.0	P - Potassium P - Priority! Since it.. P - Pumps the heart & muscles	HYPER kalemia (over 5.0) Heart - TIGHT & CONTRACTED 1 ST elevation and Peaked T waves 2 Severe = Vfib or Cardiac Standstill! 3 Hypotension, Bradycardia GI TRACT - TIGHT & CONTRACTED 1 Diarrhea 2 Hyperactive bowel sounds NEUROMUSCULAR - TIGHT & CONTRACTED Paralysis in Extremities Increased DTR Profound Muscle Weakness, (General Feeling of heaviness)	Hypokalemia (below 3.5) HEART - LOW & SLOW 1 Flat T waves, ST depression, & prominent U wave MUSCULAR - LOW & SLOW 1 Decreased DTR 2 Muscle cramping 3 Flaccid paralysis (paralyzed limbs) GI - LOW & SLOW Decreased motility, hypoactive to absent bowel sounds, Constipation Abdominal distention Paralytic ileus, paralyzed intestines! *PRIORITY* for SB0 (small bowel obstruction)
Sodium 135 - 145	S - Sodium S - Swells the body to maintain: • Blood Pressure • Blood Volume • pH balance	HYPER natremia (over 145) HYPERNATREMIA = BIG & BLOATED 1. SKIN FLUSH "Red & Rosy" EDEMA "waterbed skin" LOW GRADE FEVER 2. POLYDIPSIA EXCESS THIRST 3. LATE SERIOUS SIGN SWOLLEN dry tongue <small>NCLEX TIP</small> GI = nausea & vomiting <small>NCLEX TIP</small> INCREASED muscle tone <small>NCLEX TIP</small>	Hyponatremia (below 135) HYPONATREMIA - DEPRESSED & DEFLATED NEURO = Seizures & Coma HEART = Tachycardia, & weak thready pulses RESPIRATORY ARREST
Chloride 97 - 107	Sodium's sidekick Maintains: • Blood Pressure • Blood Volume • pH balance	HYPER chloremia (over 107) NEARLY SAME AS HIGH SODIUM 1 NAUSEA & VOMITING 2 SWOLLEN DRY TONGUE 3 CONFUSION	Hypochloremia (below 97) t NEARLY SAME AS LOW SODIUM 1 EXCESSIVE DIARRHEA, VOMITING, SWEATING 2 FEVER TEST TIP: ONLY DIFFERENCE
Magnesium 1.3 - 2.1	M - Magnesium M - Mellows the M - Muscles (relaxes)	HYPER magnesemia (over 2.1) 1. CARDIAC - CALM & QUIET Heart block Prolonged PR intervals VITALS = bradycardia, hypotension 2. DEEP TENDON REFLEXES - CALM & QUIET Hyporeflexia - Decreased DTR 3. LUNGS - CALM & QUIET Depressed shallow respirations 3. GI - CALM & QUIET Hypoactive bowel sounds	Hypomagnesemia (below 1.3) 1. CARDIAC - BUCK WILD! EKG : ST depression, T wave inversion Torsades de pointes SEVERE = V fib VITALS = Tachycardia 2. DEEP TENDON REFLEXES - BUCK WILD Hyporeflexia - increased DTR 3. EYES - BUCK WILD Abnormal eye movements (nystagmus) 4. GI - BUCK WILD Diarrhea
Calcium 9.0 - 10.5	Keeps the 3 Bs Strong B - Bone B - Blood B - Beats (heart)	HYPER calcemia (over 10.5) SWOLLEN & SLOW - MOANS, GROANS & STONES 1. CONSTIPATION 2. BONE PAIN 3. STONES Renal Calculi (kidney stones) 4. DEEP TENDON REFLEXES Decreased DTR Severe muscle weakness	Hypocalcemia (below 9.0) 1 T - Trousseau's T - Twerking arm with BP cuff on 2 C - Chvostek's C - Cheek smile when touched 3 Diarrhea 4 Circumoral tingling 5 Weak bones
Phosphate 3.0 - 4.5	Helps with bone & teeth formation. Helps regulate calcium Ca HIGH = Phosphate LOW Ca LOW = Phosphate HIGH	HYPER phosphatemia (over 4.5) "LOW CALCIUM" BAJA CA+ 1. TROUSSEAU'S SIGNS 2. CHVOSTEK'S SIGNS 3. DIARRHEA 4. WEAK Bs Strong bones? - WEAK! (fractures) Strong blood clotting? - WEAK! (risk for bleeding) Strong heart beats? - WEAK! (cardiac dysrhythmias)	Hypophosphatemia (below 3.0) Swollen & SLOW - MOAN, GROANS & STONES 1. CONSTIPATION 2. DECREASED DTR & SEVERE MUSCLE WEAKNESS 3. DECREASED HR, RR 4. INCREASED BP

*Disclaimer: Values above are based on NCLEX standards, many books & hospitals will differ in their values.

Fluid Volume Deficit & Excess

"HypOvolemia" (LOw fluid volume)



Cardiovascular

- Thready, increased pulse rate, decreased blood pressure and orthostatic hypotension, flat neck and hand in veins in dependant positions, diminished peripheral pulses, decreased central venous pressure, dysrhythmias

Respiratory

- Increased rate and depth of respirations, dyspnea

Neuromuscular

- Decreased central nervous system activity, from lethargy to coma, fever, depending on the amount of fluid loss, skeletal muscle weakness

Renal

- Decreased urine output

Integumentary

- Dry skin, poor turgor, tenting, dry mouth

Gastrointestinal

- Decreased motility and diminished bowel sounds, constipation, thirst, decreased body weight

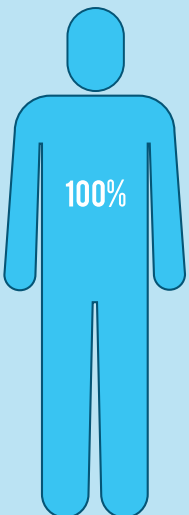
Serum Blood Lab Findings

- Increased serum osmolality, increased hematocrit,
- Increased blood urea nitrogen (BUN), Increased serum sodium level,
- Increased urinary specific gravity

Memory Trick:

- If Osmolality is **HIGH** = Body is **DRY**
- If Specific gravity is **HIGH** = Body is **DRY**

"Hypervolemia" (High fluid volume)



Cardiovascular

- Bounding, increased pulse rate, elevated blood pressure, distended neck and hand veins, elevated central venous pressure, dysrhythmias

Respiratory

- Increased respiratory rate (shallow respirations), dyspnea, moist crackles on auscultation

Neuromuscular

- Altered level of consciousness, headache, visual disturbances, skeletal muscle weakness, paresthesias

Renal & Urinary

- Increased urine output if kidneys cannot compensate; decreased urine output if kidney damage is the cause

Integumentary

- Pitting edema in independent areas, pale cool skin

Gastrointestinal

- Increased motility in gastrointestinal tract, diarrhea, increased body weight, liver enlargement, ascites

Serum Blood Lab Findings

- Decreased serum osmolality, decreased hematocrit, decreased BUN level,
- Decreased serum sodium level,
- Decreased urine specific gravity

Memory Trick:

- If Osmolality is **Low** = Body is **Liquidy**
- If Specific gravity is **Low** = Body is **Liquidy**

F&L Quick Notes:

IV Solutions

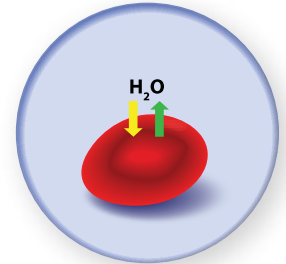
Isotonic solutions

- **Definition:** when solutions on both sides of a selectively permeable membrane have established **equilibrium** or are **equal in concentration**, they are isotonic
- Human blood is isotonic thus very little osmosis occurs since isotonic solutions have the same osmolality as body fluids & thus increase extracellular fluid volume.

Memory Trick:

- **Iso**-tonic Solutions
- **I-so**-Perfect (no fluid shift, "I'm so perfect" perfect balance)

- List of fluids:
 - 0.9% sodium chloride (normal saline)
 - 5 % dextrose in water (DWS)
 - 5 % dextrose in 0.225% saline (DSW/ 1/4 NS)
 - Lactated Ringer's (LR)



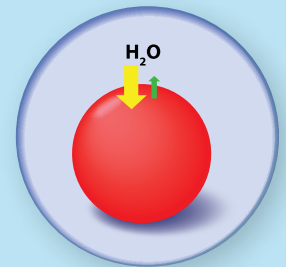
Hypotonic solutions

- **Definition:** when a solution contains a **lower concentration** of solute than another more concentrated solution, then it is a hypotonic solution.
- These solutions have **lower osmolality** than body fluids.
- They cause the movement of water into cells by osmosis, **swelling the cells** like a BIG fat hippo, and therefore, should be administered slowly to prevent cellular edema

Memory Trick:

- Hyp**O** - tonic
- Hipp**O** - tonic = fluid swells the cell like a big hippo

- List of fluids:
 - 0.45% sodium chloride (1/2 NS)
 - 0.225% sodium chloride (1/4 NS)
 - 0.33% sodium chloride (1.3NS)



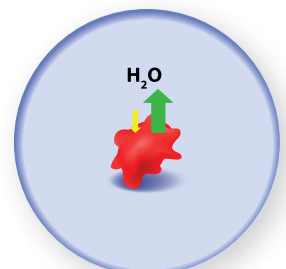
Hypertonic solutions

- **Definition:** when a solution contains a higher concentration of solutes than another less concentrated solution, then it is a hypertonic solution.
- These solutions have higher osmolality than body fluids.
- They cause the movement of water outside the cells by osmosis, making the cells skinny like a hyper person.

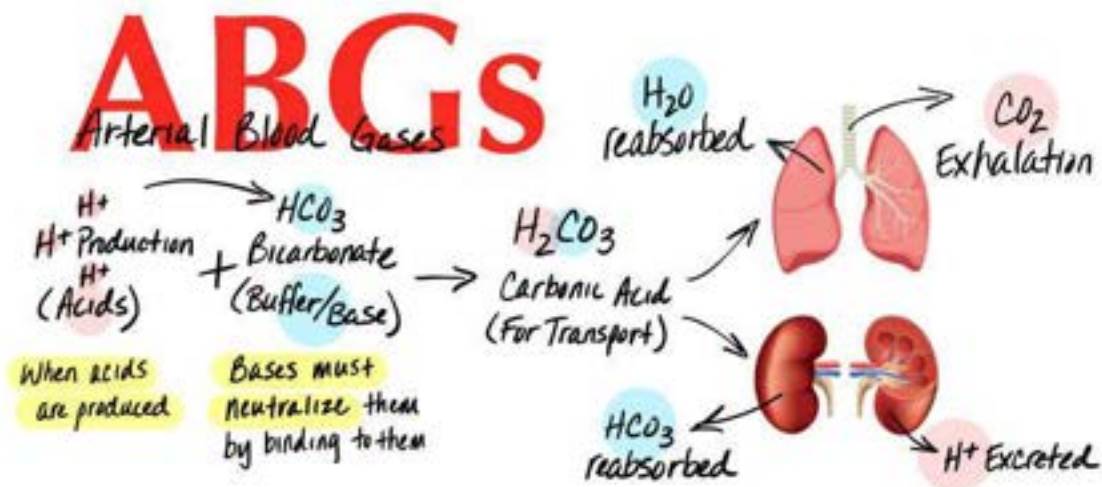
Memory Trick:

- **Hyper** - tonic
- **Hyper person** = very skinny cells like a hyper person is skinny

- List of fluids:
 - 3% sodium chloride (3% NS)
 - 5% sodium chloride (5% NS)
 - 10% dextrose in water (D10W)
 - 5% dextrose in 0.9% sodium chloride (D5W/NS)
 - 5% dextrose in 0.45% sodium chloride (D5W/ 1/2 NS)
 - 5% dextrose in Lactated Ringer's (D5LR)



**ABG
&
Acid Base Imbalances**



Normal Ranges to know

pH 7.35 - 7.45
 High (>7.45) = Alkalosis
 Low (<7.35) = Acidosis

PaCO₂ 35 - 45 mmHg
 Carbon Dioxide
 Picture Red as Acid
 ic

HCO₃ 22 - 26 mEq/L
 Bicarbonate
 Picture Blue as Base

PaO₂ 80 - 100 mmHg
 Oxygen

ROME

Mnemonic for

Acid-Base Imbalances

Respiratory **O**pposite

(pH + CO_2 move in opposite direction $\downarrow \uparrow$)

Metabolic **E**qual

(pH + Bicarb/ HCO_3^- move in equal / same directions)

Use this to help remember:

- For **respiratory** problems: pH / CO_2 move in **opposing** directions
- For **metabolic** problems: pH / HCO_3^- move in the **same** direction

Acidic
Base

ABGs

Arterial Blood Gases

pH
(7.35 - 7.45)

STEP #1 →

LOW (<7.35)

HIGH (>7.45)

STEP #2 →

Acidosis

Alkalosis

STEP #3 →

@thevisualnurse

HIGH

LOW

LOW

HIGH

PaCO_2

HCO_3^-

PaCO_2

HCO_3^-

(>45)

(<22)

(<35)

(>26)

**Respiratory
Acidosis**

**Metabolic
Acidosis**

**Respiratory
Alkalosis**

**Metabolic
Alkalosis**

ABGs

Arterial Blood Gases

Metabolic Acidosis

$pH < 7.35$ $HCO_3^- < 22$

Metabolic Equal

(pH + Bicarb / HCO_3^- move in equal / same directions)

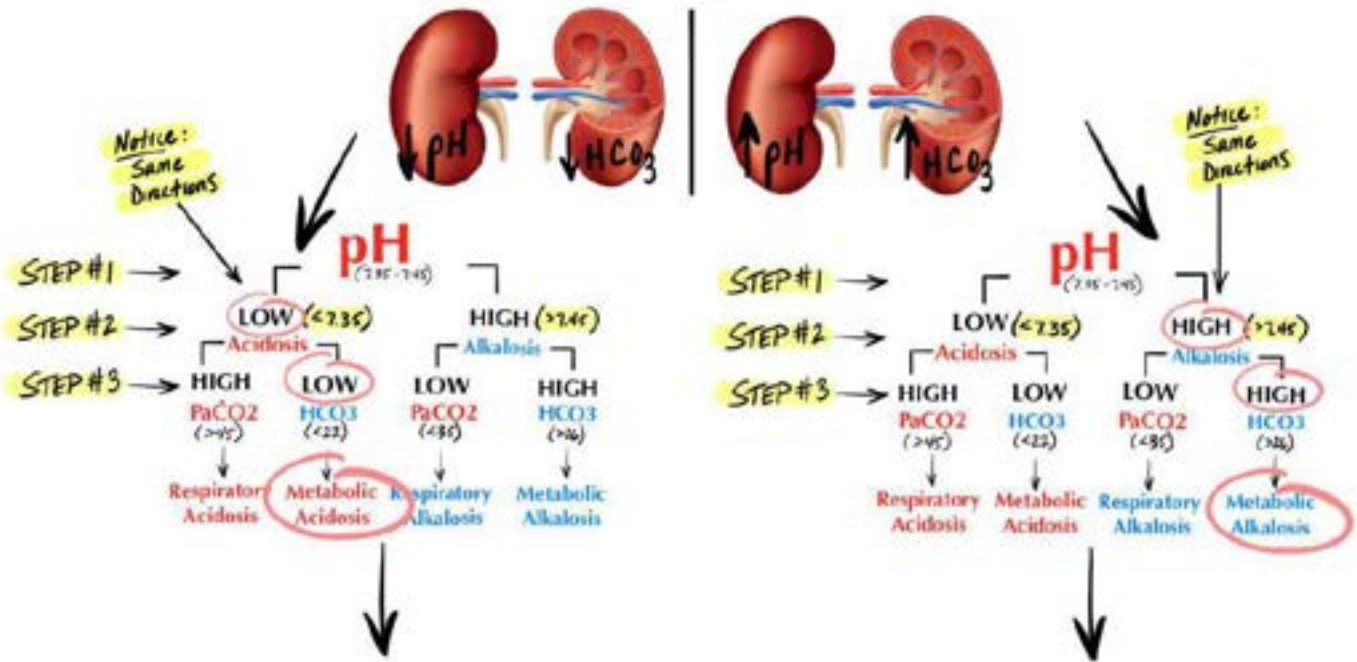
Metabolic Alkalosis

$pH > 7.45$ $HCO_3^- > 26$

Metabolic Equal

(pH + Bicarb / HCO_3^- move in equal / same directions)

VS.



Causes

- Acid Increase
 - Keto Acidosis
 - Starvation
 - Lactic Acidosis
 - Shock
 - Hypoxemia
- Decreased Bicarbonate
 - Severe Diarrhea (BASE)
 - Renal Failure

Signs/Symptoms

- Headache
- Lethargy
- Kussmaul's respirations
- Nausea
- Vomiting
- Confusion
- Coma

Treatments

- Improve Oxygenation
- Aimed at correcting underlying cause (DKA, shock, sepsis, diarrhea, renal disorders)

Causes

- Acid loss
 - Vomiting
 - Gastric suction → HCl loss
 - Diuretic use
 - K^+ / Na^+ loss
- Antacids
- Hyperaldosteronism
- Cushing's disease
- Steroid use

Signs/Symptoms

- Weakness
- Muscle cramps
- Hyperactive reflexes
- Tetany
- Confusion
- Slow, shallow respirations to minimize CO_2 loss
- Nausea
- Seizures

Body needs this to counter alkalotic state

Treatments

- Aldosterone antagonists
- K^+ sparing diuretics
- Correct underlying cause

ABGs

Arterial Blood Gases

Respiratory Acidosis

$pH < 7.35$ $PaCO_2 > 45$

Respiratory Opposite

($pH + CO_2$ move in opposite direction $\downarrow \uparrow$)

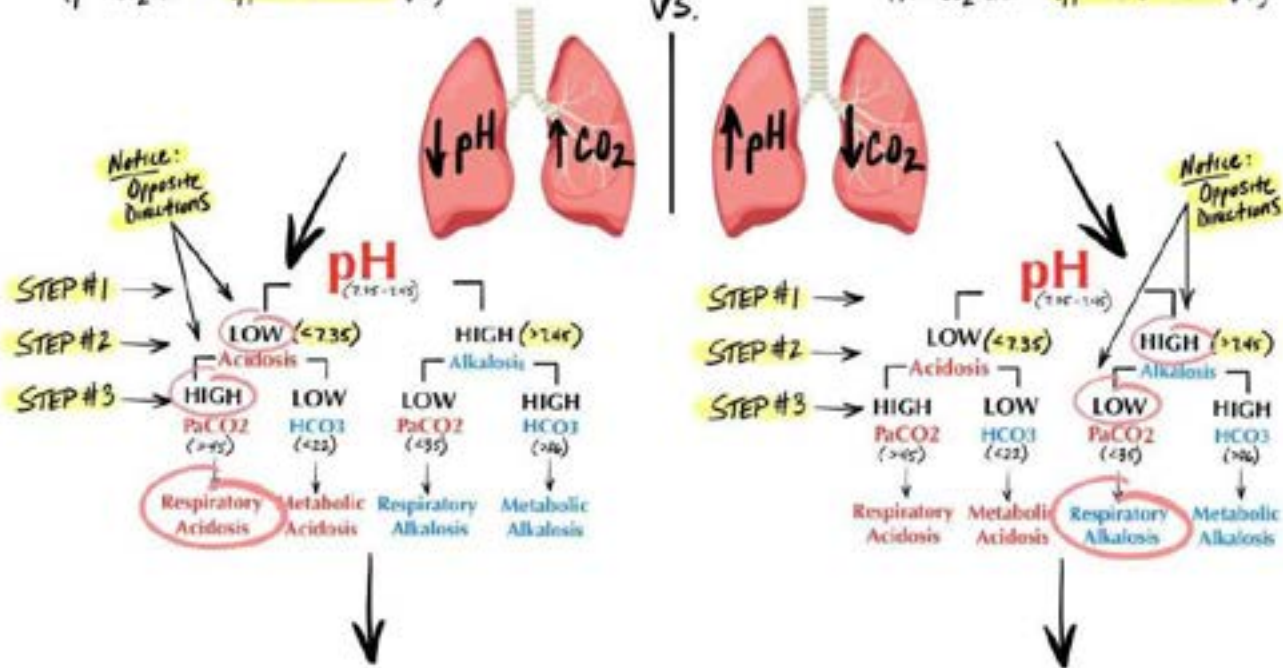
Respiratory Alkalosis

$pH > 7.45$ $PaCO_2 < 35$

Respiratory Opposite

($pH + CO_2$ move in opposite direction $\downarrow \uparrow$)

vs.



Causes

- Hypoventilation
 - Respiratory Depression (i.e. Narcotics, Head injury)
 - Respiratory muscle weakness
 - Asthma
 - COPD
 - Pneumonia
 - Pulmonary Edema
 - Drowning
- Think: conditions that would impair respiration + the ability to exhale CO2*

Signs/Symptoms

- Bradycardia
- Hypotension
- Agitation
- Confusion
- Combativeness
- Lethargy
- Coma

Think: altered mental status, trouble staying awake, retaining CO2

Treatments

- Reposition the patient
- Maintain patent airway
- Ventilation as needed to remove excess CO2

Causes

- Hyperventilation
 - Hypermetabolic states
 - Fever
 - Anemia
 - Thyrotoxicosis
 - Septicemia
 - Anxiety
 - Fear
 - Pain
 - Pneumothorax
- Think: conditions causing respiration increase (tachypnea) leading to exhaling too much CO2 (low)*

Signs/Symptoms

- Tachycardia
- Anxiety
- Confusion
- Diaphoresis
- Dizziness
- Loma

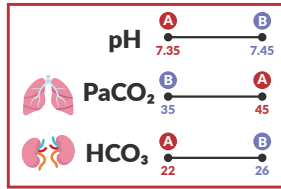
Treatments

- Control breathing
- Sedatives PRN
- Rebreather mask
- Correct for metabolic causes

3 Step ABG Interpretation

Mike's Marching Band Suit Method

Marching band suit method



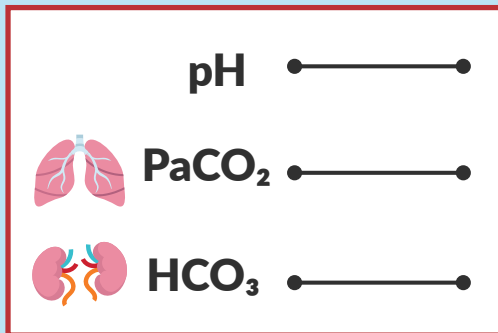
TEST TIP

Write this chart out **5 - 10 times every day the week** of your ABG exam.

Side Note: Many students & instructors use the ROME or Tic-Tac-Toe method, but that can get very confusing when interpreting *partial vs. full compensation*. Use the marching band suit method to make it **simple** & get **all your ABG questions correct!**

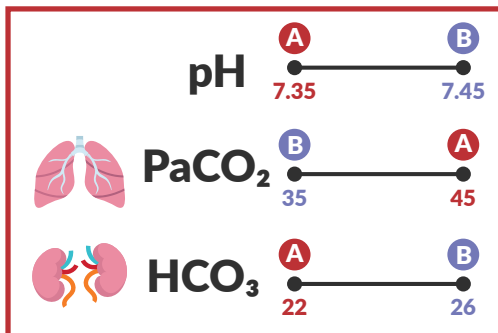
Set Up the Chart

Phase 1 - Set up the chart



Step 1	pH is on 1st! Think pH is primary since it comes first.
Step 2	CO2 comes 2nd. Look at the 2 in CO ₂ , it comes 2nd. <i>Lungs on top</i>
Step 3	HCO3 comes 3rd. Look at the 3 in HCO ₂ , it comes 3rd. <i>Kidneys on bottom</i>

Phase 2 - Key numbers to memorize

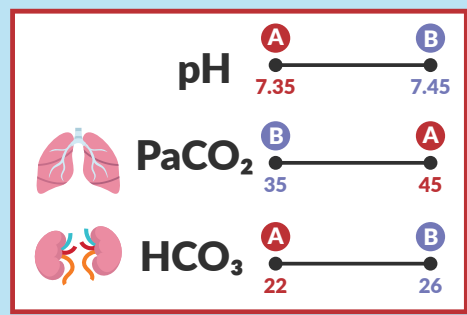


Top line **7.35 - 7.45**
 Middle **35 - 45** (*7 goes to heaven*)
 Bottom **22 - 26** (*think 2+2+2 = 6*)

Phase 3 - Label it A & B

Acid

Base



3 Step ABG Interpretation

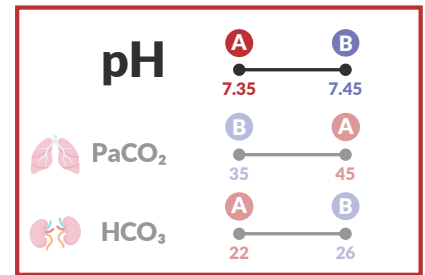
Mike's Marching Band Suit Method

How to Solve ABG Questions in 3 Steps

Step 1 - pH

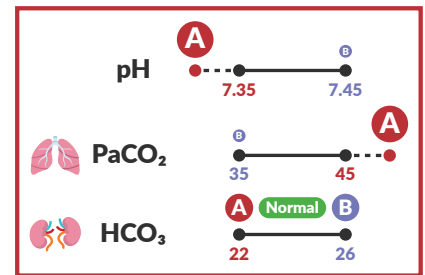
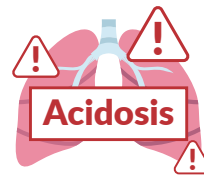
pH is primary, look here first
 pH below **7.35** = **Acidosis**
 pH over **7.45** = **Base (Alkalosis)**

pH
Primary



Step 2 - Match pH with partner

Example:
 Let's say pH is under 7.35, PaCO₂ is over 45 & HCO₃ is normal **2 acids match**:
 pH & CO₂ = **Respiratory Acidosis**
 (look at the organ icon to help you)

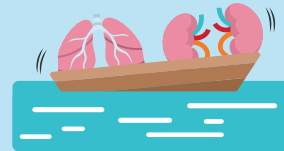


Step 3 - Compensated or Uncompensated

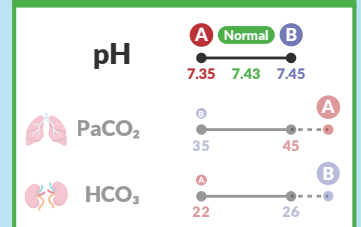
MEMORY TRICK

Compensation means finding common ground to make the pH within normal range.

Fully Compensated = **pH is within normal range**
 The lungs & kidneys are doing their part to balance the body



Fully Compensated



Step 3 - Compensated or Uncompensated

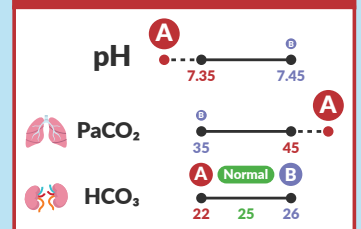
Uncompensated = pH is **OUTSIDE** normal range

The "broken home". The body is **NOT TRYING** to help balance the pH.
 It's like having a lazy partner in a relationship!

Memory Trick

UNcompensated is very **UN**friendly

Uncompensated

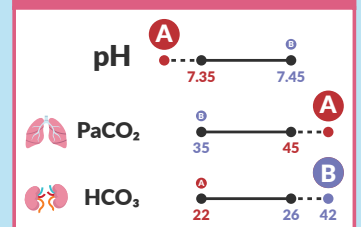


Step 3 - Compensated or Uncompensated

Partially compensated = pH is **OUTSIDE** normal range, but the body is trying!
 It is like couples counseling, sure the pH is **NOT** normal, but at least the lungs & kidneys are **TRYING** to work things out.



Partially compensated



Acid Base Imbalances + ABGs

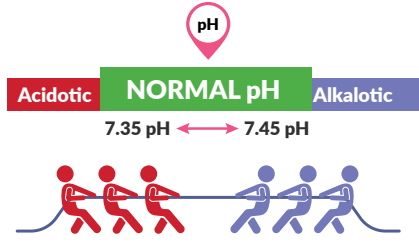
Pathophysiology Course

Pathophysiology

Acid base imbalances are the balance of Acid & Base in the body, kind of like a tug of war the body loves to keep pH in balance.

- **Normal pH:** 7.35 - 7.45
- **Acidosis:** Less than 7.35 pH
- **Alkalosis (base):** Over 7.45 pH

- **Full** compensation = **FULLY Normal** pH 7.35 - 7.45
- **Partial** compensation = pH is **not normal**



MEMORY TRICKS

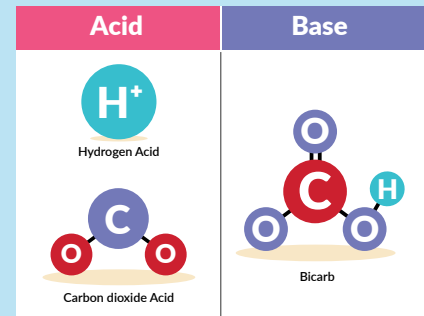
Base = Bicarbonate **Carbon diACID**

Hydrogen ions = HIGH acid

Controlling Organs

Lungs control	Kidneys control
Carbon Dioxide CO2 Breath in O2 & breath out CO2 Hypoventilation leads to HIGHER CO2 Hyperventilation leads to lower CO2	Hydrogen H+ ions (acid) Found in the urine Bicarbonate HCO3 (base) Found in the intestines

KEY PLAYERS



Metabolic Acidosis & Alkalosis - Causes

Over 7.45 pH

Metabolic ALKAlosis

- Vomiting
- NGT suction
- Hypokalemia
 - Low K+ Potassium (below 3.5)
 - **LOW K+ = AlKaLOWsis**
- Compensation
 - Slow
 - Shallow respirations

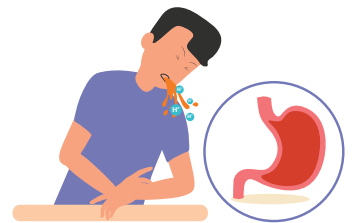
Under 7.35 pH

Metabolic Acidosis

- Diarrhea
- Renal Failure
- **DKA - Diabetic Ketoacidosis**
- **Lactic AcidOSIS**
 - Shock (low perfusion)
 - Sepsis (severe infection)
- Compensation
 - Rapid, deep respirations

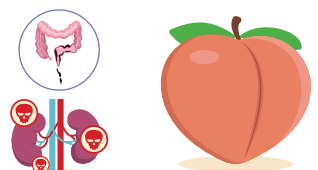
MEMORY TRICKS

Metabolic **ALK**alosis



Vomiting sounds like "ALKKK-alosis"

Metabolic **ACID**osis



Diarrhea: if it comes out of your a\$\$idosis
Renal Failure: when the kidneys fail, acid prevails!



LOW K+
AlKaLOWsis

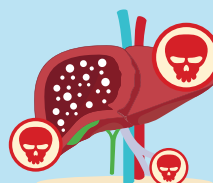
Memory tricks

Base out the **Butt**
Metabolic **ACID**osis



Memory tricks

DKA - Diabetic Ketoacidosis



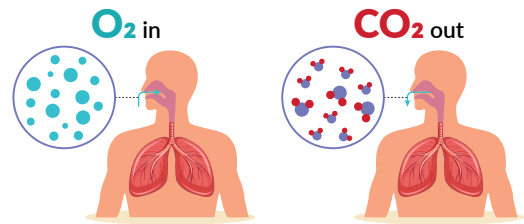
Respiratory Acidosis & Alkalosis - Causes

Recall the patho & memory tricks

- Carbon Dioxide CO₂
- Think "Carbon di**ACID**" since it pushes the body into **acidosis**.

Hypoventilation (low & slow breathing) = **HIGHER CO₂**

Hyperventilation (fast breathing) = **Lower CO₂**



Under 7.35 pH

Respiratory **Alkalosis** = Fast RR

- Panic Attack
- Key Manifestations
 - Low Pa**CO₂**
 - Low **HCO₃**
- Compensation:
 - Kidneys excrete **LESS H+** & reabsorb **LESS HCO₃**

Over 7.45 pH

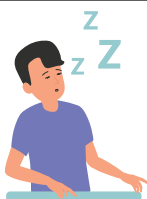
Respiratory **Acidosis** = Low & Slow RR

- Sleep apnea
- Head trauma "knocked out"
- Post-operative
- Drugs = CNS depressants
 - Opioid **overdose** **NCLEX TIP**
 - Alcohol **intoxication**
 - Benzodiazepines (Diazepam)
- Pneumonia
- COPD or Asthma attack
- Key Manifestations
 - Mental Status changes
 - Elevated Pa**CO₂**
 - Elevated **HCO₃**
- Compensation:
 - Kidneys excrete **H+** (acid) & retain **HCO₃** (base)

MEMORY TRICKS

Respiratory **ACID**osis

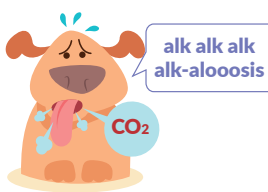
Low & Slow RR



Snoring & hypoventilation sounds like "**Acccccid-osis**"

Respiratory **ALK**alosis

Fast RR



Think of a person panting like a dog (hyperventilation), it sounds like "**ALK, alk, alk-alosis**"

Top Missed Exam Question



↓ pH
Respiratory ACIDosis



The nurse expects which client to be in respiratory acidosis?

- ✓ 1. Morphine overdose
- 2. Panic attack
- ✓ 3. Sleep apnea
- ✓ 4. COPD
- ✓ 5. Asthma attack
- ✓ 6. Alcohol intoxication

Common NCLEX question

CO₂



Acidotic 7.35 pH ← NORMAL pH → 7.45 pH Alkalotic



How does the nurse expect the client to show **compensation** for the following ABG values?

Ph 7.20, PaO₂ 82 mm Hg, PaCO₂ 37 mm Hg, HCO₃ 15 mEq/L (metabolic acidosis)

- 1. Decreased respiratory rate
- ✓ 2. Increased respiratory rate
- 3. Increased renal retention of H⁺...
- 4. Decreased renal excretion of HCO₃

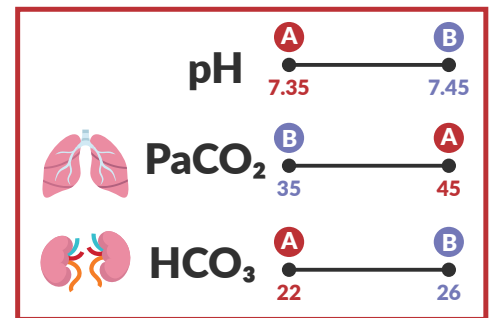
ABG Practice Questions

Pathophysiology Course

ABG Practice Question 1

pH 7.25 , PaCO₂ 55 , HCO₃ 25

Draw your marching band suit here:



ABG Practice Question 2

pH 7.57 , PaCO₂ 25 , HCO₃ 22

Draw your marching band suit here:

ABG Practice Question 3

pH 7.21 , PaCO₂ 39 , HCO₃ 19

Draw your marching band suit here:

ABG Compensation Questions

Pathophysiology Course

ABG Question 1

Full or Partial compensation?

pH 7.32 , PaCO₂ 55 , HCO₃ 42

Draw your marching band suit here:

ABG Question 2

Full or Partial compensation?

pH 7.55 , PaCO₂ 49 , HCO₃ 35

Draw your marching band suit here:

ABG Question 3

Full or Partial compensation?

pH 7.37 , PaCO₂ 52 , HCO₃ 32

Draw your marching band suit here:

ABG Question 4

Full or Partial compensation?

pH 7.43 , PaCO₂ 43 , HCO₃ 33

Draw your marching band suit here:

ABG Answers Sheet

Pathophysiology Course

ABG Practice Question 1

pH 7.25 , PaCO₂ 55 , HCO₃ 25

Step 1: pH

7.25 is below 7.35 so it is **Acidic**

Step 2: Match pH with its partner

CO₂ is 55 so it is **Acid**

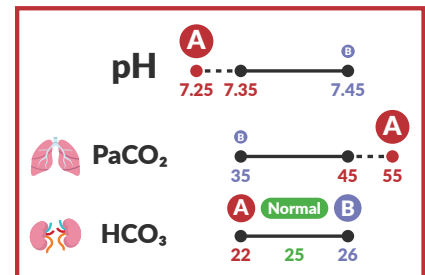
We have a match in the lung area = **respiratory acidosis**

HCO₃ 25 - normal range, no match

Step 3: Compensated or Uncompensated?

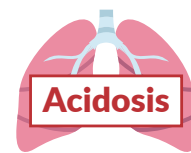
Is the pH in normal range?

NO, it's not in balance, it did not find common ground in compensation pH is **UNcompensated** (not normal range)



Answer:

**Respiratory Acidosis
Uncompensated**



ABG Practice Question 2

pH 7.57 , PaCO₂ 25 , HCO₃ 22

Step 1: pH

7.57 is above 7.45 so it is **Base (Alkalosis)**

Step 2: Match pH with its partner

CO₂ is 25 **Base (Alkalosis)**

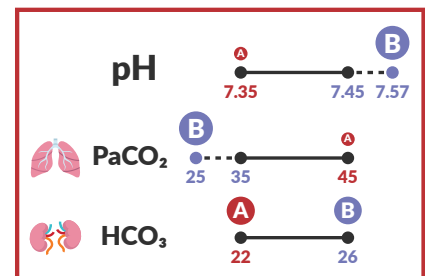
We have a match in the lung area = **respiratory alkalosis**

HCO₃ 22 - normal range, no match

Step 3: Compensated or Uncompensated?

Is the pH in normal range?

NO, it's not in balance, it did not find common ground in compensation pH is **UNcompensated** (not normal range)



Answer:

**Respiratory Alkalosis
Uncompensated**



ABG Practice Question 3

pH 7.21 , PaCO₂ 39 , HCO₃ 19

Step 1: pH

7.21 is below 7.35 so it is **Acid**

Step 2: Match pH with its partner

CO₂ is 39 - normal range, no match

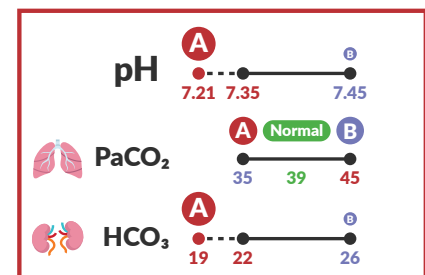
HCO₃ is 19 **Acid**

We have an acid match for the kidneys = **Metabolic acidosis**

Step 3: Compensated or Uncompensated?

Is the pH in normal range?

NO, it's not in balance, it did not find common ground in compensation pH is **UNcompensated** (not normal range)



Answer:

**Metabolic Acidosis
Uncompensated**



ABG Compensation Answers

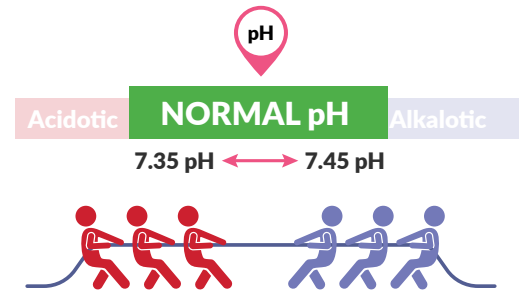
Pathophysiology Course

Remember:

- Full compensation = **FULLY Normal** pH 7.35 - 7.45
- Partial compensation = pH is **not normal**

Remember the body will try to **balance the pH** (acid & base) like a tug of war this balancing is called **compensation**.

Memory Trick: Compensation is like finding common ground (finding balance)



ABG Question 1

Full or Partial compensation?

pH 7.32 , PaCO₂ 55 , HCO₃ 42

Step 1: pH

7.32 = **Acid** (below 7.35)

Step 2: Match pH with its partner

CO₂ is 55 = **Acid**

We have a match in the lung area = **respiratory acidosis**

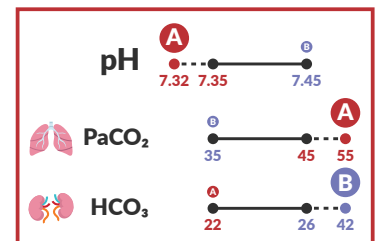
HCO₃ 42 = Base (alkalosis)

Step 3: Compensated fully or partially?

Is the pH in normal range?

NO, the pH is not FULLY normal, so it is not FULLY compensated.

Partially compensated, since the pH is only still partially recovering to normal. HCO₃ 42 = **HIGH BASE**, the body is trying to PULL the body OUT of acidosis & back into balance!



Answer:

Respiratory **Acidosis**
Partially compensated



ABG Question 2

Full or Partial compensation?

pH 7.55 , PaCO₂ 49 , HCO₃ 35

Step 1: pH

7.55 = Base **Alkalosis** (above 7.45)

Step 2: Match pH with its partner

CO₂ is 49 = Acid (no match)

HCO₃ 35 = Base **Alkalosis**

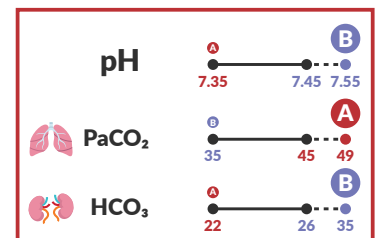
We have a match in the lung area = **metabolic alkalosis**

Step 3: Compensated fully or partially?

Is the pH in normal range?

NO, the pH is not FULLY normal, so it is not FULLY compensated.

Partially compensated, since the pH is only still partially recovering to normal. CO₂ of 49 = **High ACID**, we know the body is trying to PULL the pH back into balance!



Answer:

Metabolic **Alkalosis**
Partially compensated



ABG Compensation Answers II

Pathophysiology Course

ABG Question 3

Full or Partial compensation?

pH 7.37 , PaCO₂ 52 , HCO₃ 32

Step 1: pH

7.37 = Normal (but pH looks closer to **Acid**)

Step 2: Match pH with it's partner

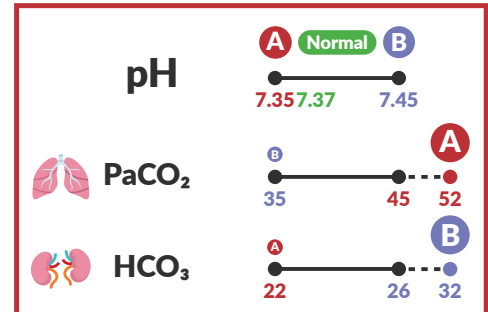
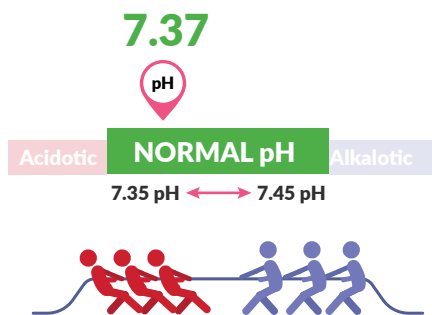
CO₂ is 52 = **Acid** (no match) Respiratory

HCO₃ 32 = Base (no match) Metabolic

Wait a minute, can't find a match with a normal pH! Uhhh ohh!

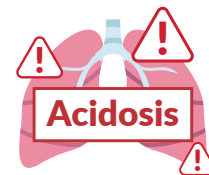
Remember it is like a tug of war, so simply ask, "Who's winning the tug of war?"

pH is leaning closer to an acid side = **Acid is Winning!**



Answer:

Respiratory **Acidosis**
Fully compensated



Step 3: Compensated fully or partially?

Is the pH in normal range?

Yes, **Fully compensated**, since the pH is **FULLY** in normal range

ABG Question 4

Full or Partial compensation?

pH 7.43 , PaCO₂ 43 , HCO₃ 33

Step 1: pH

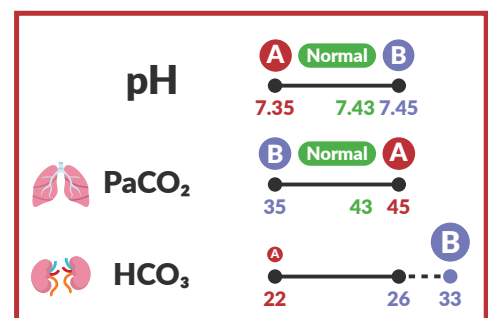
7.43 = Normal (but pH looks closer to **Base**)

Step 2: Match pH with it's partner

CO₂ is 43 = Acid (no match) Respiratory

HCO₃ 33 = Base Metabolic

pH is leaning closer to the base side = **Base is Winning!**



Answer:

Metabolic **Alkalosis**
Fully compensated



Step 3: Compensated fully or partially?

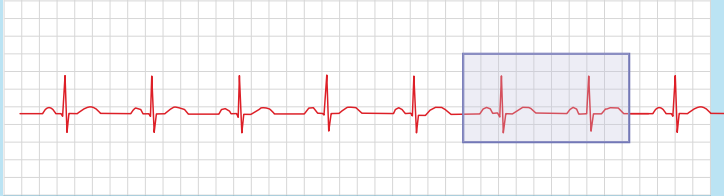
Is the pH in normal range?

Yes, **Fully compensated**, since the pH is **FULLY** in normal range.

EKG

9 ECG Strips on the NCLEX

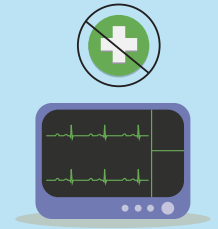
1. Normal sinus rhythm



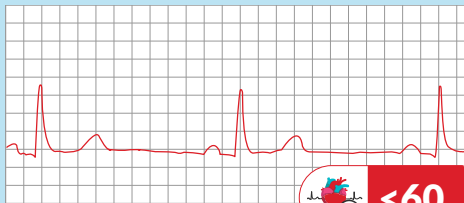
Memory tricks

Normal beat - evenly spaced

- **Treatment:**
None - continue to monitor
- **Causes:**
Being healthy



2. Bradycardia



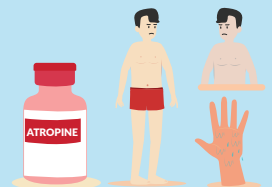
BRADY Bunch
old TV show (slow times)



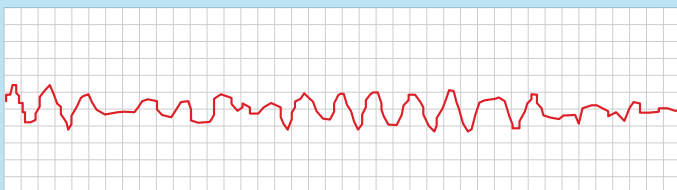
Memory tricks

BRADYcardia
Below 60/min

- **Treatment:**
Atropine **ONLY** if symptomatic showing low perfusion (pale, cool, clammy)
- **Causes:**
Vagal maneuver (bearing down), meds (CCB, Beta Blockers)



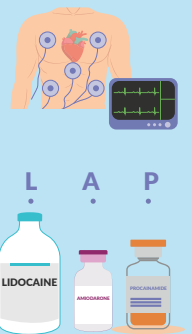
3. Ventricular Fibrillation (V Fib)



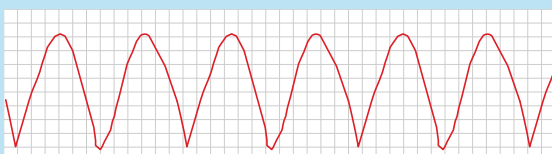
Memory tricks

Fib is flopping- squiggly line

- **Treatment:**
 1. **V Fib - Defib #1** Defibrillation immediately Stop CPR to do it & before drugs!
***NO** synchronization needed
 2. Drugs: LAP - Lidocaine, Amiodarone, Procainamide
- **Causes:**
Untreated V Tach, Post MI, E+ imbalance, proarrhythmic meds



4. Ventricular Tachycardia (V Tach)



Memory tricks

V Tach Tombstone pattern



- **Causes:**
Post MI, Hypoxia, Low potassium, Low magnesium
- **Treatment:**
 1. **Early Defibrillation!** **NCLEX TIP**
 - Apply defibrillator pads
 - Call out & look for everyone to be CLEAR!
 - Shock & **IMMEDIATELY** continue chest compressions
 2. When to Shock? **NCLEX TIP**
 - V Tach with **No pulse** = Defibrillation
 - V Tach with **Pulse** = Cardioversion

Memory tricks

C

C - Count a pulse
C - Cardiovert
*Synchronize **First** & Sedation

D

D - Dead - NO PULSE
D - DEFIB!!
***NO** Synchronize
D - Don't wait

9 ECG Strips on the NCLEX II

5. Atrial Fibrillation (A Fib)

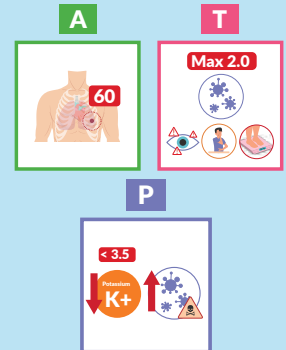


Memory tricks

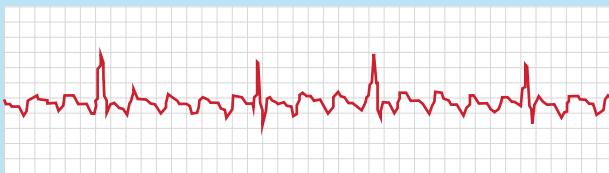
No **P** wave = Fibrillation Flo**PP**ing

- **Causes:**
Valvular disease, Heart failure, Pulm. HTN, COPD, after heart surg.
- **Treatment:**
 1. Cardioversion (after TTE to rule out clots) *Push Synch
 2. Digoxin - Deep Contraction
Check **ATP** Before giving:
A - Apical pulse 60
T - Toxicity (Max 2.0 range) visual disturbances, N/V, Anorexia
P - Potassium below 3.5 - HIGHER risk for toxicity
 3. Anticoagulants: Warfarin (monitor INR, Vit. K antidote, moderate green leafy veggies)

Digoxin



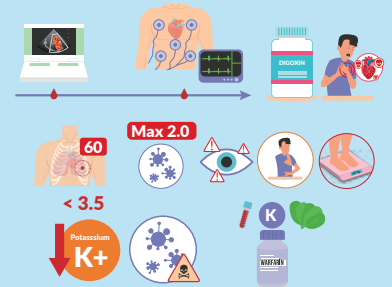
6. Atrial Flutter (A Flutter)



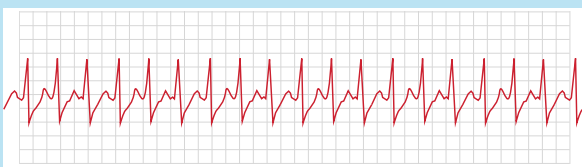
Memory tricks

A Flu**TT**er = saw**TT**er

- **Causes:**
Valvular disease, Heart failure, Pulm. HTN, COPD, after heart surg.
- **Treatment:**
 1. Cardioversion (after TTE to rule out clots) *Push Synch
 2. Digoxin - Deep Contraction
Check **ATP** Before giving:
A - Apical pulse 60
T - Toxicity (Max 2.0 range) visual disturbances, N/V, Anorexia
P - Potassium below 3.5 - HIGHER risk for toxicity
 3. Anticoagulants: Warfarin (monitor INR, Vit. K antidote, moderate green leafy veggies)



7. SVT - Supraventricular Tachycardia



Memory tricks

Super Fast = **Supra**ventricular

- **Causes:**
Stimulants, Strenuous exercise, hypoxia, heart disease
- **Treatment:**
 1. Vagal Maneuver (bear down like having a bowel movement, ice cold stimulation)
 2. Adenosine - **RAPID PUSH** & flush with NS - HR may stop
 3. Cardioversion - *Push Synch

KAPLAN

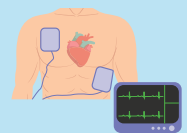
Which medication should be held 48-hours prior to an elective cardioversion for SVT?

- Digoxin due to increased ventricular irritability

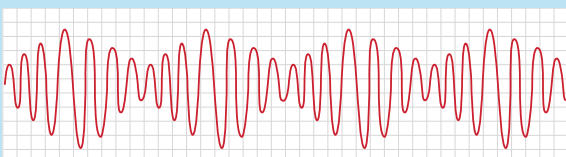
Client with SVT has the following assessment data: HR 200, BP 78/40, RR 30

- Priority action: Synchronized cardioversion

PRIORITY



8. Torsades de Pointes

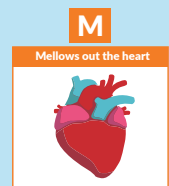
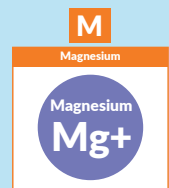


Memory tricks

Tornado Pointes

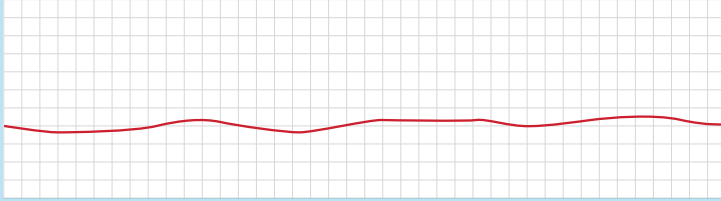
- **Causes:**
Post MI, Hypoxia, **Low magnesium**
- **Treatment:**
Magnesium Sulfate **NCLEX TIP**

Memory tricks



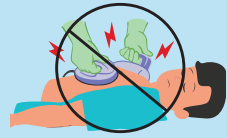
9 ECG Strips on the NCLEX III

9. Asystole - Flatline



Epinephrine, Atropine & CPR

***NO Defibrillation**
(NO shock) **NCLEX TIP**



Memory tricks

Assist Fully! ... patient is flatlined

NCLEX Key Terms

1. **P wave** = Atrial rhythm

2. **QRS wave** - Ventricular rhythm

Question:

- "Lack of QRS complexes"
Answer: Asystole
- "Wide bizarre QRS complexes"
Answer: V Tach

3. **"Chaotic or unorganized"** - Fibrillation

Question:

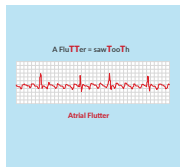
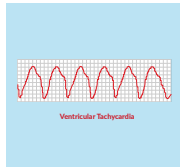
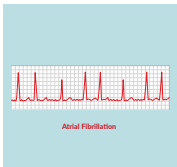
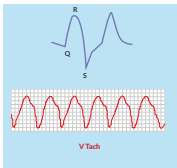
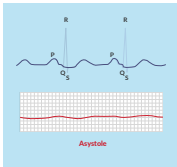
- "Chaotic rhythm with no P waves"
Answer: Atrial Fibrillation
- "CHAOTIC rhythm without QRS complexes"
Answer: Ventricular Fibrillation

4. **"Bizarre"** - Tachycardia

Question:

- "Bizarre rhythm with wide QRS complex"
Answer: Ventricular Tachycardia

5. **"Sawtooth"** - Atrial Flutter



If you know these, you will pass the **NCLEX!**

NCLEX TIP

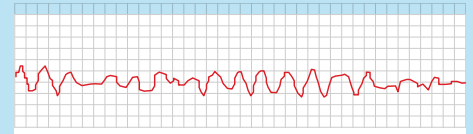
Normal sinus rhythm



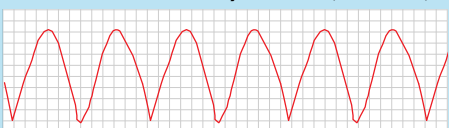
Bradycardia



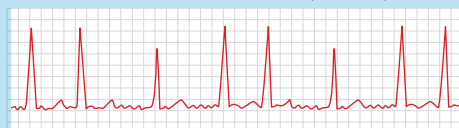
Ventricular Fibrillation (V Fib)



Ventricular Tachycardia (V Tach)



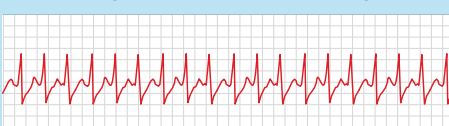
Atrial Fibrillation (A Fib)



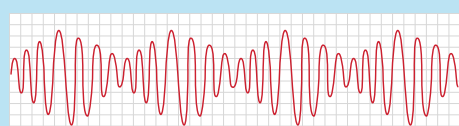
Atrial Flutter (A Flutter)



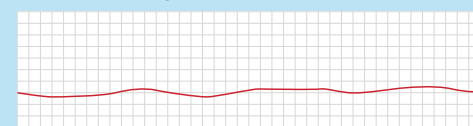
SVT - Supraventricular Tachycardia



Torsades de Pointes



Asystole - flatline



5 Step EKG INTERPRETATION

Heart rate	Rhythm	P wave	PR interval (in seconds)	QRS (in seconds)
60 -100/min	Regular	Present before each QRS, identical P/QRS ratio 1:1	0.10 - 0.20 (<5 small squares)	Normal shape < 0.12

Heart Rate

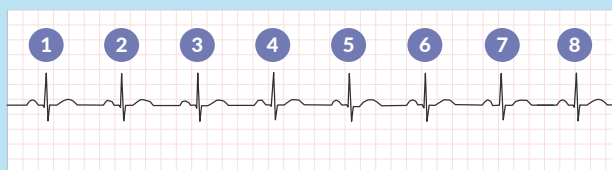
$$8 \times 10 = 80$$



1. Normal Sinus Rhythm

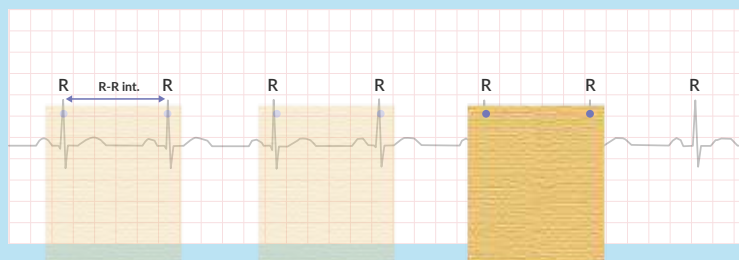
Rate - 60 -100

count the peaks - we have 8 here
multiply by 10 = 80 beats!



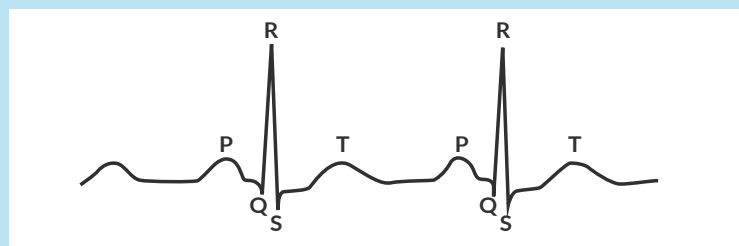
Rhythm

2. **Rhythm** - R peaks are evenly spaced apart.
To quickly measure this simply grab some paper & mark 2 R peaks then just march it out.
The R peaks should be even every time.



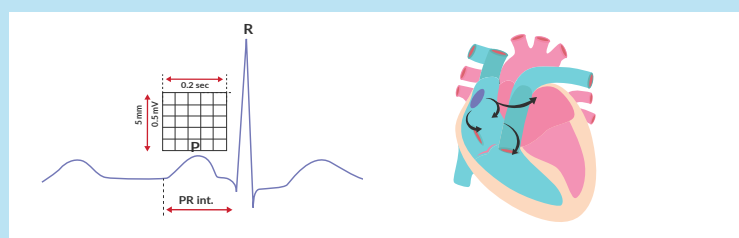
P Wave

3. **P wave** - which is our atria contracting -
is it present? & does it have its buddy QRS?
we need a P with QRS every time



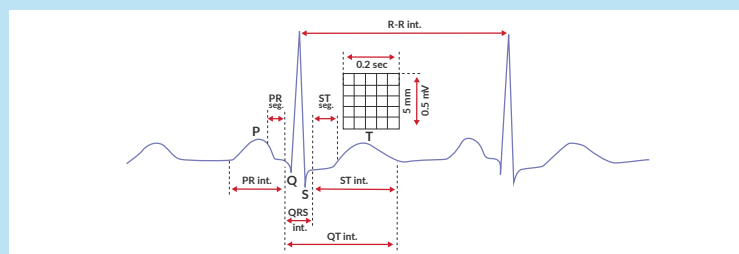
PR interval (in seconds)

4. **PR interval** - basically measures the
time it takes between atrial contractions
& ventricular contractions should be 5 mini
boxes or less - or .10 - 2.0 seconds here.



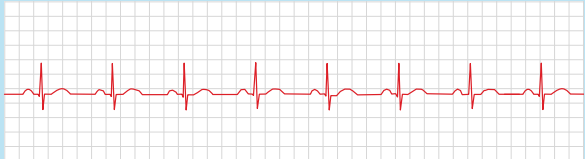

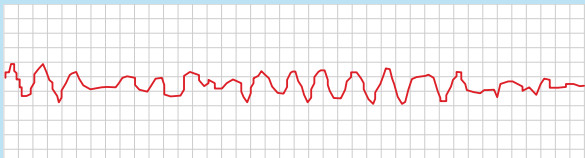
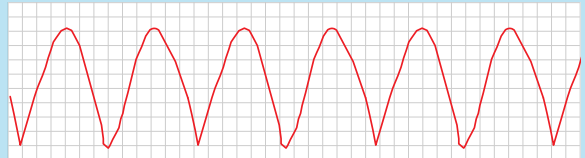

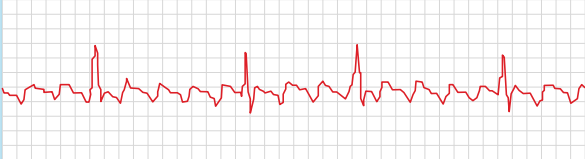
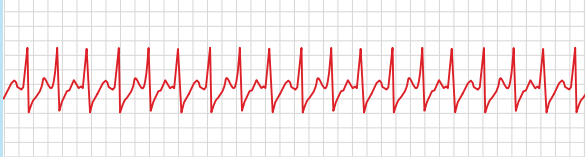
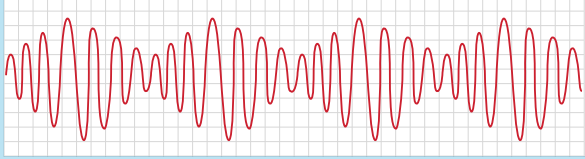
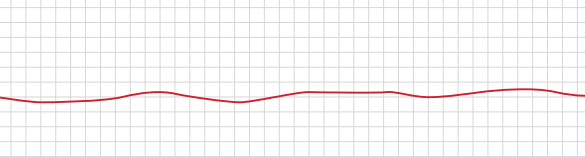
QRS (in seconds)

5. **QRS** - Ventricles contracting
Is it present, upright & TIGHT?
Should NOT be wide, should only be
3 boxes - .12 seconds here.



EKG Quick view

9 strips to know for the Nclex

Normal sinus rhythm	
Bradycardia	
Ventricular Fibrillation (V Fib)	
Ventricular Tachycardia (V Tach)	
Atrial Fibrillation (A Fib)	
Atrial Flutter (A Flutter)	
SVT - Supraventricular Tachycardia	
Torsades de Pointes	
Asystole - flatline	

Heart Sounds & 5 EKG Lead Placement

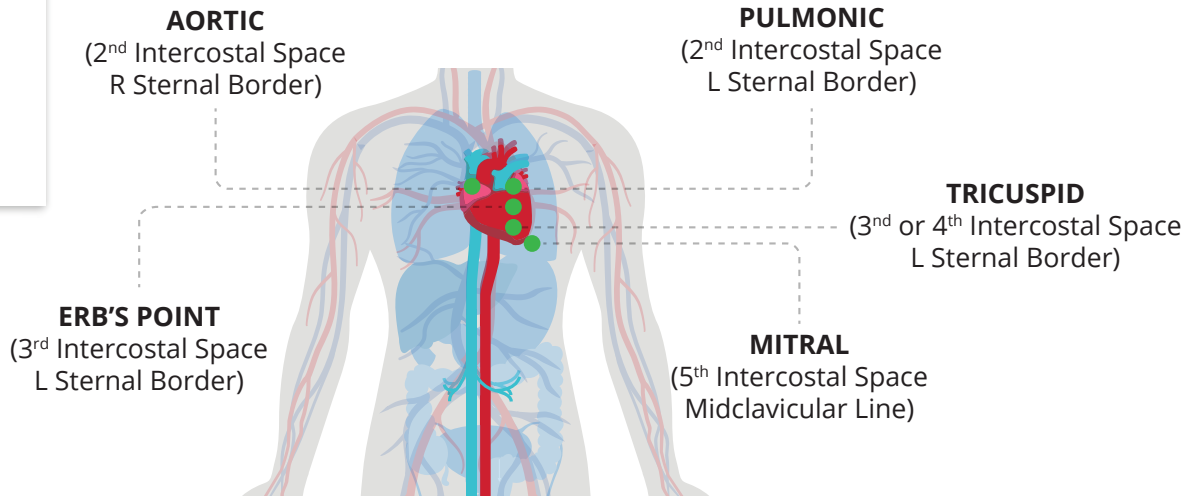
Memory Trick

APETM

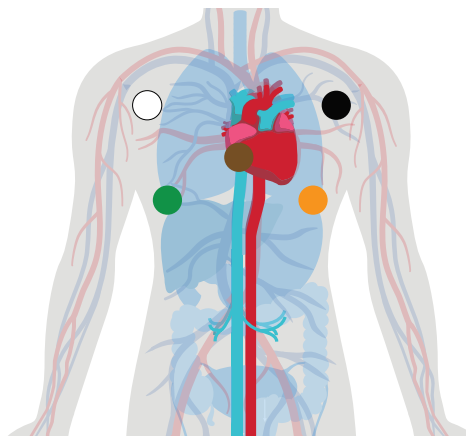
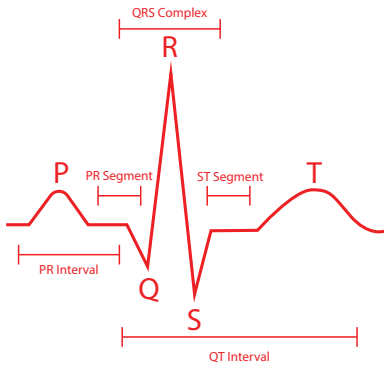
"All Pigs Eat Too Much"

- A** - Aortic
- P** - Pulmonic
- E** - Erb's point
- T** - Tricuspid
- M** - Mitral

Heart Sounds



5 EKG Lead Placement

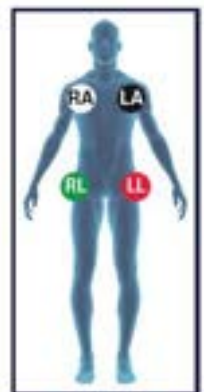
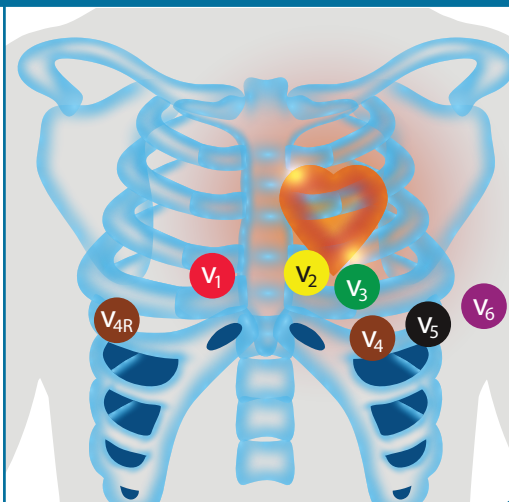


Memory Trick

White on Right
Smoke over Fire
Brown in the Middle
Grass under sky (white)

Proper 12-Lead Placement for Left Side of Chest

- V₁** 4th intercostal space to the right of the sternum
- V₂** 4th intercostal space to the left of the sternum
- V₃** directly between the leads V₂ & V₄
- V₄** 5th intercostal space at midclavicular line
- V₅** level with V₄ at left anterior axillary line
- V₆** level with V₅ at left midaxillary line
(directly under the midpoint of the armpit)
- V_{4R}** 5th intercostal space, right midclavicular line



- RA** Right Arm
- LA** Left Arm
- LL** Left Leg
- RL** Right Leg


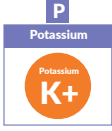


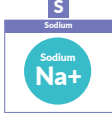

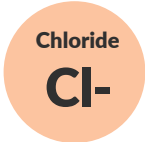





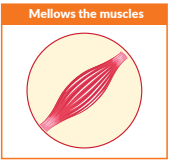

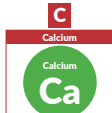

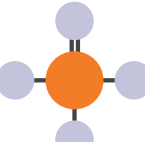



Pathophysiology

Fluid & Electrolytes

Electrolyte Imbalances

Pathophysiology Course

TEST TIP The **MOST deadly** conditions are typically the **MOST tested** conditions, since the main goal of nursing school is to create safe nurses.

Electrolytes	Function	HYPER "HIGH"	Hypo "low"
<p>Potassium K+ 3.5 - 5.0</p> 	<p>P Priority</p>  <p>P Pumps the heart</p> 	<p>HYPERkalemia (over 5.0)</p> <p>Manifestations (S/S) Heart = HIGH pumps 1 - Peaked T Waves & ST Elevation 2 - Severe V Fib & Cardiac Arrest 3 - Hypotension & Bradycardia Neuromuscular = HIGH 1 - Increased DTR 2 - Paralysis & paresthesia (tingling) 3 - Muscle Weakness (General Feeling of heaviness) GI = HIGH pumps 1 - Diarrhea 2 - Hyperactive bowel sounds</p> <p>Causes: - Renal failure - Low Aldosterone</p> <p>Memory Trick for AL A - Adds Sodium L - Loses Potassium</p>	<p>HYPOkalemia (below 3.0)</p> <p>Manifestations (S/S) Heart = Low & slow pump 1 - Flat T waves, ST depression & Uwave Neuromuscular = Low & slow 1 - Shallow Respirations! Most DEADLY 2 - Decreased DTR 3 - Muscle cramping & flaccid paralysis (paralyzed limbs) GI = Low & slow 1 - Constipation 2 - HypoActive bowel sounds 3 - Paralytic ileus (paralyzed intestine) Priority risk for SBO</p> <p>Causes: Fluid Loss/Electrolyte Loss "Where fluids flow, Electrolytes Goooo!" Diarrhea, Diuretics, Diet, DKA, Aldosterone</p>
<p>Sodium Na+ 135 - 145</p> 	<p>Maintains:</p> <ul style="list-style-type: none"> Blood Pressure Blood volume pH balance  <p>S Swells the body with FLUID</p> 	<p>HYPERnatremia (over 145)</p> <p>Manifestations (S/S) Body = Big & Bloated 1 - Edema (swollen body) 2 - Flushed "red & rosey" skin 3 - Increased muscle tone 4 - Swollen dry tongue 5 - Nausea & Vomiting</p> <p>Causes: - Low ADH (antidiuretic hormone) DI: Diabetes Insipidus Think Dry Inside - Rapid respirations - Watery diarrhea - Loss of thirst</p>	<p>HYPONatremia (below 135)</p> <p>Manifestations (S/S) Brain = Low & Slow 1 - Headache = Cerebral edema 2 - Mental status changes 3 - Seizures & Coma Muscular = Low & slow - Fatigue & muscle cramps Respiratory = Low & slow - Respiratory Arrest</p> <p>Causes: - Sweating - Excess water intake (running in the extreme heat) TEST TIP - SIADH (Excess ADH) - Vomiting & diarrhea, - Diuretics & Diuresis - Diet low in salt - Low aldosterone</p>
<p>Chloride Cl- 97 - 107</p> 	<p>Related to sodium Maintains:</p> <ul style="list-style-type: none"> Blood pressure Blood Volume pH balance 	<p>HYPERchloremia (over 107)</p> <p>NEARLY SAME AS HIGH SODIUM</p> <p>1 - Swollen dry tongue 2 - Nausea & vomiting</p> <p>Alkalosis - vomiting</p> 	<p>HYPOchloremia (below 97)</p> <p>NEARLY SAME AS low SODIUM</p> <p>1 - Fatigue & muscle cramps 2 - Fever (only difference)</p> 
<p>Magnesium Mg+ 1.3 - 2.1</p> 	<p>M Magnesium</p>  <p>M Mellows the muscles</p> 	<p>HYPERmagnesemia (over 2.1)</p> <p>Manifestations (S/S) Heart = High Mellow 1 - Heart block, 2 - Hypotension, Bradycardia DTR = High Mellow - Hyporeflexia (decreased DTR) Lungs & GI = High Mellow - Depressed respirations - Hypoactive bowel sounds</p> <p>Causes: - Renal failure - Alcoholism - Malnourishment</p>	<p>HYPOmagnesemia (below 1.3)</p> <p>Manifestations (S/S) Heart = Low Mellow - Excited! 1 - Torsades de Pointes TOP TESTED! & V Fib (ventricular fibrillation) DTR = Low Mellow - Excited! - HYPERreflexia (increased DTR) GI = Low Mellow - Excited! - Diarrhea - Hyperactive bowel sounds</p> <p>Causes: - Crohn's disease - Celiac disease</p>
<p>Calcium Ca 9.0 - 10.5</p> 	<p>Keeps the 3 Bs Strong B - Bone B - Blood (clotting) B - Beats (heart)</p> <p>Inverse relationship with Calcium</p>  <p>C Contracts the muscles</p> 	<p>HYPERcalcemia (over 10.5)</p> <p>Manifestations (S/S) HIGH Calm 1 - Kidney stones, moans & groans (Renal Calculi) 2 - Constipation 3 - Bone Pain 4 - Severe muscle weakness & lethargy</p> <p>Causes: - Hyperparathyroidism High PTH = High Calcium - Cancer, - Immobility</p>	<p>HYPOcalcemia (below 9.0)</p> <p>Manifestations (S/S) Low Calm = Excited! 1 - Trousseau's Sign Twerking arm when BP cuff on Tetany: muscle spasms all over 2 - C - Chvostek's Sign Cheek smile when stroking face 3 - Diarrhea 4 - Weak B's Weak Bones = Fractures Weak Blood clotting = r/f bleeding Weak Beats = Cardiac dysrhythmias</p> <p>Causes: - Hypoparathyroidism Low PTH = Low Calcium - Renal failure TEST TIP! Chronic kidney disease (CKD)</p>
<p>Phosphate 3.0 - 4.5</p> 	<p>- Ca HIGH = Phosphate Low - Ca Low = Phosphate HIGH</p>   	<p>HYPERphosphatemia (over 4.5)</p> <p>Manifestations (S/S) Think Low Calcium signs 1 - Trousseau's & Tetany 2 - Constipation 3 - Weak B's (bones, blood, beats)</p> <p>Causes: - Renal failure TEST TIP Chronic kidney disease (CKD)</p>	<p>HYPOphosphatemia (below 3.0)</p> <p>Manifestations (S/S) Think High Calcium signs 1 - Kidney stones, moans & groans (Renal Calculi) 2 - Constipation 3 - Bone Pain 4 - Severe muscle weakness & lethargy</p> <p>Causes: - Hyperparathyroidism High PTH = High Calcium - Genetics - Cancer</p>

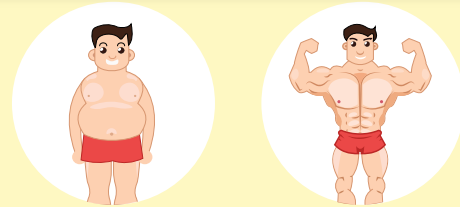
Fluid Balance

Pathophysiology Course

Factors that Influence Fluid Balance

- Muscle (more fluid)
- Body Fat (less fluid)
- Gender (men retain more fluid)
- Age

MUSCLE RETAINS MORE H₂O



Key Terms

Osmosis:

The movement of **fluid** from an area of **LOWER** concentration to an area of **HIGHER** concentration, leading to equalization.
Example: Large intestines that absorb high nutrients & balance fluids.

Diffusion:

The movement of **solutes** from an area of **GREATER** concentration to an area of **LESSER** concentration, leading to equalization.
Example: exchange of O₂ & CO₂ inside the lungs.

Filtration:

The movement of **BOTH fluid & solutes** from an area of **HIGH** hydrostatic pressure to an area of low pressure.
Example: Kidneys that filter the blood.

Osmolality:

The concentration of a solution.
 Higher osmolality = Higher solutes (heavy)
 Lower osmolality = Lower solutes (light & dilute)

Examples:

- **Isotonic** solutions: Equal osmolality 270 - 300 millimoles / kg (same as blood concentration)
- **Hypertonic** solutions: High osmolality (heavy & thick concentration) **OVER** 300 millimoles / kg
- **Hypotonic** solutions: Lower osmolality (lighter & dilute) **Less than 300** millimoles / kg

Fluid Volume Overload - Overhydration



Overhydration for Overload!

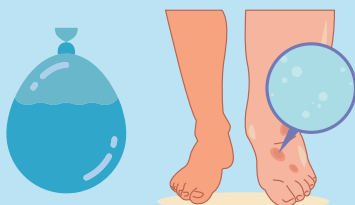
Other Names:

- Fluid Volume Excess
- **Hypervolemia**
- FVO (Fluid Volume Overload)

Edema:

The swelling of soft tissues as a result of excess fluid accumulation

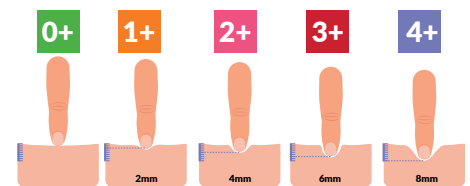
Clients puff up like a big water balloon manifesting as edema (the swelling of soft tissues from excess fluid).



Grading the Pitting Edema

0+	No pitting edema
1+	2 mm or less Mild (immediate rebound)
2+	3-4 mm Moderate (15 seconds rebound)
3+	5-6 mm Moderately Severe (30 seconds to rebound)
4+	8 mm or deeper SEVERE! (1-2 minutes to rebound)

Edema makes the skin look like a memory foam mattress, ranging from 0+ to 4+ pitting edema.



4 Main Causes of Edema

1. Increased hydrostatic pressure **TEST TIP**

- Increased volume
- Manifestations:
 - High blood pressure (BP)
 - Pitting edema
- **Examples:**
 - Renal Failure
 - Heart Failure

Memory Trick

- HF - heart failure
- HF - heavy fluid

2. Decreased colloid osmotic pressure

- **Low Albumin** (Low plasma proteins)

Memory Trick

- **A** - Albumin
- **A** - Attracts fluid

Examples:

- Cirrhosis (liver disease)
- Starvation

3. Increased capillary permeability

Examples:

- Bacteria (infection)
- Burns

4. Obstruction of the lymphatic system

- Cancer (tumor blockage)
- Infection (big lymph nodes)

Fluid Balance II

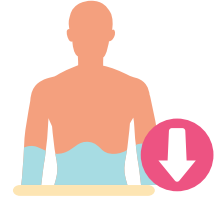
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Fluid Volume Deficit - Dehydration

MEMORY TRICK

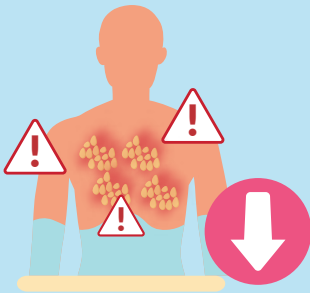
FVD is a common manifestation of dehydration, where there is a **deficit or decrease in body fluid!** Clients present sunken in, shrivelled up & very weak, like a **dried out raisin in the sun!**

DRY
Dehydration
Deficit of fluid



Top 4 Causes:

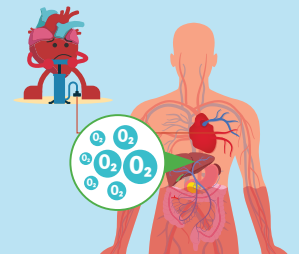
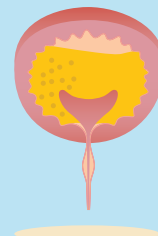
- Vomiting & Diarrhea
- Hot body & Sweating:
 - Fever, Heat Stroke, Thyroid Crisis
- Severe burns
- Urination &
- **3 Ds:** DI, DKA, Diuretics



Top Reasons	Memory Trick
DI - Diabetes Insipidus	DI think D ry Inside
DKA - Diabetic Ketoacidosis	DKA think D - Dry <ul style="list-style-type: none"> • Increased sugar concentration in the blood (hyperglycemia) • Typically caused by infection • Kussmaul respiration (insensible losses)
Diuretics Furosemide, Hydrochlorothiazide	End in “-ide” = body dried

Compensation of FVD & Dehydration:

- Increased thirst
- Holding on to urine (concentration)
- Increased HR & Vasoconstriction



Notes

Fluid Balance III

Pathophysiology Course

Manifestations - Signs & Symptoms

Fluid Volume Overload	Fluid Volume Deficit	Fluid Volume Overload	Fluid Volume Deficit
<p>Hypervolemia HIGH fluid volume Big Bulging Body</p>	<p>HYPovolemia LOw fluid volume LOw & Little Body</p>	<p>Hypervolemia HIGH fluid volume Big Bulging Body</p>	<p>HYPovolemia LOw fluid volume Low & Little Body</p>
<p>BIG & Bulging Body BIG fluid volume</p> 	<p>LOW & Little Body LOW fluid volume</p> 	<p>Weight Gain = Water Gain Key Numbers</p> <ul style="list-style-type: none"> • 2 - 3 lbs in 1 day • 5 lbs in 7 days 	<p>Weight Loss = Water Loss</p> <p>Memory Trick</p> 
<p>Cardiovascular</p> <ul style="list-style-type: none"> • High blood pressure DEADLY Hypertension (140 systolic) TEST TIP HTN Crisis (180 systolic) Stroke Risk • Increased central venous pressure CVP • Bounding pulses • Big distended veins Jugular vein distention (JVD) 	<p>Cardiovascular</p> <ul style="list-style-type: none"> • Low blood pressure DEADLY Orthostatic hypotension TEST TIP (light-headed & dizziness upon standing) • Decreased central venous pressure CVP • Weak, thready pulses • Flat neck & hand veins • Tachycardia (pulse over 100) TEST TIP 	<p>Renal & Urinary</p> <ul style="list-style-type: none"> • Increased urine output • Decreased urine output (renal issues) 	<p>Renal & Urinary</p> <ul style="list-style-type: none"> • Increased urine output initially & Decreased urine output (at end) 
<p>Integumentary (skin)</p> <ul style="list-style-type: none"> • Periorbital edema • Pitting edema (think water bed skin) from hydrostatic pressure • Pale cool skin 	<p>Integumentary (skin)</p> <ul style="list-style-type: none"> • Sunken eyes • Dry skin (Poor turgor & tenting) • Dry mucous membranes (MM) • Increased body temp 	<p>Respiratory</p> <ul style="list-style-type: none"> • Rapid shallow respiratory rate • Rales (Moist crackles) - fluid in lungs Pulmonary edema 	<p>Respiratory</p> <ul style="list-style-type: none"> • Rapid DEEP respiratory rate 
<p>Neuromuscular</p> <ul style="list-style-type: none"> • ALOC - altered level of consciousness "Mental status changes" • Headache • Weakness & paresthesias 	<p>Neuromuscular</p> <ul style="list-style-type: none"> • Lethargy to coma • Weakness 	<p>Gastrointestinal</p> <ul style="list-style-type: none"> • Increased motility - Diarrhea • Hepatomegaly (enlarged liver) • Ascites (abdominal fluid) 	<p>Gastrointestinal</p> <ul style="list-style-type: none"> • Decreased motility - Constipation • Diminished bowel sounds 
<p>Urine (Low when Liquidy)</p> <ul style="list-style-type: none"> • Decreased urine specific gravity • Low 1.005 (Normal 1.005 - 1.030) Low gravity = Low Weight 	<p>Urine (High when Dry)</p> <ul style="list-style-type: none"> • Increased urine specific gravity • High 1.005 (Normal 1.005 - 1.030) High gravity = High Weight 	<p>Lab Values (Low when Liquidy)</p> <ul style="list-style-type: none"> • Decreased Osmolality • Decreased Hematocrit (Hct) • Decreased Blood Urea Nitro (BUN) • Decreased Electrolytes Low Sodium Na+ • Hyponatremia (below 135 mEq/L) Risk for brain damage 	<p>Lab Values (Appear High when Dry)</p> <ul style="list-style-type: none"> • Increased Osmolality • Increased Hematocrit (Hct) • Increased Blood Urea Nitro (BUN) • Increased Electrolytes High Sodium Na+ • Hypernatremia (over 145 mEq/L) Risk for brain bleeding

Notes

Tonicity of Fluids

Pathophysiology Course

Isotonic Solutions

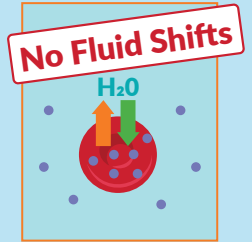
ISO-tonic think "I-SO-perfect"

These solutions have **perfect balance** (equilibrium) of solutes both inside & outside the cell, therefore no fluid shifts are made. Human blood is isotonic thus very little osmosis occurs, since isotonic solutions have the same osmolality as body fluids.

- Equilibrium or are **equal in concentration**

Memory Trick

- Iso-tonic Solutions
- I-so-Perfect "I'm so perfect" (no fluid shift)



Caution

- Too much isotonic Fluid volume overload! (FVO)
- **Monitor: Blood Pressure**
- **Key Manifestation: HTN crisis!**
 - BP over **180/systolic**
 - Risk for CVA stroke

List of fluids:

- 0.9% Sodium Chloride (**normal saline**)
- Lactated Ringer's (**LR**)

Uses:

- Hypotension (low blood pressure)
- Blood transfusions
- Hemorrhaging (blood loss)
- DKA (Type 1 diabetic disorder)
- HHNS (Type 2 diabetic disorder)

IV Normal Saline (0.9% sodium Chloride)



IV Lactated Ringer's (LR) solution



Hypotonic Solutions

HYPO-tonic think **LOW**.

These solutions have a **LOWER** osmolality & **LOWER** concentration of solutes than body fluids. They cause the movement of water into cells by osmosis, **swelling the cells like a BIG fat hippo**, and therefore should be administered slowly to **prevent cellular edema**.

- **LOWer Osmolarity** than body fluids

Memory Trick

- Hyp**O** - tonic
- Hipp**O** - **tonic** (cells swell with fluid)

Caution

- Give slowly to prevent: Cellular edema & **cerebral swelling**
- **NOT for:** ICP (intracranial pressure)
- **Manifestation to monitor** Cerebral Edema
 1. Headache
 2. Mental Status Changes
 - "Altered level of consciousness"
 - New Confusion, Restless, Agitated
 3. Seizures & Coma

List of fluids:

- 0.45% Sodium Chloride (**1/2 NS**)
- 0.225% Sodium Chloride (**1/4 NS**)
- 0.33% Sodium Chloride (**1/3 NS**)
- 5% Dextrose in 0.225% Saline (**D51/4NS**)
- 5% Dextrose in Water (**D5W**)

Side Note

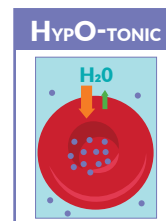
- D5W!
 - Isotonic in bag
 - Hypotonic in body

Used for Cellular Dehydration

- Hyponatremia (Sodium **over 145** mEq/L)

Memory Trick

- A lot of numbers
- A lot of fluid in the cell!



Hypertonic Solutions

HYPER-tonic think **HIGH & dry**.

These solutions have a **HIGHER** osmolality & **HIGHER** concentration of solutes than body fluids. They are **very thick salty solutions** having more solutes & less water, causing water to be moved outside the cells and **making the cells skinny like a hyper person**.

- **HIGHER Osmolarity** than body fluids

Memory Trick

- **HYPER** - tonic
- **HYPER** person (very skinny cells)

HYPER-TONIC



HYPER PERSON



Caution

- Give **slowly** to prevent: Cellular dehydration
- Fluid volume overload! (**FVO**)
- **Monitor: Blood Pressure**
- **Key Manifestation: HTN crisis!**
 - BP over **180/systolic**
 - Risk for CVA stroke

List of fluids:

- 3% Sodium Chloride (**3% NS**)
- 5% Sodium Chloride (**5% NS**)
- 10% Dextrose in Water (**D10W**)
- 5% Dextrose in 0.9% Sodium Chloride (**D5NS**)
- 5% Dextrose in 0.45% Sodium Chloride (**D51/2NS**)
- 5% dextrose in Lactated Ringer's (**D5LR**)

Memory Trick

- **very little numbers**
- **very little fluid** in the cell!

Used for clients:

- Hypovolemia
- Heat related (heat exhaustion)
- Peritonitis
- **Peritoneal Dialysis**

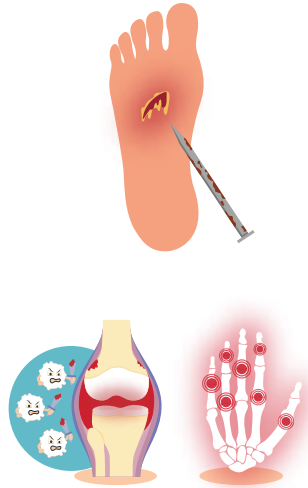
Inflammation & Healing

Inflammation & Healing

Pathophysiology Course

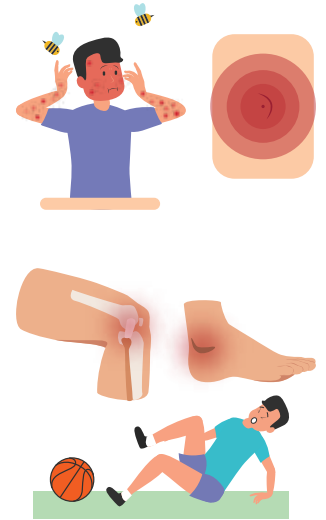
Inflammation & Healing

Inflammation is a protective reaction to an injury, disease, or irritation of the tissues. It is **NOT** the same as infection, rather infection is a cause of inflammation.

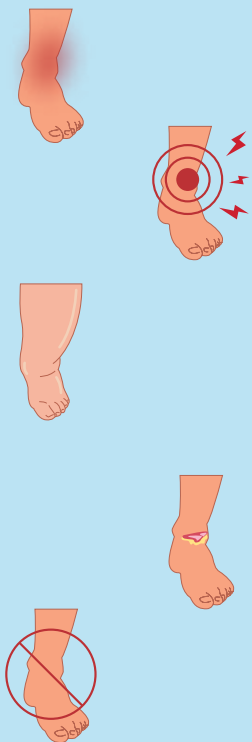


Causes:

- Infection
- Autoimmune disease
- Allergic reaction
- Trauma (sprain or break)



Manifestation - Signs & Symptoms



Local effects:

- Redness/warmth
- Edema
- Pain
- Loss of function
- Exudate

Systemic effects:

- Mild fever
- Malaise (feeling of discomfort)
- Fatigue
- Headache
- Anorexia

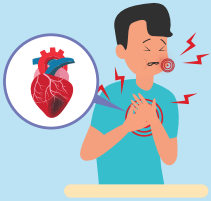


Stress, Pain & Homeostasis

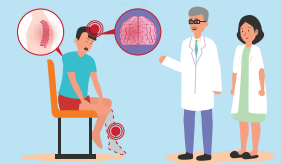
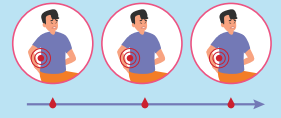
Stress, Pain & Homeostasis

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Types & Sources of Pain

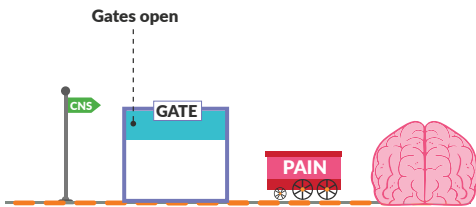


Acute Pain	Sudden, severe, short-term pain Example: New bump or bruise
Chronic Pain	Long-term pain "recurring, over an extended time" Example: Back pain (long-term)
Referred Pain	The feeling of pain in one part of body is caused by pain or injury in another part of the body Example: Chest pain from a heart attack could trigger pain in the jaw
Phantom Pain	Pain that feels like it is coming from a body part that is no longer there Test Tips Real pain! Example: Amputations



Gate Control Theory of Pain

1. Gates built into normal pain pathways ---->
2. **Gates open** & pain impulse transmitted to brain ---->
3. **Gates close** & pain impulse is reduced



Diagnosis of Pain

- Location
- Description (burning/aching, etc)
- Timing (with activity)

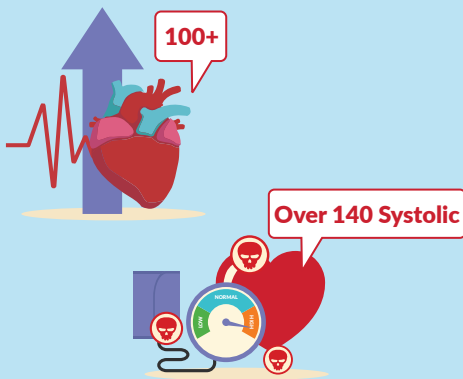


O	Onset
P	Provocation
Q	Quality
R	Radiation
S	Severity
T	Time

Pain Manifestations

Signs & Symptoms

- Pallor (pale)
- Diaphoresis (sweating)
- Tachycardia (HR 100+)
- High Blood pressure (over 140/sys.)
- Nausea & vomiting (acute)
- Fainting/ dizziness (acute)
- Anxiety/ fear (Chronic pain or trauma)
- Clenched fists
- Restlessness



Notes

Cell & Congenital Disorders

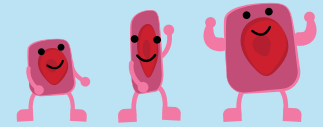
Cellular Adaptations, Damage & Necrosis

Pathophysiology Course

Cellular Adaptations

Changes made by cells in response to changes in their environment. Let name help you: Cellular adaptations, think **cells adapt & change** to their environment.

Cellular adaptations



1. Atrophy:

- **Decrease in the size** of cells, tissues or organs.
- **Example:** Bedridden clients typically have decline in muscle mass (muscular atrophy) from underuse & immobility

Memory Trick

- **A** - think without
- **Trophy** - think of a BIG "trophy award" (muscles or organs)
- **Atrophy:** without a BIG muscles or organs

2. Hypertrophy

- Enlargement of an organ due to an **increase in the size of cells**.
- **Example:** Left ventricular hypertrophy in heart failure (enlarged heart muscles)

Memory Trick

- **Hyper** - High amounts or Enlarged
- **Trophy** - BIG hard "trophy award" (muscles or organs)
- **Hypertrophy:** A lot of extra muscle or organ "beefing up"

3. Hyperplasia

- Enlargement of an organ due to **increased reproduction rate of its cells**.
- **Example:** BPH - benign prostatic hyperplasia

Memory Trick

- **Hyper** - High amounts
- **Plasia** - Production
- **Hyperplasia:** high amounts of production

4. Metaplasia

- The **change of a cell** from 1 type to another type of cell.
- **Example:** Changes in the tissue of the airways in response to smoking or chronic irritation.

Memory Trick

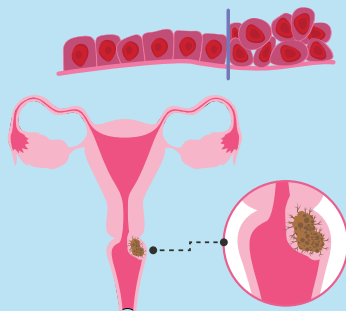
- **Metaplasia**
- **Metamorphosis**

Dysplasia

- Healthy cells undergo abnormal changes. Typically indicates a precancerous condition.
- **Example:** Cervical dysplasia

Memory Trick

- **Dysplasia**
- **Dysfunctional** production of cells (abnormal changes)



Neoplasia

- New, abnormal growth of tissue
- **Example:** Neoplasms (Tumors), Malignant Melanoma (skin cancer)

Memory Trick

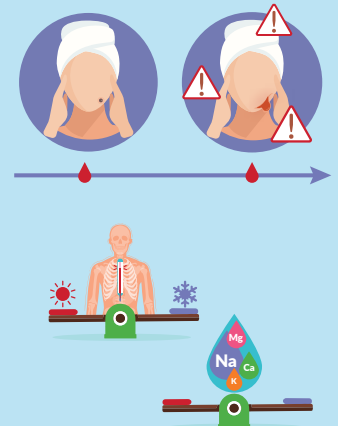
- **Neo**-plasia
- **New** production of cells (Tumors)

Homeostasis

- Stability & balancing of the biological systems necessary for survival.
- **Example:** Stabilizing body temperature, fluid balance, etc.

Memory Trick

- **Homeostasis**
- Home is **stable**



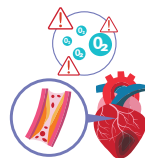
Cell Degeneration, Damage & Necrosis

Necrosis

- Cell death caused by **injury or ischemia (low oxygen)** from lack of blood flow.
- **Example:** Myocardial infarction (MI) heart attack

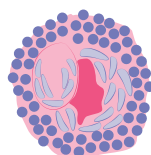
Memory Trick

- **N** - Necrosis or Necrotic Tissue
- **N** - Not living tissue (dead)



Necrosis Types

- **Liquefaction Necrosis**
The softening of the necrotic tissue that transforms into a pasty-like mush or watery debris.
Example: abscess (pus filled collection of fluid)
- **Coagulative Necrosis**
Cell death typically caused by ischemia or infarction.
Example: Heart attack (MI - Myocardial Infarction)
- **Caseous Necrosis**
Cell death in which tissue maintains a cheese-like appearance. Necrosis is surrounded by a granulomatous inflammatory process.
Example: TB - Tuberculosis



Gangrene

- Tissue death caused by an **infection or lack of blood flow**
- **Example:** Diabetic feet & toes

Apoptosis

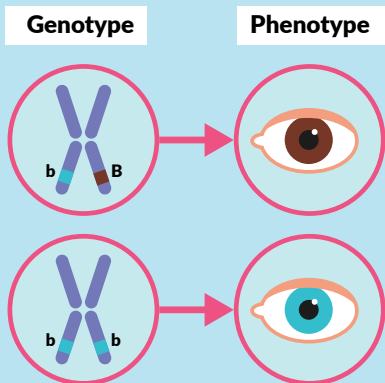
- Normal programmed cell death (cellular suicide) that occurs as part of growth or development.
- **Example:** Separation of fingers & toes in a developing embryo (early stage of human development)



Congenital Disorders & Chromosomal Defects

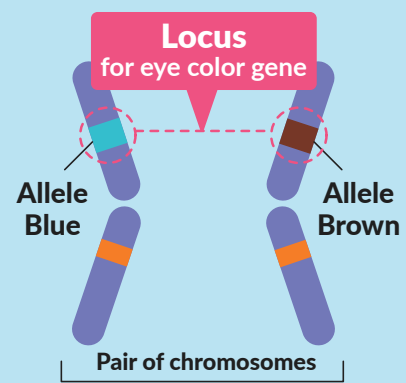
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Congenital Disorders & Chromosomal Defects



Key terms

- Genotype**
DNA sequence of the genetic makeup or set of genes responsible for a trait (no TWO are the same).
- Phenotype**
Physical expression of the trait. Influenced both by its genotype and by the environment. (example: Height, freckles, hair color)
- Allele**
Variant form of a gene
- Locus**
Fixed position on a chromosome
- Carrier**
Someone who has inherited a recessive allele for a genetic trait or mutation.



Pattern of Inheritance (Congenital Disorders)

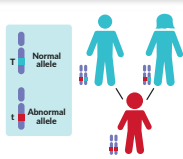
These conditions develop prenatally and may be identified before or at birth, or later in life.

Autosomal DOMINANT (Single Gene)

- Inheritance of **only 1 allele** to cause disorder (only 1 abnormal gene from 1 parent = disease)
- Memory Trick**
 - 1 Dominant
 - 1 Prominent abnormal allele gene
- Examples**
 - Familial hypercholesterolemia (high cholesterol)
 - Adult polycystic kidney disease
 - Huntington disease
 - Marfan Syndrome

Autosomal RECESSIVE

- Takes **2 alleles** to cause disorder (BOTH parents must pass on the allele (2 copies of abnormal genes needed for disease))
- Heterozygous** (1 recessive, 1 dominant) 1 "bad" allele, 1 "good allele" = carriers
- Homozygous** (may be dominant or recessive) 2 "bad" alleles = affected
- Memory Trick**
 - Recessive Autosomal
 - Rerun (2 alleles)
- Examples**
 - Cystic fibrosis
 - Sickle cell Anemia
 - Polycystic kidney disease (PKD)
 - Tay-Sachs Disease

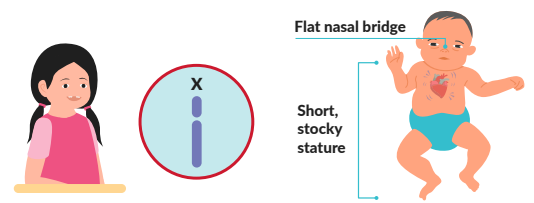


Chromosomal Defects

Either an extra, deleted or duplicated chromosome in the DNA sequence.

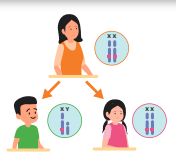
Examples

- Klinefelter Syndrome (XXY)**
 - Memory Trick**
 - K - Klinefelter
 - K - calvin Klein
 - Males born with **extra X chromosome**
 - Infertility
 - Small testes, low testosterone, incomplete puberty, gynecomastia.
 - XY (normal in men)
 - XXY chromosomes
- Turner Syndrome (Monosomy X) Test Tip**
 - Memory Trick**
 - "Turner Syndrome = Tina TURNER (girls)"
 - Female clients are **born with only one X chromosome** or missing part of one
 - Infertility
 - Absence of puberty
 - Shorter stature
 - Thick webbed neck
- Down Syndrome (Trisomy 21)**
 - Test Tips**
 - Systolic heart murmur
 - 50% have heart defects
 - Flat nasal bridge
 - Short stocky stature



X-linked Recessive Disorders

- Allele carried on the X chromosome
Males = XY Passed from mother to son
Females XX
- Males with a "bad" X chromosome are affected
- Females **BOTH X chromosomes** must be "bad"
- Examples**
 - Duchenne Muscular Dystrophy
 - Hemophilia A



Multifactorial Disorders

- Environment & Family history (genetics)
- Teratogenic Effects Patho Tip**
Exposure to substances that cause birth defects (cigarettes, alcohol, medications)
- Memory Trick**
 - Multifactorial
 - Multiple/ Many Factors
- Examples**
 - Cleft palate
 - Congenital heart disease
 - Type 2 Diabetes (Type II DM)
 - Congenital hip dislocation (dysplasia)

Cancer & Neoplasms

Neoplasms & Cancer Signs

Pathophysiology Course

Cancer Pathophysiology



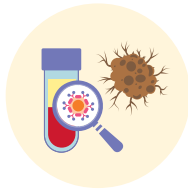
Risk factors



Diagnostics



Signs & Symptoms



Staging & Tumor marker

Tumor Markers (TNM)

- **T - Tumor Size**
size of primary Tumor
- **N - Node involvement**
Lymph nodes: quick spread if involved
- **M - Metastasis of primary**
spread of cancer to other parts of the body

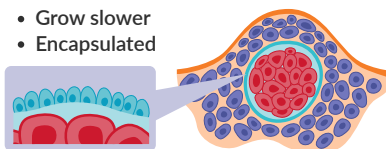
Memory Trick

M - Malignant
Malicious BAD (cancerous)
Metastasis (spread)

B - Benign
Be nice (non cancerous)
Bogged down in 1 place

Test Tips

1. **Rapidly growing** cells
2. **Lack** a specific form
3. **Disorganized cells** that spread to other parts of the body (metastasis)
Typically non-encapsulated



4 Stages of Cancer

- **Stage 0:** No cancer
- **Stage I:** Small & only in 1 area
- **Stage II & III:** Large & has grown into nearby tissues or lymph nodes
- **Stage IV:** Severe! Cancer has spread to other parts of the body (Metastasis)

Cancer Risk factors

- Family history
Genetics: Oncogenes (mutated genes that contribute to the development of cancer)
- Viruses: Oncoviruses (viruses that can cause cancer like HPV)
- Radiation:
 - UV light (Sun & tanning beds)
 - X-rays
- Biologic factors:
 - Hormone therapy (estrogen)
 - Age: over 65 yrs
- Lifestyle & Habits
 - Diet: low in fiber
 - Weight: Obesity (BMI over 25)
 - Alcohol intake (over 2 per day)

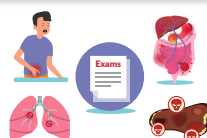
Cancer Manifestations

Early Signs

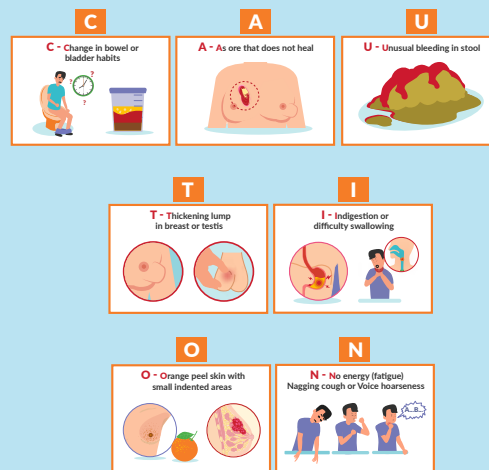
- Unusual sudden **Bleeding**
 - Tumor cells can erode blood vessels
 - Anemia (low blood count)
- Unexplained **Weight Loss**
 - Cachexia (extreme weight loss)
- Change in urine & **Bowel Habits** (colon cancer)
 - Yearly fecal occult blood test
- **Non-healing sore** or Thickened Lump
- Cough
 - Nagging, constant, persistent
 - Hoarseness in the voice for months
- **Skin changes:** skin cancer or breast cancer
 - Skin lesions "irregular or uneven growth"
 - Orange peel skin with small indented areas
- Difficulty swallowing and/or indigestion
- Paraneoplastic syndrome
 - Substances released by tumors affect neurological function: slurred speech, memory loss, seizures.
- Fatigue (low energy)
- Fever (night sweats)
- Effusions (fluid build-up in body cavities)

Late Signs

1. Pain
2. Obstruction: Digestive tract, Airflow in the bronchi
3. Tissue necrosis and ulceration



Memory Trick



7 Early Signs of Cancer

- C** - Change in bowel or bladder habits
- A** - A sore that does not heal
- U** - Unusual bleeding in stool
- T** - Thickening lump in breast or testis
- I** - Indigestion or difficulty swallowing
- O** - Orange peel skin with small indented areas
- N** - No energy (fatigue)
Nagging cough or voice hoarseness

Cancer Diagnostics

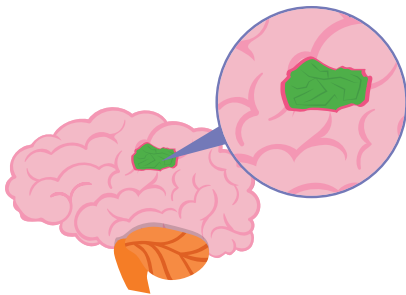
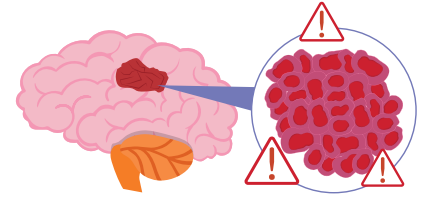
- Labs (blood tests)
 - Tumor marker
PSA - Prostate-Specific Antigen
- Imaging
 - X-ray, Ultrasound, MRI, CT
- Biopsy
 - Most accurate in the confirmation of malignancy

Brain Tumors

Pathophysiology Course

Pathophysiology

A brain tumor is a mass or growth of abnormal cells in the brain.



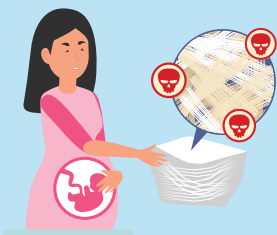
- Benign: Noncancerous
- Malignant: Cancerous



Causes & Manifestations



- **Primary malignant brain tumors:**
Very invasive & difficult to remove
- **Causes (etiology)**
 - Prenatal exposure to carcinogens & embryonic development
 - Adults: Don't know predisposing factors
- **Manifestations** (signs & symptoms)
 1. Seizures
 2. Signs of increased ICP
 - Headache
 - Vomiting
 - Mental status changes
"Change in mental status"
 3. Death before general
Signs & Symptoms (manifestations)



Notes

Leukemia

Pathophysiology Course

Pathophysiology

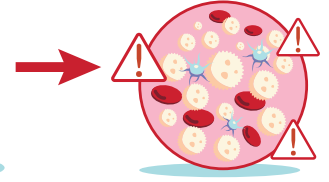
Leukemia is a type of cancer that affects the **blood cells & bone marrow**. Bone marrow is responsible for making blood cells: WBCs, RBCs, platelets. In Leukemia there is an **overproduction of white blood cells (WBCs)** that crowd out the production of normal cells, leading to low RBCs & low platelets.

Leukemia

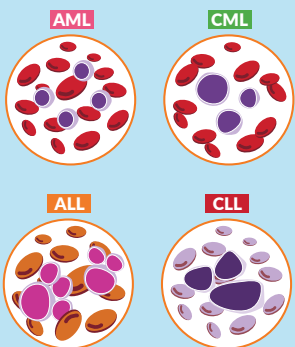
- Leuk = Leukocyte (WBC)
- emia = blood



Crowd out the production of **RBCs & platelets**



Main Types

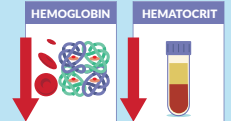


- AML** - Acute myeloid leukemia
Pediatrics more common
- CML** - Chronic myeloid leukemia
- ALL** - Acute Lymphocytic Leukemia
- CLL** - Chronic Lymphocytic Leukemia

Labs

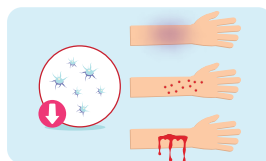
Labs

- High WBCs
- Low H/H
- Low Platelets



Signs & Symptoms

- **Frequent infections**
- **Fatigue**, Unsteady Gait, Pale "Pallor"
- **Bruising**, Petechiae, & Easy Bleeding
- Weight Loss & **Anorexia**
- Bone pain



Acute Leukemias (AML, ALL)

- Immature, nonfunctional WBCs
- Acute = Abrupt onset
- Common in children

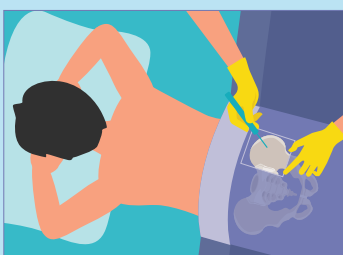
Chronic Leukemias (CML, CLL)

- Mature cells with reduced function
- Slow onset (insidious)
- Older adults

Diagnostics

Bone marrow biopsy

Taken from the posterior iliac crest



Treatment

Radiation & Chemotherapy to kill the cancer.
Rarely: Stem cell transplant - like hitting the restart button to reboot the bone marrow.



Stem cell transplant



Lymphoma

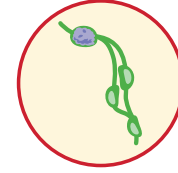
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Pathophysiology

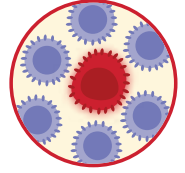
Lymphoma is cancer within the **lymphatic system**, the body's disease fighting network including:

- **Lymph nodes** - the drainage tubes that help to empty the waste
- **Spleen** - houses the white blood cells (WBCs), which help to defend the body against infection
- **Thymus gland** & bone marrow

Hodgkins



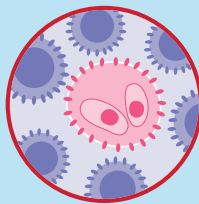
Non-Hodgkins



Diagnostics

Hodgkin's = Reed-Sternberg

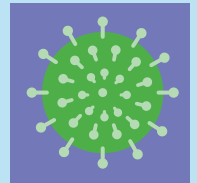
Non-Hodgkin = NOT Reed-Sternberg



Causes

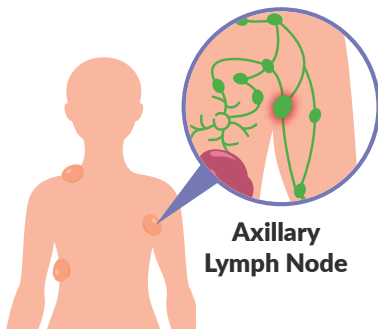
Epstein Barr virus

50% of cases



Epstein Barr virus

Signs & Symptoms

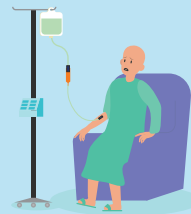


- **Painless Bumps & "Lumps under arm"**
- Enlarged lymph glands
- Fever (**no chills** or feeling bad)
- **Weight Loss**
- **Night sweats** (changing sheets)
- Infections



Treatment

Clients are treated with chemotherapy and/or radiation.



Notes

Skin Cancer

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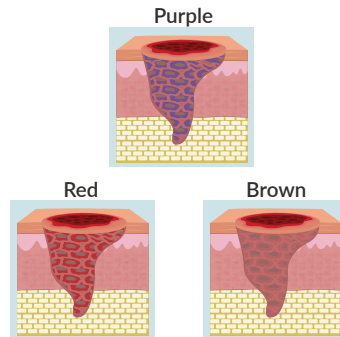
Pathophysiology

Uncontrolled growth of cells within the skin.

TYPES

- Basal cell carcinoma
- Squamous cell carcinoma
- Sarcoma **NCLEX TIP**
- **Melanoma**

KEY TERMS



Mole = Nevi



Tumor = Neoplasm



MEMORY TRICK

- **BeNign** = **Be Nice**
- **MALignant** = **MALicious**

Signs & Symptoms

Screening: Skin Lesions

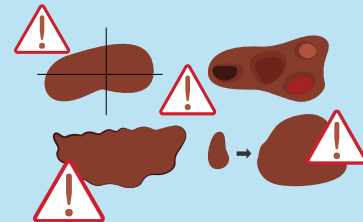
NCLEX TIPS

- A** - Asymmetry: **Irregular is BAD**
 - Half raise & half flat
- B** - Border **irregularity**: Uneven edges
- C** - **Color** Variation and changes:
 - Mixture of brown, tan, black, & red
 - **Black** / dark
- D** - **Diameter Over 6 mm**
 - Lesion is the **size of a coin** or nickel
- E** - **Evolving** - changes in size, shape, and color



NCLEX TIP: Key Terms

- **Irregular** or **Uneven** growth
- Change: **Abrupt, Sudden, Rapid** (color, size, shape)



Causes & Risk Factors

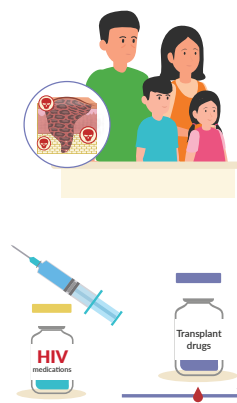
Environmental **NCLEX TIPS**

- Exposure to UV light
- **Tanning beds**
- **Sun exposure**
 - "Frequent sunburns"
 - "Outdoor occupation"

Genetics **NCLEX TIPS**

- **Family History** of skin cancer "father or mother with melanoma"
- Caucasian (light skin, blonde hair, freckles)
- **High number of moles**

Drug **Immunosuppressant** medications



Diagnostics

Tissue biopsy is required to make a definitive diagnosis of skin cancer, but again

ONLY the ones with **irregular uneven changes**.

Nursing Interventions

NCLEX TIPS

- Apply **broad spectrum sunscreen**
 - **15 minutes** before
 - SPF over 30
- **Reapply sunscreen**
 - Every 2 hours
 - **After swimming**
- **Sunburns** can happen on **overcast days** & avoid sun **10 am - 4 p.m.**
- **AVOID** Tanning beds



Cardiovascular Disorders

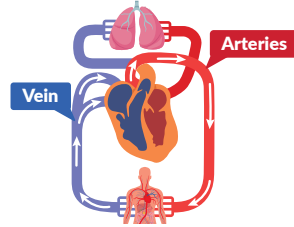
Cardiovascular Key Terms

Pathophysiology Course

Cardiac Basics

The heart acts like a pump, pumping oxygen-rich blood **OUT** to the body. This is mainly possible with the help of the "big mamma" **LEFT ventricle!**

Acting like a slingshot, the **LEFT ventricle** shoots out this oxygen-rich blood to the body through the aorta & the arteries in order to perfuse (oxygenate) the vital organs. Remember **arteries** pump oxygen-rich blood **away** from the heart & **veins vacuum deoxygenated** blood back to the **RIGHT side of the heart.**



- **A** - Arteries push oxygen rich blood
- **A** - Away from the heart
- **V** - Veins
- **V** - Vacuum **DE**-oxygenated blood

Key Terms & Concepts

Heart Rate (HR)

- The **number** of times the **heart beats** (normal: 60 - 100 bpm)

Stroke volume (SV)

- The **amount of blood** pumped by the **left ventricle** of the heart in 1 heart contraction.

Cardiac Output (CO)

- The **amount of blood** the heart pumps in 1 minute. Normal is 4 - 8 L/minute

Patho Test Tip

$$CO = SV \times HR$$

Cardio output = Stroke volume x Heart rate

Memory Trick

- Cardiac **OUT**put
- O2 blood **OUT** to the body

Cardiac Output = **Stroke Volume** X **Heart Rate**

Preload

- The **filling & stretching** of the ventricles myocardium (heart muscle) **right before contraction** (pump).

Afterload

- The **amount of resistance** that the heart has to overcome to **eject the blood** out of the ventricles & into systemic circulation (the blood vessels). Also known as **systemic vascular resistance (SVR)**.

Ejection Fraction

- The **percentage of blood** leaving the heart each time it contracts (in 1 pump).

Key Numbers

- 55 - 70% is Normal
- **40% or LESS is BAD!**
Indicates heart failure

55 - 70% is Normal
40% or less is BAD



Pulmonary circulation

- The movement of blood between the heart & lungs. **Deoxygenated blood** is transported through the right side of the heart and into the lungs to absorb **oxygen (O2)** and release carbon dioxide (CO2).
- Then back to the left side of the heart to be pumped to the body.

Systemic circulation

- The movement of **oxygen rich blood** from the heart to the rest of the body through the arteries, and back to the heart via the veins.

Memory Trick

- **A** - Arteries push oxygen rich blood
- **A** - Away from the heart to perfuse the tissues
- **V** - Veins
- **V** - Vacuum **DE**-oxygenated blood back to the heart

Coronary circulation

- Supplies oxygen rich blood to the myocardium (heart muscle) via the **coronary arteries**.

Cardiac enzymes

Are released into the circulation when the **heart muscle is damaged from lack of oxygen (ischemia)** and indicating myocardial necrosis (tissue death) during a myocardial infarction (MI) heart attack.

Troponin - proteins found in both skeletal and cardiac muscle fibers that **regulate muscular contraction**. **Top test**

Memory Trick

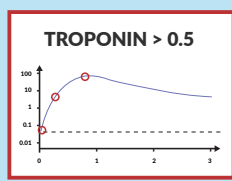
- **T** - Troponin Over 0.5
- **T** - Trauma to heart muscles
- #1 indicator = Myocardial Infarction (MI) heart attack

Myoglobin - any damage to muscle tissue, including myocardial necrosis

Creatinine Kinase (CK, CPK)

ROMI panel

cardiac enzymes taken after a heart attack, myocardial infarction (MI).



Myocardial infarction

ROMI panel

cardiac enzymes taken after a heart attack, myocardial infarction (MI).

- Troponin
- Myoglobin
- CK-MB

ANP: Atrial Natriuretic Peptides

Test tip

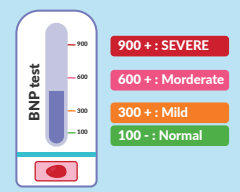
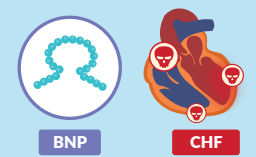
BNP: Brain or B-Type Natriuretic Peptides

Memory Trick

- **B** - BNP
- **B** - Bulging ventricles
- Very helpful in diagnosing the **severity** of **CHF: Congestive Heart Failure**

Key Numbers

- **100 & less** - Normal
- **300+** - Mild
- **600+** - Moderate
- **900+** - Severe

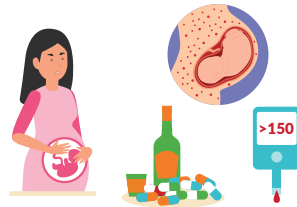
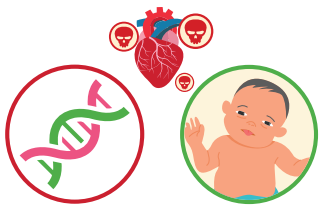


Congenital Heart Defects

Pathophysiology Course

Pathophysiology

This is an abnormality in the heart that develops before birth, where one or more problems with the heart's structure changes the way blood flows through the heart & out to the body.



- **Genetics**
 - Family history
 - Down Syndrome
- **During pregnancy**
 - Infection (Rubella)
 - Alcohol/Drug abuse
 - Diabetes

Causes

Congenital Heart Defects types

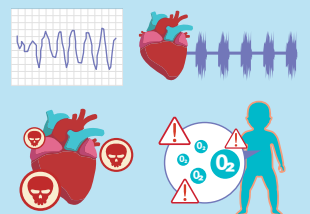
<p>Aortic valve stenosis</p>	<p>Coarctation of the aorta</p>	<p>Ebstein's anomaly</p>	<p>Patent ductus arteriosus</p>
<p>Pulmonary valve stenosis</p>	<p>Septal defects</p>	<p>Single ventricle defects</p>	<p>Tetralogy of Fallot</p>
<p>Total anomalous venous pulmonary connection</p>	<p>Transposition of the great arteries</p>	<p>Truncus arteriosus</p>	

V - Veins
V - Vacuum blood back to heart

- **Decreased cardiac **OUT**put** meaning
- **Less oxygen rich blood **OUT**** to the body

As you know in a **NORMAL** heart, deoxygenated blood is vacuumed back to the heart via the **Veins** through the vena cava into the right side of the heart. Then pushed into the lungs to get oxygenated. After that - this oxygenated blood is pushed into the **LEFT** side of the heart to be pumped **OUT** to the body - this is cardiac **OUT**put, oxygen-rich blood **OUT** to the body.

But with these heart problems less blood is pumped **OUT** of the heart resulting in decreased cardiac **OUT**put meaning **Less oxygen-rich blood **OUT**** to the body, resulting in the big complications like abnormal heart rhythms, murmurs, heart failure & hypoxia - low oxygen in the blood



Congenital Heart Defects II

Pathophysiology Course

Complications

Hypoxia (low O2)

RIGHT to left blood flow: TOF, TGA

Memory Trick

- T - Trouble!
- T - Tetralogy of Fallot (TOF)
- T - Transposition of the Great Vessels (TGA)
- T - Truncus Arteriosus
- T - Tricuspid Atresia

Hypoxia (low O2)

RIGHT to left blood flow: TOF, TGA

Signs & symptoms

- Cyanosis (blue skin)
- Poor feeding & weight gain
- Clubbing fingers
- Dyspnea & Tachypnea
- **Polycythemia**
Blood clot risk!
Report Hemoglobin level **OVER 22 g/dL NCLEX TIP**

Priority intervention = **Hydration**

CHF (Congestive Heart Failure)

LEFT to right: ASD, VSD, PDA, AVSD

Memory Trick

- HF - Heart Failure
- HF - Heavy Fluid

Signs & symptoms

- **Weight Gain** = Water Gain **NCLEX TIP**
 1. Pale, cool **extremities**
 2. **Puffiness** around the eyes (periorbital **edema**)
 3. Reduction in number of **wet diapers**
- Diaphoresis & Grunting (during feedings) **NCLEX TIP**
- Dyspnea
- Tachypnea & Tachycardia
- Poor weight gain

The **MOST deadly & MOST tested** Hypoxia (low O2)

MEMORY TRICK if it starts with **T** - then it's trouble

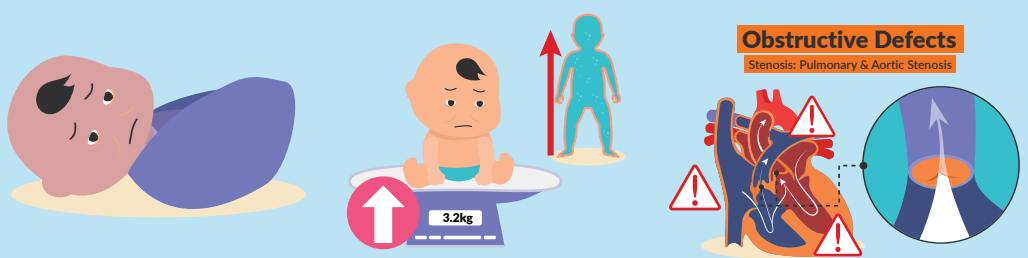
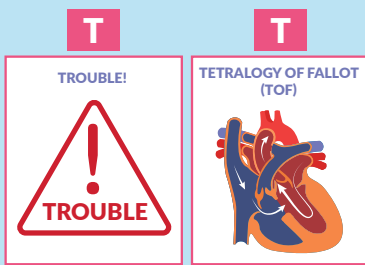
T - Transposition of the Great Vessels (TGA) these 2 are the most tested

T - Truncus Arteriosus

T - Tricuspid Atresia

But first you must remember that these are **PRIORITY** since low oxygen is always a priority on the NCLEX - as it's the **MOST deadly!** This hypoxia leads to blue babies, as these defects take blood away from the lungs & push blood from right to **LEFT** side of the heart.

Report Hemoglobin level **OVER 22 g/dL**. This is **PRIORITY** & must be reported to the health care provider! Due to the hypoxia the body says **OHHH SNAP!** I better make more oxygen carriers. So a lot of red blood cells are created to compensate for this low O2. But - Instead of perfusing the body the extra RBCs cause a traffic jam within the blood vessels. This thick viscous blood can easily clog tiny vessels & form a deadly blood clot, specifically in the tiny blood vessels within the brain - causing a delayed stroke!



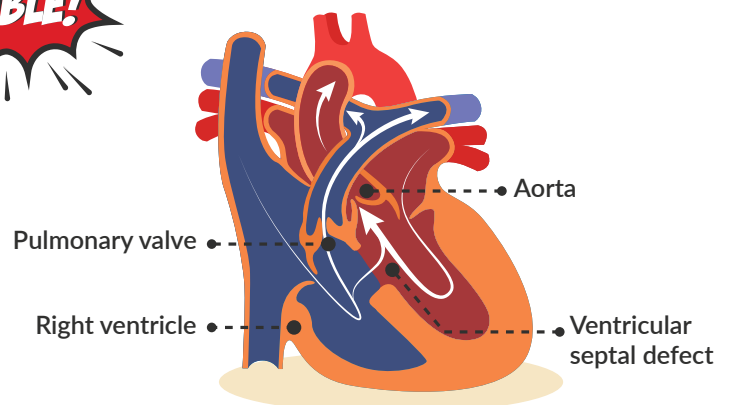
Types (RIGHT to left blood flow)

Since it results in oxygen problems as there is decreased blood flow to the lungs.



4 defects in 1

- T** TOF: Tetralogy of Fallot
- T** TGA: Transposition of the Great Vessels
- T** Tricuspid Atresia
- T** Truncus arteriosus



Congenital Heart Defects III

Pathophysiology Course

Types (RIGHT to left blood flow)

T TOF: Tetralogy of Fallot

4 defects (Tetra = 4)

1. **P** - Pulmonary Stenosis
2. **R** - Right Ventricular Hypertrophy
3. **O** - Overriding Aorta
4. **V** - VSD (ventricular septal defect)

Symptoms

- "TET Spells" **MOST TESTED**
 - **Cyanosis** (blue skin)
 - Hypoxemia: **O₂ sat 65 - 85%**
- Clubbing fingertips
- Polycythemia = **Blood clot risk!**
- Report **Hemoglobin level OVER 22 g/d** **NCLEX TIP**

MOST TESTED

TET

Hemoglobin
OVER 22 g/dL



T TOF: Tetralogy of Fallot

Hypercyanotic Spell "TET spells"

5 NCLEX TIPS

During an Episode

1. Infants: **Knees to chest**
Older children: Squatting position

Prevention

2. **DO NOT** interrupt sleep & Provide a calm quiet environment upon waking up
3. Offer a pacifier during crying
4. Small & frequent feeding
5. Swaddle or hold the infant during procedures

T TOF: Tetralogy of Fallot

Treatment

- Surgical repair

Discharge instructions

5 Heart Failure signs

To REPORT **NCLEX TIPS**

Memory Trick

- HF - Heart Failure
 - HF - Heavy Fluid
1. **Weight Gain** = Water Gain
 2. **Puffiness** around the eyes (**periorbital edema**)
 3. Pale, cool **extremities**
 4. Reduction in number of **wet diapers**
 5. **Decreased** feeding

T TGA: Transposition of the Great Vessels

- **Reversal** of the **2 main arteries** leaving the heart (pulmonary artery & aorta)

Treatment

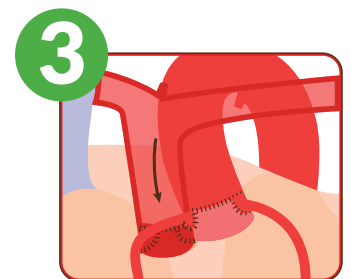
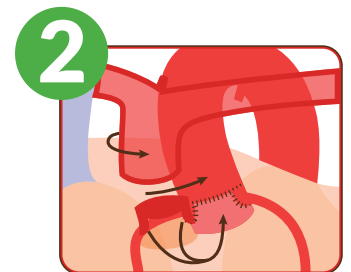
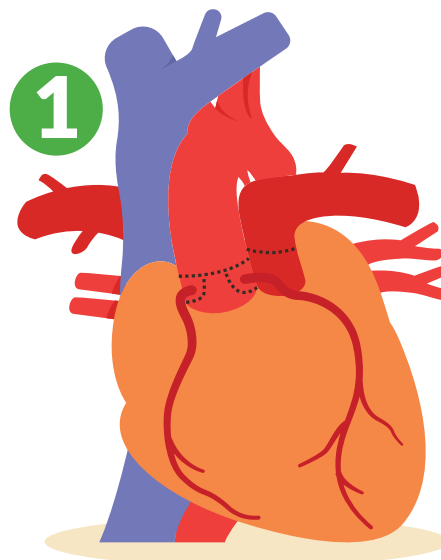
- Surgical repair

T Tricuspid Atresia

- Closure of the **tricuspid valve** & ASD (atrial septal defect)

T Truncus arteriosus

- **Connection** between the aorta & pulmonary artery & VSD (ventricular septal defect)

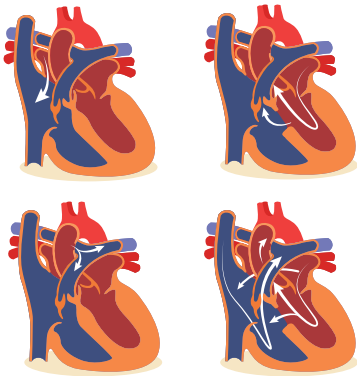


Notes

Congenital Heart Defects IV

Pathophysiology Course

Types (RIGHT to left blood flow)

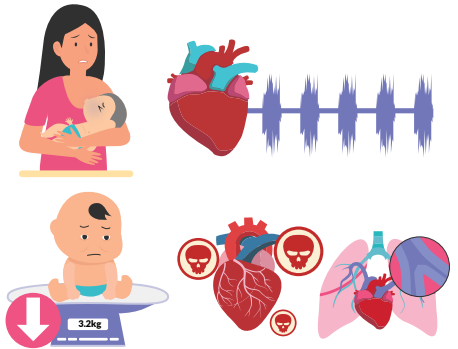


- ASD** Atrial Septal Defect
- VSD** Ventricular Septal Defect
- PDA** Patent Ductus Arteriosus
- AVSD** Atrioventricular Septal Defect

Left-to-right Cardiac Shunts

4 NCLEX TIPS

1. Diaphoresis (during feedings)
2. Heart murmur
3. Poor weight gain
4. Increased Risk: heart failure & Pulmonary HTN



ASD Atrial Septal Defect

- Hole between the **Atria**

Symptom

- Murmur (normal & to be expected) **NCLEX TIP**

Treatment

- Closes naturally
- Surgical repair

VSD Ventricular Septal Defect

- Hole between the **Ventricles** (septal opening)

Symptoms

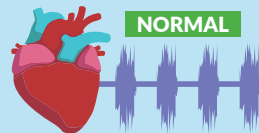
- **Grunting** during feeding **NCLEX TIP**
- Systolic heart murmur (left sternal border)

Treatment

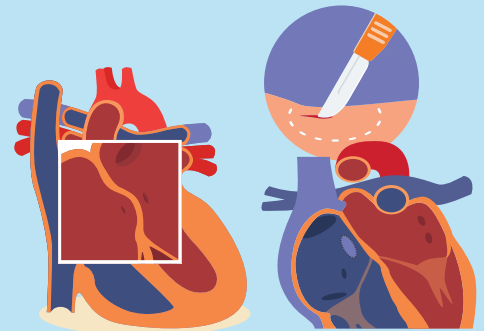
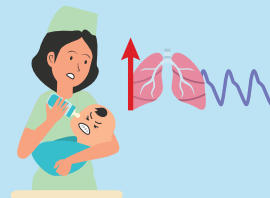
- Closes naturally
- Surgical repair

Don't let

NCLEX TRICK YOU



PRIORITY



PDA Patent Ductus Arteriosus

- Opening that connects aorta to pulmonary artery

Symptom

- Loud **machine-like** murmur **NCLEX TIP**

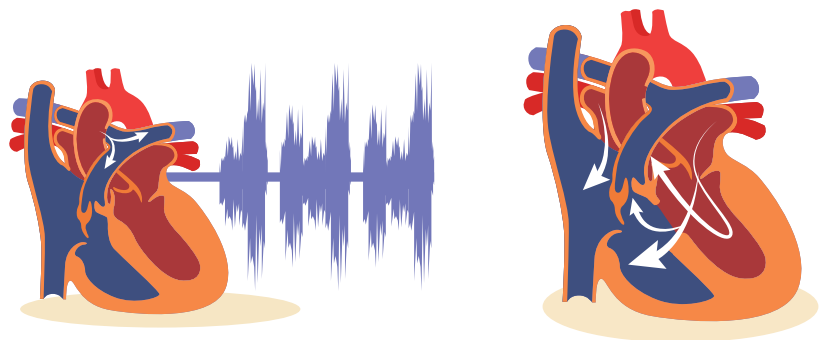
Memory Trick: Loud machine like **DUCK**

Treatment

- Indomethacin (NSAID)
- Surgical ligation

AVSD Atrioventricular Septal Defect

- Both ASD & VSD
- **2 holes:** Atria & Ventricles



Notes

Congenital Heart Defects V

Pathophysiology Course

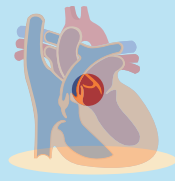
Stenosis (stiff valve)

Memory Trick:

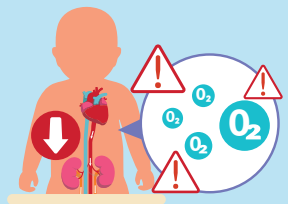
- **S** - Stenosis
- **S** - Stiff & narrow

When blood flow attempts to leave the heart it meets resistance from this narrowed valve. This blocked blood flow now backs up in the heart - resulting in
 Decreased cardiac **OUT**put meaning
 Less oxygen-rich blood **OUT** to the body

- S** Stenosis
- S** Stiff & narrow



Decreased cardiac **OUT**put
 Less oxygen-rich blood **OUT** to the body



Pulmonic Stenosis

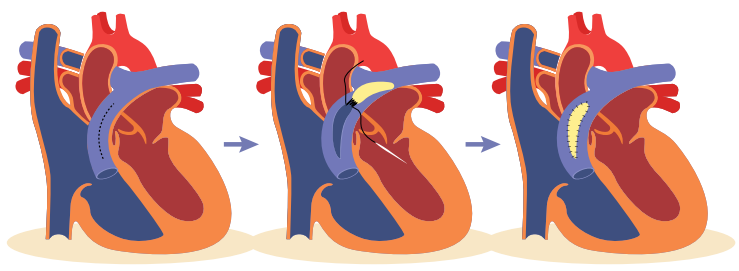
- Pulmonary valve: stiff, small, narrow valve.

Symptoms

- Right ventricular **hypertrophy**
- Loud "systolic ejection" heart **murmur**

Treatments

- Balloon **angioplasty**
- Surgical repair (Valvotomy)



Aortic Stenosis

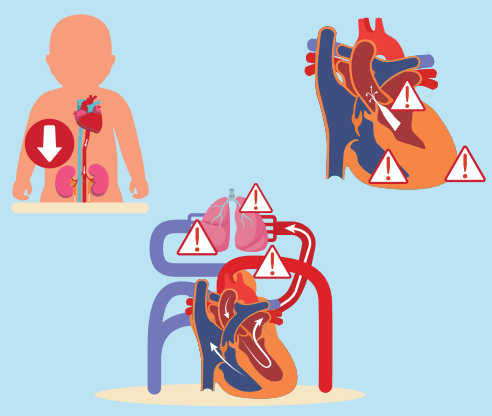
- Aortic valve: narrowing

Symptoms

- **Decreased** cardiac output
 Decreased O2 blood **OUT** to the body
- Activity **intolerance**
- Vitals: Low BP, Tachycardia
- Left ventricular **hypertrophy**
- Pulmonary **congestion**

Treatments

- Balloon **angioplasty**
- Surgical repair (Valvotomy)



COA: Coarctation of the Aorta

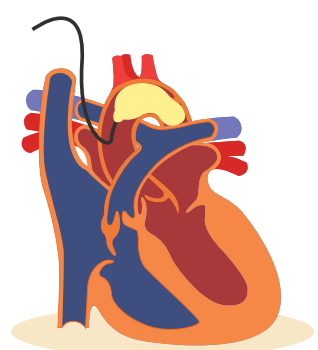
Narrowed aorta:
 decreased cardiac **OUT**put
 (Decreased O2 blood **OUT** to the body)

Symptoms

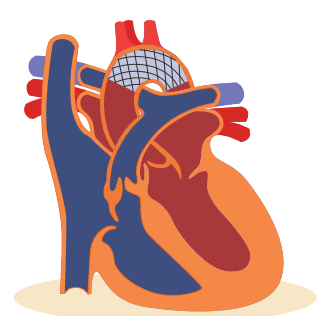
- Upper extremities: High BP, **Bounding pulses**
- Lower extremities: **Cool**, low BP & diminished pulses

Treatments

- Balloon angioplasty
- Stents



Balloon angioplasty



Stents

Congenital Heart Defects VI

Pathophysiology Course

Treatments

They include medications to lower blood pressure and control heart rate, heart devices, cardiac catheter procedures. Surgery is the ultimate solution in most cases & serious cases may require a heart transplant.

Cardiac Catheterization

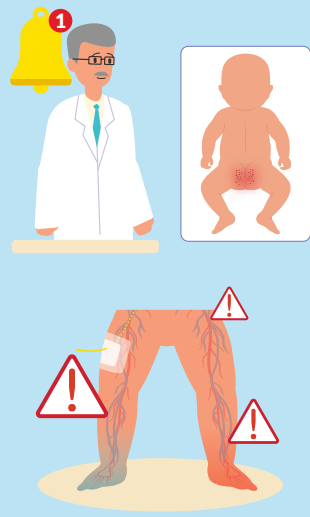
BEFORE

- Allergy to iodine
- NPO 4 - 6 hours (children)
Shorter NPO status (infants)
- Report to HCP**
Severe diaper rash **NCLEX TIP**

AFTER

Priority Assessments:

- Pulses **distal to cath site!**
Normal: Weak pulse **NCLEX TIP**
NOT normal!: Cool, cold, pale extremity
- Straight leg for 4 - 8 hours
- Incision site:
 - Assess for **bleeding**
 - Infection - no baths



Chest Tube Monitoring

Chest tubes are placed during cardiac surgery to help drain excess fluid & air for lung expansion. After surgery it remains in place to drain excess blood.

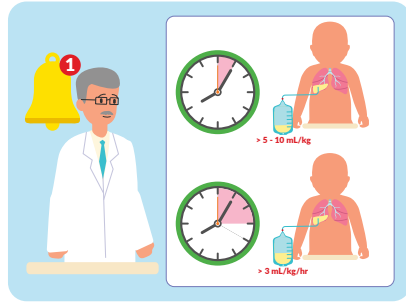
Priority Report to HCP **NCLEX TIP**

- 1 hour: **Over 5 - 10 mL/kg**
- 3 hours: **Over 3 mL/kg/hr**

Indicates: severe bleeding & cardiac tamponade

For example

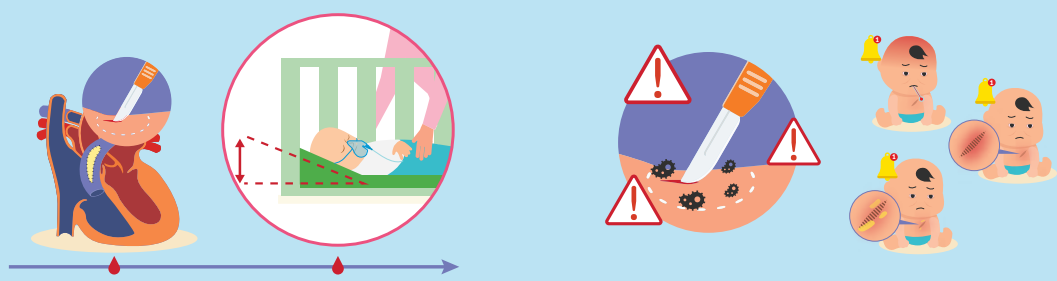
- Child weighs **6 kg**
- 1 hour: 30 - 60 mL/kg
- 3 hours: 6 kg x 3 mL = **18mL/hr**
(54 mL in 3 hours)



Post-Op Care & Teaching

After surgery the nurse should always elevate the head of bed to reduce respiratory effort

Surgical sites - infection! Report fever, warm surgical site, smelly purulent drainage & no heavy lifting or strenuous activity for the first 3 to 4 weeks.



Angina

Pathophysiology Course

Stable Angina

(classic exertional)
relieved with rest

Memory Trick:

S - Stable Angina
S - Safer Angina
S - Stops with rest

Unstable Angina

Pain at rest!
Warning signs for MI

Memory Trick:

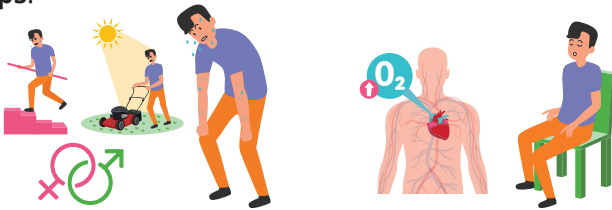
U - Unstable Angina
U - Unsafe Angina
U - Unrelieved pain at rest

Patho & Causes

Stable angina is **chest pain induced by any physical activity** like: walking up stairs, working in the yard or even from sex. Anything that causes exertion!

There is **less oxygen** being delivered to the **heart muscles** during the **physical** exertion resulting in pain from the heart muscles saying "HEY, I don't have enough oxygen!"

Naturally the **pain stops when the physical activity stops**.



Patho & Causes

Pain at rest! This is a warning sign for an MI (heart attack). It is the **more severe angina** as it means **more severe narrowing of the coronary arteries** resulting in **less oxygen** to the heart muscles.



Treatments

Nitroglycerin

O₂ to Heart

NO viagra "-afil" Sildenafil = **DEATH!**
NORMAL ADVERSE EFFECT:
HA=Normal Side Effect
Hypotension=Adverse effect
(need slow position changes)

*Take before strenuous activity

GOAL:

NO chest pain=Daily activities
"comb hair, fix hair, get dressed, make up, making bed etc."

TAKING MED:

CALL 911: PAIN 5 min. After 1st dose.
3 doses max x 5 min apart
NO SWALLOW-SL under tongue

STORAGE:

NO LIGHT-NO HEAT
NOT: pill box, car, plastic bag, pocket
YES: purse ok
*Replace every **6 months**



1 x daily **NOT PRN**

1 patch at a time **NOT 2 patches**

YES Shower is ok

LOCATION: Rotate locations **Daily**

"Clean, Dry, shaven area" teach patient to wash hands after application

Upper Body (subclavian, arm, upper chest)

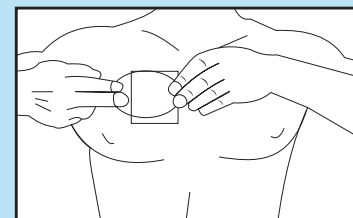
NOT: hairy, scarred, burned, callous

NOT BROKEN SKIN

***TEST TIP:** Patch fall off? (Over 1 hour ago)

Take nitro (pill/spray) New patch can take 40-60 min.

***Nurses wear gloves!** Will cause **MAJOR HA** if it comes into contact with skin!



Angina II

Pathophysiology Course

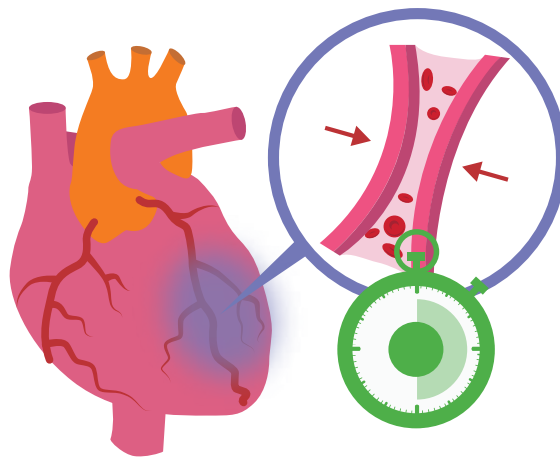
Pathophysiology

Variant Angina (Prinzmetal)

- Coronary vasospasm

Sudden spasm, temporary narrowing or tightening in a coronary artery that supplies the heart muscle with oxygen.

Naturally the heart does not get enough blood & oxygen - resulting in pain



Causes

Short-term factors that cause vasoconstriction:

- Stress
- Stimulants (caffeine, meth, cocaine)
- Smoking, cold weather

NOT from long-term narrowing of the arteries from plaque buildup, which is more typical in stable & unstable angina.

Notes

MI - Myocardial Infarction

Pathophysiology Course

Pathophysiology

Myocardial Infarction (MI) the heart muscles **DIE** "necrosis" from lack of oxygen. This occurs when there is a **blockage of the coronary arteries**, the "O2 tubes" feeding the heart oxygen.

Signs & Symptoms

PAIN-Jaw, back, mid back/shoulder pain, heartburn (epigastric), Substernal

Key words = priority: "Sudden" "Crushing" "radiating" **NCLEX TIP**

SOB "dyspnea" "labored breathing"

NAUSEA Vomiting "Abdominal pain"

SWEATING "Diaphoresis"

PALE COOL SKIN "dusky"

ANXIETY

Causes

SODDA

S-Stress, Smoking, Stimulants (caffeine, amphetamines)

O-Obesity-(BMI over 25)

D-Diabetes & HTN (over 140/90)

D-Diet (high cholesterol) animal fats

A-African American males & Age (over 50)

*Men more than women

Progression

CAM

C-CAD "coronary artery disease"

A-ACS "acute coronary syndrome"

Angina - **Stable** "Safer"- relieved w/rest

Angina - **Unstable** "Unsafe" - **Unrelieved**

M-MI (heart die)



Nursing Interventions

DRESS

D-Diet low (sodium & fluids (2g/2L per day)

Prevent **HF Heart Failure=Heavy Fluid**

Report "New, Rapid" Weight Gain-Water Gain!

R-Reduce Stress, Alcohol, Caffeine, Cholesterol (animal fats)

E-Exercise (30 min x 5 days/wk)

S-Smoking Cessation

S-Sex (2 flights of stairs with NO SOB)

***AVOID** NSAIDS (naproxen, ibuprofens) = increases CLOT risk!

Treatment: Pharmacology

AC-Anti Clogging of Arteries

A-Antiplatelet **HOLD** if: Platelets 50K or LESS "below 50 gets risky" (not INR, not aPTT)

A-ASA

C-Clopidogrel

C-Cholesterol Lowering "**-Statin**"

Lovastatin "stay clean"

CAUTION:

NO grapefruit

Liver Toxic-report "clay colored stools"

Muscle pain (Rhabdomyolysis risk)

Late night-take at dinner

CHOLESTEROL PANEL

C-CLOGGED ARTERIES (risk)

200 or Less-Total Cholesterol
150 or Less-Triglycerides
100 or Less-LDL

40 or More = HDL



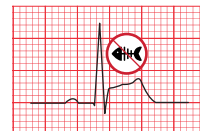
Diagnostics

1st-EKG

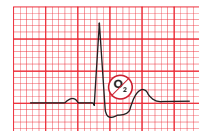
(Any chest pain or MI symptoms)



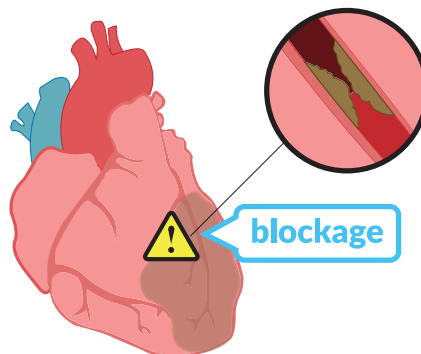
Normal



ST elevation



ST Depression



2nd-LABS

T-Troponin (Over 0.5 ng/mL)

T-Trauma (**ONLY** indicator of MI)

Other labs: Crp, Ckmb, Myoglobin, CRP (inflammation)

Treatment: Pharmacology

DURING-Any Chest Pain

O-Oxygen

A-Asa

N-Nitro-under tongue x 3 Max

M-Morphine - Any pain after = MI (injury)

AFTER-MI

Clot Stabilization:

Heparin: prevents CLOT growth (**NOT dissolve** only t-PA)

PTT: 46 - 70 "**3 x MAX**" Antidote: Protamine Sulfate

Memory Trick: "HaPTT" frog

Heart Rest:

B-Beta Blockers (-lol) Atenolol

Blocks both BP & HR (Lol = Low BP & HR)

CAUTION:

B-Bad for Heart Failure patients (CHF)

B-Bradycardia (60 or Less) & BP low (HR LESS than 60)

B-Breathing Problems "wheezing" (Asthma, COPD)

B-Blood sugar masking "hides s/s" (Diabetics)

C-Calcium Channel Blockers

Calms BP & HR-(**AVOID** Low Hr & BP)

(Nifedipine, Diltiazem, Verapamil)

-dipine "declined BP & HR"

-zem "zen yoga for heart"

-amil "chill heart"

D-Dilators (vasodilators = O2 to heart)

Nitroprusside (only for HTN crisis) & Isosorbide

Nitro "Pillow for heart"

NO viagra "**-afil**" Sildenafil = **DEATH!**

Nitro drip: **STOP** if Systolic BP below 90 or 30 mmHg Drop

SE: HA is Common + SLOW Positions changes "syncope"

DISCHARGE-GOING HOME

Heart Rest:

1st choice **A**-Ace (-pril) Lisinopril "chill pril"

2nd choice **A**-ARBs (-sartan) Losartan "relax man"

Antihypertensive (BP ONLY) ***HOLD:** Low BP (not HR)

Precautions:

A-Avoid Pregnancy

A-Angioedema "thick tongue"

(Airway Risk) *only Ace **NCLEX TIP**

C-Cough *only Ace

Creatinine (Kidney) (normal: 0.9 -1.2) *only Ace

E-Elevated K+ (normal 3.5-5.0) **NCLEX TIP**

AVOID Salt Substitutes + Green Leafy veggies

• 1st-Cardiac Monitor

• High Potassium = High Pump

• Monitor: muscle cramps, spasms,

peaked T waves, ST changes

Heart Failure

Pathophysiology Course

Pathophysiology

The heart fails to maintain adequate cardiac output (oxygenated blood pumped OUT to the body) due to impaired pumping ability.

MEMORY TRICKS

- **HF - Heart Failure** (failure to pump blood forward)
- **HF - Heavy Fluid** (backs up in lungs / body)
Weight Gain = Water Gain

Signs & Symptoms

R - RIGHT-sided HF R - ROCKS BODY with fluid	L - LEFT-sided HF L - LUNG fluid
<ul style="list-style-type: none"> • Peripheral Edema • Weight Gain = Water Gain • JVD (big neck veins) • Abdominal Growth <ul style="list-style-type: none"> - Ascites (fluid in abdomen) - Hepatomegaly (big liver) - Splenomegaly (big spleen) 	<ul style="list-style-type: none"> • Pulmonary Edema • Crackles in lungs "Rales that don't clear with a cough" • Pink Frothy "blood tinged" sputum • Orthopnea - difficulty breathing when lying flat

Causes

R - RIGHT-sided HF	L - LEFT-sided HF
<ul style="list-style-type: none"> • HTN (high BP) • Pulmonary HTN • Stiff "fibrotic" lungs • Left-sided HF can cause Right HF 	<ul style="list-style-type: none"> • Weak heart = weak pump • After a heart attack (MI - myocardial infarction) • Ischemic heart disease - low oxygen to heart muscles (CAD, ACS)

3 Common EXAM Questions:

Patient with **heart failure** who is constipated!
What would the **nurse recommend**?

- ✓ 1. Walking
- 2. Increase fiber
- ✓ 3. Stool Softeners
- 4. Drink extra water - **NO!**

Which **food item** should the **heart failure patient avoid**?
Select all that apply.

- ✓ 1. Chips - **NO SODIUM!**
- 2. Fruits
- 3. Veggies
- ✓ 4. Grilled chicken & fries - **NO!**
- ✓ 5. Canned beans - **NO!**
- 6. Bread

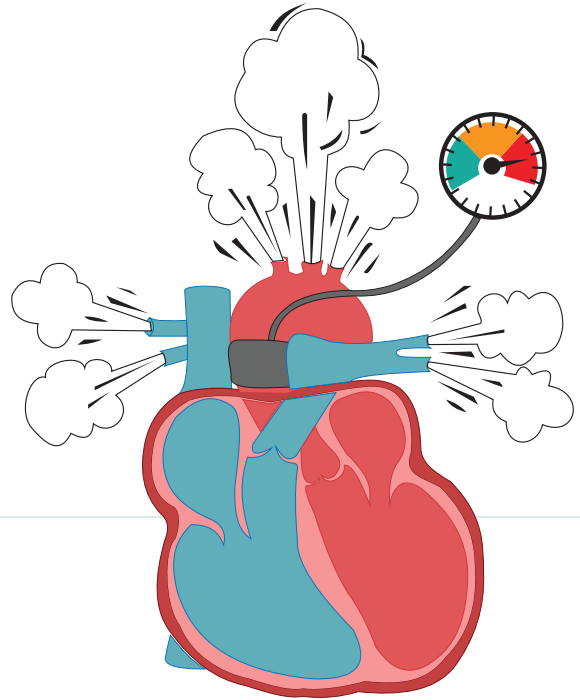
A client with chronic heart failure took **cold medicine** for her flu. She presents with **new** productive cough with **pink frothy sputum** and **worsening crackles**.

What action should the nurse take **first**?

- 1. Assess lung sounds
- ✓ 2. Give bumetanide IV Push - **YES**
- 3. Notify the HCP
- 4. Clock out for lunch

Look for **KEY WORDS**

"New, sudden, worsening, rapid symptoms"
1 Action is Furosemide = "Body Dried"



Risk Factors

1. Hypertension (high BP) is the **#1 risk factor**
2. Atrial fibrillation & other dysrhythmias
3. Mitral valve regurgitation
4. Cardiomyopathy

Diagnostic tests

- **Labs: BNP** (brain type natriuretic peptides)
Memory trick: B - Broken ventricles
Over 900+ = SEVERE HEART FAILURE
- **Echocardiogram** measures **Ejection Fraction** (blood pumped out of heart)
55 - 70% = normal
40% or LESS = BAD (heart failure)
- **Hemodynamic Monitoring**
"Swanz Ganz" (Pulmonary Artery catheter)
Over 8 = is NOT GREAT! (normal: 2 - 8 mmHg)

Priority Interventions

For Pulmonary Edema Crisis (lung fluid)

KEY WORDS

"New, sudden, worsening, rapid symptoms"
1 Action is Furosemide = "Body Dried"

- **H** - HOB **45** degree or higher
(Semi-Fowler's, High-Fowler's, orthopneic position)
- **O** - Oxygen
- **P** - Push Furosemide + Morphine, Positive inotropes
- **E** - End sodium & fluids
(Sodium Swells the body)
NO drinking fluids + **STOP** IV fluids

Heart Failure II

Pharmacology & Care

A ACE & ARBS (Lowers BP)

Lisinopril • Losartan

B BETA BLOCKERS (Lowers HR & BP)

Atenolol

C CALCIUM CB (Lowers HR & BP)

Nifedipine, Cardizem, Verapamil

D DIGOXIN (Lowers HR)

Cardiac Glycoside

D DILATORS (Vasodilators)

Nitroglycerin

D DIURETICS (Lowers BP)

Potassium Wasting & Sparing
Milrinone *inotropic drug-LAST LINE therapy-palliative care

Nursing Care & Interventions

DRBEDSS

D DIET LOW Sodium & Fluid (2L + 2g or LESS/day)

R RISK FOR FALLS! (Change positions slowly!)

B BP & BNP (Should **NOT** be increasing)

E ELEVATE LEGS (with pillows) High Fowlers

D DAILY WEIGHTS (3lbs/day or 5 lbs/7 days = Worsening!)

S SEX (2 flights of stairs with **NO** SOB)

S STOCKINGS "TED hose" (decreases blood pooling, Remove daily)

NO OTC meds (Cough or Flu, Antacids or NSAIDS) **NCLEX TIP**

NO Canned or packaged foods (chips, sauces, meats, cheeses, wine)

NEVER massage calves (CHF patients) **NCLEX TIP**

Pharmacology

A - ACTS on BP only (**not HR**)

A - ACE (-pril) Lisinopril "chill pril" 1st choice

A - ARBS (-sartan) Losartan "relax man" 2nd choice

A-Avoid Pregnancy

A-Angioedema (Airway Risk) *only Ace

C-Cough *only Ace

E-Elevated K+ (normal 3.5-5.0)

B - BETA BLOCKERS (-lol) Atenolol "LOL = LOW"

Blocks both BP & HR (**AVOID** Low HR & BP)

Caution: **HOLD IF:**

B-Bradycardia (LESS than 60) & BP low (90/60)

only hold if the patient is in an acute exacerbation of CHF

B-Breathing problems "wheezing" (Asthma, COPD)

B-Bad for Heart Failure patients

B-Blood sugar masking "hides S/S" (Diabetics)

C - CALCIUM CHANNEL BLOCKERS

Calms BP & HR (**AVOID** Low HR & BP)

(Nifedipine)

-dipine "declined BP & HR"

-amlodipine "chill heart"

D - DIURETICS Drain Fluid

D-Drains Fluid "Diurese" "Dried"

K+ Wasting-Furosemide & Hydrochlorothiazide

(caution: Low K+, Eat melons, banana & green leafy veg)

K+ Sparing-Spironolactone "Spare potassium"

(**AVOID** Salt Substitutes, melons & green leafy veg)

D - DILATORS (Vasodilators)

Nitroglycerin, Isosorbide

Nitroglycerin "Nitro = Pillow for heart"

Caution: NO Viagra "-afil" Sildenafil = **DEATH!**

Nitro drip: **STOP** = Systolic BP below 90 or 30 mmHg Drop

Adverse effect:

HA= side effect

Low BP= adverse effect (**SLOW** position changes)

D - DIGOXIN (Inotropic)

Digs for a DEEP contraction

Increased contractility

Apical Pulse x 1 minute

Toxicity (over 2.0) Vision changes, N/V **TEST TIP**

Potassium 3.5 or less (higher r/t toxicity)

PVD: Peripheral Vascular Disease

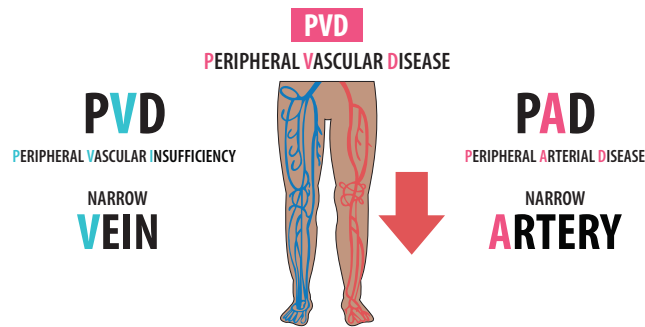
Pathophysiology Course

Pathophysiology

Peripheral Vascular Disease is a condition where there is scarring & narrowing of the peripheral blood vessels (veins & arteries) like those in the legs. Eventually the blood vessels become small & stiff making it very difficult for blood to get and from the extremities.

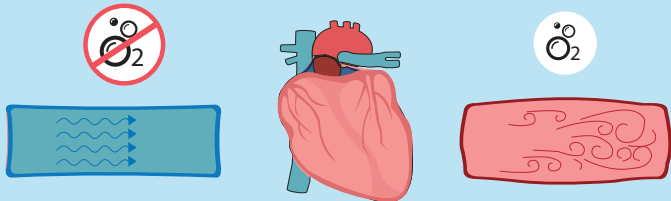
2 different conditions for Peripheral Vascular Disease

- **PVD:** Peripheral **Venous** Disease - narrowed **Veins**
- **PAD:** Peripheral **Artery** Disease - narrowed **Arteries**



VEINS VACUUM

ARTERY AWAY

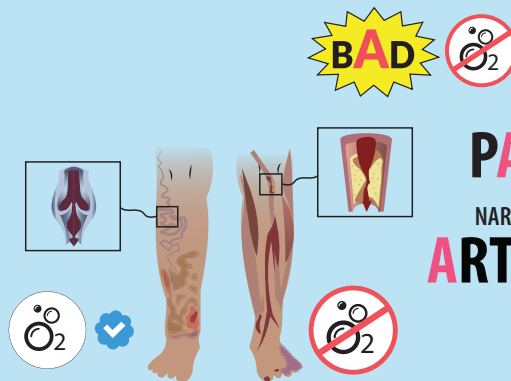


Veins pull or **Vacuum** deoxygenated blood back to the heart

PVD = problem Vacuuming deoxygenated blood back to the heart! **Blood begins to pool in the legs** manifesting as **Varicose Veins**

PVD NARROW VEIN

PAD NARROW ARTERY



Arteries push oxygen rich blood **Away** from the heart

PAD = problem pushing oxygen rich blood **Away** from the heart.

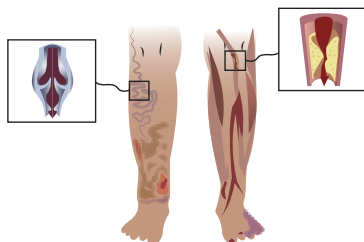
Oxygen can't get to legs! **WORSE PROBLEM** leading to:

- Ischemia (low oxygen) &
- Necrosis (tissue death)

Signs & Symptoms

VEINY

- V** **VOLUMPTUOUS PULSES** - Warm legs
- E** **EDEMA** (blood pooling)
- I** **IRREGULAR SHAPE SORES** (Exotic pools)
- N** **NO SHARP PAIN** (Dull pain)
- Y** **YELLOW & BROWN ANKLES**



ARTS

- A** **ABSENT PULSES**,
Absent Hair (Shiny) = Cool legs
- R** **ROUND, RED SORES** (blood pooling)
- T** **TOES & FEET PALE** or BLACK "Eschar"
- S** **SHARP CALF PAIN**
(intermittent Claudication)
E - Exercise • E-Elevation (recliner chair)

Memory Trick for PAD



PAD

Intermittent **Cl**audication

Intermittent **CA**lf Pain

Severe calf pain when muscles are depleted of oxygen. Common with:

- E - Exercise
- E - Elevating legs (recliner chair)

PVD: Peripheral Vascular Disease II

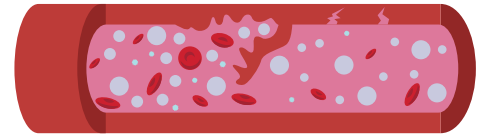
Pathophysiology Course

Causes & Risk Factors

Think of anything that scars the lining of the blood vessels.

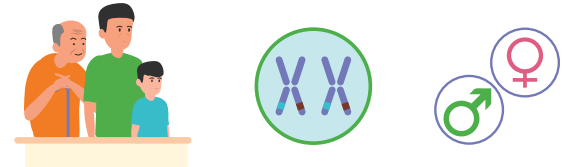
Modifiable

- **Obesity (BMI over 25)** - puts pressure on the blood vessels.
- **Sedentary "sitting" lifestyle** - makes the vessels stiff.
- **Smoking** - chemicals scar the lining of the vessels.
- **Diabetes DM (uncontrolled)** - think the blood is turned to mud (like syrup) from HIGH sugar & this scrapes & scars the blood vessels.
- **High cholesterol** - fatty deposits stick to the vessel walls making them narrow & hard (plaque).
- **Hypertension HTN (High blood pressure)** - Uncontrolled over a long period of time will damage & stretch out the vessels.
- **High stress** - leads to high blood pressure.



Non-modifiable

- **Age, Gender, Genetics (family history)**

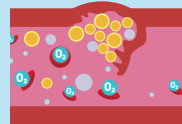


Complications

Atherosclerosis

- After the scarring & stretching occurs (from the risk factors) **small fatty deposits**, calcium, & even macrophages settle into these tiny tears in the blood vessels (called **plaque**) making the **arteries hard & narrow**. This plaque can also burst, leading to a blood clot which can kill the client!

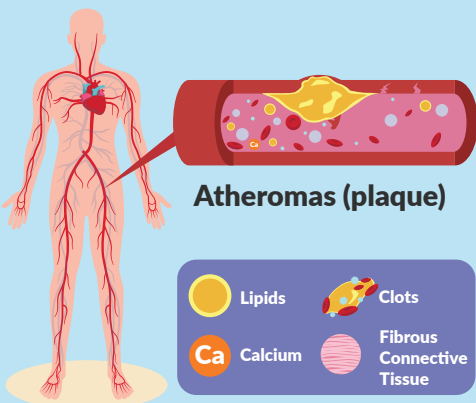
Atherosclerosis Athero**SCAR**osis



Atherosclerosis

MEMORY TRICK:

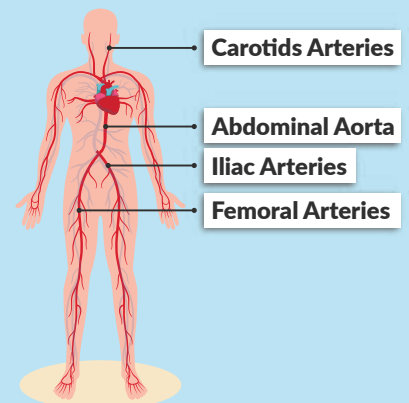
- Athero**SCAR**osis
- Hardening & narrowing of the blood vessels limiting blood flow (O2 perfusion)



PATHO TIP

Atheromas (plaque) in large arteries (lipids, calcium & possible clots)

- **Main Sites:**
 - Abdominal aorta
 - Carotids arteries (neck arteries)
 - Femoral arteries
 - Iliac arteries



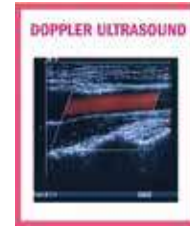
Notes

PVD: Peripheral Vascular Disease III

Pathophysiology Course

Diagnostics

- Doppler ultrasound
- ABI - ankle brachial index (for PAD)



Interventions



PVD

VEINS = ELEVATE
(Vacuum)

PVD & PAD

- C**-Constriction **AVOID**
- C**-Cross legs
- C**-Constrictive clothing
- C**-Cigarettes
- C**-Caffeine
- C**-Cold Temperatures
- T**-Toenails trimmed **ONLY** by Dr.

NCLEX TIP



PAD

ARTERIES = HANG
(Away)

Test Tip

- PVD with **varicose veins**, wear compression socks & limit standing to aid with blood return to the heart.

Pharmacology

PHARMACOLOGY

AC ANTI-CLOGGING OF ARTERIES

A ANTI PLATELET (Anti Clumping)

A-ASA

C-Clopidogrel

CAUTION: Bleeding

C CHOLESTEROL LOWERING

Lovastatin "stay clean"

CAUTION: Liver Toxic,

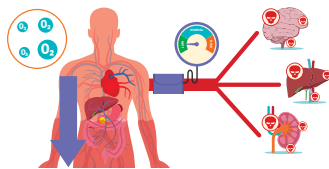
NO grapefruit

Notes

Shock

Pathophysiology

Shock is a critical condition where the body has decreased tissue perfusion eventually leading to organ failure and death



Memory trick

S Shock

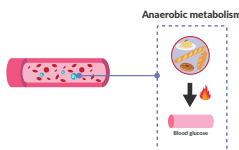
S Severely low blood pressure

4 Stages of Shock



I. Initial

There is too little oxygen in the blood to feed the organs, resulting in anaerobic metabolism, meaning metabolism without oxygen - BUT s/s are absent in this stage

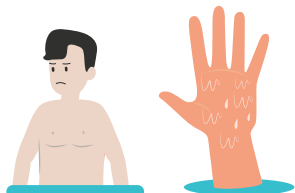


II. Compensatory

The body is trying to compensate for the LOW oxygen, So the heart will pump faster (tachycardia) & RR increases to get more oxygen (tachypnea) body compensates with the sympathetic nervous system to speed up the vital signs & renin-angiotensin activation to maintain BP and oxygenation to keep the organs perfused

III. Progressive

Key sign



■ Cold and clammy skin
PRIORITY NCLEX TIP

IV. Irreversible

Death is imminent



5 TYPES OF SHOCK

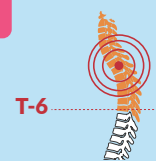
1. Septic shock

Septic shock caused by widespread bloodborne infection - think Sepsis infection causes Septic shock



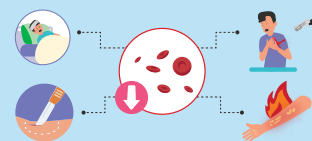
2. Neurogenic shock

Neurogenic shock caused by spinal cord injury T-6 or higher.



3. Hypovolemic shock (hemorrhagic)

Hypovolemic shock (hemorrhagic) caused by blood loss like from a trauma or a gunshot wound or even from surgery or burns



4. Cardiogenic shock

Cardiogenic shock where the heart fails to pump like in heart failure exacerbation or an MI heart attack heart muscles are weak & fail to pump



5. Anaphylactic shock

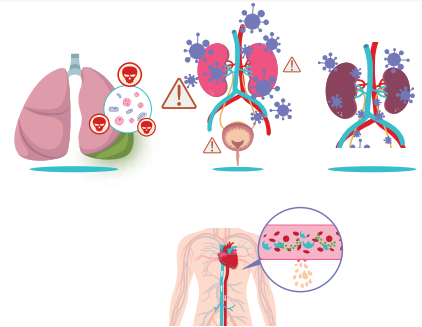
Anaphylactic shock from a severe allergic reaction like from a bee sting, eating seafood or something you have an allergy to



Septic Shock

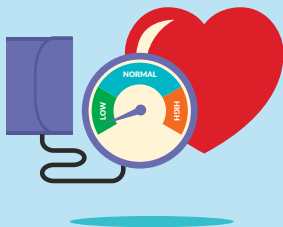
Pathophysiology

Septic shock Pathophysiology results from a septic widespread bloodborne infection that overwhelms the body typically caused by a bacterial infection like Pneumonia - infection in the lungs or even UTI or kidney infection that gets worse. A systemic cytokine release inside the bloodstream causes extreme vasodilation & fluid leakage from capillaries



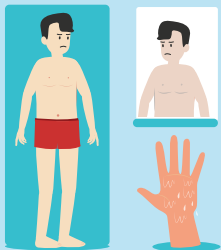
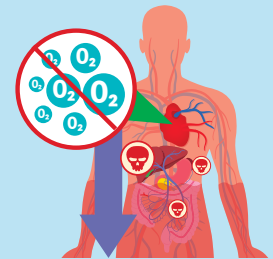
Signs & Symptoms

Severely low blood pressure



Memory trick

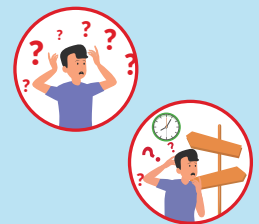
S	S
Shock	Severely low blood pressure



- Low blood pressure (Less than 80/systolic)
- **Cold, clammy skin** (pale & cool extremities)

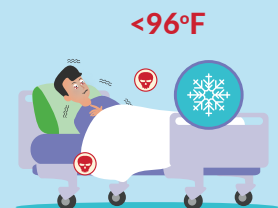


- **Delayed capillary refill**
- Mental Status change **NCLEX TIP**
 - **Confusion**
 - **Disorientation**



>10,000

- High WBC (over 10,000)
- Temp. High or **very low (96°F)** **NCLEX TIP**



Treatment

Emergency treatment may include supplemental oxygen, intravenous fluids, antibiotics, and other medications.

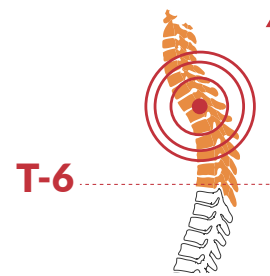


Neurogenic Shock

Pathophysiology

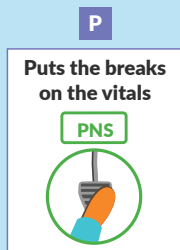
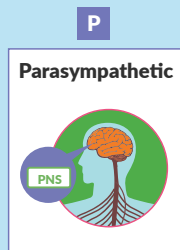
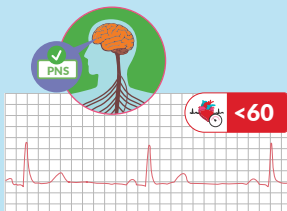
The Autonomic nervous system is damaged resulting in the blockage of the sympathetic nervous system which is supposed to speed up the vitals & vasoconstriction. Only the parasympathetic system is intact - which puts the breaks on the vitals causing widespread vasodilation & hypotension naturally, we see low & slow vital signs like low heart rate & low BP as Vasodilation occurs making it difficult for blood to return BACK to the heart. This decreased blood flow BACK to the heart leads to decreased blood flow OUT of the heart basically decreased cardiac OUTPUT - meaning less oxygenated blood OUT of the heart to the body & this leads to poor tissue perfusion from the lack of oxygen & impaired cell metabolism resulting in organ failure & death.

- Spinal Cord Injury (T-6 or higher) **NCLEX TIP**



Signs & Symptoms

- Bradycardia **NCLEX TIP**



Interventions

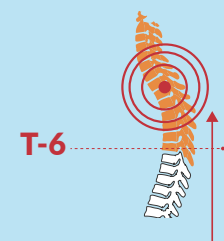
PRIORITY

- IV Normal Saline (0.9% sodium chloride) Increases the blood pressure



SIDE NOTE

- Spinal cord injury ABOVE T-6 Autonomic dysreflexia



Saunders

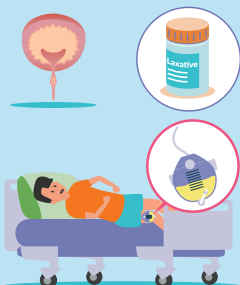
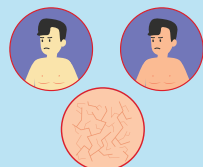
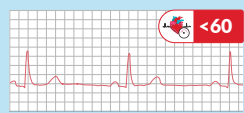
A client is admitted to the hospital with a diagnosis of **neurogenic shock** after a traumatic motor vehicle collision. Which manifestation **best** characterizes this diagnosis?

- Bradycardia



NCLEX TIPS

- Low HR (bradycardia) Less than 60
- Low BP (hypotension) Less than 80/systolic
- Skin: Warm, Pink, & Dry



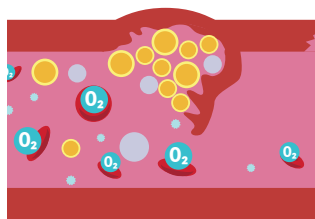
Atherosclerosis

Pathophysiology Course

Atherosclerosis

After the scarring & stretching occurs (from the risk factors) **small fatty deposits**, calcium, & even macrophages settle into these tiny tears in the blood vessels (called **plaque**) making the **arteries hard & narrow**. This plaque can also burst, leading to a blood clot which can kill the client!

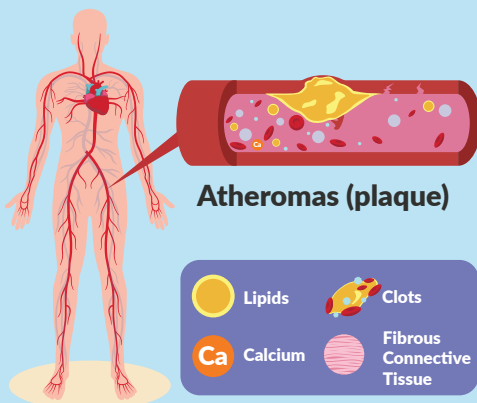
Atherosclerosis Athero**SCAR**osis



Atherosclerosis

MEMORY TRICK:

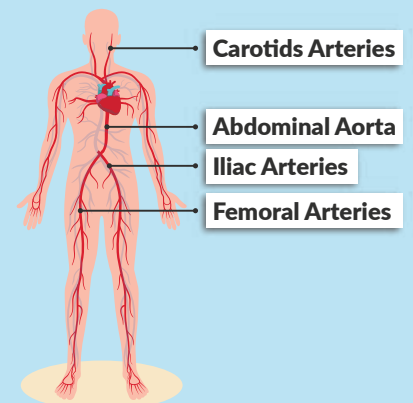
- Athero**SCAR**osis
- Hardening & narrowing of the blood vessels limiting blood flow (O₂ perfusion)



PATHO TIP

Atheromas (plaque) in large arteries (lipids, calcium, & possible clots)

- **Main Sites:**
 - Abdominal aorta
 - Carotid arteries (neck arteries)
 - Femoral arteries
 - Iliac arteries



Notes

Cardiac Tamponade

Pathophysiology Course

Pathophysiology

COMPRESSION OF THE HEART

caused by fluid collecting in the pericardial sac (weaker pump = less cardiac output)

This is a **medical emergency** as fluid or blood fills the pericardial sac, compressing the heart so that it can not fill & pump! The result is a **dramatic drop in blood pressure** that can kill the client.

- **C** - Cardiac Tamponade
- **C** - Compression on the heart
- **C** - Critical client!

Causes

ACUTE

TRAUMA: (Stabbing or MVA)
CHRONIC: Pericarditis



Signs & Symptoms

BECKS TRIAD **BEC**

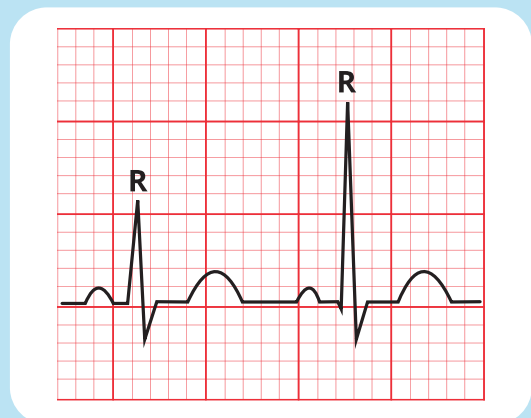
- B** • Big Jugular Veins Distension (JVD)
- E** • Extreme Low BP (Hypotension)
- C** • Can't hear heart sounds (muffled)

PULSE PARADOXES

Systolic drop of 10 mmHg
(120/80 to 110/80)

ECG

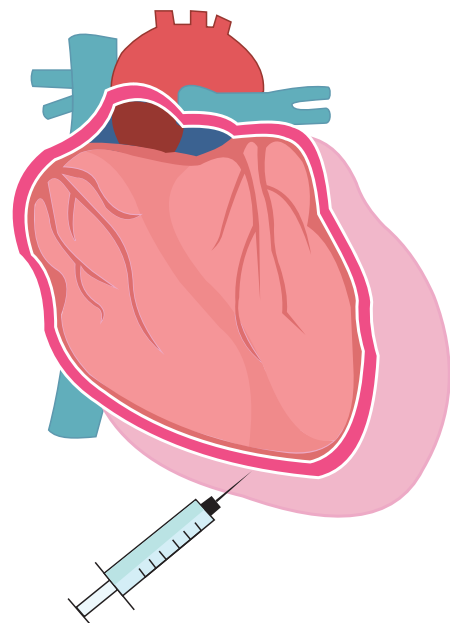
QRS complexes
(short & uneven height)



Treatments

PERICARDIOCENTESIS

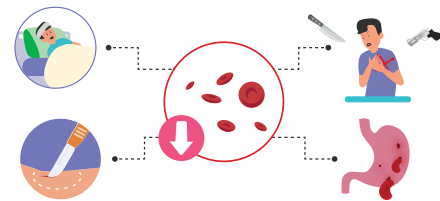
1. **CARDIAC MONITOR**
2. **CATHETER ATTACHED**
to drainage system
3. **ASSESS DRAINAGE**
(Type & speed of drainage)



Hypovolemic Shock

Pathophysiology

Caused by anything that can lower blood volume - Think HYPO - LOW blood or fluid volume from excessive fluid volume loss through diarrhea, vomiting, or fluid shifts as in burn patients & from bleeding (hemorrhage) from trauma like a gunshot or knife injury, or even surgery & GI bleed.



HYPOvolemic shock
LOW blood volume

Signs & Symptoms

Key Point



- Cold and clammy skin
PRIORITY NCLEX TIP

III. Progressive

Hypovolemic shock - As mentioned before - this is often seen in the progressive stage & is an indication that the client is **GETTING WORSE!** So you must notify the healthcare provider immediately & get some IV normal saline started quickly!

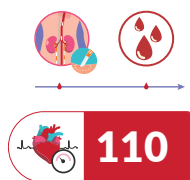
1. Hypotension (less than 80/systolic)
2. Tachycardia
3. **Low** central venous **pressure** (normal 2-6 mmHg)



KAPLAN

Which vital sign would alert the nurse to **potential hemorrhage** following a nephrectomy:

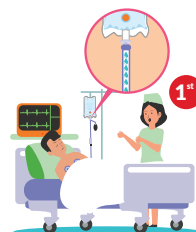
- HR 110



Saunders

A client in shock develops a **central venous pressure (CVP)** of less than 2 mm Hg. Which prescribed intervention should the nurse implement first?

- Increase the **rate of intravenous IV fluids**



Interventions



PRIORITY = Hemodynamic stability

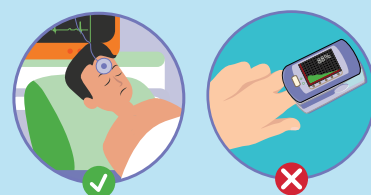
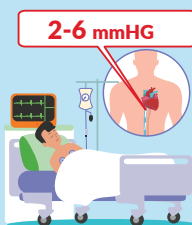
1. **LOWER** head of bed right away **NCLEX TIP**
NEVER place the HOB in **High Fowler's position**
2. IV Normal Saline (0.9% sodium chloride)
3. **IV norepinephrine** / dopamine

Memory trick

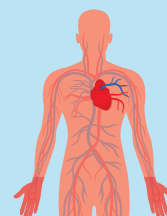
Put the Head **LOW** in **HYPO**volemic (hypotension)



- **CRITICAL!** DO NOT delay a new bag of norepinephrine **NCLEX TIP**
- **MAP** (mean arterial pressure) Over **65 mmHg**
- **CVP** (central venous pressure) **2 - 6 mm Hg**



- SpO2 = the sensor should be **placed on the forehead instead** of extremities

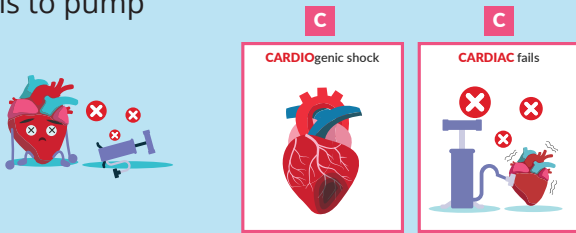


Cardiogenic & Anaphylactic Shock

Pathophysiology

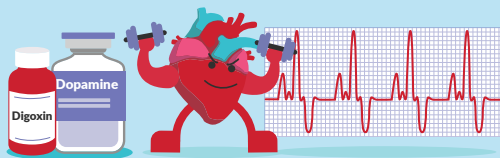
Cardiogenic shock

The heart fails to pump blood out of the heart & to the body like in a heart attack where heart muscles die or heart failure exacerbation - where the heart fails to pump



Treatment

Positive INOtroptic = more FORCEFUL beats



Dopamine & Digoxin both have INOtroptic properties meaning they help the heart to pump more forcefully.

D - Dopamine (vasopressor)

Caution:

- Tachycardia (over 100/min) **NCLEX TIP**
- Arrhythmias

D - Digoxin

Signs & Symptoms

Saunders

A client having a... **myocardial infarction** based on elevated **troponin** levels ... the nurse should **alert the primary** health care provider because the **vital sign changes** ... are **most** consistent with which complication? **Refer to the exhibit.**

- Cardiogenic shock

Cardiogenic shock - Cardiac problem - Heart attack - MI heart tissue DIES - heart FAILS to pump adequately. So just look at the BLOOD Pressure here, when clicking on the exhibit the low blood pressure goes lower & lower!

Client's Chart

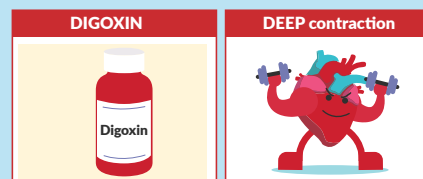
Time	11:00 a.m.	11:15 a.m.	11:30 a.m.	11:45 a.m.
Pulse	92 beats/min	96 beats/min	104 beats/min	118 beats/min
Resp. rate	24 breaths/min	26 breaths/min	28 breaths/min	32 breaths/min
BP	140/88 mm Hg	128/82 mm Hg	104/68 mm Hg	88/58 mm Hg

Saunders

Client with heart failure **exacerbation...** and suspected **state of shock**. The nurse knows which intervention is the **priority** for this client?

- Administration of **Digoxin**

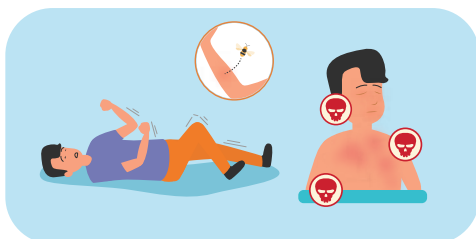
Ds is for **DEEP** Contraction



Anaphylactic Shock

Severe allergic reaction - like from a bee sting or peanut allergy.

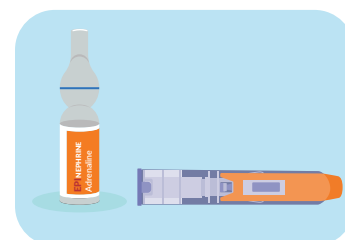
Anaphylactic shock - severe **ALLERGIC** reaction



Treatment

NCLEX TIP

Epinephrine
EpiPen Auto Injector



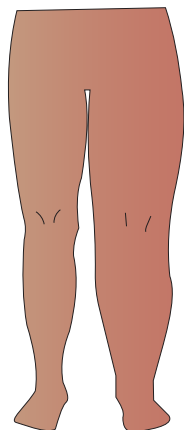
DVT, Raynaud's & Buerger's

Pathophysiology Course

DVT - Deep Vein Thrombosis

Pathophysiology

CLOT in a deep vein



Signs & Symptoms

COWS

- C** CALF PAIN & CRAMPING
- O** ONE-SIDED SWELLING (Unilateral)
- W** WARM & RED (Blood pooling)
- S** SOB & CHEST PAIN = PE! (Call Doctor)

Treatments

DURING CLOT-DV

- D** Don't Walk (bed rest)
- V** Venous return (eleVate)

CHANT

AFTER CLOT

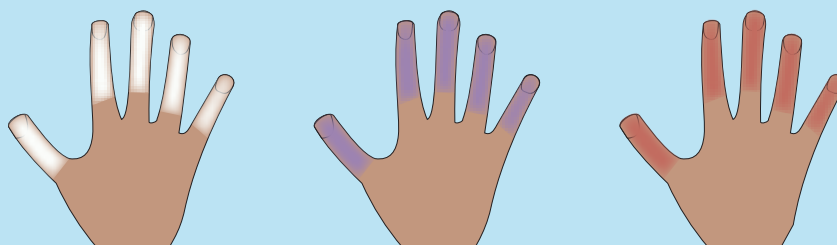
- C** Calf Exercise & Isometrics
- H** Hydration
- A** Ambulation
- N** NO long sitting (Car, Airplane, Bedrest)
- T** Ted & SCDs (AFTER CLOT resolved)

NCLEX TIP

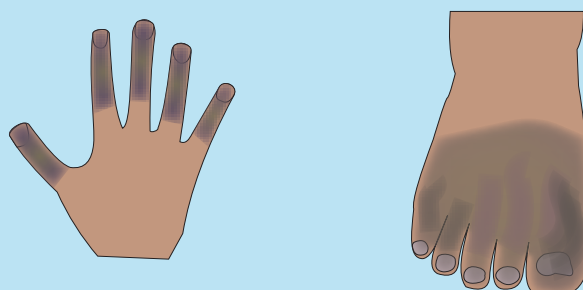
Raynaud's & Buerger's Disease

Signs & Symptoms

R-RAYNAUD'S • R-RING FINGER



B-BUERGER'S • B-BLACK FINGERS & TOES



Endocarditis

Pathophysiology Course

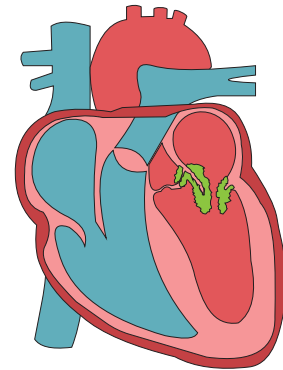
Pathophysiology

Inflammation **IN**side the heart

- Infective = bacteria (mold on heart valves)
- Noninfective = No bacteria (only inflammation)

Heart valves can't close fully

Less cardiac output = Less oxygen **OUT**



Signs & Symptoms

- **C** - Clots in the heart & brain
 - Risk for stroke CVA - monitor for "agitation"
 - "change in level of consciousness" **NCLEX TIP**
 - Splinter hemorrhages (clots under fingernails)
- **L** - Lung fluid (crackles)
- **O** - Overheated (fever)
- **T** - Too little oxygen (low cardiac output)
 - Clubbing fingers

*Roth spots, Osler's nodes, Janeway lesions
(body's immune response)

Nursing Interventions

- M** **MONITOR**
for infection
- O** **ORAL CARE**
brush 2x day **NO FLOSSING**
- L** **LET ALL PROVIDERS KNOW**
HX of Endocarditis
- D** **DENTAL VISITS OR SURGERY**
Antibiotic **ADHERENCE** **NCLEX TIP**

Causes

- Dirty Needles
- Dental visits **NCLEX TIP**
- Heart Surgery: Valve replacements & CABG **NCLEX TIP**
- Untreated Strep Throat

Treatment

- Antibiotics
- Valve repair or replacement

Notes

Cardiomyopathy

Pathophysiology Course

Pathophysiology

Dilated Cardiomyopathy:
Think "Distended heart muscles", clients present with fibrosis (stiff hard muscles) of the myocardium and endocardium, dilated chambers, making it hard for the heart to pump out oxygen-rich blood.

Restrictive Cardiomyopathy:
Think "Rockhard heart muscles", so the heart cannot **RE**-fill with **RE**strictive cardiomyopathy, emboli (blood clots) are common.

Hypertrophic Cardiomyopathy:
Think "**Huge Trophy** like heart muscles" in the middle septum which can obstruct the **aorta** blocking all oxygenated blood out to the body - **very deadly!**

Obstructive = blocks the Aortic valve
Non-obstructive = does not block

All problems lead to **LESS cardiac output** meaning **LESS oxygen-rich blood OUT** to the body.

Causes

- Hypertrophic = genetics **ONLY** NCLEX TIP
- Dilated & Restrictive
 - Genetics
 - Damage to the heart = radiation

Signs & Symptoms

- Low oxygen
- Restlessness, agitation, altered level of consciousness NCLEX TIP
- syncope, dizzy + fatigue
- Heart failure signs
 - Left-sided = lung fluid
 - Right-sided = rocks the body with fluid (edema, ascites, JVD)

Dilated cardiomyopathy

- S3 murmur
- Cardiomegaly (dilated heart)

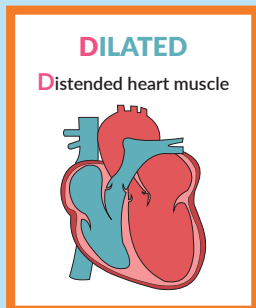
Restrictive Cardiomyopathy

- (same general low oxygen & HF)

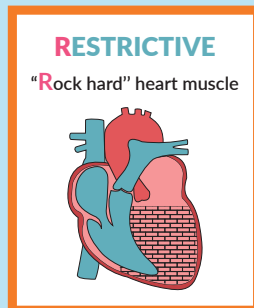
Hypertrophic Cardiomyopathy

- Typically asymptomatic (no s/s) until heavy exercise & then the child **DIES!**

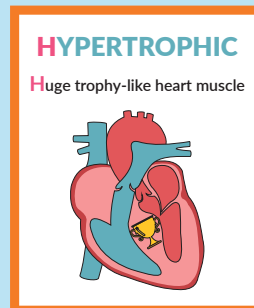
D



R



H



Pharmacology

- A ACE INHIBITORS**
-pril • Lisinopril
- B BETA BLOCKERS**
-lol • Atenolol
- C CALCIUM CHANNEL BLOCKERS**
-dipine, -zem, -amil • Nifedipine, Diltiazem, Verapamil
- D DIGOXIN**
Cardiac Glycoside
- D DIURETICS**
Furosemide & HCTZ

Labs & Diagnostics

- Chest X-ray & MRI
- Echocardiogram** measures Ejection Fraction (blood pumped out of heart) 55 - 70% = normal 40% or LESS = **BAD** (heart failure)
- Angiography**
Highlights the coronary arteries to see blockages & rule out ischemic heart disease (low oxygen to heart muscles)
- BNP**
"B-type or Brain Natriuretic Peptides"
Breaking & Stretching of ventricles

BNP ELEVATED

100 OR LESS - NORMAL

101-299+ MILD ELEVATION

300+ MILD HF

600+ MODERATE HF

900+ SEVERE HF

DIGOXIN NCLEX TIP



HOLD MED IF:

- Apical Pulse 60 ↓
- Potassium (K+) 3.5 ↓
(Risk for Dig Toxicity)
- Digoxin Toxicity **OVER 2.0**
Vision Changes, N/V, Fatigue "dizzy"



Side note:

Hypertrophic Cardiomyopathy

- B - Beta blockers
- C - Calcium channel blockers

NO DDD

- D - Dilators
- D - Digoxin
- D - Diuretics

NO strenuous activity!

This can block the aorta.

Nursing Interventions

DRESS

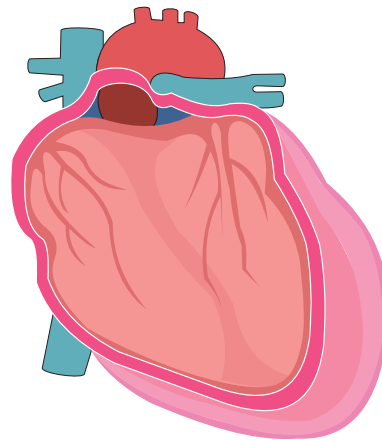
- D DIET** (low sodium & low fat)
- R REST PERIODS**
- E EXERCISE**
- S STOP SMOKING & ALCOHOL**
- S STRESS REDUCTION**

Pericarditis

Pathophysiology Course

Pathophysiology

Inflammation **OUT**side the heart
(heart gets compressed & can't pump)
Less cardiac **OUT**put = Less oxygen **OUT**



Signs & Symptoms + Labs

- Precordial chest pain
- Elevated WBC (over 10,000)
- C-reactive protein
- Cardiac Tamponade
 1. JVD
 2. Muffled heart sounds
 3. Pulsus paradoxus
(drop in sys. BP by 10 mmHg)

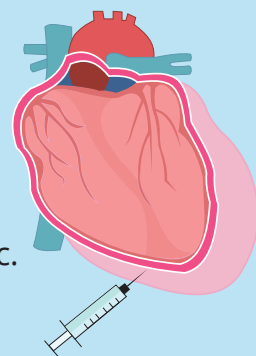
Causes

HAIR

- H** **HEART ATTACK**
Acute MI
- A** **AUTOIMMUNE DISORDERS**
Lupus, Scleroderma, RA (Rheumatoid Arthritis)
- I** **INFECTION**
HIV, Herpes, & Bacterial (TB)
- R** **RENAL FAILURE**
Uremia (High BUN)

Treatment

- NSAIDS (indomethacin)
- Steroids (prednisone)
- **Pericarditis (needle in the heart)** used to drain any fluid or blood in the heart sac.



Notes

Hypertension

Pathophysiology Course

Pathophysiology

Hypertension is chronic high blood pressure, which if not treated can cause damage to organs from all that **high pounding pressure**

- Brain - CVA (**stroke risk!**) **NCLEX TIP**
- Heart - MI (heart attack) & HF (heart failure)
- Kidney - CKD (Renal failure)
- Blood vessels - Atherosclerosis (scared arteries)
- Eyes - **Blindness** (Retinopathy) **NCLEX TIP**

MEMORY TRICK

HYPERtension = **HIGH BP**
"High Tension on the heart and organs"

Signs & Symptoms **NO SYMPTOMS = Silent KILLER**

- A** -Achy head (**Headache**) **NCLEX TIP**
- B** -**Blurred vision** (retinopathy)
- C** -Chest pain (**angina**)

SEVERE: HTN Crisis **OVER 180/120**

Immediate Action:

- **B** - Beta blockers "Blocks Beats"
- **C** - CCBs "C Calms the heart"
- **D** - Dilators (Vasodilators) "Nitro = Pillow"
- **E** - Emergency to ICU!

Causes

SODA

- S** -Stress, Smoking, Sedentary Lifestyle
- O** -Obesity, Oral Contraceptives (birth control)
- D** -Diet (High sodium & Cholesterol) Diseases
DM, Renal disease, HF, Hyperlipidemia (Over 200)
- A** -African men & Age (old)

Imaging

- **Echocardiogram** measure
Ejection fraction (blood pumped out of heart)
55 - 70% = normal
Less than 40% = Heart Failure
- ECG & EKG - Tall R peaks from the high pumps
- Side note: 3 BP measurements - 1 week apart, confirms diagnosis

Nursing Interventions

DRESS

- D** **DIET** **LOW SCC** (Sodium, Calories, Cholesterol)
- R** **REDUCE** **ALCOHOL & CAFFEINE**
- E** **EXERCISE: WALKING** (30 min. x 5 days/wk)
- S** **STOP** **SMOKING & ALCOHOL**
- S** **STRESS** **REDUCTION**

Numbers to know:

HTN CRISIS:
180/120
 (or more)

STAGE 2: 140/90 (or more)

"NORMAL BP"

STAGE 1: 130-139/80-89



ELEVATED: 120-129/80 (or less)

NORMAL: 120/80 (or less)

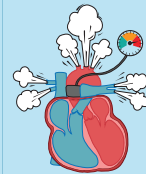
LOW: 90/60 (or less)

120/80

Systolic/Diastolic

"San/Diego"

Squeeze/Decompress



OVER
140/90
OH LORDY!

Labs

BNP - B-type Natriuretic Peptides

- 100 & Less = Normal
- 300+ Mild
- 600+ Moderate
- 900+ SEVERE

Cholesterol Panel

- Total Cholesterol = **200**
- Triglycerides = **150**
- LDL = Under **100**
- HDL = OVER **40**

NOTE: All should be low, except the HDL
 "Happy - keep them HIGH"

Pharmacology

Blood Pressure Lowering Drugs ABCD

A-Ace inhibitors -**pril** Lisinopril

- A-Angioedema
- C-Cough
- E-E+ imbalances (LOW sodium, HIGH potassium)
- ARBS "**-sartan**" Losartan

B-Beta blockers (slows HR) "**-lol**" Atenolol

- Blocks Beats
- Caution: **4 B's**
- Bradycardia (60 or Less)
- Bottomed out BP (80/60)
- Breathing problems (COPD, Asthma)
- Blood sugar masking (diabetics)

C-Calcium channel blockers

- Calms heart, Controls BP
- Niphedipine, Cardizem, Verapamil

D-Diuretics

- D-Drains Fluid "Diurese"
- K+ Wasting**-Furosemide & HCT (caution: Low K+, Eat fruits & green leafy)
- K+ Sparing**-Spironolactone (avoid Salt Substitutes)

D-Dilators (vasodilators) (Relieves Pressure)

- Nitroglycerin = Pillow** (rest & relaxed heart)
- Caution:** No Viagra = **DEATH**

AC Anti-Clogging of the arteries

A-Antiplatelet (Anti Clumping)

- A-ASA
- C-Clopidogrel Caution: Bleeding

C-Cholesterol Lowering

- Lovastatin "stay clean"
- Caution: Liver Toxic, NO grapefruit

Endocrine

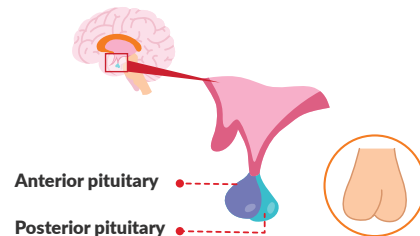
Endocrine Glands & Functions I

Pathophysiology Course


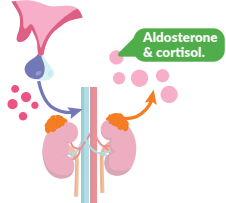

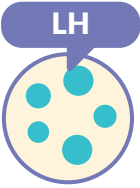
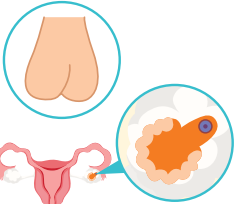
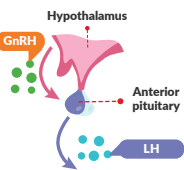
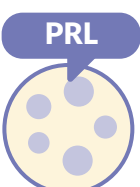
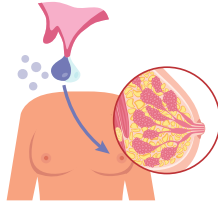
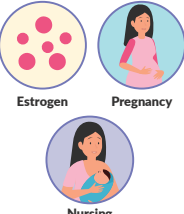
Pituitary Gland

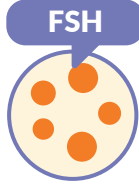
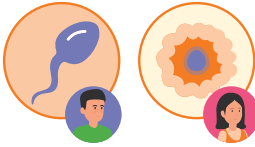
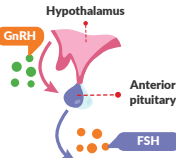
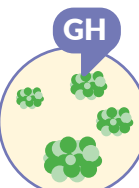
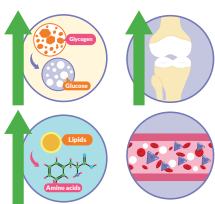
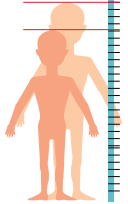

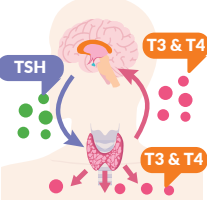

Think of the **pituitary** as the testis of the brain, since they look like a set of testicles & similarly **release hormones** that help the body do many functions. Separated into **2 lobes**:

- **Anterior pituitary**
The largest part of the pituitary responsible for synthesis & release of most pituitary hormones
- **Posterior pituitary**
Stores & secretes hormones produced by the **hypothalamus** right above the pituitary



Anterior Pituitary

HORMONE	EFFECT ON TARGET	STIMULUS FOR RELEASE
ACTH: Adrenocorticotropic hormone 	Stimulates adrenal cortex to release aldosterone & cortisol. 	Stress 
LH: Luteinizing hormone 	Men: testicular Women: ovulation (release of the egg) 	GnRH 
PRL: Prolactin 	Stimulates production of milk in the breast 	Estrogen, pregnancy & nursing 

HORMONE	EFFECT ON TARGET	STIMULUS FOR RELEASE
FSH: Follicle-stimulating hormone 	Men: sperm production Women: ovarian follicles for eggs 	GnRH Gonadotropin-releasing hormone 
GH: Growth hormone 	Increased during anabolic metabolism, cartilage growth & catabolism of fat. Blood glucose & insulin effects 	Normal growth & development 
TSH: Thyroid-stimulating hormone 	Stimulates thyroid to release T3 & T4 	Thyroid needs 

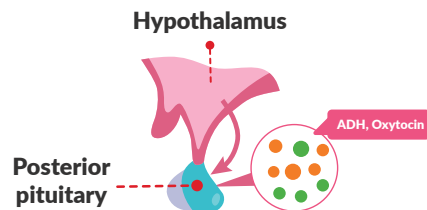
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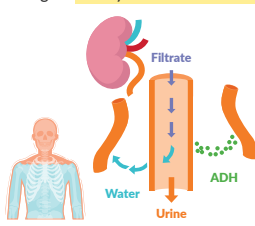

Endocrine Glands & Functions II


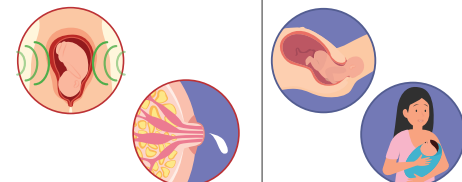
Pathophysiology Course

Posterior Pituitary

The posterior pituitary gland does not produce hormones, but rather stores and secretes hormones produced by the hypothalamus.

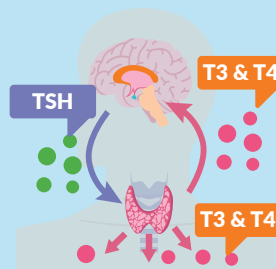


HORMONE	EFFECT ON TARGET	STIMULUS FOR RELEASE
ADH: Antidiuretic Hormone Memory Trick Add Da H2O 	Add water back into the body by telling the kidneys to reabsorb water 	Decreased BP, Pain, high osmolality of the blood 

HORMONE	EFFECT ON TARGET	STIMULUS FOR RELEASE
Oxytocin 	Maternity: Stimulates uterine contractions & lactation of breast milk 	Labor & delivery of newborn or infant breastfeeding

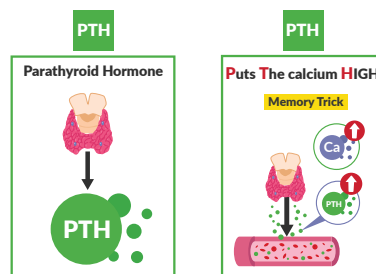
Thyroid

- T4 → T3 (active thyroid hormone)
- TSH - Thyroid stimulating hormone



Parathyroid Glands

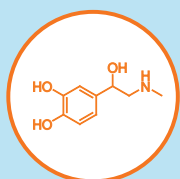
- **PTH:** Parathyroid Hormone
- **PTH:** Puts The calcium **HIGH** **Memory Trick**



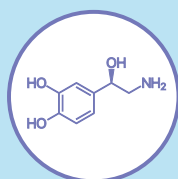
Adrenal Glands

TEST TIP

Catecholamines



Epinephrine



Norepinephrine



Adrenal Cortex

the outer region of the adrenal gland

3 parts:

1. Zona glomerulosa
2. Zona fasciculata
3. Zona reticularis

Adrenal Medulla

the inner part of the adrenal gland

- Makes Fight & Flight Catecholamines **TEST TIP**
 - Epinephrine (adrenaline)
 - Norepinephrine (noradrenaline)

Addison & Cushing Syndrome

Pathophysiology Course

Addison
Absent Steroids **LOW**
Small, Weak, Tanned

Pathophysiology

- A • **ADD** "some steroids" (Cortisol & Aldosterone)
- A • **ADDED** Stress will **KILL!**

Causes

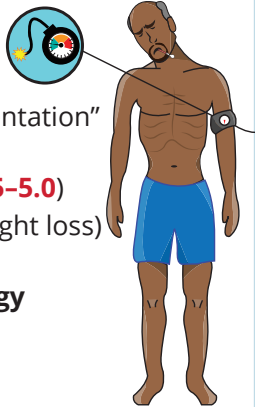
- A • **AUTOIMMUNE** (body kills adrenals or Pituitary)
- D • **DISEASES:** Cancer, Infections (TB/HIV)
- D • **DAMAGE:** Adrenal Hemorrhage (Trauma)

Signs & Symptoms

LOW BP, Wt, Glucose, Temp, Hair, Mood, Sodium, Energy
HIGH Skin Tan (bronze) + Potassium (K+) Over 5.0

ADDS

LOW BP - TICKING TIME BOMB



- A • **ADDED Tan**
"Bronze pigmentation" "hyper pigmentation"
 - A • **ADDED Potassium**
"Hyperkalemia" **Over 5.0** (normal 3.5-5.0)
 - D • **DECREASE Weight** (Water loss = weight loss)
NOT TRUNCAL OBESITY
 - D • **DECREASED BP, hair, sugar & energy**
"fatigue" "alopecia" "hypoglycemia"
"hypotension"
 - S • **SODIUM loss 135 or LESS**
(135-145 normal)
 - S • **SALT craving**
- *NOT hairy NOT "Hirsutism" = hair suit &
*NOT thin skin is Cushings

Treatment

- A • **Add Steroids "-sone"** Prednisone)
Increase the Dose during **Stress, Surgery, Sepsis**
- D • **Diet HIGH** in Protein, Carbs & Sodium
- D • **Don't "Abruptly" STOP** Steroids! (Crisis)
- D • **Don't** believe this medication will cure you
- I • **Indefinitely:** "Lifelong" hormone replacement

ADDisonian "Adrenal" Crisis

Caution: No Steroids = DEATH!

- A • **Addisonian Crisis**
- D • **Drop in BP 89/40 LESS** (Normal: 120/80)

1ST NURSE ACTION

ADD steroids (IV push)
"**-sone**" hydrocortis**one** prednisone

Cushing
Cushion of Steroids **HIGH**
Big, Round, Hairy

Pathophysiology

- C • **C**ushing (HIGH Cortisol Steroids)
- C • **C**ushion Pillow 'Air Bag'

Causes

STERIODS Prednisone **LONG-TERM** Therapy (asthma + RA)
TUMOR (Pituitary/Adrenal)
SMALL CELL LUNG CANCER **NCLEX TIP**

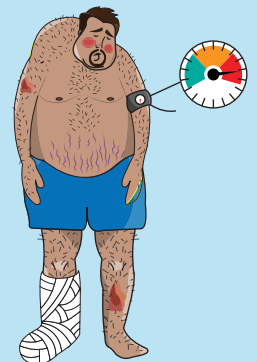
Signs & Symptoms

BIG BP, Infections, Wt, Hair, Belly, Brittle Bones

CUSH

HIGH BP

- C • **CUSHION**
TRUNCAL Obesity + Moon Face + Buffalo hump
- U • **UNUSUAL HAIR Growth**
"Hirsutism" (hairy suit)
- S • **SKIN**
"Purple Striae" "butterfly mark"
- H • **HIGH Sugar, BP, Weight**



Treatment

SURGERY Cut out Tumor **RE**move organ = **RE**place Steroids
SLOWLY decrease Steroids "taper off gradually"

NCLEX Question

Which clinical manifestation(s) would be observed in a patient with Cushing syndrome? Select all that apply:

- 1. Easy bruising
- 2. Increased blood glucose
- 3. Increased blood pressure
- 4. Increased potassium
- 5. Increased abdominal girth
- 4. Decreased weight

Diabetes

Pathophysiology Course

Pathophysiology Basics

INsulin = puts **IN**to the cell (sugar & K+)

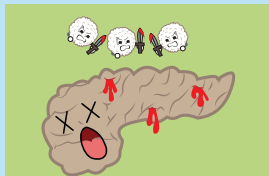
GLycogen = Stored **GL**ucose in Liver



Pathophysiology & Causes

Type **ONE**

None: body does **NOT** produce insulin
Autoimmune (body attacks the pancreas)
SON: heredity "you can pass it on"



Type **TWO**

FEW-insulin receptors work
"Insulin resistance" (Diet)
YOU: your diet (high simple sugars)
& sedentary lifestyle



Risk Factors

"MetaBOLic Syndrome"-Increased risk for diabetes, heart disease, stroke

B-BP meds or HTN (over 130 systolic)

B-Blood Sugar Meds (insulin, oral diabetics) or High Blood Sugar (over 100+)

O-Obes (waist size: 35+ Female 45+ Male)

L-Lipids HIGH Total Cholesterol/Triglyceride/LDL
200-150-100—HDL 40

(higher LDL and lower HDL are risk factors)

3 or MORE criteria

Top Missed Exam Question

Which clients are **MOST** at risk for developing **metabolic syndrome**? Select all that apply

- 1. 35 year-old male with triglycerides of 140
- 2. **48 year-old female with fasting blood glucose of 105**
- 3. **55 year-old female with waist size of 40 inches**
- 4. **28 year-old male with blood pressure of 135/85**
- 5. 42 year-old female with high density lipoprotein (HDL) level of 55

Diagnostic labs

	RANDOM	FASTING	GTT "TOLERANCE"	HgB _{A1C}
NORMAL	70-115	UNDER 100	UNDER 140	UNDER 5.7
PRE-DM	70-115	100-125	140-199	5.7-6.4
DM	200+	126+	200+	6.5+



Signs & Symptoms

HIGH sugar

hot and dry = sugar high
"Hyperglycemia"
(blood turns to mud)
3 **P**'s: Polyuria
Polydipsia
Polyphagia

LOW sugar (70 or LESS)

cold and clammy need some candy
Hypoglycemia
MORE SEVERE! "Hypogly Brain will Die!"
• Cool, pale "pallor", sweaty, clammy = candy **NOT** hot or flushing
• Trembling, Nervous, Anxious
• HIWASH = Headache, Irritable, Weakness, Anxious, Sweaty, Shaky, Hungry

Causes

HIGH sugar (115 or MORE)

- Sepsis (infection #1 cause),
- Stress (surgery, hospital stay),
- Skip insulin
- Steroids (prednisONE)

TREATMENT: Insulin

LOW sugar (70 or LESS)

- Exercise
 - Alcohol
 - Insulin PEAK times
- MOST DEADLY!** "Hypogly brain will DIE!"
1st TREATMENT:

Awake? Ask to eat:
Juice, Soda, Crackers, Low Fat Milk
NOT high fat milk or peanut butter
Sleep? Stab them (D50W given IV/IO)



2 Common Exam Question

A client with type 1 diabetes is **only responsive to painful stimuli** with a blood sugar of 42, what is the first action taken by the nurse?

- 1. Repeat the blood sugar assessment
- 2. **Give dextrose IV push**
- 3. Call the HCP (doctor)
- 4. Clock out for lunch - dis too much...

LOW Sugar
"hypOglycemia"
70 or LESS

Awake = Ask them to eat
Sleeping = Stab with IV D50 (dextrose 50)

Which medication could cause risk for **hyperglycemia**?

- 1. Labatolol
- 2. Albuterol
- 3. Spironolactone
- 4. **Prednisone**

Tricky Exam Question

The non diabetic client is admitted for a kidney **infection** that has now turned **septic**. The blood sugars have increased from **150 to 225**, what is the best answer to give a family member who is asking why insulin is used?

- 1. The client now has type 2 diabetes because of the infection.
- 2. Insulin is given to control the hypoglycemia.
- 3. **High sugar is common during infection and stress to the body, the insulin will help lower the sugar until the infection resolves.**
- 4. Be QUIET & let me do my job

Diabetes II

Pathophysiology Course

Treatment - Nursing Intervention

D-DIET -Low carbs

AVOID: Simple Sugars (soda, candy, white bread/rice, juices)

- Good High Fiber = BROWN (bean, rice, bread, peanut butter)
"whole wheat/grain/milk"
- Bad Low fiber = White (bread, rice, bread potatoes (fries), low fat milk)

D-DIABETIC FEET "Delicious Feast for bacteria"

GOAL: Clean, Dry, Injury Free

AVOID

- F-Flip Flops**, high heels, Nylon,
- O-OTC** corn removal
- O-Overly HOT** (baths, pads etc.)
- T-Toe Injuries** — cut nails STRAIGHT

NCLEX KEY WORDS:

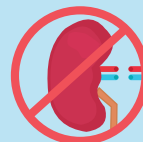
- Daily inspection — **NOT** weekly
- Shoes fit properly — **NO** sandals
- SOFT** Cotton Socks — **NOT** nylon
- Nails trimmed-cut straight — **NOT** curved angles
- Non healing skin wounds — Report to HCP (Dr.)

- NO** callous removal
- NO** heavy powder — light powder
- NO** rubbing feet hard "vigorously"
- NO** HOT baths or HOT pads — warm is ok



Chronic Complications

- KIDNEY**-Nephropathy (High Creatinine **OVER 1.3**)
- EYE**-Retinopathy (blind)
- HEART**-HTN & Atherosclerosis
- BRAIN**-CVA (strokes)
- NERVES**-Neuropathy (loss of feeling)

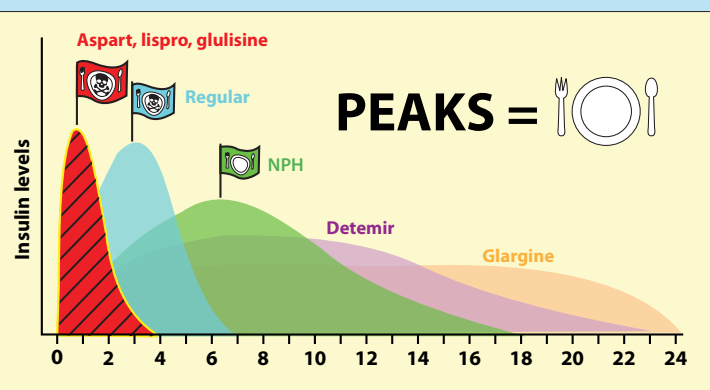


Oral Hypoglycemics (Type 2 Only)

- DIET & EXERCISE** BEFORE oral meds and insulin
- METFORMIN**-Minimal chance of Low Sugar "hypoglycemia"
 - 1. Weight Loss
 - 2. Lactic Acidosis: **NO** Alcohol + **STOP** 48 hours before and after cath
IV Contrast = Kills Kidney
- GLIPIZIDE GLYBURIDE**-Heart can **DIE** (bad for CHF)
LOW blood sugar (Avoid alcohol "**ETOH**" = hypoglycemia)
TOXIC: Renal, Liver & elderly population
Sun Burns = sunscreen & protective clothing
- THIAZOLIDINEDONE (TZD)** Pioglitazone (**ONE** heart)
NO Heart Failure patients-new pitting edema, crackles (lungs)
NO Liver failure patients "Cirrhosis" "Liver Failure"

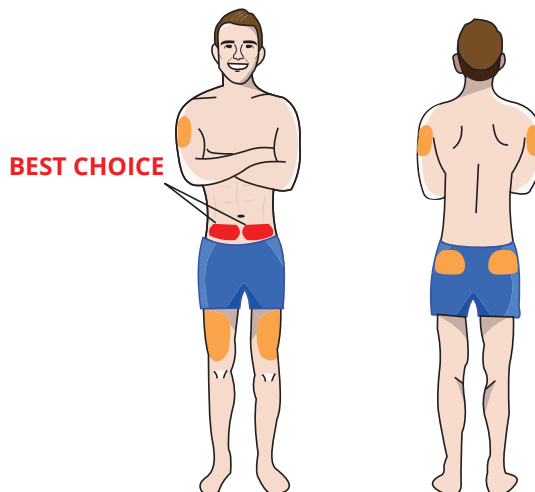
Insulin Types

LONG ACTING	NPH	REGULAR	RAPID
NO Peak NO Mix • Detemir • Glargine • Levemir = Long acting	iNtermediate NEVER IV drip or IV bag Mix clear to cloudy Given 2x per day	Ready to go IV Regular goes right into the vein ONLY IV insulin	Aspart/Lispro/Glulisine
NO PEAK	PEAK 4-12 hour	PEAK 2-4 hour	PEAK 30-90 hour ONSET 15 minute MOST DEADLY



7 Insulin Tips

- Peaks + Plates** = Food during PEAK times (prevent **HYPO**gly=brain die)
- NO Peak NO Mix** = Long acting "old guys"—Detemir & Glargine
- IVP or IVPB ONLY** = Regular insulin "ready to go IV"
- Draw Up:** Clear to Cloudy "you want **CLEAR** days before cloudy ones"
- Rotate locations**-Macarena-**BEST** on abdomen (2 inches from: Umbilicus, Naval, "belly button")
- DKA** - Type 1—"sick days"—**YES INSULIN** without food!!!
- Hypoglycemia (70 or LESS)**
Awake = Ask them to Eat (soda, juice, low fat milk)
Sleeping = Stab with IV D50W (dextrose 50)
 "Unresponsive" "Responsive ONLY to pain"



DKA vs. HHNS

Pathophysiology Course

DKA

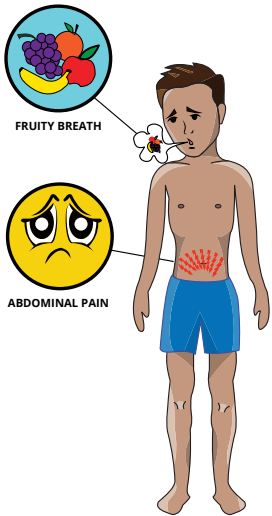
Pathophysiology

TYPE 1—FASTER & YOUNGER
"D COMES 1ST IN ALPHABET"

- S**—SEPSIS (INFECTION) **NCLEX TIP**
- S**—SICKNESS "STOMACH VIRUS & FLU"
(MOST COMMON)
- S**—STRESS (SURGERY)
- S**—SKIP INSULIN EASIER FIX

Signs & Symptoms

- D**—DRY & HIGH SUGAR **250-500+** **NCLEX TIP**
- K**—KETONES & KUSSMAUL RESP.
(DEEP/RAPID/REGULAR RESPIRATIONS
AND FRUITY BREATH) **NCLEX TIP**
- A**—ABDOMINAL PAIN
- A**—ACIDOSIS METABOLIC **LESS THAN 7.35**
(NORMAL 7.35—7.45)
HYPERKALEMIA (ABNORMALLY HIGH K+)



HHNS

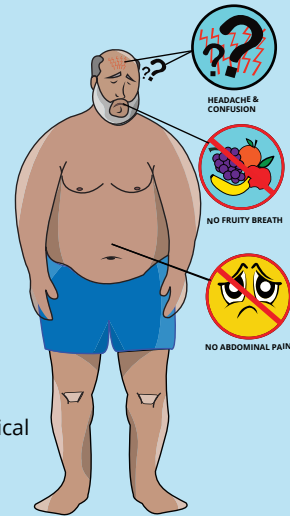
Pathophysiology

TYPE 2—SLOWER & OLDER "H COMES
2ND IN ALPHABET"

- ILLNESS
- INFECTIONS
- OLDER AGE HARDER TO FIX

Signs & Symptoms

- H**—HIGHEST SUGAR **OVER-600+**
- H**—HIGHER fluid loss & **Extreme dehydration** **NCLEX TIP**
- H**—Head change—LOC, Confusion, Neurological Manifestations
- N**—No ketones **No Acid**, (NO fruity breath/ketones)
- S**—Slower Onset & Stable Potassium (3.5-5.0)



Treatment

- D**—Dehydration **FIRST!** (0.9% normal saline) **NCLEX TIP**
- K**—Kill the sugar (**SLOWLY**) prevent low sugar
Hourly BS checks "land the plane slow & smooth"
Over 250: IV Regular **insulin ONLY** (bolus 1st)
Below 200 (or ketones resolve): SQ insulin + 1/2 NS
with D5W IV
- A**—Add Potassium K+ (Yes even if norm: 3.5 - 5.0)
During IV Insulin **NCLEX TIP**
- IN**-sulin = sugar & K+ IN the cell

Treatment

- H**—Hydration—0.9% NS 1st, then HYPOTonic **NCLEX TIP**
- S**—Stabilize Sugars (Insulin)
CAUTION: Insulin IV = **ONLY Regular Insulin** **NCLEX TIP**
- IV bolus
- IV titration
- SQ injection & IV
- SQ only

Common NCLEX Question

Q: Child is nauseous NOT eating—maybe vomiting—do you still give INSULIN?

A: **Yes, we give sick day insulin to prevent DKA...**
because glucose is **HIGH** during times of illness.

**DKA patients DIE from hypokalemia where
HHNS patients die from hypovolemia**

Re-Assessment

Blood Glucose **Hourly**

Re-Hydration Signs:

- BP stable & Cap Refill (3 sec or less)
- Skin color & warm temp (NOT cool/pale)
- 30ml/hr + Urine Output
- Low spec gravity (1.005–1.030)

NOT Apical pulse **NOT** Lung sounds **NOT** Pupils

Potassium IV (Normal 3.5 - 5.0)

- First Action = Heart monitor

Never push = **DEATH**

- 10–20 mg MAX per hour IV!! (IV Pump)
- Site (central) and Slow infusion

Potassium Pumps Muscles

High Potassium (5.0+)

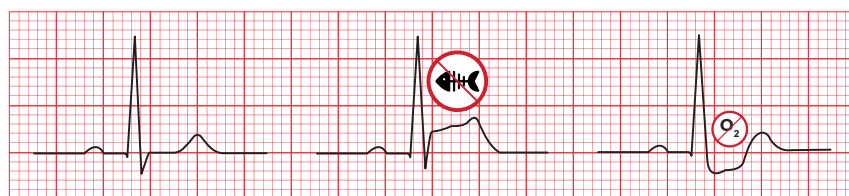
High Pump

Peaked T waves, ST elevation

Low Potassium (Below 3.5)

Low Pump

Flat T wave, ST depression, U wave



Normal

ST elevation

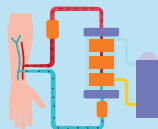
ST Depression

Dialysis

Pathophysiology Course

Hemodialysis

- Machine version of the kidney
- Helps to clean the blood by filtering waste & flushes out excess fluid and electrolytes



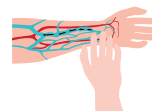
MEMORY TRICK

Any time you see the word "DIAL" think of the soap, it cleans the blood



Before Dialysis

- Assess **Fluid Status**
 - Weight (current & previous)
 - Vital Signs
- Assess **Fistula** (shunt) **NCLEX TIP**
 - Feel a thrill "vibration"
 - Hear a bruit



■ Hold meds:

• Antihypertensives

A	Ace & Arbs Lisino pril , Losartan
B	Beta Blockers Atenolo l NCLEX TIP
C	Ca Channel Blockers Nifedipine, Verapami l , Diltiazem
D	Diuretics Furosemide, Hydrochlorothiazide
D	Dilators Nitroglycerine

• Washed Out:

- Antibiotics
- Digoxin
- Water-soluble vitamins (B, C, and folic acid)

Deadly Complication

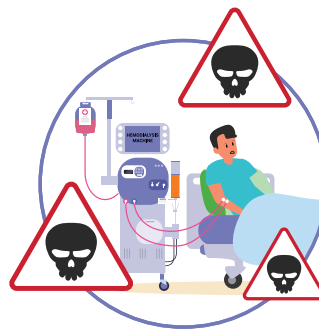
Deadly Complication

Dialysis disequilibrium syndrome (DDS)

- Restless & disoriented
- Vomiting
- Headache

Priority Action

- Stop or slow infusion
- Report to Provider **NCLEX TIP**



Nursing Interventions

Care for Fistula (AV shunt)

- Squeeze or Grip: "Rubber ball" "sponge"
- Pitting edema = Normal



Not Normal

P	P	P	P	P
Pale skin "pallor"	Paresthesia "Numbness or tingling"	Pulses diminished	Poor cap refill	Pain (distal to shunt)

Monitor:

- Infection
- Bleeding
- Feel a thrill

No Nos

- **NO** restrictive clothing or jewelry (watch)
- **NO** BP on affected arm
- **NO** sleeping on arm
- **NO** creams or lotions
- **NO** lifting **over 5 lbs** (**NO** purse)

Dialysis II

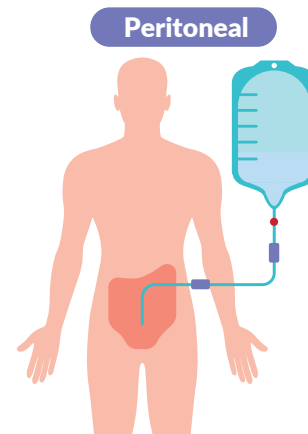
Pathophysiology Course

Peritoneal Dialysis

The peritoneal cavity is filled up with hypertonic solution to PULL solutes out

Before:

1. Take Weight
2. Warm solution



Infection Risk

Sterile technique **PRIORITY**

Peritonitis: Key Signs to REPORT

- Fever
- Tachycardia
- Cloudy drainage

Key Signs

- Crackles in lung bases
- Rapid respirations
- Dyspnea

Priority Intervention:

- First action: Raise HOB



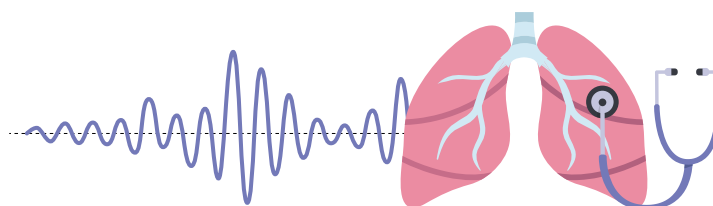
Respiratory Distress - due to rapid infusion or overfilling the abdomen:

Key Signs

- Crackles in lung bases
- Rapid respirations
- Dyspnea

Priority Intervention:

- First action: Raise HOB
- Remember breathing over circulation



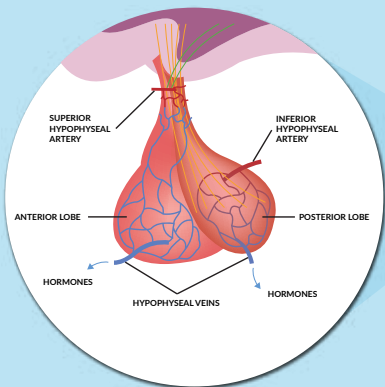
Insufficient outflow

1. Assess **Patient** = abdomen: distention & **Constipation**
2. Assess **Device** = catheter **kinks** & **obstructions**
3. **Intervention:** Reposition to **side-lying** position



SIADH vs. DI

Pathophysiology Course



ADH
Anti-Diuretic Hormone
Adds $Da H_2O$

Nursing Care

- D** **DAILY WEIGHTS** (NOT weekly)
- W** **WEIGHT GAIN** = Water Gain

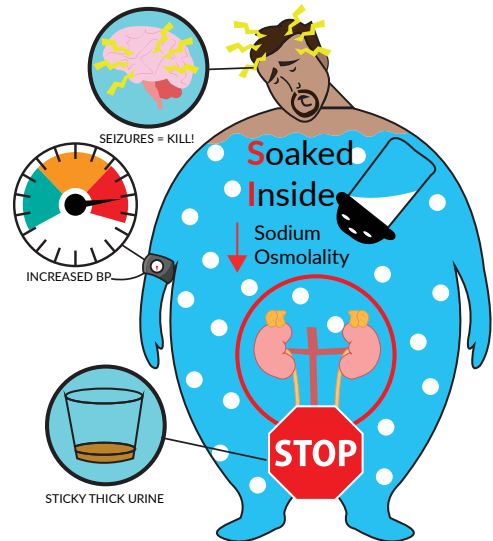


SIADH "Soaked"
"Yes" **ADDS DA H₂O**
Syndrome of Inappropriate Antidiuretic Hormone

Patho, S/S, Treatments

- S** **STOPs** urination (**LOW** urine output)
- S** **STICKY & THICK** "urine" **HIGH Sp. Gravity 1.030+**
- S** **SOAKED** Inside "Low & Liquidy" Labs
HYPO osmolality (**LOW**) **NCLEX TIP**
HYPOnatremia below **135 Na+** (**LOW**)
- S** **SODIUM** Low!! (**Headache** Early Sign) **NCLEX TIP**
- S** **SEIZURES**- **NCLEX** key words: Headache, Confusion
- S** **SEVERE HIGH** blood pressure
- S** **STOP ALL FLUIDS + GIVE Salt + Diuretics**
(**NO IV** or drinking) + (**IV 3% Saline + Eat Salt**)

SIADH
"Soaked Inside"



Causes

- S** • **S**mall cell lung cancer **NCLEX TIP**
- S** • **S**evere Brain Trauma (trauma/surgery)
- S** • **S**epsis infections of brain (meningitis)

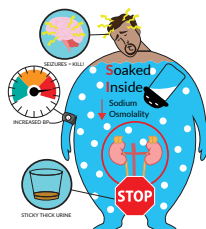
Labs

- S** **SOAKED** Inside "Low & Liquidy" Labs
HYPO osmolality (**LOW**)
HYPOnatremia below **135 Na+** (**LOW**)
- S** **STICKY** thick urine" Outside • **LOW** urine output (**STOPs** urine)
HIGH specific Gravity **1.030+**

Common NCLEX Question

What does the nurse expect to find in a patient with syndrome of inappropriate antidiuretic hormone? Select all that apply

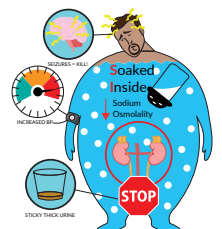
- 1. Low blood osmolality
- 2. Increased serum osmolality
- 3. Low urine specific gravity
- 4. Hyponatremia
- 5. Decreased urine output



Common NCLEX Question

When caring for a patient with SIADH, what does the nurse expect to implement? Select All That Apply

- 1. IV maintenance fluid 0.9% normal saline
- 2. Fluid restriction
- 3. Sodium restriction
- 4. Seizure precautions
- 5. Monitor urine I & O (intake & output)
- 6. Measure weights weekly



Siadh vs. DI II

Pathophysiology Course

DI "Dehydrated"
"Die" **ADH**
Diabetes Insipidus

Patho, S/S, Treatments

- D** **DI**URESE "Drain" fluid (**HIGH** urine output)
- DD****I**LUTED urine Low specific Gravity (**1.005**)
- DD****R**Y **I**nside "High & Dry" Labs
 - HYPER** osmolality (**HIGH**) **NCLEX TIP**
 - HYPER**natremia over **145 Na+** (**HIGH**)
- D** **DR**INKING a lot "thirsty"
- D** **DE**HYDRATED Dry Mucosa & Skin
- D** **DE**CREASED blood pressure
- D** **DE**SMopressin "Vasopressin" (ADH)
 - Decrease Urine Output **NCLEX TIP**
 - Death by **Headache!** (Low Na+) **135 or Less**

Treatment

- D** • Desmopressin/Vasopressin (synthetic ADH)
- D** • Decreases Urine Output "Pressin" the BP Up!
- CAUTION:** "Headaches" Priority!
- Low Na+ (**135 or less**) > Seizures > **DEATH!**

Causes

- D** • **D**amage to brain
(Tumors, Trauma, Surgery)

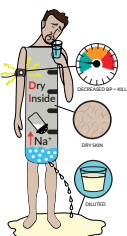
Labs

- D**ry **I**nside "High & Dry" Labs
 - HYPER** osmolality (**HIGH**)
 - HYPER**natremia over **145 Na+** (**HIGH**)
- D**iluted **O**UTSIDE "High urine output (**D**rain urine)
 - LOW** specific Gravity **1.005**

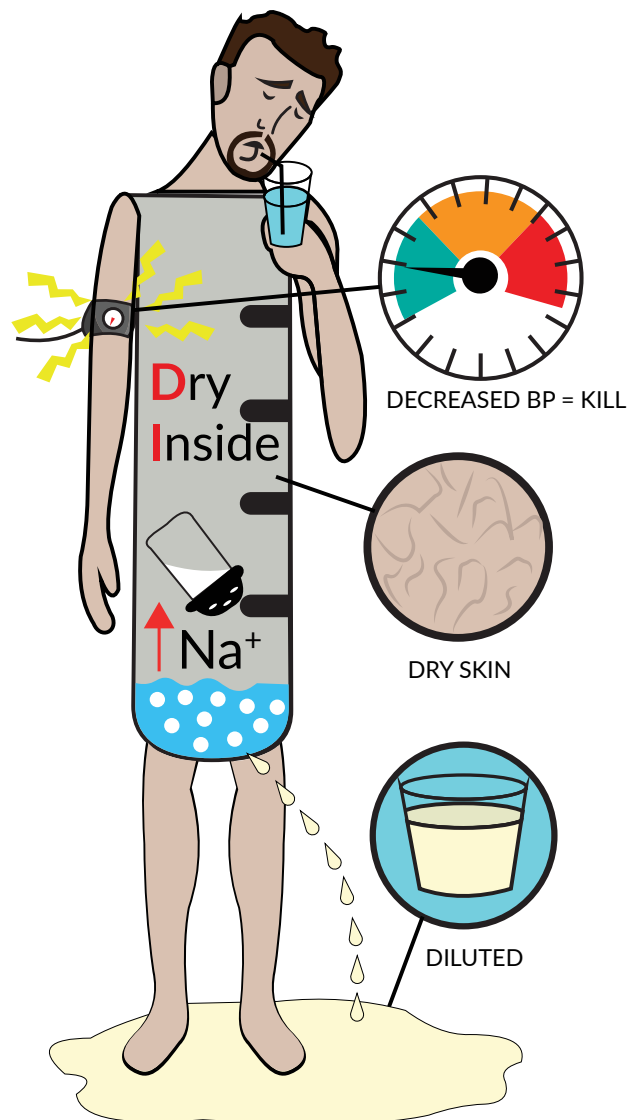
Common NCLEX Question

A client with a brain tumor develops **diabetes insipidus**, which data should nurse **expect to find**?
Select All That Apply

- 1. Dark urine with increased specific gravity
- 2. High blood serum osmolality
- 3. Weight gain with edema
- 4. Increased thirst
- 5. Sodium level below 135
- 6. Urine output 30 ml/hr or less.



DI "Dry Inside"



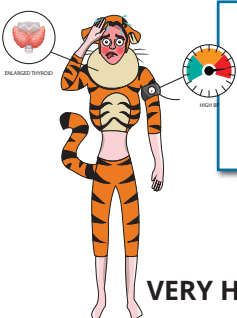
Common NCLEX Question

A client is newly prescribed **desmopressin** nasal spray, which statement by client indicates **further education is needed**?
Select All That Apply

- 1. Frequent headaches are normal
- 2. I will make sure to restrict my water intake
- 3. This drug is used to decrease my frequent urination
- 4. I am glad this drug is able to treat my syndrome of inappropriate antidiuretic hormone.
- 5. I will record my output closely while taking this drug.
- 6. I will make sure to weigh myself weekly.

Hyper & Hypothyroidism

Pathophysiology Course



HYPERthyroidism

Graves = GAINS "HIGH"

EMERGENCY CONDITION:
Thyroid Storm "**thyrotoxicosis**"
VERY HIGH = "Agitation/Confusion" + HTN crisis!

Patho & Causes

HIGH T3 & T4 Thyroid Hormones

- Too much Iodine
- Too much Thyroid Meds. (**Levo**thyroxine)
- Autoimmune: Graves = GAINS "HIGH"

AUTOIMMUNE: Graves = GAINS "HIGH"

Labs

HIGH T3 & T4 HYPER

Low—TSH
(look at T3 & T4 levels **FIRST**)

Signs & Symptoms

HIGH & HOT!

CLASSIC SIGNS - NCLEX KEY WORDS

- G GRAPE EYE "Exophthalmos"**
(Use Eye patch/Tape Eyelids down) **NCLEX TIP**
- G GOLF BALLS** in throat "**Goiter**" **NCLEX TIP**
- HIGH BP**-HTN Crisis **180/100+**
(MI,CA, Aneurysms)
- HIGH HR**-Tachycardia **100+** (normal **60-100**)
- HEART PALPITATIONS** + Atrial Fibrillation
- HIGH TEMP. = NOT DRY!**
HOT & Sweaty Skin "diaphoresis"
Heat Intolerance **NCLEX TIP**
- HIGH GI** "Diarrhea"

Critical Complication

PRIORITY: EXTREME HIGH = Thyroid Storm
"Agitation & confusion" early sign

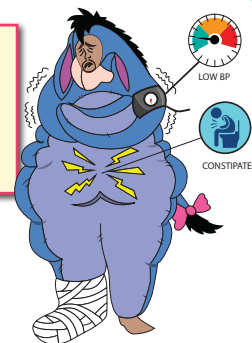
Diet

HIGH METABOLISM
HIGH calories (4,000–5,000 per day) **NCLEX TIP**
HIGH protein & carbs (meals & snacks)
NOT high fiber = **LOW FIBER!** (unless constipated)
NO caffeine (coffee, soda, Tea)
NO spicy food

HYPOthyroidism

HashimOtos | LOW & SLOW

EMERGENCY CONDITION:
Myxedema Coma (Mini hypothyroid)
VERY Low/Slow:
Airway, Breathing, Low BP = **DEATH!**



Patho & Causes

LOW T3 & T4 Thyroid hormones

- Low Iodine, Antithyroid Treatments
- Pituitary Tumor **NCLEX TIP**
- **AUTOIMMUNE:** HashimOtos | **LOW & SLOW**

Labs

LOW T3 & T4 hypO

- HIGH TSH
"TSH always opposite of T3 & T4"

Signs & Symptoms

LOW & SLOW = HYPO

CLASSIC SIGNS

- LOW** energy "fatigue, weakness, muscle pains, aches"
- LOW** metabolism—Weight **GAIN**/Water **Gain** (Edema eyes)
- LOW** digestion "**Constipation**" **NOT** diarrhea
- LOW** **HAIR LOSS** "alopecia" **NOT** hirsutism **NCLEX TIP**
- LOW** mental—forgetful, ALOC (altered)
- LOW** mood—depression, "apathy, confusion"
- LOW** Libido—low sex drive, infertile
- SLOW DRY** skin turgor **NCLEX TIP**
- LOW & SLOW**—menstruation "**irregular**" **NCLEX TIP**
NO period "missed"—**Amenorrhea** "**AMEN** no period!"
SLOW heavy period—**Hypermenorrhea**
(**Hyper Menstruation**)

Critical Complication

PRIORITY: EXTREME LOW = Myxedema Coma
Low RR—**Respiratory FAILURE**

PRIORITY: Place "Tracheostomy Kit" by bedside **NCLEX TIP**

KEY WORD: "**Endotracheal Intubation set up**"

Low BP & HR "hypotension" "bradycardia" (below 60)
Low Temp. "cold intolerance" **NO** electric blankets

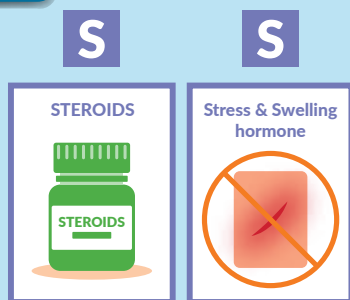
Diet

LOW Metabolism
LOW Calories
LOW energy "Frequent rest periods" **NCLEX TIP**

Steroids

Pathophysiology Course

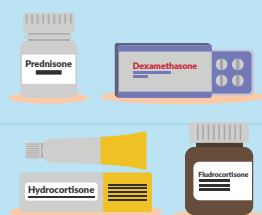
Drug name



S - STEROIDS
S - Stress & Swelling hormone

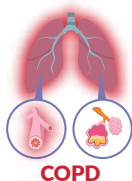
"-Sone"

- Predni**son**e
- Dexametha**son**e
- Hydrocorti**son**e
- Fludrocorti**son**e



Indication

Given to help the body respond to inflammation & STRESS!
Commonly for:



- Inflamed lungs like **COPD**
- Inflamed joints like **Rheumatoid Arthritis**
- Inflamed SKIN like **Psoriasis**
- Inflamed body - like **Lupus** where the body attacks itself
- **Allergic** reaction where EVERYTHING swells UP

Also given to **Addison** clients

We need to **ADD some** steroids

ADDISON TREATMENTS:

7 Ss STEROID PRECAUTIONS

"-sone" predni**son**e, hydrocorti**son**e, dexametha**son**e

S SWOLLEN (Water gain = Weight gain)
KEY TERMS: "Sudden" "excessive", "rapid"
REPORT: 1 Lb. in 1 day, or 2-3lbs in a few

S SEPSIS (Infections or Illness)
"Low WBC" Fever is **PRIORITY** **NCLEX TIP**

S SUGAR INCREASED
"Hyperglycemia" **NCLEX TIP**

S SKINNY
Muscle & Bones "Osteoporosis" (R/F Fx)

S SIGHT
(Cataracts risk) refer to Optometrist

PREVENT CRISIS:

S SLOWLY taper off
(**NEVER** abruptly stop) **NCLEX TIP**

S STRESS or Surgery
(increase dose)

TOP 3 MISSED Questions:

The nurse should be concerned when the client states: "I have a **sore on my leg that won't go away**". Which medication should be reviewed with HCP? **Select all that apply.**

- 1. Naproxen
- 2. Dihydromorphinone
- 3. **Dexamethasone**
- 4. Hydrocodone
- 5. **Hydrocortisone**

Which priority teaching is required for a patient prescribed **prednisone** for Lupus?

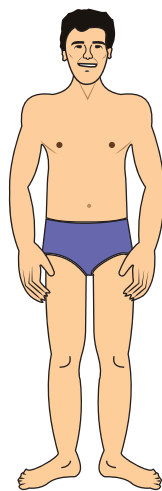
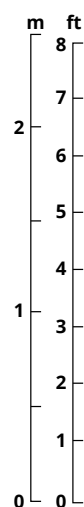
- 1. Report slight increases in blood sugar to HCP immediately.
- 2. **Increase dose before surgery or during times of stress.**
- 3. Monitor weight weekly.
- 4. Take with full meal at breakfast.

Which of the follow is an indication that the client needs additional teaching, while taking fludrocortisone?

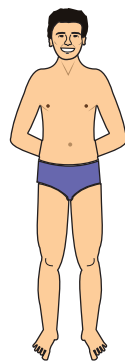
- 1. I will not discontinue this medication abruptly
- 2. **New bilateral pedal edema is normal**
- 3. The most important value to monitor is my weight.
- 4. I will report signs & symptoms of infection

Growth Hormone Disorders

Pathophysiology Course



gigantism



normal growth



dwarfism

Hyperpituitarism

Pathophysiology

Increased secretion of **GH - growth hormone** by the anterior pituitary gland, typically caused by a tumor.

- **Acromegaly:** occurs after puberty
- **Gigantism:** occurs before puberty
(Puberty generally occurs around 8 - 14 years old)

Signs & Symptoms

- **Hyper think HIGH**
- High blood pressure
- Tall height, long hands & feet
- Enlarged organs

MEMORY TRICK

HE'S TALL

H - Hypertension & Height
E - Enlarged Organs
S - Sweating & oily skin
T - Too much pain in joints
A - Arthritis
L - Long hands & feet
L - Long protruding jaw

Pharmacology

- NSAIDS - for joint pain
- Growth Hormone receptor antagonists - they work by blocking GH
- Dopamine Agonists - work by stopping release of GH

Surgery

- **Hypophysectomy** (1st line treatment)
Complications post operative: **ICP**, meningitis (infection in the brain), hypopituitarism, CSF leakage

Interventions Post-Op

- Monitor **ICP**, vital, neuro status
- Elevate the head of bed - to decrease ICP
- NO sneezing, coughing or blowing nose - for ICP
- Monitor for **diabetes insipidus** - too much urination, indicates pituitary damage

Hypopituitarism

Pathophysiology

Decreased secretion or production of hormones within the pituitary, typically caused by a tumor, trauma, stroke etc.

Signs & Symptoms

- **Hypo think low**
- Hypotension - low BP
- Low cardiac output
- Low height & energy
- Low sex drive & infertility
- Obesity - from low metabolic rate
- Headaches

Pharmacology

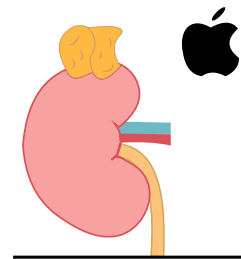
- **Corticosteroids:** to replace steroid hormones ending in "**-sone**"
 - **Prednisone**
 - **Hydrocortisone**
- **Levothyroxine:** to replace thyroid hormones
- **GH - Growth Hormone** replacement

Hyperaldosteronism

Pathophysiology Course

Pathophysiology

Hypersecretion of aldosterone hormone from the adrenal gland. Aldosterone's function is to maintain blood pressure by retaining sodium & water, but also lets potassium out of the kidneys



Signs & Symptoms

- Hypertension
- **Hypernatremia** (sodium **OVER 145**)
 - Polydipsia (extreme thirst)
 - Swollen dry tongue
 - Increased muscle tone **NCLEX TIP**
- **Hypokalemia** (potassium **under 3.5**)
 - ST depression & U waves
 - Decreased DTRs
 - Constipation & hypoactive bowels
- Polyuria & low urine gravity

MEMORY TRICK

HYPER AL

- H**- **HYPERTENSION** (Over 140/90)
- Y**- **YIELDING DTRS & BOWEL SOUNDS** (low & slow)
- P**- **POLYURIA & POLYDIPSIA** (excess urination & thirst)
- E**- **ECG U WAVE & ST DEPRESSION**
- R**- **RAINING URINE** (low SG less than 1.005)
- A**- **ADDING SODIUM** (Over 145 mEq/L)
- L**- **LOSING POTASSIUM** (3.5 mEq/L or Less)

Memory Trick for Aldosterone



AL
A • **ADDS SODIUM & WATER IN**
L • **LETS POTASSIUM K+ OUT**

Causes

Primary Inside Adrenals	Secondary Outside Adrenals
<ul style="list-style-type: none"> - Conn's Syndrome (benign tumor) - Genetics 	<ul style="list-style-type: none"> - CHF (congestive heart failure) - Renal artery stenosis

Treatment

Goal = lower fluid volume & increase K+

- Potassium supplements
- Spironolactone = potassium sparing diuretic
- Adrenalectomy + steroid treatment

Watch for Addison's CRISIS!

Low blood pressure that it will KILL!

Nursing Interventions

- Sodium restriction
- Monitor: blood pressure, Intake & Output, potassium & sodium levels

Notes

Hyper & Hypoparathyroid

Pathophysiology Course

Parathyroid's Function

The parathyroid glands are mainly responsible for controlling the **regulation of blood calcium**.



MEMORY TRICK

PC
P • PARATHYROID
C • CALCIUM
 (9.0-10.5 mg/dL)

Hyperparathyroid = **Hyper**calcemia (over 10.5)
Hypoparathyroid = **Hypo**calcemia (under 9.0)

HYPER **P** arathyroid
HYPER **C** alcemia
Hypo **P** arathyroid
Hypo **C** alcemia

It does with the help of **PTH - Parathyroid hormone**, so just think PTH - "**P**uts **T**he calcium **H**IGH in the blood". When blood calcium is low - PTH increases to increase blood calcium & when blood calcium is HIGH - PTH decreases.

PTH
 Parathyroid Hormone
P • PUTS
T • THE CALCIUM
H • HIGH in the blood

Hyperparathyroidism

Pathophysiology

Increased production of **PTH - Parathyroid Hormone**, resulting in **HIGH calcium!**

MEMORY TRICK

Hyperparathyroid = **Hyper**calcemia (over 10.5)

Signs & Symptoms

Think **HIGH calcium** in the blood. PTH makes bones weak by taking calcium from its storages.

HYPER Ca+

STONES = Kidney Stones
MOANS = Fractured Bones
GROANS = Constipation



Causes

- Tumor **NCLEX TIP**
 - Adenoma - **NOT** cancerous
 - Malignant - Cancerous
- Vitamin D deficiency (since it helps Ca absorb)
- GI issues = Malabsorption of calcium
- Renal failure

Treatment

- **Lower** the high blood calcium
 - IV furosemide & saline to flush out Ca
 - IV phosphate to lower Ca
- Parathyroidectomy - cut the tumor out

Hypoparathyroidism

Pathophysiology

Decreased production or resistance of **PTH - Parathyroid Hormone**, resulting in **LOW calcium!**

MEMORY TRICK

Hypoparathyroid = **Hypo**calcemia (under 9.0)

Signs & Symptoms

Think **LOW calcium** in the blood, signs include:

1. **T - Trousseau's Sign:**
T - Twerk with BP cuff
2. **C - Chvostek's Sign**
C - Cheeky smile when stroking the face
3. Diarrhea

Causes

- Thyroidectomy **NCLEX TIP**
- Low Mag+ (Hypomagnesemia)
- Autoimmune - body attacks the parathyroids
- Radiation Treatment - damages thyroid

Treatment

- **Increase** the low blood calcium
 - IV Calcium gluconate
 - Vitamin D (helps absorption of Ca)
- Seizure precautions & phenobarbital to decrease neuro excitability

Hyper & Hypothyroidism II

Pathophysiology Course

HYPERthyroidism
Graves = **GAINS** "HIGH"

Pharmacology

- SSKI** (Potassium Iodide)
- S**-Shrinks the Thyroid
- S**-Stains Teeth (use straw + juice)
- K**-Keep 1 hour apart of other meds
- METHIMAZOLE**
- NOT** baby safe
- PTU**-Propylthiouracil **MEMORY TRICK**
- "Puts Thyroid Underground"
- Baby safe
- REPORT:** Fever/Sore Throat
- BETA BLOCKERS** "-lol" Propranolol
- L**-Low BP
- L**-Low HR



Treatments

RAIU-Radioactive Iodine Uptake (Destroys the Thyroid)

BEFORE:

- Pregnancy test before
- REMOVE** neck jewelry & dentures
- 5-7 days before** Hold antithyroid Meds
- AWAKE-NO** anesthesia or Conscious Sedation
- Diet: Before-NPO 2-4 hrs
- After-NPO 1-2 hrs



AFTER: AVOID EVERYONE!

- NO** pregnant people **NO** crowds
- NOT** same restroom (Flush 3 x) **NOT** same food utensils
- NOT** same laundry as your family

Patient Education

- E**-Exophthalmos" (grape eyes)
- Eye **E**xercise "full range of motion" (**YES MOVE EYES**)
- Eye Drops "artificial tears in conjunctiva" (**NO** dry eye)
- Dark** Sunglasses (avoid irritation) **NO** Massaging
- T**-Tape the eyelids closed or use Eye Patch **NCLEX TIP**
- AVOID 5 Ss**
- Can Trigger **THYROID STORM!** **NCLEX TIP**
- NO** Sodium (eye swelling) + HOB Up (drain the eyes)
- NO** Stimulants (Cluster care/ Dim Lights)
- NO** Smoking, Stress, Sepsis "sickness" (infection)
- *Don't Touch Neck... release MORE T3 & T4*

Thyroidectomy Surgery

- Risk for **THYROID STORM!** **NCLEX TIP**
- Priority: Stridor/Noisy breathing** **NCLEX TIP**
- A**-Airway-Endotracheal Tube bedside **#1 Priority**
- Tracheostomy Set
- B**-Breathing-Laryngeal **Stridor** "Noisy breathing"
- Keywords:** "Monitor Voice strength & Quality"
- C**-Circulation-bleeding around pillow & Incision site
- Neutral head & neck alignment **NCLEX TIP**
- **NOT SUPINE!** HOB 30-45 degree
- **NO FLEXING** or Extending Neck **NCLEX TIP**
- C**-Calcium **LOW** below **8.6** (normal: **8.6-10.2**)
- Chvostek** (Cheek Twitch when touched)
- Trousseau** ("Twerk arm" with BP cuff x 3 min.)
- Tingling** around mouth/Muscle Twitching **NCLEX TIP**
- MEMORY TRICK:** "Remove the **T** (thyroid) Check the **C** (calcium)"



HYPOthyroidism
Hashim**O**tos | **LOW** & **SLOW**

Pharmacology

L-Levothyroxine (Lev**O** = HYP**O**)
"Leaves" T3 & T4 in the body **MEMORY TRICK**

- L**-Life Long + Long slow onset (3-4 weeks till relief)
- E**-Early morning /Empty stomach x 1 daily (**NOT** at night)
- V**-Very active (HIGH HR & BP) **Report** "agitation/confusion"
- O**-Oh the baby is fine! (pregnancy safe)
- NO FOOD**-take 1 hour **BEFORE** breakfast
- NO** Cure-med will **NOT** cure, only treat
- NO** Doubling doses (missed dose? Take it!)
- NEVER** "abruptly" **STOP** = Myxedema Coma

L

E

LIFELONG
+ Long slow onset
(3-4 weeks till relief)

EARLY MORNING
EMPTY STOMACH
x 1 daily (**NOT** at night)



V

O

VERY HYPER
(HIGH HR, BP, Temp.)
REPORT "agitation/confusion"

OH BABY IS FINE
(Pregnancy safe)



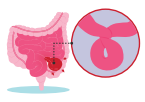
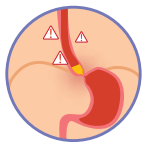
Gastrointestinal

GI Patho Key Terms

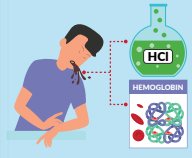
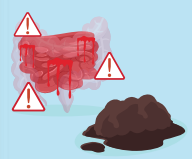
Pathophysiology Course

Key Terms

- **Anorexia:** lack or loss of appetite for food
- **Achalasia:** muscles of the lower part of the esophagus fail to relax, preventing food from passing into the stomach.
- **Cachexia:** severe weakness & wasting of the body due to severe chronic illness.
- **Dysphagia:** swallowing difficulties
- **Volvulus:** twisting of intestines resulting in a bowel obstruction.



- **Hematochezia:** Blood in stool
 - Low bleed (Rectum) **bright red blood**
 - High bleed (intestines) **dark tarry stool "Melena"**
- **Hematemesis:** Blood in emesis (vomit)
 - Coffee ground color: brown, granular material (HCl acid acting on HgB)
 - Bright red blood = hemorrhage
- **Malabsorption:** inability to absorb nutrients from certain foods.
 - Lactose intolerant (dairy intolerant)
 - Celiac disease (gluten intolerant)



- **Megacolon:** abnormal dilation of the colon with abdominal distention.
- **Liver Labs:** Blood in emesis (vomit)
 - A - Albumin **3.5 - 5.0 g/dL Top Tested**
 - B - Bilirubin
 - C - Clotting Factors
 - ALT (alanine transaminase)
 - AST (aspartate aminotransferase)

- **Pancreas:**
 - Serum amylase: enzyme for **protein** breakdown
 - Serum lipase: enzyme for **fat** breakdown
- **H. pylori bacteria:**
 - PUD (peptic ulcer disease) & Gastritis

A

Albumin

3.5 - 5.0 g/dL

B

Bile

C

Clotting factors

ALT AST

Amylase

Lipase

4 Major Roles of the Liver

Detoxing ammonia	Drug metabolism	Storing Glycogen	Producing
			<ul style="list-style-type: none"> Bile Coagulation factors Albumin

Crohn's Disease & Ulcerative Colitis (UC)

Pathophysiology Course

ULCERATIVE COLITIS

Pathophysiology

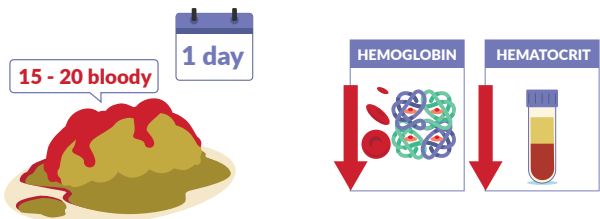
Inflammation & ulcers in the colon (big long open sores that bleed) leading to decreased hemoglobin.



Signs & Symptoms

15 - 20 bloody liquid stools per day

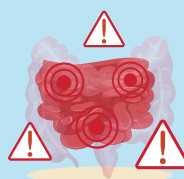
- Anemia
- **Decreased H/H** (Hemoglobin & Hematocrit)
- Rebound tenderness **Report to HCP**



CROHN'S DISEASE

Pathophysiology

Inflammation granulomas (bumps & lumps) from mouth to anus, but mainly in the small intestines that **do not bleed**. This deep inflammation can lead to fistulas, which are open tunnels of the GI tract that can contaminate the body.



Memory trick

Crohn's disease
Crown's disease

Test Tip

- Small intestines**
- Skip Lesions
 - No blood (main difference from UC)
 - Inflamed tissue:
 - Fistulas, fissures, & abscesses
 - Granulomas (bumps & lumps)

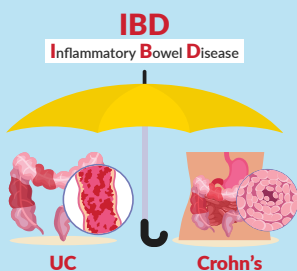


Signs & Symptoms

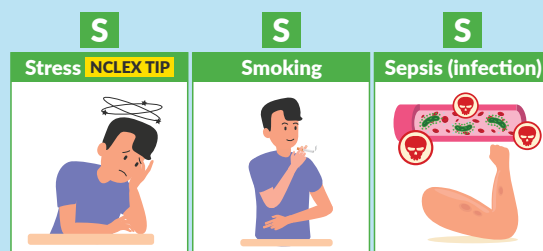
- **5 loose stools /day** (mucus/pus)
- Steatorrhea (fatty stools)



Causes & Triggers



Both conditions are autoimmune diseases (the body is attacking itself), so naturally signs & symptoms come & go during times of stress, smoking & sepsis (infection).



Notes

Nursing Care

Fluid & E+

- Strict I & O monitoring
- **2 Liters** of water daily + more with diarrhea
- **Hypokalemia** low potassium: **3.5 or less**
- Daily multivitamins containing **Calcium**

Diet

- **High:** Protein & Calories
- **Low:** Fiber
- **Keep food journal** **NCLEX TIP**
- Small frequent meals

- **Pain** - administer analgesics
- **AVOID** Alcohol
- Reduce **Caffeine** (coffee, tea)
- PsychoSocial
 - **Stress** reduction
 - Encourage clients to **discuss feelings**



Common Exam Question

Client with **ulcerative colitis** ... interventions? **Select all that apply.**

- 1. Discuss plans to decrease client's stress
- 2. Give analgesics as prescribed
- 3. Limit fluids to 500 ml per day
- 4. Increase protein foods with meals
- 5. Monitor Input & Output closely
- 6. Recommend high fiber and low calorie diet



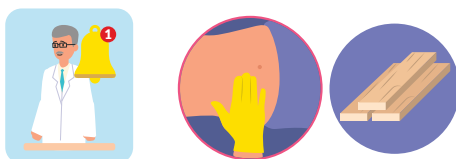
Complication

Peritonitis **NCLEX TIP**

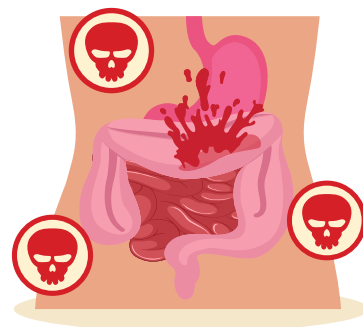
Report to HCP!

- **Fever** (over 100.3°F)
- **Rebound tenderness**
- **"Rigid" or "board-like abdomen"**
- Increasing Pain, tenderness
- Restless
- Fast HR & RR (tachycardia / tachypnea)

Bowel rupture from a toxic megacolon, which can lead to **peritonitis** (deadly infection in the peritoneal cavity).

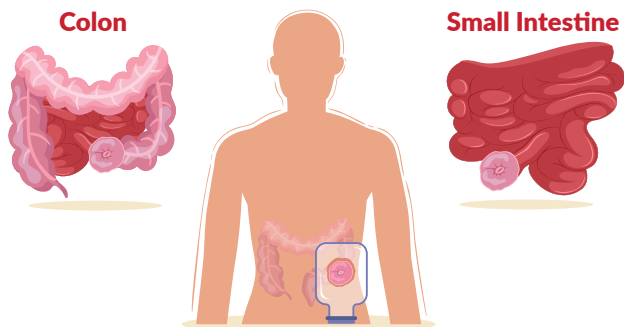


Toxic megacolon



Surgery

Most clients get a **colostomy** or **ileostomy** after a bowel resection, where we cut out the part of the bowel causing the problem.



Pharmacology

- **Sulfasalazine** "STOPS body attacking itself"
- **Steroids** "Soothe the Swelling"
 - **PredniSONE**
- Antidiarrheal:
 - **Loperamide** "Low bowel movements"
 - **Dicyclomine** "Dry Cycle"

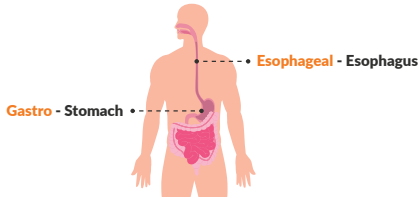


GERD

Pathophysiology Course

Pathophysiology

Gastro Esophageal Reflux Disease



Gastroesophageal Reflux Disease

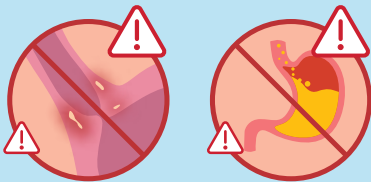
Fancy words for heartburn or acid reflux where stomach acids burn the esophagus, leading to pain, inflammation, & even **CANCER** called Barrett's esophagus (if the chronic acid reflux is not treated)

- Dyspepsia "heart**BURN**"
- Worse pain = Lying down



Causes & Education

Anything that can weaken or damage the **LES** (Lower Esophageal Sphincter) the muscle that closes the opening between the stomach & esophagus.



- **AVOID Eating** **EXAM TIP**
 - **Fried Foods** (Fries, **fried chicken**)
 - **Fatty Foods** "low fat diet = BEST"
 - Citrus (Acidic)
 - Dairy (milk, cheese)
 - **Chocolate**
 - **Peppermint / Spearmint**
- **NO** Caffeine (**coffee**)
- **NO** Cigarettes (tobacco)
- **NO** Alcohol

- **AVOID** eating **before** lying down (3 hours after meals)
- Sit up after meals
- Elevate HOB **at night**
- Eat Small meals



Pharmacology

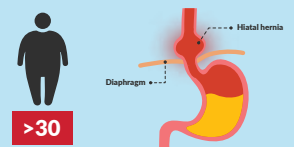
Acid reducers

- Antacids
- Histamine receptor blockers
 - **Ranitidine**
- PPIs: Proton pump inhibitors
 - **Omeprazole**



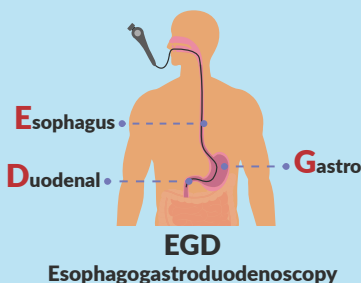
Risk Factors:

- Stress
- Obese (BMI over 30)
- Hiatal hernia



Procedures

- Upper gastrointestinal endoscopy
- Esophagogastroduodenoscopy (EGD)



Complication of Procedures

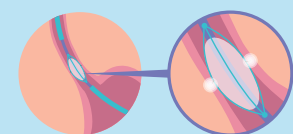
Peritonitis **PRIORITY** Report to HCP!

- **Fever** (over 100.3°F)
- **Rebound tenderness**
- **"Rigid" or "board-like abdomen"**
- Increasing Pain, tenderness
- Restless
- Fast HR & RR (tachycardia / tachypnea)



Surgery

Stretta procedure - delivers radiofrequency energy waves through electrodes to tighten the LES.



Fundoplication - wrap the upper curve of the stomach called the fundus around the esophagus & sew it shut. Helping to tighten this esophageal sphincter.

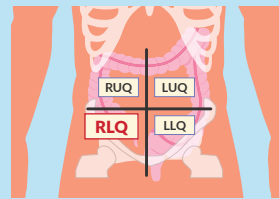


Appendicitis

Pathophysiology Course

Pathophysiology

Inflammation of the appendix, located in the **RLQ** (Right Lower Quadrant) of the abdomen.

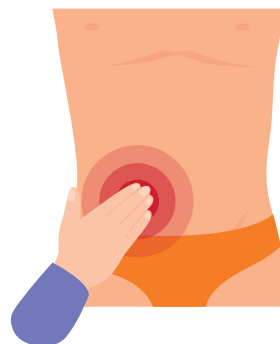


RLQ - **R**ight **L**ower **Q**uadrant



Signs & Symptoms

- **Fever** low-grade
- **RLQ** pain with **rebound tenderness**
“Pain between the **right hip area** & belly button”



Rebound tenderness

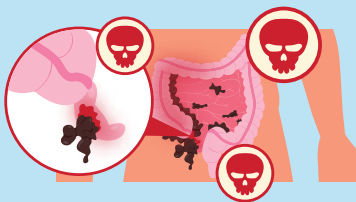
Common Exam Question

What is the typical **pain presentation** of a client with **appendicitis**?

- 1. Pain starts in the left side below the belly button
- 2. Pain is diffuse and all over the abdomen
- 3. Pain starts in the left upper quadrant radiating to the shoulder
- 4. Pain starts around the **umbilicus** and then moves to the **right lower quadrant**

Complications

Perforation = Peritonitis
Medical Emergency!



NCLEX TIPS

- **High** Fever
- Tachycardia, Tachypnea
- **Rigid** “board-like abdomen”
- **Rebound tenderness**

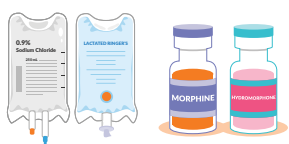
- NO** heat pad or blanket
- NO** laxatives
- NO** enemas



Interventions

1. NPO
2. **IV normal saline** or **LR** (Lactated Ringer's)
3. Pain meds:
IV morphine / hydromorphone
NEVER give pain medications **until seen by the surgeon.**

PRIORITY



Side note

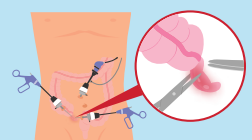


Surgery

Appendectomy

Post-operation

- **Avoid** lifting heavy objects
- Prevent **Pneumonia**
 - Assist with **early ambulation**
 - **Deep breath & Cough**
 - Incentive spirometer
- Prevent **Infection**
 - **NO** baths - shower **ONLY**
 - Report **redness, swelling, & drainage** at incision sites



Appendectomy

PRIORITY

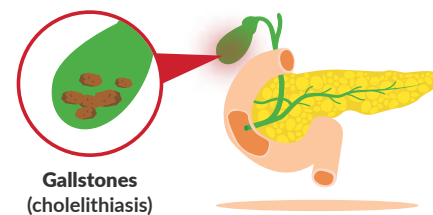


Cholecystitis

Pathophysiology Course

Pathophysiology & Causes

Inflammation of the gallbladder. Typically caused by gallstones also called cholelithiasis, that block the ducts leading out of the gallbladder resulting in a backup of bile which causes inflammation.



Signs & Symptoms

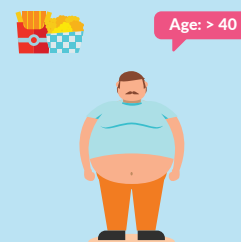
Highly tested

1. **RUQ pain** "radiates to the **RIGHT** shoulder"
2. **Fever** with chills
3. Tachycardia



Risk factors

- High fat diet
- Obesity
- Age over 40



Priority Intervention

Nothing per oral - NO eating or drinking since eating can cause more pain & complications



Treatment

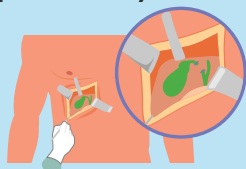
Lithotripsy - shockwaves to break up the stones but if the stones are too large then we can do surgery



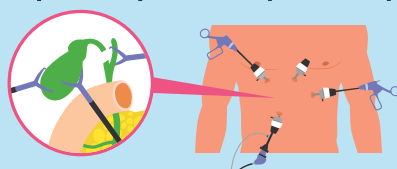
Surgery

Cholecystectomy - surgical removal of the gallbladder.

Open cholecystectomy

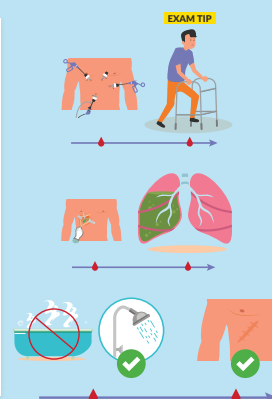


Laparoscopic cholecystectomy



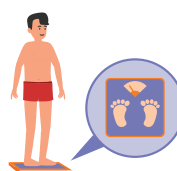
Post Operative

- Assist with **early ambulation** **EXAM TIP**
- Prevent Pneumonia
 - **Deep breath & cough**
- Prevent infection **EXAM TIP**
 - **NO baths** - shower ONLY
 - Report **redness/swelling** at incision site



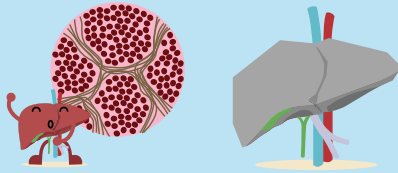
Nursing Interventions

- Lose weight
- Avoid fatty fried foods



Pathophysiology

Liver cirrhosis THINK liver Scarrrosis.
Since normal healthy tissues get replaced with **SCAR** tissue, making the liver hard like a rock!

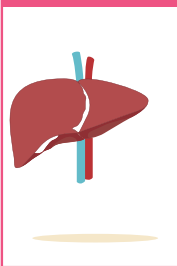


Causes

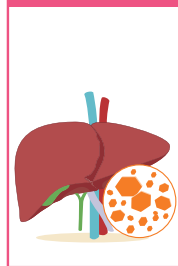
Anything that causes inflammation & scarring to the liver:

- **Alcohol** abuse
- Chronic **Hepatitis** (inflammation)
- **Cystic fibrosis** (serious mucus clogs the entire body & the liver)

Detoxing ammonia



Storing Glycogen



Cirrhosis II

Pathophysiology Course

Signs & Symptoms

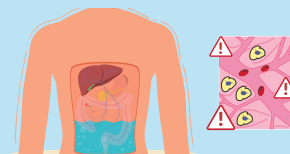
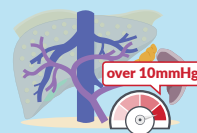
Jaundice

Yellow skin & eyes from build up of bilirubin (dead RBCs) as bile can not take it from the body into the potty.



Portal Hypertension

Is high pressure in the portal vein, since the liver is hard like a rock! Naturally, blood flow will back up & fluid now spills over into the **abdomen called ascites** (third spacing)



Ascites

Huge fluid filled abdomen as fluid backs up from the hard liver & now spills into the third space. Clients will look pregnant with fluid.



A - Ascites
A - Abdominal fluid

Esophageal Varices

The **enlargement of veins in the esophagus!** As blood backs up from the liver it forces major pressure on the esophagus causing the vessels to bulge to the max! Like a ticking time bomb of blood it can explode & blood can block the airway - **VERY DEADLY!**

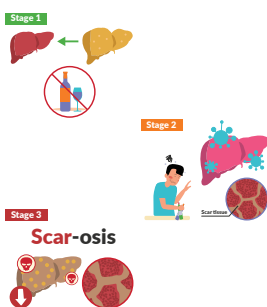
Key point

- **NO** nasogastric tube (NGT)
- **NO** straining (bowel movement)



Alcoholic Cirrhosis Manifestations (S/S)

1. Initial Stage: Fatty liver
 - Enlargement of liver (reversible with cessation of drinking)
2. Second Stage: Alcoholic hepatitis
 - Irreversible fibrous (scar tissue formation)
3. Third: **End stage cirrhosis**
 - Fibrotic tissue replaces normal tissue
 - Little function remains



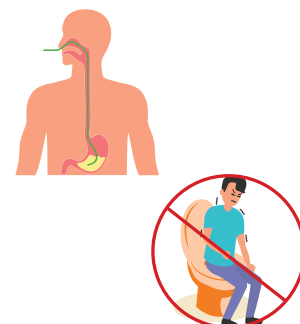
Common Exam Questions

Client with a history of cirrhosis ... with suspected gastroesophageal varices. Which order would the nurse question?

- ✓ New nasogastric tube insertion

Client with cirrhosis ... portal hypertension, ascites, and esophageal varices. Which of the following is correct patient teaching?

- ✓ Avoid straining when having a bowel movement



Hepatic Encephalopathy

Cloudy brain from ammonia (protein waste). The liver can not detox the ammonia & now it builds up in the blood.

Hepatic encephalopathy

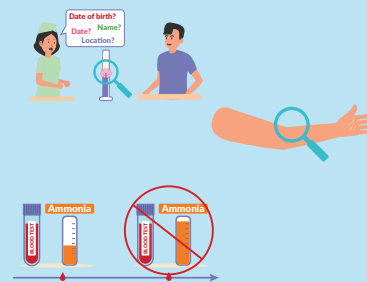
- **Twitching extremities** in the arms & legs = Asterixis.
- Mental status changes:
 - **Confusion** & bizarre **behavior**.
 - Sleepiness.
- **Key Assessments:**
 - Assess **hand movements** with **arms extended**.
 - Assess **mental status** with those from previous shifts.
 - Assess recent **blood draws** for ammonia levels.



Top Missed Exam Questions

Which assessments would indicate if a client with cirrhosis has progressed to hepatic encephalopathy? Select All That Apply

- ✓ Ask the client for their **date of birth, name, date, and location**
- ✓ Tell the client to **extend their arms**
- ✓ Compare **ammonia blood levels** with that of previous shifts



Lab Values

The ABCs of the liver will be low. Including **Low Calcium** from the low albumin leading to the 2 classic signs - Trousseau's & Chvostek's

LIVER FAILURE LABS NCLEX TIP

- Ammonia **HIGH** → Hepatic Encephalopathy
- **A** Albumin **Low** (under 3.5) → Calcium **Low** platelets
- **B** Bilirubin **HIGH**
- **C** Coagulation Panel (clotting time **HIGH**) **HIGH** PT, PTT, INR
- **Elevated** ALT & AST



Common Exam Questions

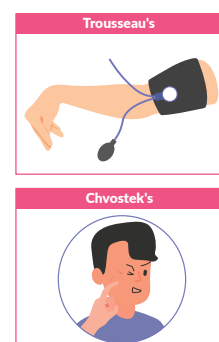
Which **blood lab** values are expected to be **elevated** in a client with worsening liver cirrhosis?

Select all that apply

- ✓ 1. **Ammonia**
- ✓ 2. **Bilirubin**
- ✓ 3. **Prothrombin time (PT)**
- 4. Albumin
- 5. Calcium



2 classic signs of hypocalcemia



Cirrhosis III

Pathophysiology Course

Interventions

Ascites = Paracentesis

A - Ascites

A - Abdominal fluid

1. **Empty the bladder**
2. Vital Signs
3. Measure **abdominal circumference & weight**
4. HOB UP - **High Fowlers**



Always tested

Albumin IV

- Increased BP & Bounding pulses
- Assess **vital signs!** **NCLEX TIP**
- Must remain within **normal limits** = **albumin** has been **effective**



NCLEX TIP

NCLEX



NORMAL

Students get this wrong all the time

Pruritus - itchy skin

1. Apply a **cool moist cloth** to affected areas
2. Apply **moisturizing cream** over unbroken skin
3. Wear long sleeved clothes & cotton gloves
4. Trim **finger nails** short

Common Exam Question

A client with **worsening liver failure** presents to the med-surg floor... which **assessment findings** should the nurse expect?

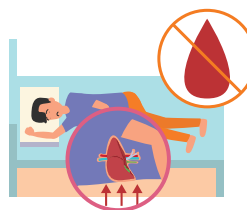
Select all that apply

- 1. Enlarged abdomen from ascites
- 2. Bruise marks on the skin
- 3. Fatigue and possible confusion
- 4. Sclera that appears yellow
- 5. Reports of itchy skin

Diagnostics

Liver biopsy

- After procedure Lay on **RIGHT SIDE** to prevent bleeding



Nursing Care

Diet

- Low Protein = Low Ammonia prevents **Hepatic Encephalopathy**
- Low Sodium & Fluid = Low Swelling **Ascites**
- **NO** Alcohol

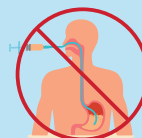
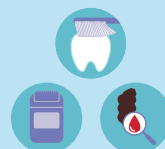


Bleed Risk

- Soft toothbrush
- Electric razor
- Monitor blood in stools

Esophageal Varices

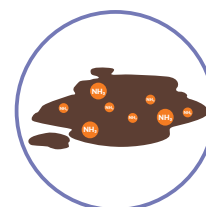
- **AVOID** Valsalva Maneuver: NO bearing down (bowel movements)
- NO new NGT **nasogastric tube**



Pharmacology



- Neomycin
- **Lactulose**
 - Lose the ammonia
 - Loose bowels
 - Lose potassium (**hypokalemia**)



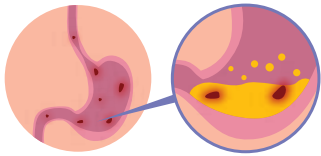
PUD: Peptic Ulcer Disease

Pathophysiology Course

Pathophysiology

PUD (Peptic Ulcer Disease) happens when gastric acids erode the gastric lining creating open sores / holes in the esophagus, stomach, or duodenum.

Peptic Ulcer Disease



Signs & Symptoms

- G** Gastric Ulcer
- G** Gut Pain with food

- D** Duodenal Ulcer
- D** Don't have pain with food

- **Dyspepsia:** Burning Pain "Epigastric" "Back"
- Gastric Ulcer (stomach)**
 - **PAIN Increased** with food **NCLEX TIP**
 - 30 - 60 min. after meals
 - **Weight LOSS**
 - **Vomits** blood "Hematemesis"
- Duodenal Ulcer (intestine)**
 - **PAIN Decreased** with food **NCLEX TIP**
 - 2 - 3 hours after meals
 - **Worse at NIGHT**
 - **Weight Gain**
 - Blood in **stool** "melena" (dark tarry stool)

Complications

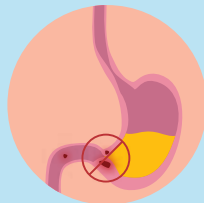
Perforation = Peritonitis & Sepsis Report to HCP!

- **Fever** (over 100.3°F)
- **Rebound tenderness**
- **"Rigid" or "board-like abdomen"**
- Increasing Pain, tenderness
- Restless
- Fast HR & RR (tachycardia / tachypnea)

Hemorrhage (bleeding)

- Melena (black **tarry** stools)
- **Hematemesis** (vomiting of blood)

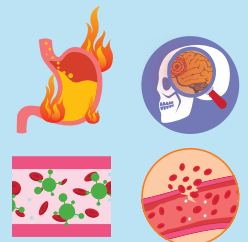
Gastric outlet obstruction



Stress Ulcers

Occur within hours of a traumatic event such as

- Burns (Curling's ulcers)
- Head injury
- Sepsis
- Hemorrhage



PATHO TIP

Stress ulcers are related in part to **low blood flow & perfusion to the GI tract**, known as mucosal ischemia.

Diagnostics

- Esophagogastroduodenoscopy (EGD)
- **Perforation** = Peritonitis & Sepsis
 - **PRIORITY** - Report to HCP! **Fever** (over 100.3°F)
- Upper GI Series with **barium contrast**

NCLEX TIP

HCP

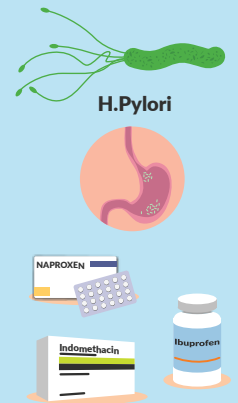


Client Education:

- **NPO** (no eating or drinking) No smoking **8 hours BEFORE** the procedure
- **Expected:**
 - During: Abdominal cramping
 - After: Chalky white stool
- **Flush the Contrast**
 - Increase fluid intake **Kaplan**
 - **Take Laxatives**

Causes & Risks

1. **H. Pylori** bacteria
2. **NSAIDs**
 - Naproxen
 - Indomethacin
 - Ibuprofen
3. Stress (prolongs the ulcer)
 - Nursing school / NCLEX



Pharmacology

- **Antibiotics: H. Pylori bacteria**
 - Amoxicillin
 - Clarithromycin
 - Tetracycline
 - Metronidazole
 - Bismuth (brand: Pepto-Bismol)
- **Acid reducers**
 - Antacids
 - Histamine receptor blockers
 - Rani**tidine**
 - PPIs: Proton pump inhibitors
 - Ome**prazole**
- **Mucosal protectants**
 - Sucralfate
 - Misoprostol



Patient Education

- **Diet**
 - **Avoid** Spicy, Fatty, Fried, **Acidic** foods
 - **NO** Caffeine (**coffee, Soda, tea**)
 - **NO** Alcohol
 - **NO** Cigarettes (**tobacco**)
- **Decrease Stress**
- **Avoid NSAIDs**
 - Naproxen
 - Indomethacin
 - Ibuprofen
- Report **black tarry** stools to HCP!

Common NCLEX Question

The nurse is educating the client on **peptic ulcer prevention**. Which statement by the client shows **correct understanding**? Select all that apply.

- 1. "I will not drink beer at the party this weekend"
- 2. "I will avoid using naproxen"
- 3. "I should avoid drinking excess coffee or soda"
- 4. "I will start smoking cessation"
- 5. "I will avoid spicy foods but fried chicken is ok"

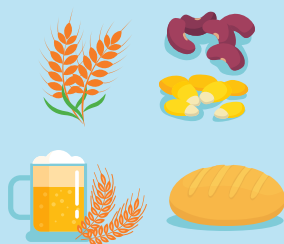
Celiac Disease

Pathophysiology Course

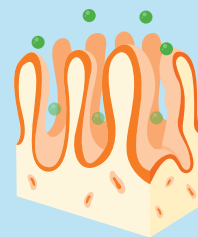
Pathophysiology

Gluten

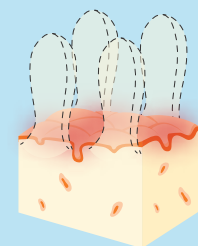
- **Whole wheat**, Grains, & Beer (Rye & Barley)
 - Dinner roll
 - Breaded meat
 - Spaghetti



An immune reaction to eating **gluten** (a protein found in wheat, grains & beer). **Inflammatory damage** in the small intestine (absence of intestinal villi) resulting in **malabsorption** of fats & nutrients as well as slow growth in children.



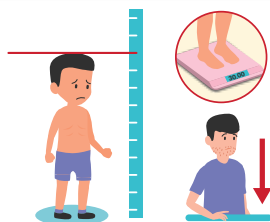
Normal



Celiac disease

Signs & Symptoms

Weight loss, stunted growth, & delayed puberty in **children**



- Diarrhea
- Steatorrhea - fatty stools as fats are not absorbed
- Abdominal pain



Diarrhea

Steatorrhea

Education

Fat-soluble vitamins - as nutrients are not easily absorbed.



Fat-soluble vitamins

- Vitamin A, D, E, K

Memory trick



Gluten Free Foods - anything without WHEAT base like:

- Plain meats (fish, beef, chicken, turkey)
- Grains: Rice, Corn, Potatoes, Soy, Quinoa
- Nuts, Beans, Legumes
- Fruits & veggies



Hepatitis

Pathophysiology Course

Pathophysiology

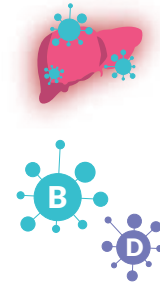
Refers to an inflammatory condition of the liver, commonly caused by a viral infection.

Non-viral causes are:

- Alcohol
- Autoimmune disease where the body attacks itself

There are 5 types, but the most tested are the **B & C**

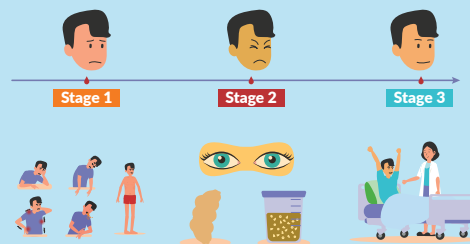
Type	Transmission
A	Fecal-oral (contaminated food)
B	Blood & body fluids
C	Blood & body fluids
D	Co-infection with Hep B
E	Fecal-oral Contaminated drinking water



3 Stages of Hepatitis

- Prodromal (pre-icteric) Stage:**
 - General nonspecific manifestations: Malaise, fatigue, muscle aches, N/V, anorexia
- Icteric Stage:**
 - Jaundice, light "clay-colored" stool, dark urine
- Post-icteric Stage:**
 - Recovery stage

Patho Test Tip



Causes & Risk

- BCD - blood & body fluids
- IV drug use, tattoos, body piercings
- Sharing razors
- Unprotected sex

MEMORY TRICK

- **A** - Anus to mouth
- **BC** - Blood Cultures & Sex
- **E** - E. Coli water (contaminated water)

Signs & Symptoms

- Headache
- Fever
- Fatigue (malaise)
- N/V

Elevated Liver Enzymes

- ALT & AST
- Bilirubin



Diagnostics

Liver biopsy

- After procedure Lay on **RIGHT SIDE** to prevent bleeding

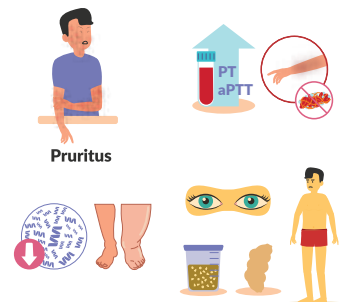
Complications

- Acute liver failure
- Cirrhosis
- Liver cancer
- Gallbladder issues



Common Liver Disease Signs

- Itching "pruritus"
- **Elevated** bilirubin
 - Jaundice
 - Dark colored urine
 - Clay color stools "Pale stools"
- **Elevated** PT & aPTT
 - Bruising
- **Low** Albumin
 - Edema



Treatments

A - typically resolves on its own with bed rest

B - treated with antiviral medications

Nursing Interventions

1. Small **frequent meals** to prevent nausea
 - **Low Protein** (all liver disease)
 - Low fat foods (until nausea subsides)
2. Frequent **rest periods**
3. Protected sex!
4. **AVOID** drinking alcohol / Acetaminophen (tylenol)
5. **AVOID** sharing shaving razors, toothbrushes



Common Exam Question

Modes of transmission for hepatitis C?
Select all that apply.

- 1. Blood
- 2. Contaminated water
- 3. Fecal oral
- 4. Semen
- 5. Vaginal secretions

Common Exam Question

A client is admitted with hepatitis and complains of constant itching. What interventions would the nurse recommend? SATA

- 1. Apply a moisturizer
- 2. Avoid the sun
- 3. Apply a cold compress
- 4. Apply a hot pad

Common Exam Question

A client has hepatitis ... What advice should the nurse include regarding personal living?

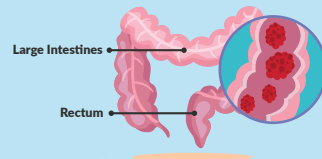
- Do not share personal care products



Colon Cancer & Esophageal Pathophysiology Course

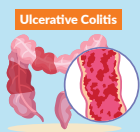
Colon & Colorectal Cancer

Cancer of the colon - the large intestines & the rectum - the exit door of the GI tract.



Risk Factors

- Diverticulosis
- **Ulcerative colitis** (long-term)
- **Family history** of colorectal cancer
- O - Obesity (**BMI over 30**)
- A - Alcohol
- **T - Tobacco** (cigarettes & cigars)



Colorectal Cancer

- **Unexplained weight loss** **NCLEX TIP**
- **A - Abdominal pain**
- **B - Bleeding:**
 - Blood in stools
 - Low Hemoglobin
- **C - Change in bowel habits**



Esophageal Cancer

There is cancer within the esophagus, the food tube, that takes food from the mouth into the stomach.



Risk Factors

- **Acid Reflux (GERD)** **NCLEX TIP**
- O - Obesity (**BMI over 30**)
- A - Alcohol
- **T - Tobacco** (smoking, chewing tobacco)



Diagnostics

Colonoscopy

Scope up the rectum to inspect the colon for cancerous tumors, polyps & used for other GI issues like ulcerative colitis & Crohn's disease.



EMERGENCY



Before

- Clear liquid diet, laxatives
- **Polyethylene Glycol** (brand: GoLyteLy)
- NPO after midnight

After

Perforated bowel = Peritonitis
Medical Emergency! NCLEX TIP

1. **Fever**
 2. Tachycardia, Tachypnea
 3. Abdominal distention
- Rigid "board-like abdomen"**

Tachycardia



Tachypnea



Common Exam Question

Client with a **family history of colorectal cancer** ... with **unexplained weight loss**, **change in bowel habits**, & a hemoglobin value of **9 compared to 14** just 12 months earlier... Which **diagnostic test** is expected?

- ✔️ Colonoscopy

Nursing Interventions

- High fiber = **Cabbage**
- O - Obesity = **LOSE Weight**
- A - Alcohol = **STOP!**
- T - Tobacco = **Smoking cessation**



Pancreatitis

Pathophysiology Course

Pathophysiology

Inflammation within the pancreas that happens when enzymes begin to digest the pancreas (autodigestion)

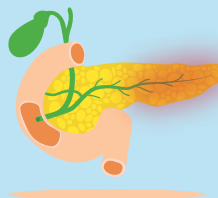
Functions of the Pancreas

- Exocrine: Produce Digestive enzymes
- Endocrine: Secrete Insulin & Glucagon



3 enzymes

- Protease - protein
- Lipase - fat
- Amylase - carbs



Pancreatitis



Causes

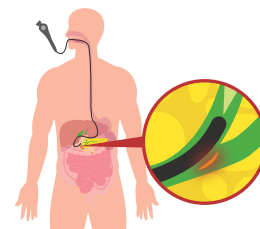
- Alcohol abuse
- Gallbladder disease
- Cystic fibrosis
- ERCP procedure
endoscopic retrograde cholangiopancreatography



Common Exam Question

Which client should the nurse assess first?

- ✓ Epigastric pain after endoscopic retrograde cholangiopancreatography (ERCP)



Signs & Symptoms

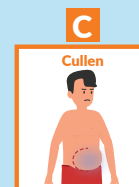
PAIN NCLEX TIP

- Epigastric pain
- LUQ pain "radiates to the back"

- Jaundice - elevated bilirubin
- Hypotension "Low BP"
 - Internal bleeding
 - Ascites

Bruising

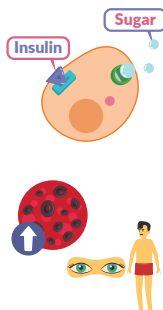
- Turner's sign
- Cullen's sign



Diagnostics

LABS

- Elevated enzymes
 - Amylase
 - Lipase
- Elevated Glucose "Hyperglycemia"
- Elevated WBC (over 10,000)
 - Fever
- Elevated Coagulation Time
 - PT & aPTT
- Elevated bilirubin



Nursing Interventions

- NPO
- Insert a nasogastric tube (NGT) for suction
- IV pain meds hydromorphone
 - NO morphine
- IV fluids
- Monitor glucose
 - Hyperglycemia = Insulin
- Pharm:
 - Antacids
 - Proton Pump Inhibitors Pantoprazole
 - H2 Blockers famotidine

Common Exam Question

After performing a physical assessment and obtaining vital signs for a client with acute pancreatitis, which nursing intervention is the priority?

- ✓ IV fluids and pain control



Complications

ARDS

(Acute respiratory distress syndrome)

Peritonitis NCLEX TIP

- Report to HCP!
- Fever (over 100.3°F)
- Rebound tenderness
- "Rigid" or "board-like abdomen"
- Increasing Pain, tenderness
- Restless
- Fast HR & RR (tachycardia / tachypnea)



Diet

- LOW fat & LOW sugars
- Enzymes with meals



> 100.3 °F

Constipation

Pathophysiology Course

Pathophysiology

Inability to go poop or in fancier terms infrequent bowel movements or difficult passage of stools, that persists for several weeks or longer.



Signs & Symptoms

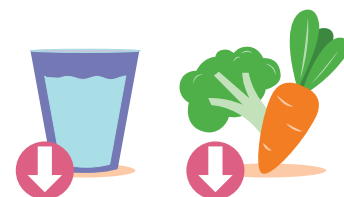
- Passing fewer than three stools a week
- Having lumpy or hard stools
- Straining to have bowel movements



Causes

- **Stress**
- **Low Fluid & Fiber**

Basically not enough fruits, veggies, or whole grains in the diet, or even too much fiber without low fluid intake. Fiber can cause constipation if not taken with fluid, since fiber inflates with fluids to scrub the GI tract. So too much fiber without high fluid intake - can cause constipation.

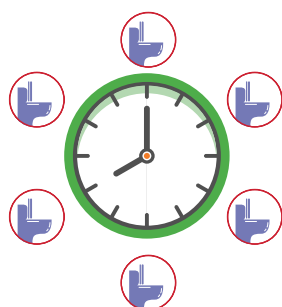


Treatment

- High **F**luid & **F**iber
- Ambulation (walking)



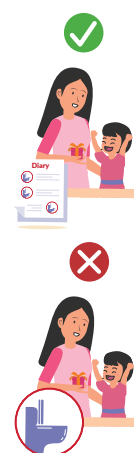
Complications



Fecal incontinence (Encopresis)

3 Steps to Treatment

1. Laxatives & stool softeners
2. Fluid & fiber
3. Change Habits
 - Schedule regular toilet visits **after meals**
 - **Keep a diary** for toilet sessions
 - **Reward system for effort** **NCLEX TIPS** & **NOT** rewarding for each bowel movement



Diverticulitis & Diverticulosis

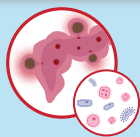
Pathophysiology Course

Pathophysiology

Diverticulosis = little pouches of stress bubbles



Diverticulitis = inflammation of diverticula



Diverticulosis:

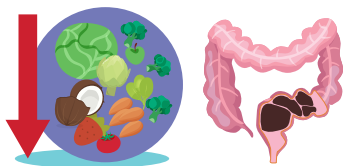
Little pouches of stress bubbles called diverticula form on the walls of the colon. Typically caused by a diet that lacks fiber, resulting in constipation & increased pressure within the bowels.

Diverticulitis:

Inflammation of diverticula (the little pouches) resulting in infection & swelling!

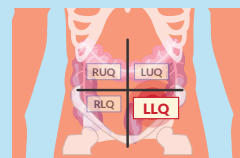
Causes

- **Low Fiber** (constipation)
- Popcorn, Seeds, Nuts



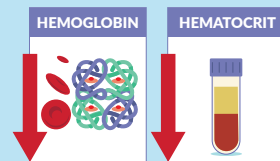
Signs & Symptoms

- Fever & chills
- **Pain LLQ** (descending & sigmoid colon)



Labs

- Decrease H/H
- Increase WBC



Complications

Peritonitis

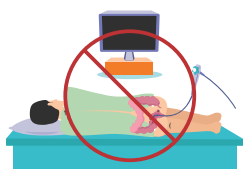
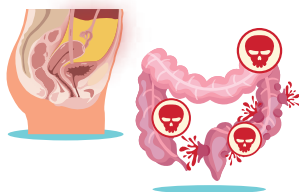
REPORT to HCP **NCLEX TIP**

- Abdominal **pain LUQ**
- Rigid “board-like abdomen”

NO barium enema = increases abdominal pressure

NO colonoscopy

Medical Emergency!



Nursing Care

Highly tested

1. **Avoid** constipation & **straining**
2. **NPO** (nothing per oral)
3. Pain meds = Morphine, Hydromorphone
4. IV normal saline

NPO



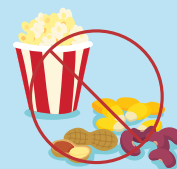
Diet

Diverticulitis - flare up:

- NPO
- Clear liquid diet: jello, broth, juices
- **Low fiber diet**
- Eventually high fiber again

Diverticulosis:

- High Fiber diet = Clean bowels & **Avoid constipation**
- **AVOID:** Popcorn, Seeds, Nuts

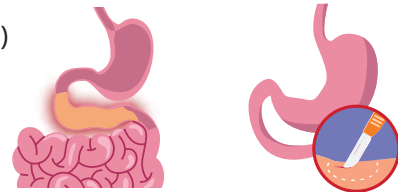


Dumping Syndrome

Pathophysiology Course

Pathophysiology

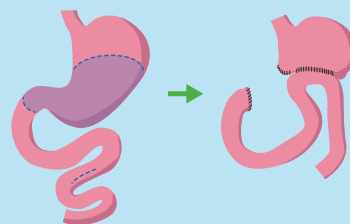
Occurs when the **stomach empties too quickly into the duodenum** (small intestines) after eating. This **DUMPING** causes a **massive fluid shift** leading to severe pain, low blood pressure, & nausea/ vomiting **30 minutes after eating**. Commonly seen after **any type of bariatric surgery** like a **gastric bypass** or **gastrectomy** (removal of the stomach), typically done for our bariatric clients who are morbidly obese.



Causes

Key terms

- **Gastrojejunostomy** (Billroth II surgery)
- Partial **Gastrectomy**
- Sleeve **Gastrectomy**

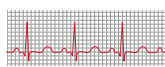


Signs & Symptoms

PRIORITY ACTION

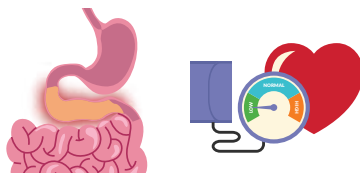
Report to HCP / Surgeon

- Hypotension & **Tachycardia**
- **Sweating**, Dizziness, Severe **abdominal pain**, N&V
- **30 minutes AFTER** eating



HR > 100

MEMORY TRICK

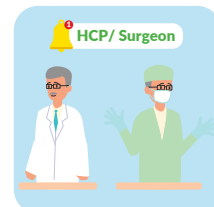


Think for Dumping syndrome- we see DUMPing of Blood pressure

Common Exam Question

A client recovering from a **partial gastrectomy** presents with vomiting, severe abdominal pain, **blood pressure 105/62**, heart rate of **122/min**, temperature of **100.5°F**. Which **action** should the nurse take?

- 1. Administer a bolus of IV fluid
- 2. Assess blood glucose for hypoglycemia
- 3. **Immediately notify the HCP or surgeon**
- 4. Insert nasogastric tube



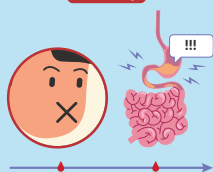
GI SURGERY

Post-Operative Care

Gastrectomy

1. **NPO** until **bowel sounds return** **NCLEX TIP**
2. **Apply SCD** (sequential compression devices)
3. Early ambulation
4. Incentive spirometer Q Hour
5. Teach **splinting the incision** when coughing

Priority



Priority action:

Dehiscence / Evisceration

1. Stay with client & call for help
2. Position: **Low Fowler's with knees bent** **NCLEX TIP**
3. **Sterile gauze** & saline to cover the wound
4. Report to HCP / Surgeon

NCLEX TIPS



Education

4 NCLEX TIPS

1. **HIGH** protein, fiber, & fats foods
Low **carbohydrates**
2. **Small**, frequent meals
3. **LIE DOWN after eating** (left side)
4. **No fluids** with meals (30 min before / after food)



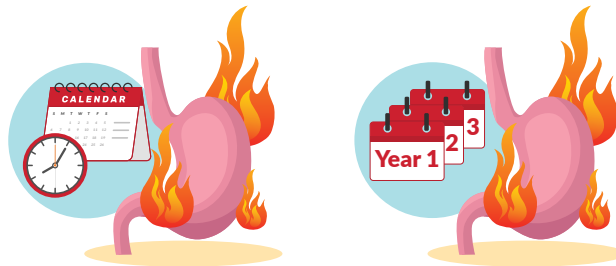
Gastritis

Pathophysiology Course

Pathophysiology

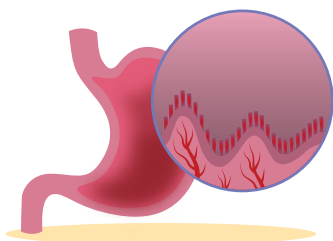
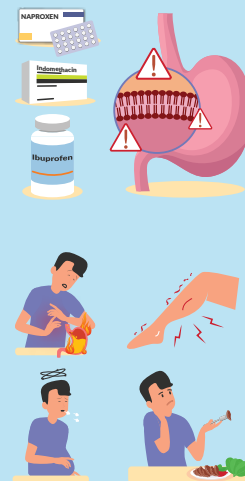
Gastritis is the inflammation of the lining of the stomach

- **Acute** Gastritis: short term inflammation
- **Chronic** Gastritis: long term inflammation



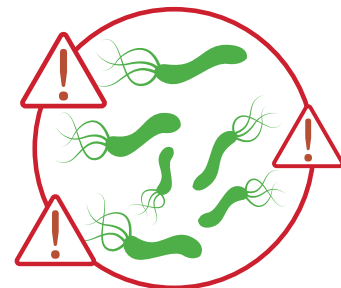
Acute Gastritis

- **Patho:** Inflammation of gastric mucosa (stomach lining)
- **Causes:**
 - Alcohol & spicy food
 - Aspirin
 - NSAIDs **Top Tested**
 - Naproxen
 - Indomethacin
 - Ibuprofen
- **Manifestations:**
 - Hematemesis (vomiting blood)
 - Epigastric pain (heartburn) & cramps



Chronic Gastritis

- **Patho:** Atrophy of gastric mucosa
- **Causes:** H. Pylori infection
- **Complications:**
 - Increased risk for peptic ulcers & gastric cancer



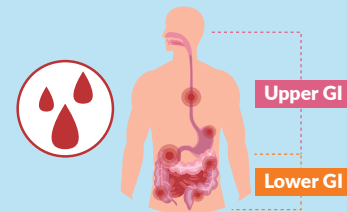
Notes

GI Bleed

Pathophysiology Course

Pathophysiology

Bleeding anywhere inside the GI tract. Classified as **upper** or **lower** GI bleed - one of the biggest problems is knowing the exact location of the bleed!



Causes & Risks

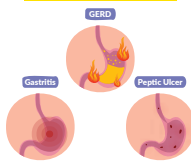
Upper GI

- **Gastritis, GERD, Peptic ulcer** **NCLEX TIP**
- Esophageal varices

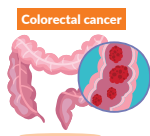
Lower GI

- **Hemorrhoids**
- **Colorectal cancer** **NCLEX TIP**
- Diverticulosis
- Ulcerative colitis

NCLEX TIPS



NCLEX TIP



Signs & Symptoms

Upper GI bleed **NCLEX TIP**

- Vomiting: **Hematemesis** "coffee ground emesis"
- Stool: **Melena** "dark or black tarry stools"

Lower GI bleed

- Bright red bleeding



Diagnostics

Guaiaec Fecal Occult Blood Test

NCLEX TIP

- Step 1** Gather supplies, **wash** hands, **non-sterile** gloves
- Step 2** Open & apply **stool samples** to the boxes on the slides
- Step 3** Open the back of the slide & apply **2 drops of developing solution**
- Step 4** **Wait** 30-60 seconds
- Step 5** **Document** the results

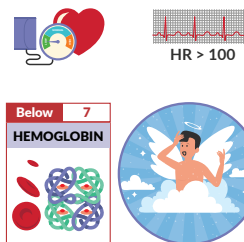
Positive



Complications

Hypovolemic Shock! (hemorrhagic shock)

- **Hypotension** (Low BP)
- **Tachycardia** (High HR)
- **Pale skin**
Cool, Clammy "**diaphoretic**"
- Fatigue & dizzy
- **Low CBC Labs:**
Low H/H
Hemoglobin Less than 7 = Heaven **NCLEX TIPS**



Nursing Interventions

Priority Actions

- 1. Lower head of bed** **NCLEX TIP**
2. IV Normal Saline = Stabilizes Blood Pressure
3. Oxygen
4. **Blood Transfusion**
Hemoglobin **Less than 7** **NCLEX TIP**

Upper GI bleed:

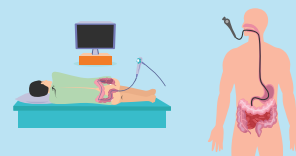
- Nasogastric lavage (NGT) **NCLEX TIP**
- **NO NGT** for **gastroesophageal varices**



Surgery

Includes procedures to locate & stop the bleeding. They put a little camera tube to scope out the bowels.

- **Endoscopy** - Upper GI
- **Colonoscopy** - Low GI



AFTER "-Scopy"

Clear liquids:

- Apple juice
- Broth soup
- Tea (unsweet)

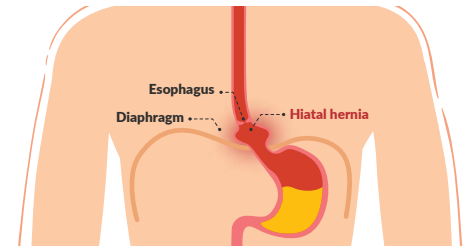


Hiatal Hernia

Pathophysiology Course

Pathophysiology

Protrusion of part of the **stomach through the diaphragm** & is now stuck in either the esophagus or to the side of the esophagus.

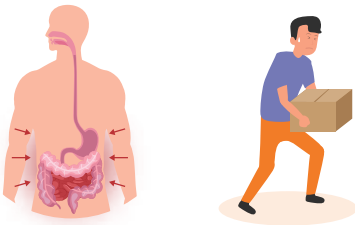


Signs & Symptoms

- **Dysphagia** - difficulty swallowing
- Gastric **Reflux**:
 - **Heartburn** "epigastric pain"
 - Chest pain & SOB



Causes & Risks



- Increased abdominal pressure
 - **Straining / Lifting** heavy objects
 - "**Weightlifting** exercises"
- Obesity



Nursing Care

1. Avoid **lifting / straining**
2. **NO** tight clothing "**Girdle**" **NCLEX TIP**

Diet:

3. **Avoid** high fatty foods / alcohol
4. **NO** **tobacco**, **caffeine**, **chocolate**, **peppermint**
5. **Small**, frequent **low fat** meals **NCLEX TIP**
6. Sit up "**elevate HOB**" after eating / at night

NCLEX TIP



NCLEX TIP



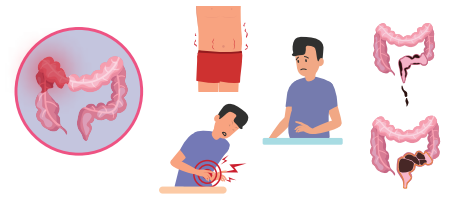
Notes

IBS - Irritable Bowel Syndrome

Pathophysiology Course

Pathophysiology

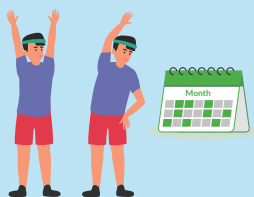
IBS is an intestinal disorder that affects the large intestines, causing cramping, pain, bloating & either diarrhea or constipation. Keep in mind that IBS is **NOT IBD** (Inflammatory bowel disease: UC & Crohn's)



Education

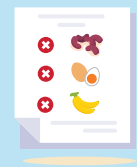
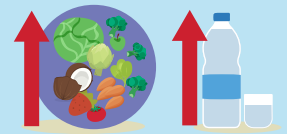
Key point

- Keep a **journal** of symptoms, diet, & **stress** levels
- Perform exercise **3 x per week**



Diet

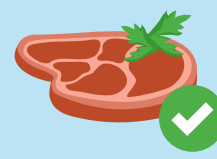
- **Increase** Fiber & Fluid intake
- **Limit** "reduce intake"
Gas producing foods:
 - **Legumes** (beans)
 - Eggs
 - Dairy products (Yogurt)
 - **Fruits**
- **Reduce**
 - Alcohol
 - Caffeine



Common Exam Question

A client with **irritable bowel syndrome** ... which **meal choices** demonstrates **correct understanding** of diet guidelines?

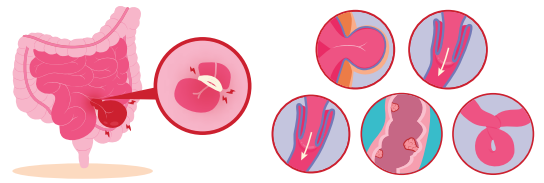
- 1. Beans
- 2. Cornbread
- 3. Fruit salad
- 4. Steak
- 5. Tomato basil soup
- 6. Yogurt with granola



Notes

Pathophysiology

A small bowel obstruction is a blockage in the small intestines.



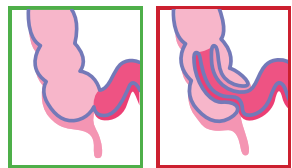
Causes & Risks

Non-Mechanical obstruction

- Paralytic Ileus

Mechanical obstruction

- **Adhesions** (scar tissue) from surgery
- Hernias
- Intussusception
- Tumor (cancer)
- Volvulus (twisting of bowel)



Normal Intussusception



Adhesions

Signs & Symptoms

RAPID Onset

Key point

- **Frequent** vomiting & nausea
- **Abdominal** distention
- **Colicky** "intermittent" abdominal pain
- Bowel sounds
 - Hyperactive = **ABOVE** obstruction
 - Hypoactive = Below obstruction

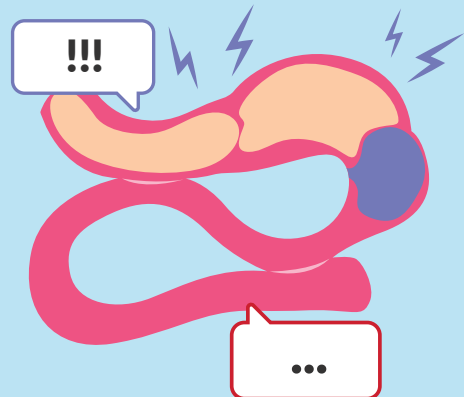
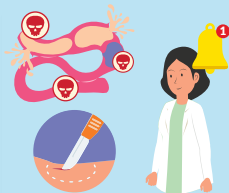
Complication

Peritonitis Medical Emergency!

NCLEX TIP

- **Fever**
- Tachycardia, Tachypnea
- Abdominal distention

Rigid "board-like abdomen"



Common Exam Question

Client with a **small bowel obstruction** ... suddenly develops **tachycardia** and **tachypnea** with a **high fever**. What is most likely the problem?

- 1. Pulmonary embolism
- 2. **Bowel perforation notify HCP**
- 3. Pneumonia
- 4. Atelectasis

Surgery

Patients that fail to improve will need a **bowel resection** to cut out the problem area & may have an ostomy placed until bowels heal

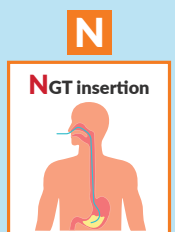


Treatment

1. **NPO**
2. **NGT insertion** (nasogastric tube)
3. IV fluids
4. Semi-Fowler's position
5. Pain control (**non-opioids**)

AVOID Opioid analgesics:

- Morphine
- **Hydrocodone**
- Hydromorphone



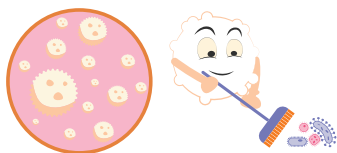
Hematological

Hemo Terminology

Pathophysiology Course

Key Terms

L - Leukocytes
L - Like to Clean



Leukocytes (WBC)

MEMORY TRICK:

- **L** - Leukocytes
- **L** - Like to Clean

Erythrocytes (Red Blood Cells - RBC)

- Hemoglobin - HgB (oxygen carriers on RBC)

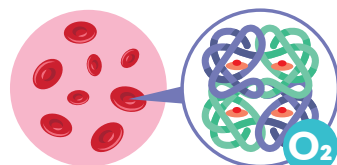
MEMORY TRICK:

Hem**O**globin = **O**₂ carriers

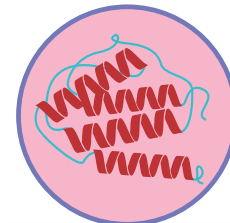
- Erythropoietin (EPO)

MEMORY TRICK:

Ery**THRO**poietin
THROws requests to make RBC's

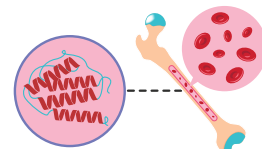


Erythrocytes Hemoglobin

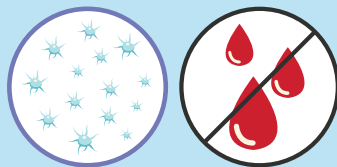


Erythropoietin (EPO)

Ery**THRO**poietin **THRO**ws



Platelets
Plug cuts to stop bleeding



Thrombocytes: Platelets

Plug cuts to stop bleeding

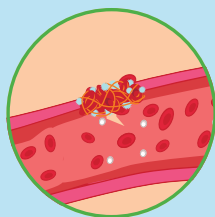
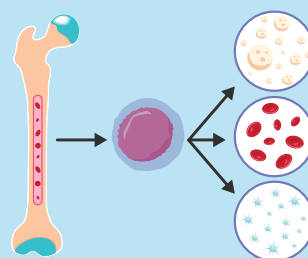
Hematopoiesis

(formation of blood cells, occurs in **bone marrow**)

Hemostasis

(blood clotting)

- **Clot Formation:**
 Pro**thrombin** → Thrombin → Fibrin mesh
 = CLOT FORMED!
- **Clot Destruction**
 Clot retracts → Plasmin breaks the clot down



Hemostasis

Prothrombin

Thrombin



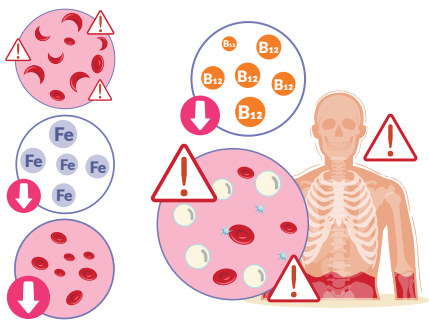
Notes

Anemia

Pathophysiology Course

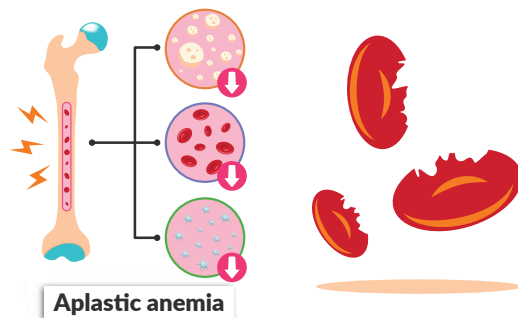
Anemia

The body **lacks adequate RBCs (Red Blood Cells) to carry oxygen** around the body to perfuse the tissues. Clients present tired, fatigued & pale skin, with shortness of breath and dizziness, as the body lacks oxygen.



Top Tested

- Iron deficiency Anemia**
- Sickle cell anemia**
- Pernicious Anemia
- Aplastic anemia
 - Impairment in bone marrow
 - **Pan**cytopenia (Low RBC, WBC, Platelets)
- Hemolytic anemia
 - Destruction of RBCs
 - Incompatible blood transfusion (antigen-antibody reactions)



Anemia Causes

- **Blood loss:** surgery, trauma, excessive menstruation etc.
- **Chemotherapy & Immunosuppressants:** suppresses the bone marrow where the RBCs are made.
- **Lack of iron, B12 & other building blocks:** like with iron def. anemia & pernicious anemia

NCLEX TIP

Hemoglobin

- Normal: 12 +
- Bad: 8 - 9
- **Less than 7 = Heaven**

Iron Deficiency Anemia - Causes

- **Diet low in:** meat, fish, & poultry
- Gastric bypass surgery
- **Pregnancy:** fetus stores iron
- **Pica**
 - **LOW hematocrit and hemoglobin levels** **NCLEX TIP**
- **Other Causes:**
 - Low vitamin B12
 - **Hypochlorhydria** (low stomach acid)
 - Gastric atrophy (Atrophic gastritis)

Infants & Children

1. Premature birth
2. Insufficient oral intake
3. **Excessive intake of milk** **NCLEX TIP**
4. Preterm infants **exclusively bottle-fed** with breast milk
5. **Vegan diet** **NCLEX TIP**
 1. Fortified breads & cereals
 2. **HIGH** iron foods with **HIGH vitamin C**
 3. Calcium & Vitamin D

Signs & Symptoms

GI Manifestations:

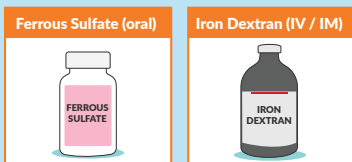
- Stomatitis - inflammation of mouth & lips
- Glossitis - inflammation of the tongue



Pharmacology

KEY POINTS

- Dark or black stools = **Normal & Expected** NOT GI BLEED
- Empty stomach **1 HOUR BEFORE** medications



Treatment

Rich in iron

1. Meat, Fish, Poultry
2. Spinach "green leafy veg" & whole grains

Infants & Children

Limit **EXCESSIVE** milk intake

Iron + Vit. C

HIGH iron foods
HIGH vitamin C



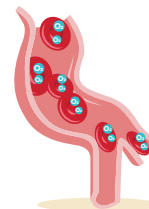
Anemia II

Pathophysiology Course

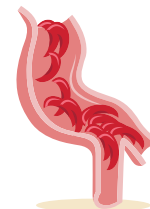
Sickle Cell Anemia

The RBCs have a distorted shape, transforming from a nice round plump shape to a **skinny sucked in sickle shape**. These misshapen RBCs die quicker than normal RBCs, **carry less oxygen** to the body & get clogged in tiny blood vessels - **blocking or occluding the blood supply** causing ischemia (low oxygen) to the organs. A vaso-occlusive crisis or **"sickle cell crisis"** can occur, causing **extreme pain** from the lack of oxygen!

Normal Cell



Sickle Cell



Signs & Symptoms

Blood Clot Manifestations

- **One-sided** arm weakness
- Swelling of the feet and hands (Dactylitis)

EXAM TIP

- **New-onset** paralysis of extremities
- **Sudden** inability to be aroused

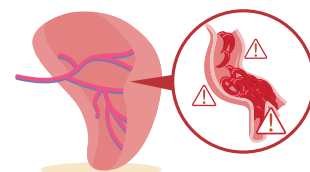


Complication

Splenic sequestration crisis

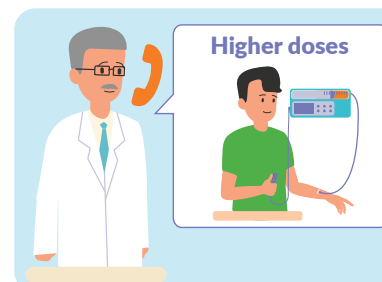
- Rapidly enlarging spleen
- Low blood pressure

Splenomegaly



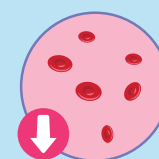
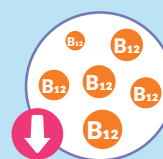
Treatment

- Hydration: **IV fluids**
- Bed rest
- **Pain Control NCLEX TIP**
 - PCA - patient control analgesia pump
 - **Call the HCP for Higher doses**



Pernicious Anemia

The body **cannot absorb B12**, which is a vital building block to create RBCs. Clients **lack intrinsic factor** in the GI tract, which **helps the body take in B12**.



Signs & Symptoms

- Glossitis: **EXAM TIP**
 - Inflamed red smooth tongue
- Extreme weakness
- Jaundice: "pale yellow skin"



Treatment

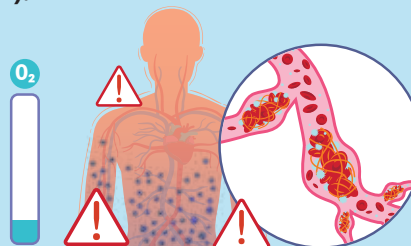
- **B12** - Injection: IM or IV
- **NOT** orally (PO)

Disseminated Intravascular Coagulation



DIC is a serious disorder in which the **proteins that control blood clotting become overactive**, causing many blood clots to form all over the body.

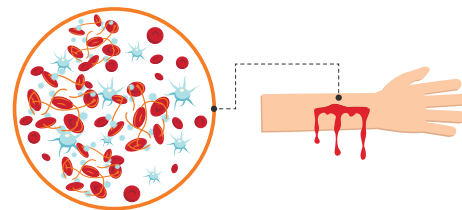
These **blood clots block small blood vessels causing organs to infarct** & not function properly due to the lack of perfusion (**lack of oxygen**).



The 2nd BIG event

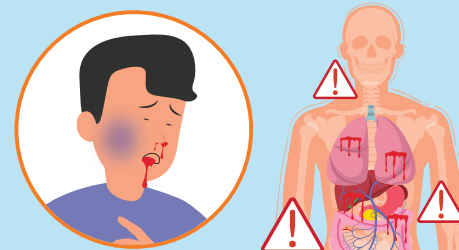
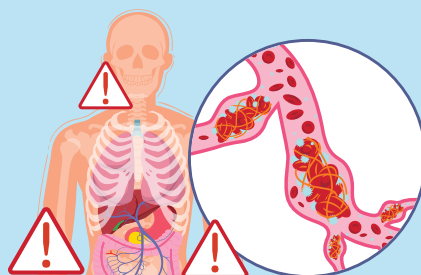
Eventually the body uses **up all the platelets & clotting factors** resulting in the body having **NO ability to stop bleeding**.

Therefore we see **bleeding everywhere in the body**, commonly seen right beneath the skin, in the nose or mouth, or deep inside the body.



Patho Order

1. Overactive clotting (Thrombi and infarcts of organs) →
2. Depletion of platelets & clotting factors for normal clotting →
3. Massive bleeding all over the body



Notes

Leukemia

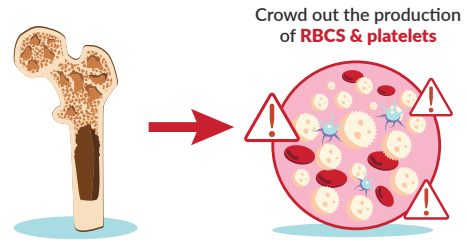
Pathophysiology Course

Pathophysiology

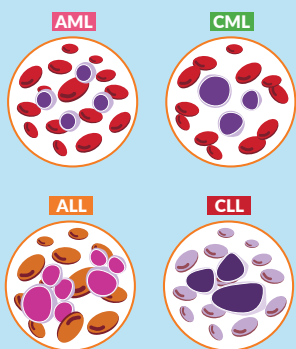
Leukemia is a type of cancer that affects the **blood cells & bone marrow**. Bone marrow is responsible for making blood cells: WBCs, RBCs, platelets. In Leukemia there is an **overproduction of white blood cells (WBCs)** that crowd out the production of normal cells, leading to low RBCs & low platelets.

Leukemia

- Leuk = Leukocyte (WBC)
- emia = blood



Main Types

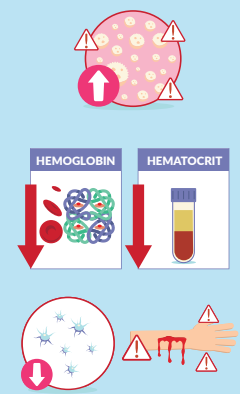


- AML** - Acute myeloid leukemia
Pediatrics more common
- CML** - Chronic myeloid leukemia
- ALL** - Acute Lymphocytic Leukemia
- CLL** - Chronic Lymphocytic Leukemia

Labs

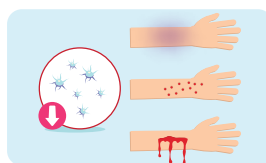
Labs

- High WBCs
- Low H/H
- Low Platelets



Signs & Symptoms

- **Frequent infections**
- **Fatigue**, Unsteady Gait, Pale "Pallor"
- **Bruising**, Petechiae, & Easy Bleeding
- Weight Loss & **Anorexia**
- Bone pain



Acute Leukemias (AML, ALL)

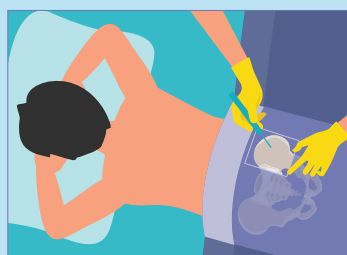
- Immature, nonfunctional WBCs
- Acute = Abrupt onset
- Common in children

Chronic Leukemias (CML, CLL)

- Mature cells with reduced function
- Slow onset (insidious)
- Older adults

Diagnostics

Bone marrow biopsy
Taken from the posterior iliac crest

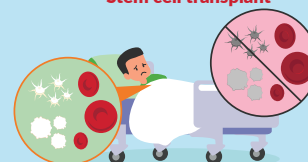


Treatment

Radiation & Chemotherapy to kill the cancer.
Rarely: Stem cell transplant - like hitting the restart button to reboot the bone marrow.



Stem cell transplant



Hemophilia

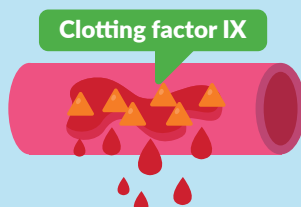
Med Surg: Hematology

Pathophysiology

Inherited bleeding disorder in which the **blood doesn't clot normally**, increasing the risk of **excessive bleeding** after any type of small injury like a paper cut or a fall on the ground.



Hemophilia A



Hemophilia B

Hemophilia A

- Lack of clotting factor **VIII** (8)

Hemophilia B

- Lack of clotting factor **IX** (9)

HESI Question

A nurse is caring for a patient diagnosed with **hemophilia A**. The nurse knows this type of hemophilia is caused by an **absence of which clotting factor**?

- VIII

Signs & Symptoms

- Pain, Bruising, & Petechiae
- Ineffective tissue perfusion
- Joint stiffness & Lack of mobility

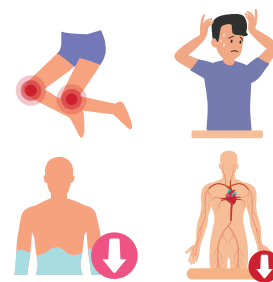


HESI Question

A nurse is caring for a patient with **hemophilia**. Which concerns would be expected on the nursing care plan?

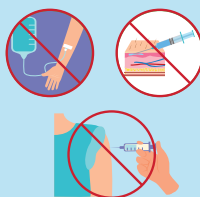
Select all that apply.

- Pain
- Anxiety
- Deficit of fluid volume
- Ineffective tissue perfusion



Treatment

- **AVOID Injections:** IV, IM, SQ
- Administers **coagulation replacement factors**
- **Ice packs** & **Elevate** the affected area



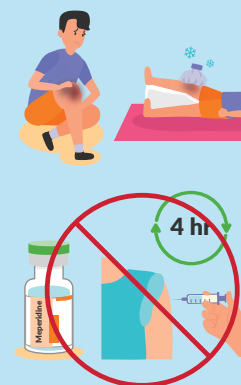
Kaplan Question

Q1 Client with **hemophilia** develops painful swelling of the knee after **bumping the leg**... which **initial action** is most appropriate for the nurse to take?

- Apply ice to the knee and elevate the leg

Q2 The nurse reviews the medical record for a client diagnosed with **hemophilia**. It is most **important** for the nurse to **question** which entry?

- Meperidine 75mg IM q 4 hr for severe pain



Education

- **NO NSAIDS**
- **NO Razors**
- **NO Contact sports**



HESI Question

Which statement by a patient with **hemophilia** indicates the **need for further teaching**?

- "I can learn to play **contact sports** for exercise."

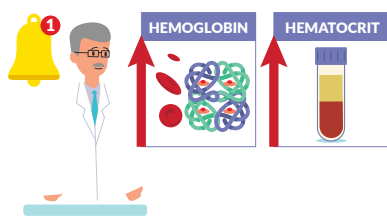
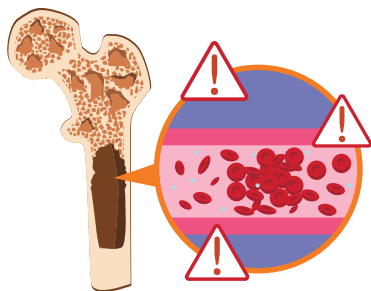


Polycythemia

Pathophysiology Course

Pathophysiology

Polycythemia refers to a condition where the body produces an increased number of red blood cells (RBCs) due to hypoxia (low oxygen) within the body. **Instead of perfusing the body**, these extra RBCs make the blood very thick, causing **blood clots** like traffic jams with blood vessels, mainly in the brain (CVA - stroke).



Polycythemia vera

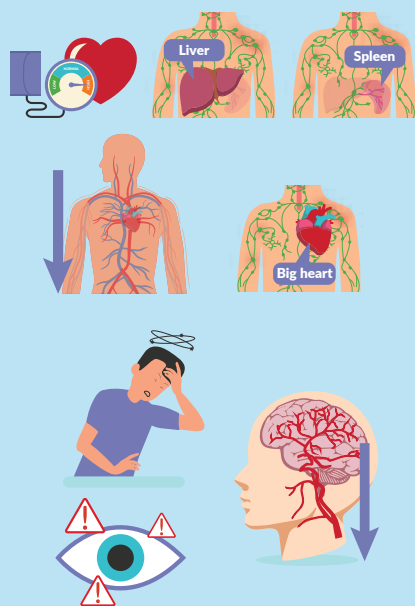
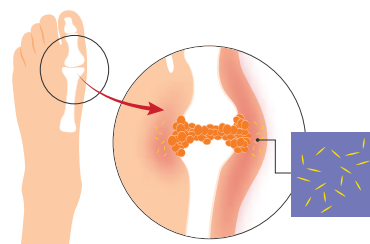
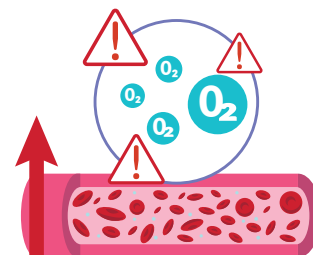
- Increased RBCs
- Low erythropoietin levels
- **Cause:** Cancer (Neoplasm, Neoplastic)

Secondary polycythemia

- Increased RBCs
- **Cause:** Hypoxemia (low oxygen in the blood)

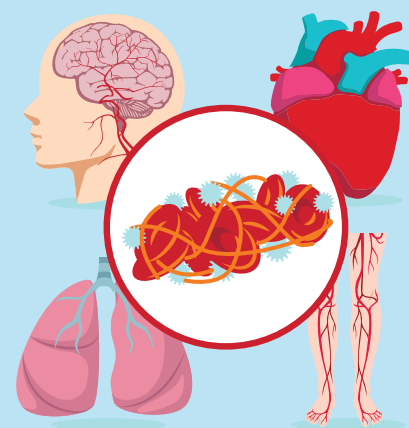
Diagnosis

- Increased RBCs (red blood cells)
- Increased H&H **Report to HCP**
Hemoglobin (HgB) & Hematocrit (HcT)
- Hypercellular bone marrow
- Hyperuricemia



Manifestations

- Increased BP
- Hepatomegaly (big liver)
- Splenomegaly (big spleen)
- Sluggish blood flow
- Cardiac hypertrophy (big heart)
- Headache & visual problems
- **Thrombosis (clot)**
 - Infarctions
 - CVA = clot in the brain
 - MI = clot in the heart
 - PE = clot in the lung
 - DVT = clot in the deep vein



Notes

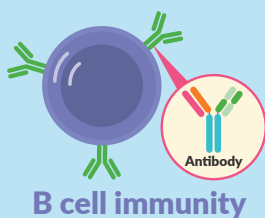
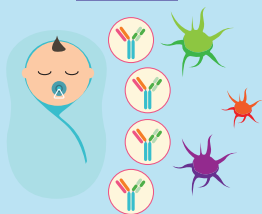
Immunity

Immunity

Pathophysiology Course

Immunity - Type of Immunity

Adaptive



Innate (natural immunity):

present at birth & does not have to be learned through exposure to an invader.

Adaptive Acquired

- Exposed to foreign substances and the immune system responds.

Passive Acquired

- Antibodies are transferred from one host to another.

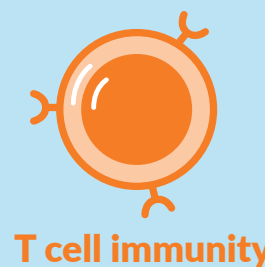
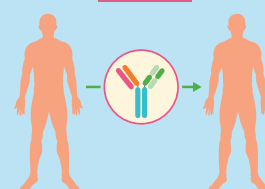
B cell immunity (Humoral immunity)

- Antibodies (Immunoglobulins)

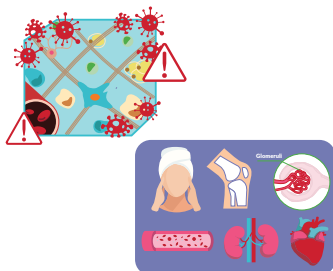
T cell immunity

- Lymphocytes

Passive



Immunity - Hypersensitivity Reactions



Type I (Immediate hypersensitivity reaction)

- IgE (immunoglobulin E)
- Allergic reactions (food, dander, pollen etc.)
- Potential complication: Anaphylaxis **Patho Test Tip** supersized systemic allergic reaction that closes the airway.

Type II (antibody-mediated immune reaction)

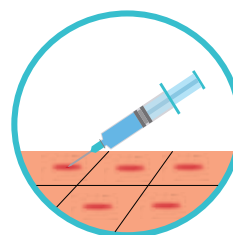
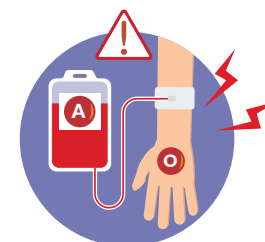
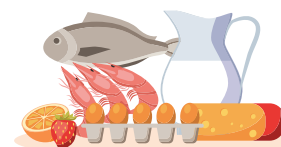
- Cytotoxic (cell toxin)
- IgG (Immunoglobulin G)
- Blood transfusion reaction

Type III (immune-complex reactions)

- Immune complex
- Autoimmune disorders:
 - Hashimoto - Hypothyroidism
 - RA - Rheumatoid Arthritis
 - SLE - Systemic Lupus Erythematosus
- Glomerulonephritis (caused by strep infection)

Type IV (Cell mediated/ Delayed hypersensitivity)

- TB skin test



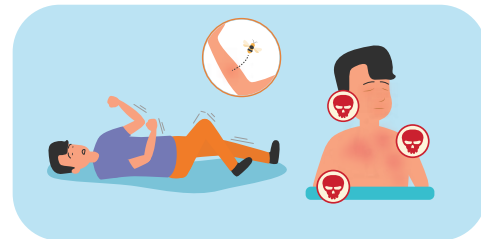
Anaphylaxis

Pathophysiology Course

Pathophysiology

Severe allergic reaction - like from a bee sting or peanut allergy.

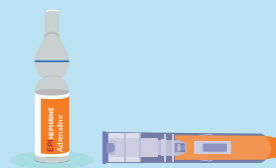
Anaphylactic shock - severe **ALLERGIC** reaction



Treatment

EXAM TIP

Epinephrine
EpiPen Auto Injector



KEY POINT

Epi is the **1st drug** to use for anaphylaxis.

First signs of anaphylaxis (hives, dyspnea, hypotension) **give EpiPen**

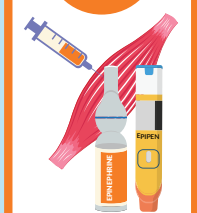
- Repeat every 5 -15 minutes if s/s continue **EXAM TIP**
- Repeat Epi until signs & symptoms resolve! **EXAM TIP**

Normal EXPECTED Side effects

- Tachycardia (HR over 100)
- Palpitations
- Dizziness



1st



Epinephrine

2nd



Diphenhydramine

3rd



Albuterol
Steroids

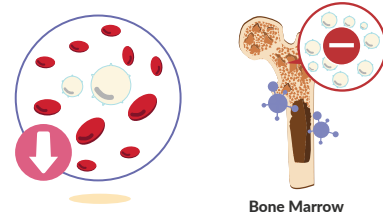
How to use Epi-Pen

KEY POINTS

1. Inject into **outer THIGH** at **90 degree** angle at onset of s/s
"Stab pen into outer thigh"
 - Hold in place for **10 seconds**
2. Seek immediate medical attention after use!
 - Go to the hospital!
3. Store epipens in **dark place** at **room temperature**
(not too cold/ not too hot)

Neutropenic Precautions

Neutropenia is the very low white blood cell (WBC) count - normally 5,000 - 10,000. This happens when clients with cancer undergo **chemotherapy & radiation** which kill the cancer cells, but also kill the bone marrow where WBCs are produced. Clients have HUGE risk for infection!



Interventions

Neutropenic precautions



3 BIG TEST TIPS

- NO** fresh flowers, or fresh fruit
- AVOID** crowds & sick people!
- FEVER** is a priority **OVER 100.3 F (38 C)!!!**

EXAM TIP



Drug name

- Doxorubicin
- Cisplatin
- Cyclophosphamide



Adverse Effects

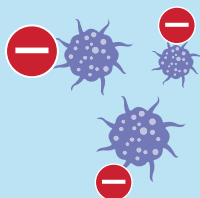
All fast growing cells die

- Bone cells **DIE**
- Blood cells **DIE**
- **Low** immunity



Indication

Slow & stop the growth of tumors.



MOA

Directly inhibiting growing cells in the body.



KEY WORDS

- "Immunodeficiency" "Immune compromised"
- **FEVER** is a priority **OVER 100.3 F (38 C)!!!**

EXAM TIP



Key Points

- **Low RBC & LOW CBC - "Anemia"**
 - Normal: 4.5 - 6 million RBC
- **Low Platelets**
 - Normal plt 150 - 400,000
 - Less than 100,000 = **Thrombocytopenia**
- **Low WBC - leukopenia < 4,000**
 - Normal: 5,000 - 10,000



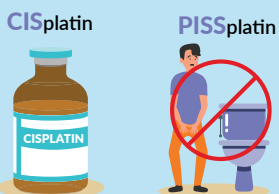
Cisplatin

KEY POINT

Renal toxicity
Monitor Urine- Input & Output

- Creatinine **OVER 1.3 = Bad kidney**
- BUN **OVER 20**
- Urine output **30ml/hr** or LESS = **Kidney Distress**

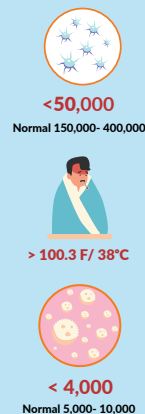
MEMORY TRICK



Common Exam Question

The nurse is caring for a client with ovarian cancer taking **doxorubicin**, which assessment finding should the nurse report to the health care provider? **Select All That Apply**

- 1. Partial thromboplastin time 55.
- 2. Platelet count of 48,000.
- 3. Red blood cell count 5×10^6 .
- 4. Temperature of 100.7 (38.2 C).
- 5. White blood cells 3,600.

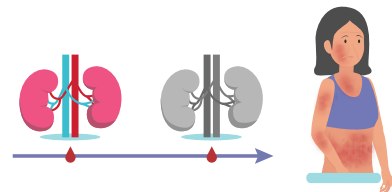


Lupus

Pathophysiology Course

Pathophysiology

Systemic Lupus Erythematosus (SLE) is an **autoimmune disorder** where the body attacks itself, causing major **inflammation** in the skin, joints, kidneys, & heart resulting in **organ failure over time**, most often in the kidneys.



Triggers

Avoid anything that can irritate the body

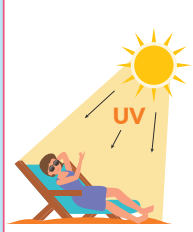
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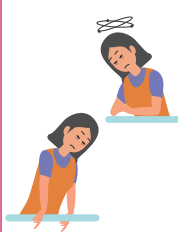
Sun exposure/
UV radiation **NCLEX TIP**



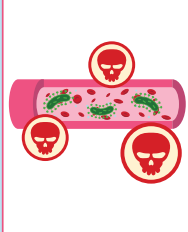
Smoking



Stress:
physical & emotional



Sepsis "infection"



Causes & Risks

- Cause is unknown
- Most cases: Women 14 - 45 years.
- **UV radiation from the Sun makes it worse**

Signs & Symptoms

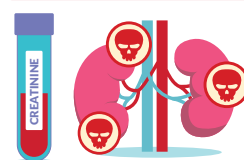
1. **A butterfly-shaped rash** (cheeks & nose) **NCLEX TIP**
2. **Fever** higher than 100°F
Report to HCP
3. **Joints** (painful & swollen)



Labs

- Creatinine **over 1.3** = Bad Kidney **NCLEX TIP**
- Decreased **WBC** (norm: 5,000 - 10,000)
- Inflammation:
 - Increased ESR (erythrocyte sedimentation rate)
 - CRP (C Reactive Protein)

Creatinine = **1.3**



Nursing Interventions

AVOID the 4 S's **NCLEX TIP**

- S - **Sun exposure** / UV light
 - S - Smoking
 - S - **Stress**: physical & emotional
 - S - Sepsis "infection"
- Notify the HCP for **fever***

Pharmacology

- **Steroids "-sone"** Prednisone
- **Immunosuppressants**:
 - Hydroxychloroquine
 - Methotrexate
 - Infliximab
 - Azathioprine (brand: imuran)



Notes

Infection

Infection & Transmission

Pathophysiology Course

Physiology of infection

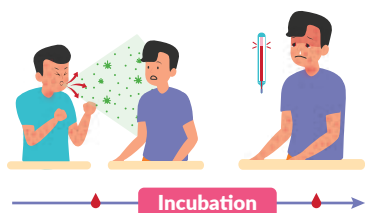
- **Incubation:** The time from exposure to an infectious agent until the onset of symptoms. Viral or bacterial particles replicate during the incubation stage.
- **Prodromal:** The infectious agent continues replicating, which triggers the body's immune response & mild, nonspecific symptoms (infectious)
- **Acute:** Time when a person shows apparent signs & symptoms (manifestations).

Local signs

- Pain, swelling, redness, warmth, exudate
 - Purulent exudate: bacterial infections
 - Serous exudate: viral infections

Systemic Signs

- Fever, fatigue, body aches, headache, nausea



Top Tested Key Terms

Modes of Transmission

- **Vector:** insect or animal carrier host
 - **Example:** Contraction of west Nile virus via mosquito bite
 - Memory Trick**
Vector - west Nile Virus
- **Aerosol:** Small particles from the respiratory tract travel AIRBORNE transmission because droplets are very small and can travel long distances.
 - **Example:** Measles, Tuberculosis (TB), Varicella, COVID-19
 - Memory Trick**
COVID think CovAIR
- **Droplet:** Respiratory or saliva expelled from infected individual
 - **Example:** Pertussis, Influenza, Meningitis, Pneumonia
- **Direct contact:** No intermediary host. Spread via touching of infectious lesions or direct contact with blood/ body secretions.
 - **Example:** HIV, Herpes, Hepatitis C
 - Memory Trick**
H - coHHHntact



Measles



Tuberculosis



Varicella



Covid-19



Pertussis



Influenza



Meningitis



Pneumonia

Droplet

- P** - Pertussis
- I** - Influenza
- M** - Meningitis
- P** - Pneumonia

1. Surgical Mask & Goggles
2. Single room

ATI

Teach unlicensed personnel to wear a mask

Airborne

- M** - Measles
- T** - TB (Tuberculosis)
- V** - Varicella (shingles/chickenpox)

1. N95 mask - Staff
2. Neg. Pressure Room
3. Door closed
4. Transport - Patient wears surgical mask

MEMORY TRICK

- On AIR with MTV
- "PIMP my ride" the old TV show like DROPPing lowrider



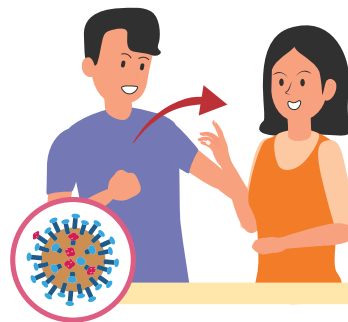
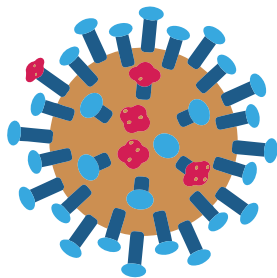
Influenza

Pathophysiology Course

Pathophysiology

Often called the **flu** for short, this infectious disease is caused by the **influenza virus**. It is NOT a bacteria, therefore antibiotics will NOT work to treat this infection.

INFLUENZA



Cause

- Influenza Virus
(Not bacteria = No antibiotics)

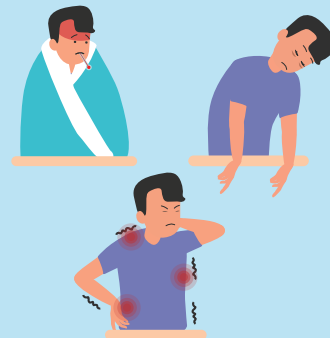
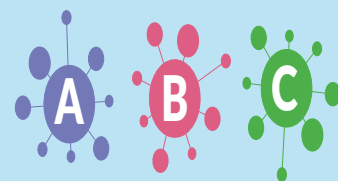
Types

- A,B,C, constantly mutating

Annual Vaccination recommended

Manifestations (signs & symptoms)

- Fever
- Fatigue
- Body aches



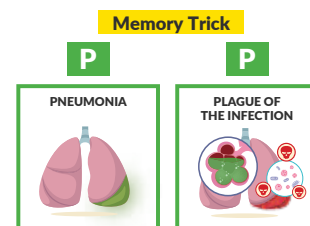
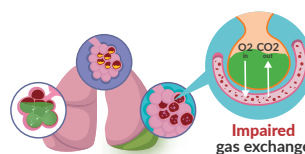
Notes

Pneumonia

Pathophysiology Course

Pathophysiology

Pneumonia is a **major infection within the lungs** causing severe inflammation & filling the alveoli with mucus, fluid, & debris. This leads to **impaired gas exchange** since carbon dioxide **CO2 can't get out** & oxygen O2 can't get IN, ultimately resulting in **hypoxia (low oxygen)**.



Signs & Symptoms

TOP 6 MANIFESTATIONS

1. Altered Mental Status
Restlessness, Agitation, Confusion
2. **Fever** (Over 100.4°F/ 38°C)
3. Productive cough "**Yellow Sputum**"
4. Fine or Coarse **Crackles**
5. **Dyspnea** "Shortness of Breath"
6. Pleuritic Chest pain
(Pleural friction rub) Report to HCP
"Sharp chest pain upon inspiration or coughing"



Big Sign



Common EXAM Question

Priority Patient: who to see first?

- ✓ **Post operative** patient with suspected **pneumonia** temp. of 98.2°F, SpO2 94%
... **becoming restless & agitated.**

Patho Key Points

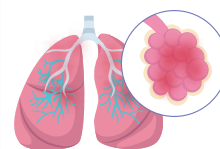
Lobar pneumonia:

- Infection in 1 or more **LOBES**
- **Cause:** Streptococcus pneumoniae
- **Pleural empyema:**
collection of pus in the pleural cavity
- **Manifestations** (signs & symptoms)
 1. Sudden onset
 2. Rales (crackles)
 3. **Rusty colored sputum**
(caused by exudate)



Bronchopneumonia:

- Diffuse infx in **BOTH LUNGS**
Memory Trick:
B - Bronchopneumonia
B - Both Lungs
- **Cause:** Several different microorganisms
- **Manifestation** (signs & symptoms)
 - **Yellow or green sputum**
 - with productive cough



Diagnostics

1. Chest X-ray (CXR) **Patho Test Tip**
2. Elevated white blood cells (WBC)
Over 10,000
3. Sputum Culture
4. ABGs (respiratory acidosis)

TEST TIP

Blood cultures are always taken first **BEFORE** antibiotics

MEMORY TRICK

A - Antibiotics begin
A - **AFTER** cultures
in order to identify the causative bacteria & choose the best treatment.

1st

CULTURES

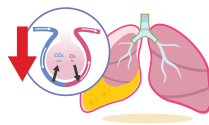


Notes

Pneumonia II

Pathophysiology Course

Critical Complications



1. Pleural Effusion

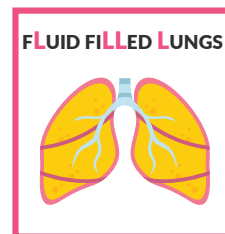
Fluid that fills the pleural space (space between the lung itself & the chest wall). This prevents full expansion of the lung, resulting in decreased gas exchange.

Priority Intervention

- **Thoracentesis:** big needle in the lung space to drain the fluid!
- **2 BIG complications:**
Pneumothorax (popped lung)
Hemothorax (blood in the lung space)
- **PRIORITY** to report:
Asymmetrical chest expansion &
Decreased breath sounds

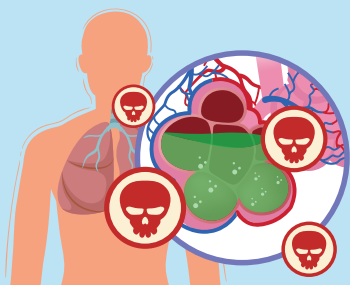
KEY SIGNS

1. D - During **inhalation** = Chest pain
2. D - Dyspnea
3. D - **Diminished** breath sounds
4. D - **Dull** resonance on percussion



2. ARDS (acute respiratory distress syndrome)

ARDS, think **HARDS** - hard stiff lungs



KEY SIGNS

Refractory Hypoxemia = Low PaO₂

MEMORY TRICK

- **RE**sistant to Oxygen
- **RE**fractory Hypoxemia

#1 Sign of **Low O₂** = Altered Mental status

1. Confusion
2. Agitation
3. **Restlessness**



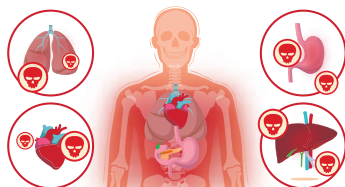
3. Septic Shock



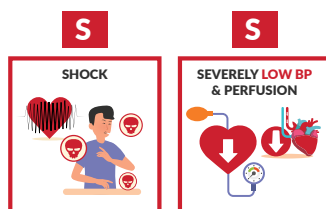
If the infection gets severe, the body releases chemicals into the bloodstream to fight the infection resulting in severe low blood pressure & total body inflammation which can damage multiple organs causing them to fail, known as MODS - multiple organ dysfunction syndrome.

MEMORY TRICK

- S** - Shock
- S** - Severely Low BP & perfusion



MEMORY TRICK



Key signs

- Hypotension **NCLEX TIP**
 - Systolic < **90** mm Hg
 - MAP < **65** mm Hg
- Cap refill over 3 - 4 seconds
- Tachycardia
- Early - Fever (Over 100.4)
- **Late** - Hypothermia (**Under 96.8°F**)
- Elevated WBC (norm: 10,000 or less)
- Decreased Urine Output
 - **30 ml/hr** or **Less** = Kidney Distress



MODS - Multiple Organ Dysfunction Syndrome

Pneumonia III

Pathophysiology Course

Risk Factors & Causes

#1 - Advanced AGE

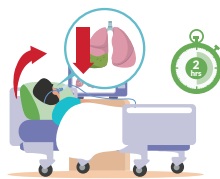
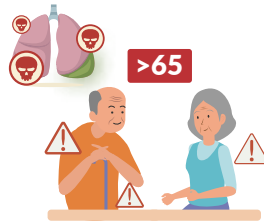
Over 65 years old

VAP - "Ventilator Associated Pneumonia"

1. Reposition side to side **Q 2 hours**
2. Oral Care & Suctioning **Q 2 hours**
3. **Chlorhexidine**

Best indicators of VAP **NCLEX TIP**

- **Positive sputum culture**
- **Fever**
- Chest X-ray: new infiltrates



- Prolonged immobility - secretions are not mobilized & get stuck in body
- Post-Operative - Anesthesia - the body is put to sleep which traps infection in the lungs

Common Exam Question

Best indicator of ventilator associated pneumonia (VAP) ?

- ✓ Positive sputum culture

Best blood lab value shows effective treatment of pneumonia after IV antibiotics?

- ✓ White blood Cell count



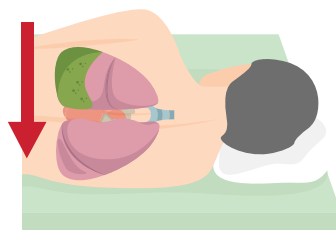
Nursing Care

Mobilize secretions & Expand Lungs

- Chest physiotherapy
- TCDB - turn **cough** & deep breathe!
 - Huff **coughing** technique **NCLEX TIP**
 - **AVOID** cough suppressants
- **Fluid** 2 - 3 L per day
- Positioning
 - HOB UP! **High Fowler's**
 - **Hypoxia** in Unilateral Pneumonia? = Good Lung Down **NCLEX TIP**



Common Exam Questions



Early ambulation

(within **8 hours** after surgery)

Cough with splinting

Hand Washing

Mouth Care Q 12 hour

- Chlorhexidine swab
- Incentive Spirometer **Q Hour**
- GIVE** Pain Meds



Interventions

Mobilize Secretions

- **Avoid** cough suppressants
 - Antitussives: Codeine
- **Cool mist humidifier** at night
- Increase Fluids

Re-expand Alveoli

- **IS - Incentive spirometer** at home

Prevent Reinfection

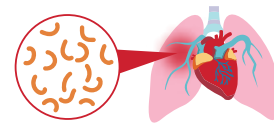
- **Finish oral antibiotics** at home
- **Pneumonia vaccine** (Every 5 years)
- Smoking cessation
- Hand Washing
- **Schedule follow up** & Chest X-ray
- **Report:** increased or Worsening
 - Fever
 - Confusion
 - SOB, cough, sputum

Tuberculosis

Pathophysiology Course

Pathophysiology

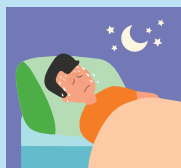
- Bacterial infection in lungs caused by the bacteria M.Tuberculosis
- Spread via the **airborne route**, once inhaled it enters the lungs & spreads to the lymph & blood stream.



Signs & Symptoms

KEY POINTS

- **Night Sweats**
- Anorexia: **Weight loss**
- Cough + Hemoptysis
"Blood tinged sputum" **NCLEX TIP**
- Dyspnea & SOB
- **Fever** & chills



Memory Trick

T

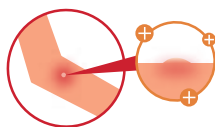
 Terrible cough **"blood tinged"**
B

 Bad infection:
Fever, night sweats, **weight loss**

Diagnostics

- **Intradermal injection** (mantoux test) requires a 2 to 3 day window for reading.

Over **15 mm** induration
= **positive TST**



Patient has a
TB infection

- **Chest X ray & sputum cultures** test for active form.

Key point

Sputum Culture Diagnosis

- **Early morning** sterile sputum specimen
3 consecutive days




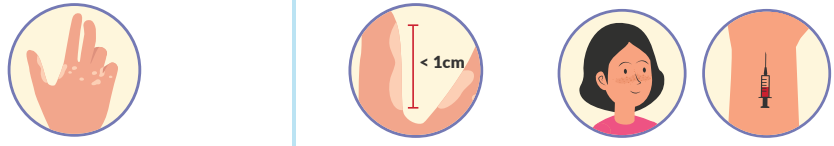
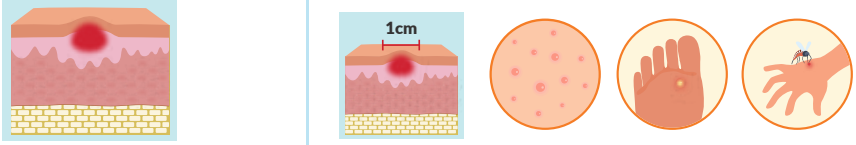
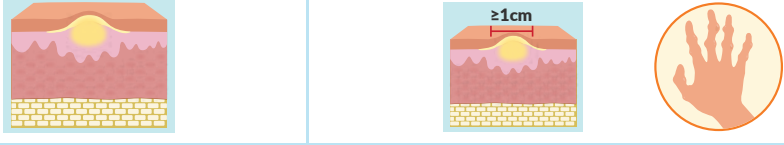
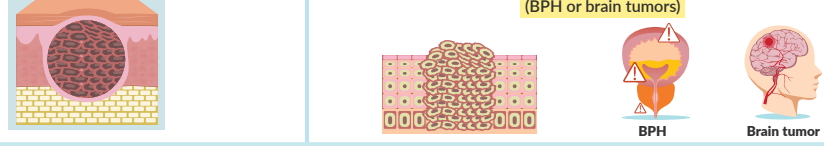
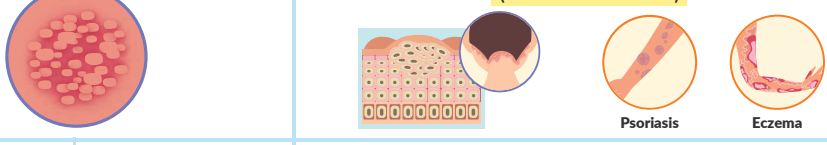

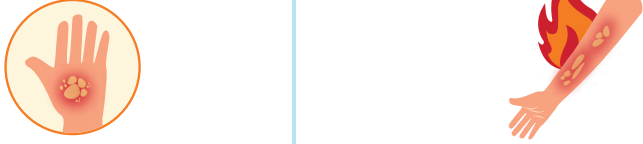
Pharmacology (see pharmacology TB study guide)

Notes

Integumentary

Skin Lesions (Integumentary Key Terms)

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Name	Medical Term	Description
Mole	Nevi, Nevus	<p>Growths on the skin (cancerous - uneven irregularly shaped)</p>  <p>Cancerous</p>
Macule	Macule	<p>Flat, discolored area of skin less than 1 cm wide (Freckles, tattoos)</p>  <p>< 1cm</p>
Boil, pimple	Papule	<p>Red raised area of skin tissue (1 cm) (Acne, warts, insect bites)</p>  <p>1cm</p>
Lump, Bump	Nodule	<p>Lump underneath the skin that's at least 1 cm in size (Granuloma in Rheumatoid arthritis)</p>  <p>≥1cm</p>
Tumor	Neoplasms	<p>A mass formed when normal cells begin to change & grow uncontrollably. Benign (noncancerous), Malignant (cancerous) (BPH or brain tumors)</p>  <p>BPH Brain tumor</p>
Plaque	Plaque	<p>Fast growth of skin cells that appear in a few small spots looking similar to dandruff. (Psoriasis & eczema)</p>  <p>Psoriasis Eczema</p>
Hives Wheal, Weal	Urticaria	<p>Superficial skin colouring or pale skin swelling, usually surrounded by erythema that lasts anywhere from a few minutes to 24 hours (Heat hives)</p>  <p>24 HOURS</p>
Blister	Vesicle	<p>Small fluid filled blisters on skin (burns)</p> 

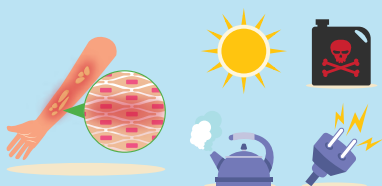
Burns

Pathophysiology Course

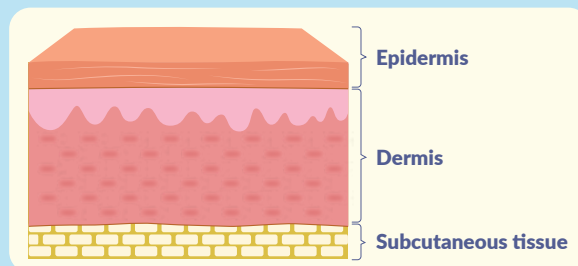
Types & Causes

Burn injuries caused by direct tissue damage from exposure to:

- Sun
- Chemicals
- Thermal (boiling liquids)
- Electricity



As you know the skin is made of 3 layers - Epidermis, Dermis, & subcutaneous tissue (that fatty bubble looking tissue) under the skin we find fascia, muscle, & bone.



First-degree (superficial)

- Dry with blanchable redness

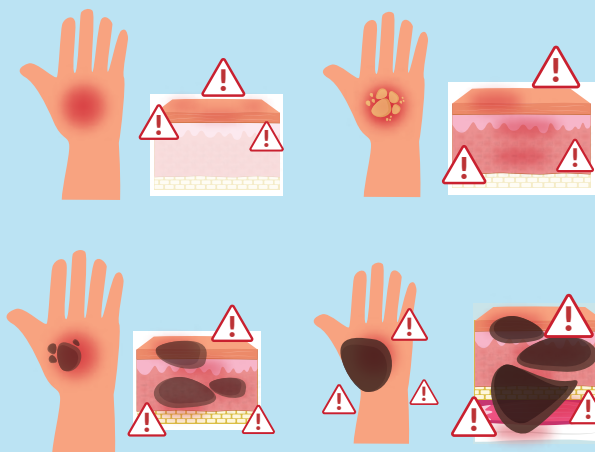
Second-degree (partial thickness)

- **Painful Blisters NCLEX TIP**
- "Red, moist, shiny fluid filled vesicles"

Third-degree (full-thickness)

- Dry waxy white, leathery, or charred black color, **Non-blanchable**

Fourth-degree (full-thickness)



Care for Minor Burns

C	C	C
Cool water	Cover the area	Clothing removal

Prehospital Care

- C** - Cool water
 - Briefly soak area
 - **NO** ice, creams, antibiotic ointment **to open skin**
- C** - Cover area "Clean dry cloth"
- C** - Clothing & Jewelry removal
 - **Not adhered**



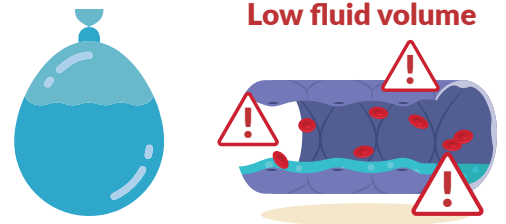
Notes

Burns II - Major Burns

Pathophysiology Course

Pathophysiology

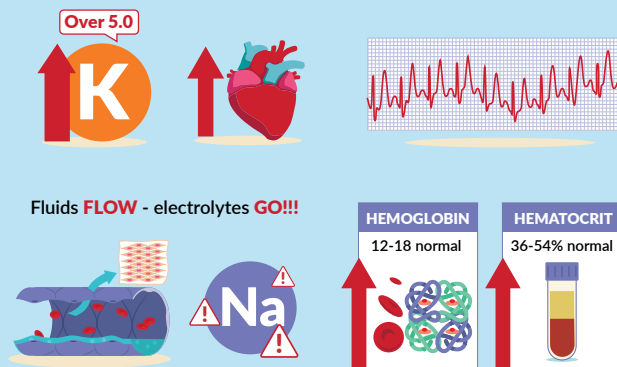
Massive tissue damage & cellular destruction leads to widespread systemic inflammation that increases vascular permeability (leaky blood vessels that fill up the body like a water balloon). This results in **low fluid volume** within the blood vessels leading to **Hypovolemic Shock & then death!**



Signs & Symptoms

First 24-hours

- High Potassium (Hyperkalemia) **Over 5.0**
 - Potassium **P**riority **P**umps heart
 - HIGH Potassium = HIGH Pumps
 - **Tall, Peaked T Waves** on ECG **NCLEX TIP**
- Low Sodium (hyponatremia) **Below 135 NCLEX TIP**
- **Elevated H/H**
 - Hemoglobin: 12 - 18 normal
 - Hematocrit: 36 - 54% normal

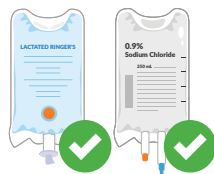


Treatments

KEY Term

#1 Intervention first 24-hours

- IV Lactated Ringer's (LR) solution
- IV Normal Saline



PRIORITY

IV Lactated Ringer's (LR) solution

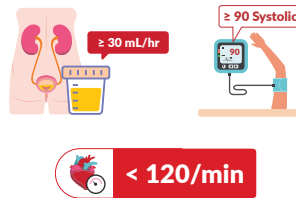


IV Normal Saline (0.9% sodium Chloride)



Assessment of Fluid Resuscitation

1. Urine output **30 mL/hr** or **MORE NCLEX TIP**
2. Blood pressure (**90/systolic** Or **MORE**)
3. Heart rate less than 120/min.



Administer enteral feedings
Once **bowel sounds** return



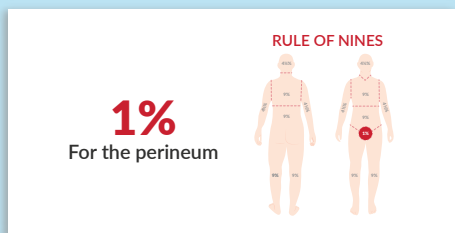
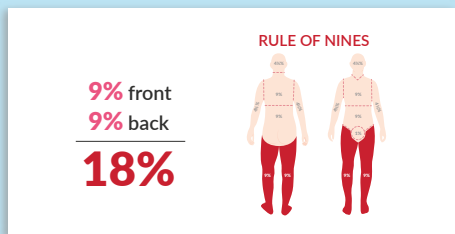
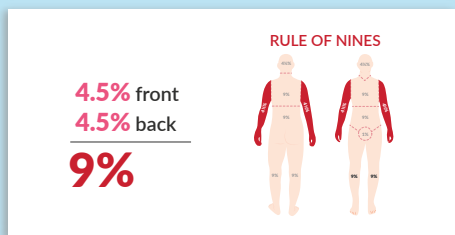
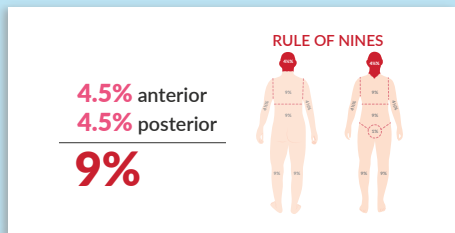
Notes

Burns III - Rule of 9s & Rehabilitation Phase

Pathophysiology Course

Rule of 9's

The Rule of 9s is used to quickly estimate the percentage of the body affected by a burn, called **Total Body Surface Area (TBSA)**. Used in order to calculate the necessary fluid resuscitation needed.



Once the total body surface area is calculated then the volume needed for emergency fluid resuscitation within the FIRST 24 hours can be calculated using the Parkland Formula.

4 mL × body weight × %TBSA

Parkland Formula
4 mL x kg of body weight x TBSA %

Rehabilitation Phase

Happens after the wounds fully heal & typically takes around 12 months or so depending on the severity of the burn.



Key point

Infection is **NOT** a big risk



WATER-BASED LOTION HELPS



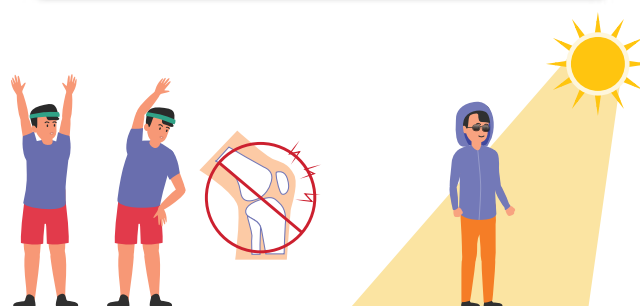
Wear PRESSURE GARMENTS



Patient Education

NCLEX TIPS

- **W** - Water-based lotion helps
- **W** - Wear pressure garments
- **E** - Exercise daily (Range-of-motion)



Burns IV – Top Missed Questions

Pathophysiology Course

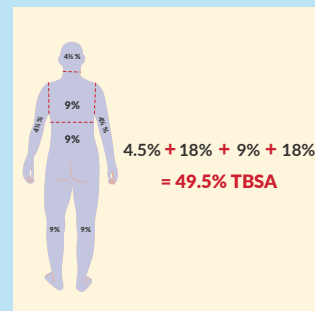
Top MISSED Exam Questions

Client has full thickness burns to all **posterior** body surfaces.
Using the **rule of nines**, calculate the % of total body surface area affected.

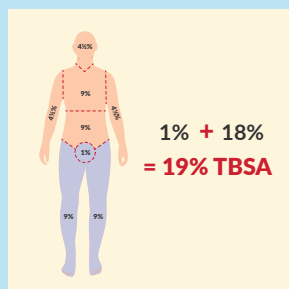
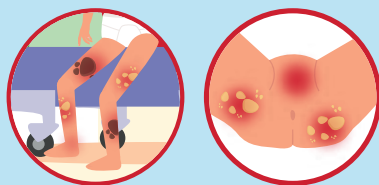
Posterior body surfaces:

- Head = 4.5%
- Back = 18%
- Right & left arm = 9%
- Right & left leg = 18%

✔️ **Answer = 49.5% TBSA**



50% of the body



Client has partial thickness burns to the anterior legs & perineum.
Using the **rule of nines**, calculate the % of total body surface area affected.

- 1% peri-area
- 18% Right & Left leg

✔️ **Answer = 19% TBSA**

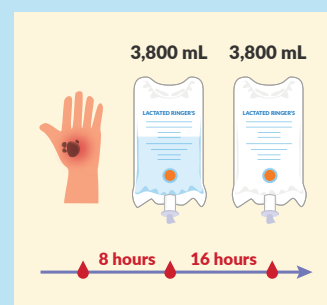
Client weighed 100 kg with **19% TBSA**... calculate the **lactated Ringer's** fluid resuscitation needed?

4 mL x 100 kg x 19 TBSA

✔️ **Answer = 7,600 ml**
(within the first 24 hours)



4 mL × 100 Kg × 19%TBSA



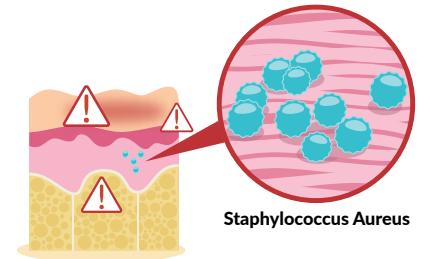
Cellulitis

Pathophysiology Course

Pathophysiology



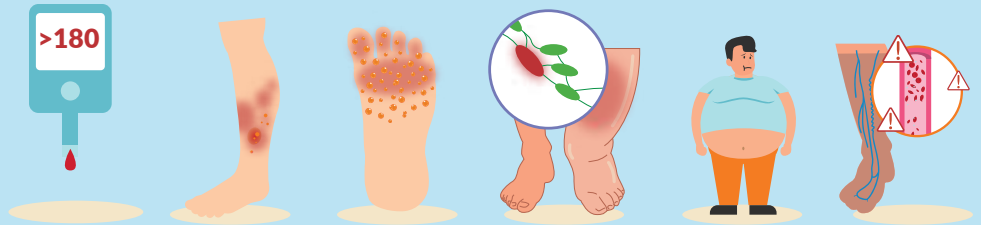
Bacterial skin infection of the deep dermis and subcutaneous tissue, typically cause a staph infection - staphylococcus aureus. Normally found in the lower limb, like near the tibia for example.



Risk Factors

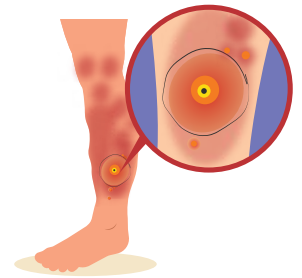
Risk factors include patients with:

- Trauma,
- History of diabetes,
- Cellulitis,
- Tinea Pedis (athletes foot),
- Lymphedema,
- Obesity,
- Venous insufficiency - where blood flow is limited to the lower legs



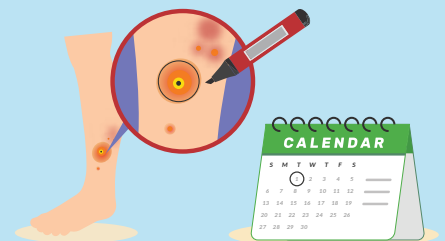
Signs & Symptoms

- Think infection: **Fever**, redness, pain, warm & tender, **swelling**, & **erythema**
- **Abscess** if untreated



Treatment

Antibiotics, such as Penicillins, cephalosporins, or clindamycin. Good way to monitor if the infection is getting better or worse is to draw a border around the infection site with a marker, and date it, then see if it gets larger or smaller.



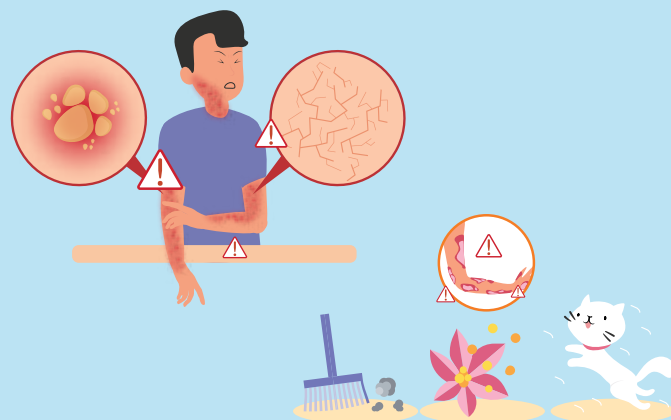
Notes

Atopic & Contact Dermatitis

Pathophysiology Course

Atopic Dermatitis

Eczema (atopic dermatitis) is an autoimmune disorder where the body attacks its own skin resulting in raised patches of skin becoming inflamed, itchy, cracked, and rough. It tends to come & go with flare-ups when exposed to allergens.



COMMON

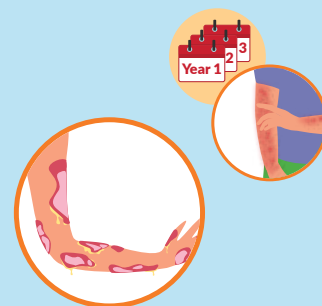


Main Cause

- Inherited (genetics)
& very common in infancy

Manifestations

- Chronic inflammation of the skin
- Erythematous rash w/serous exudate

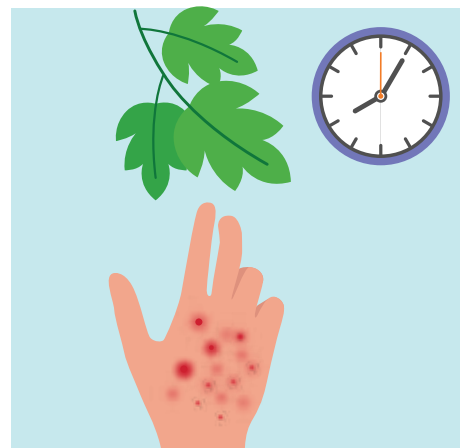


Contact Dermatitis

Contact dermatitis is very different from atopic dermatitis in that it occurs **after contact or exposure to allergen** or irritant. Again it is very different in that the **body is NOT attacking itself**.

Example: Exposure to allergen
(poison ivy)

- Pruritic rash within hours
- NO immune response exudate
- Direct exposure =
inflammatory response



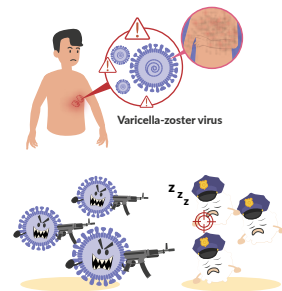
Notes

Herpes Simplex Virus / Shingles

Pathophysiology Course

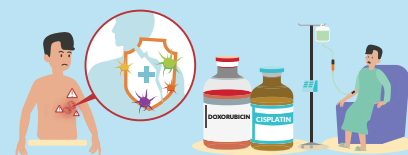
Pathophysiology

Caused by reactivation of the **varicella-zoster virus** (the virus that causes **chickenpox**), those that have had chickenpox as a child are most likely to get **shingles**. This kind of virus is an opportunistic infection meaning that it waits till the body's defenses are weak, before attacking



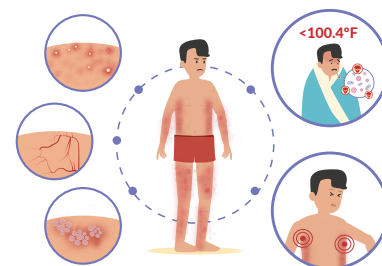
Risk Factors

- Clients whose defenses are down
- Compromised immune system
- Weak immune system like clients on immunosuppressants, or chemo
- Clients who are fighting off another infection like pneumonia where the immune system is preoccupied
- Poor nutrition, or even too much stress, fatigue

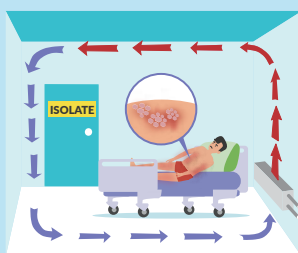


Signs & Symptoms

Rash that runs horizontally along the left or right side of the torso. A rash can present vascular, pustular, or crusting with a low grade fever and paresthesia, burning, numbness, & tingling



Treatment



- Isolate the patient:
negative airflow room
- Avoid exposure



Notes

Skin Cancer

Pathophysiology Course

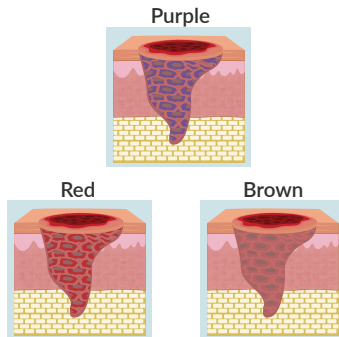
Pathophysiology

Uncontrolled growth of cells within the skin.

TYPES

- Basal cell carcinoma
- Squamous cell carcinoma
- Sarcoma **NCLEX TIP**
- **Melanoma**

KEY TERMS



Mole = Nevi



Tumor = Neoplasm



MEMORY TRICK

- **BeNign** = **Be Nice**
- **MALignant** = **MALicious**

Signs & Symptoms

Screening: Skin Lesions

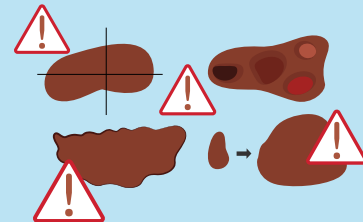
NCLEX TIPS

- A** - Asymmetry: **Irregular is BAD**
 - Half raise & half flat
- B** - Border **irregularity**: Uneven edges
- C** - **Color** Variation and changes:
 - Mixture of brown, tan, black, & red
 - **Black** / dark
- D** - **Diameter Over 6 mm**
 - Lesion is the **size of a coin** or nickel
- E** - **Evolving** - changes in size, shape, and color



NCLEX TIP: Key Terms

- **Irregular** or **Uneven** growth
- Change: **Abrupt, Sudden, Rapid** (color, size, shape)



Causes & Risk Factors

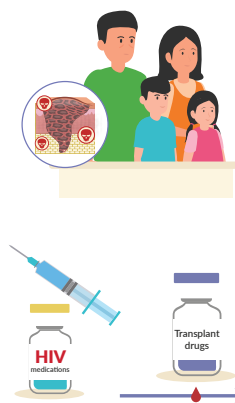
Environmental NCLEX TIPS

- Exposure to UV light
- **Tanning beds**
- **Sun exposure**
 - "Frequent sunburns"
 - "Outdoor occupation"

Genetics NCLEX TIPS

- **Family History** of skin cancer "father or mother with melanoma"
- Caucasian (light skin, blonde hair, freckles)
- **High number of moles**

Drug Immunosuppressant medications



Diagnostics

Tissue biopsy is required to make a definitive diagnosis of skin cancer, but again **ONLY** the ones with **irregular uneven changes**.

Nursing Interventions

NCLEX TIPS

- Apply **broad spectrum sunscreen**
 - **15 minutes** before
 - SPF over 30
- **Reapply sunscreen**
 - Every 2 hours
 - **After swimming**
- **Sunburns** can happen on **overcast days** & avoid sun **10 am - 4 p.m.**
- **AVOID** Tanning beds



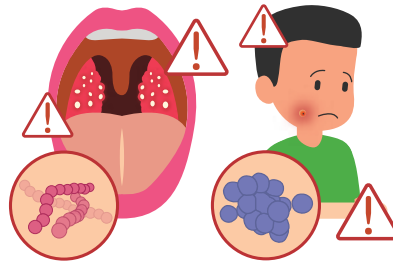
Impetigo

Pathophysiology Course

Pathophysiology & Causes

Very common highly contagious skin infection affecting infants & children.
Caused by a strep or staph infection - which is really dangerous in children, as that strep infection can travel down to the kidneys.

Strep infection Staph infection



Memory Trick

Impetigo
Infant -igo

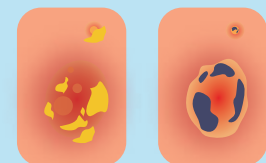
- Glomerulonephritis secondary to **streptococcus infection**

Signs & Symptoms

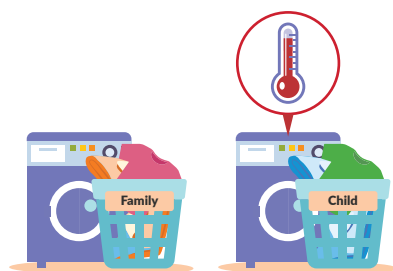
Itchy red sores mainly on the nose and mouth, as well as the hands and feet. Sores can burst & dry into honey-colored crusts, this is when the infection is MOST contagious & most easily spread!
A more serious form of impetigo, called ecthyma, penetrates deeper into the skin, causing painful fluid, or pus-filled sores that turn into deep ulcers. It is spread when a child has open sores or items they've touched such as clothing, bed linen, towels, and even toys.



Impetigo Ecthyma

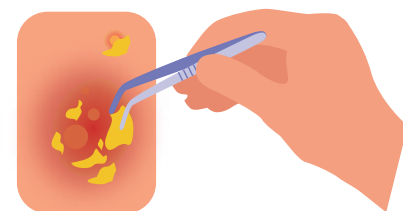


Treatment



NCLEX TIPS

1. NO **school** / daycare
2. **Wash hands before & after** touching infected areas
3. **Separate child's clothes & towels** from other laundry & wash with **HOT WATER**
4. Short & filed **fingernails**
5. Softly remove crust & debris



Notes

Pressure Injury (Pressure Ulcer)

Pathophysiology Course

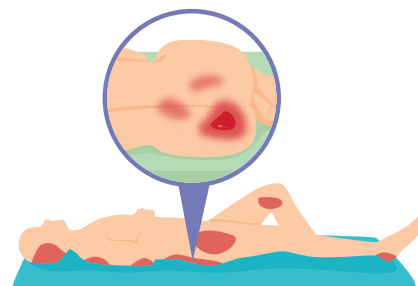
Pathophysiology

Damage to the **skin** and/or the **underlying tissue** over a **bony prominence**, common with bed-ridden clients who are not turned adequately or from a medical device (oxygen therapy)

Most common areas:

- lower back & buttocks (sacrum & coccyx)
- heels & ankles
- hip bones
- shoulder area & elbows

MOST tested

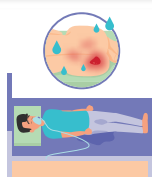


6 Stages of Pressure Injuries

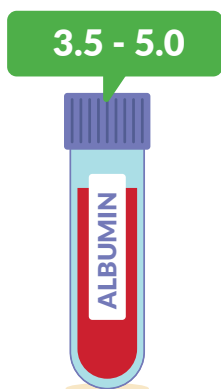
<p>Stage 1</p>	<p>Stage 1 = 1 layer of damage (epidermis) Red skin that is NONblanchable & NOT broken.</p>	<p>Stage 4</p>	<p>Stage 4 = 4 layers of damage Extends all the way down into muscle, bone, or tendon.</p>
<p>Stage 2</p>	<p>Stage 2 = 2 layers of damage Open wound: affecting both the epidermis & dermis. Wound bed is red / pink & shiny or dry.</p>	<p>Unstageable NCLEX TIP</p> <ul style="list-style-type: none"> • Eschar (black / brown) • Slough (yellow stringy) 	<p>Eschar (black / brown) dead necrotic tissue MEMORY TRICK: EsCHARCOAL Slough (yellow stringy) MEMORY TRICK: Slough = skin of a chicken *These wounds need to be debrided before a stage is made.</p>
<p>Stage 3</p>	<p>Stage 3 = 3 layers of damage (epidermis, dermis, & subcutaneous) Full thickness skin loss into the subcutaneous fat; wound may tunnel under the edges of the wound bed.</p>	<p>Deep tissue</p>	<p>The fatty tissue is injured below the skin (dark purple, & sometimes open wound).</p>

Causes & Risks

- **Bedridden**
- **Incontinence**
- Poor nutrition
- Diabetic neuropathy
- Liver cirrhosis = Low Albumin



Treatments



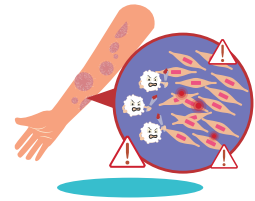
- Assess skin & document (**first 24 hours**)
 - Turn every **1 - 2 hours**
 - Nutrition: **Protein & Fluids** (2 - 3 L / day)
 - **Urine output 30 mL/hr** or Less = Kidney Distress
 - **Albumin** (norm: 3.5 - 5.0)
 - **Monitor:**
 - Stage, size, color
 - Braden Scale
- MEMORY TRICK:**
- **BS** - Braden Scale monitors for risk factors
 - **BS** - Broken Skin

Psoriasis

Pathophysiology Course

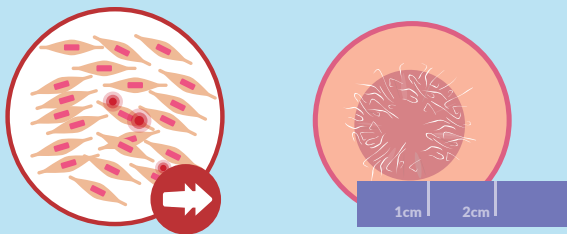
Pathophysiology

Autoimmune disease where the body attacks normal healthy tissue, causing **rapid cell division of epidermal cells** (skin cells) resulting in key signs below.



Signs & Symptoms

- **Silver plaques** & “reddening skin”
- Rough, raised **flat top**



Causes & Risks

Triggers:

- Food allergen
- Trauma
- S - Stress
- S - Sickness
- S - Sepsis (infection)
- **NOT Sun exposure**

Sun is GOOD!



S

S

S

Stress



Sickness



Sepsis

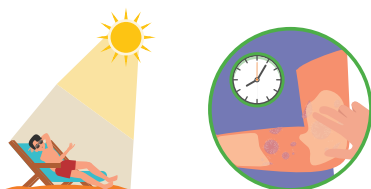


Nursing Interventions

NCLEX TIPS

1. Exposure to **sunlight = GOOD!**
2. Moisturize frequently!

LOTS OF STUDENTS ANSWER WRONG



Pharmacology

- Steroids “-sone” **Prednisone**
- Immunosuppressants:
 - Methotrexate
 - Infliximab



MOST TESTED



Notes

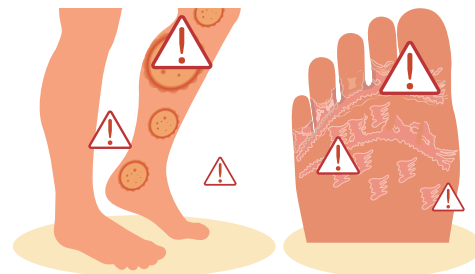
Tinea

Pathophysiology Course

Pathophysiology

Both are very contagious fungal infections that live on the surface of the skin.

- **Tinea corporis (body)** - Ringworm (round lesions with clear center)
- **Tinea pedis** - Athletes foot
- **Tinea capitis** (scalp)



Signs & Symptoms

- Circular rash
- Scaly
- Pruritus (itchy)



Education

PRIORITY: Tinea Corporis **NCLEX TIPS**

- **Most important** to teach ways to prevent the spread

Ringworm is spread very easily (HIGHLY tested). So we **must educate the clients NOT to share personal items** like brushes, towels, hats, clothes, & anything else.

Treatment

Griseofulvin = Tinea corporis (Ringworm)

Key Points

- **Take** weeks to months
- **DO NOT discontinue** once itching stops
- **BEST** absorbed after eating a high fat meal

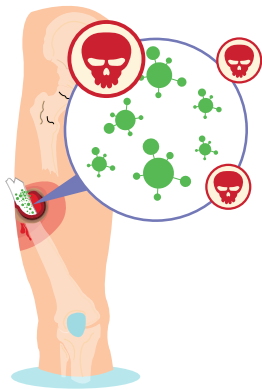


Musculoskeletal

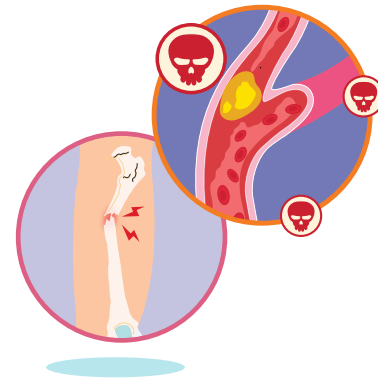
Fractures

Pathophysiology Course

Types of Fractures



- Closed Fracture:
 - Does not break skin
- Open Fracture "Compound"
 - Skin surface broken
- Complete fracture
- Incomplete fracture "GreenStick"
- Spiral fracture
- Oblique fracture
- Compression fracture "Impact"
- Crush "Compression" fracture

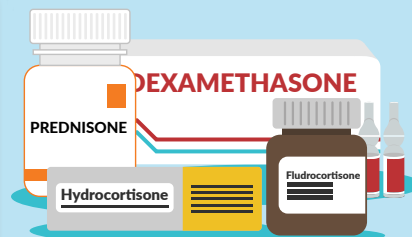


Causes & Risks

Bed rest
Osteoporosis
Steroids "-sone" **NCLEX TIP**

- Prednisone

Trauma



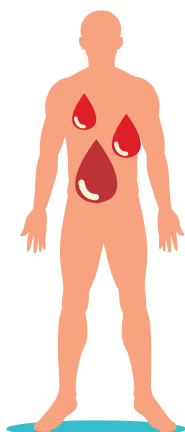
Signs & Symptoms

- Pain & swelling (bruising)
- Crepitus
- Muscle spasms

Priority Findings: NCLEX TIP

Internal bleeding

- Hypotension
- Tachycardia
- Hematuria



Basilar skull fracture

CSF "cerebrospinal fluid" (rhinorrhea)

- Clear liquid drainage: **nose area**

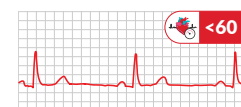
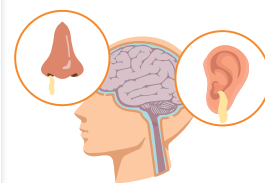
Spine fracture (T-6 or higher)

Neurogenic shock

- Hypotension
- Bradycardia
- Skin: pink & dry

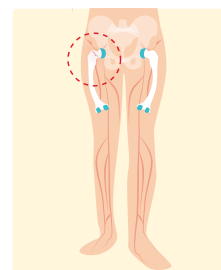
Mandibular Fracture

- Bleeding & drooling in the mouth
- **Suction the mouth**



Hip Fracture **NCLEX TIP**

- **Shortening** of leg on the **affected area**
- **Muscle spasm** around the affected area
- **Ecchymosis** on thigh and hip
- **Groin & hip pain** with weight bearing



Buck's Traction & Postoperative Care

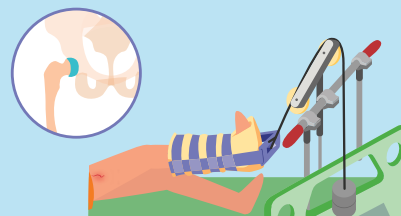
Pathophysiology Course

Buck's Traction

Used short-term before surgery to **realign hip & femur fractures**, and to stop muscle spasms. This device pulls bones back into place with free hanging weights.

KEY POINTS

- Weights: **free hanging at all times**
- Traction ropes **TIGHT!**
 - **NOT loose**
 - **NOT resting** "on bed or floor"
 - Reposition: hold weights
- Keep limb in **neutral position**
- Assess for **skin breakdown**
- **Neuro checks** on limb: P,M,S,C
- Supine position (flat) **NCLEX TIP**
 - **DO NOT elevate HOB** Over 25 degrees

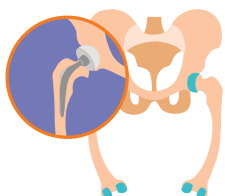
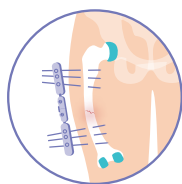


Hip Replacement Postoperative Care

KEY WORDS

Hip & Femur Surgery

- **Total hip** replacement
- **ORIF** "open reduction internal fixation"
- External fixation



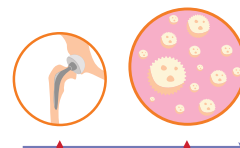
1. Bleeding **NCLEX TIP**

- Hemoglobin **Less than 7** = HEAVEN Report to HCP!!
- Monitor **pulses** distal to injury
- Hypotension & tachycardia

2. Infection

- **Elevated WBC** **NCLEX TIP** (norm: 5,000 - 10,000)
- Assess drainage: **color, amount & odor**
- Perform pin care with a **sterile solution**
 - **3** times per day

WBC 17,000



Hemoglobin

Normal	12 - 18
Risky	8 - 11
Below	7

PRIORITIZE the order

1. Bleeding
2. Infection
3. Positioning Education

PRIORITY



Positioning Education

- **Total hip** arthroplasty: **NCLEX TIP**
 - **Abducted legs:** Place a pillow between the legs **Kaplan**
 - **NO** crossing legs
 - **NO** leaning forward (**NO tying shoes**)
 - **NO** sitting in chairs (**90 degree angle**)



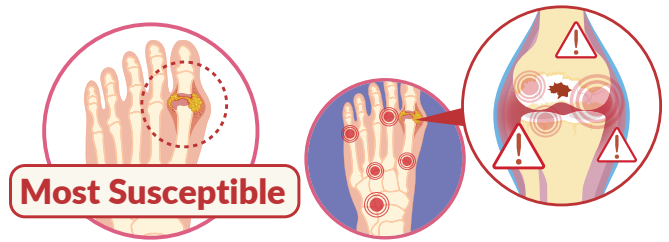
Notes

Gout

Pathophysiology Course

Pathophysiology

Uric acid accumulation causes **pain & inflammation in the joints** which leads to destruction & eventually arthritis (bone on bone pain from loss of cartilage).



Causes & Risk Factors

High **purine** foods

- **Meats:** chicken, steak, liver
- **Alcohol :** wine, beer, liquor
- **Seafood:** crabs, lobster, shrimp



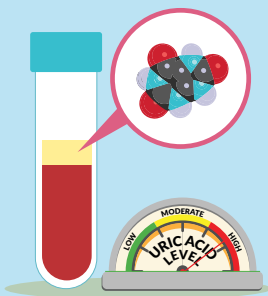
Signs & Symptoms

Big toes are most susceptible to Gout. But the pain & inflammation can also affect joints in the ankles, knees, wrists and elbows, & the skin becomes red due to pain & inflammation.



Diagnostics

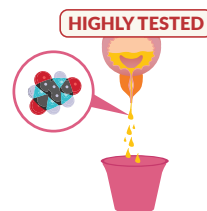
- **Labs:** Serum Uric Acid Levels



Treatments

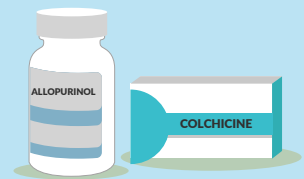
Prevent Gout **NCLEX TIPS**

- **Lose** weight: "achieve healthy **weight**"
- **AVOID** high purine foods!
 - Meats, Alcohol, Seafood
- **INCREASE** fluid intake
- Monitor fluid I & O



Pharmacology

Allopurinol & Colchicine



BIG KEY DIFFERENCE

Allo**P**urinol
Prevents Gout

Col**C**hicine
ACute Gout Attacks

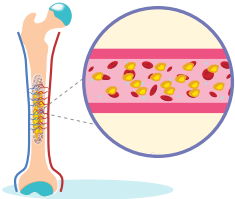


Notes

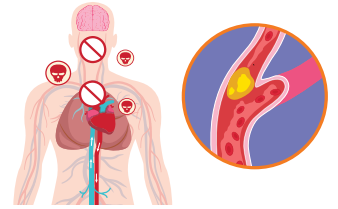
Fat Embolism Syndrome & Osteomyelitis

Pathophysiology Course

Fat Embolism - Pathophysiology



Fat Embolism Syndrome is a major complication with **crushing fractures & long bone injuries** (femur, pelvic & hip fractures). The bones release **fat globules** into the bloodstream & just like a blood clot, this fat emboli could cause a **deadly** blockage in the brain (CVA), heart (MI), or lung.



Signs & Symptoms

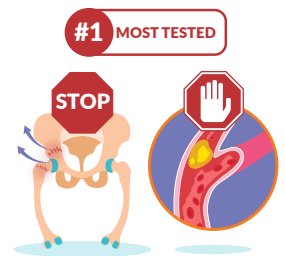
KEY SIGNS

- **Mental Status** changes **NCLEX TIP**
 1. Confusion and restlessness
 2. Altered mental status
- Dyspnea & **chest pain**
- Low pulse ox
- **Petechiae** over neck & chest

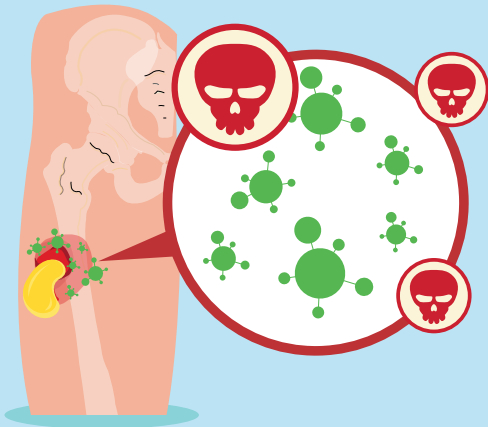


Intervention

- Minimize movement of the fracture



Osteomyelitis - Pathophysiology



Bone infection, caused by a bacteria that enters the blood via:

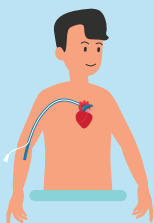
- Open fracture
- After surgery
- Puncture wound like a dog bite
- Contaminated needles like with a bone marrow aspiration.

Signs & Symptoms:

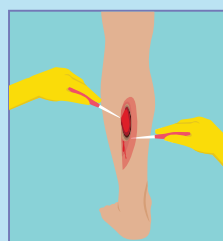
High fever, pain & even pus or yellow drainage from a puncture site.

Osteomyelitis - Treatment

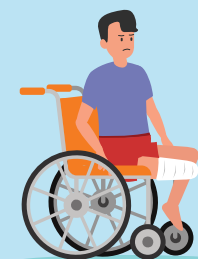
IV antibiotics for weeks or months, so clients will go home with a **PICC line** & a nurse will visit to give the IV antibiotics.



Surgical debridement to drain any abscesses & to remove necrotic dead bone tissue.



Amputation may be done if not responsive to therapy.

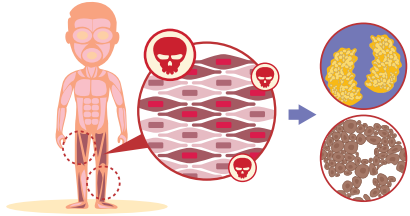


MD: Muscular Dystrophy

Pathophysiology Course

Pathophysiology

Muscular dystrophy (MD) is a **genetic disorder that causes muscle weakness**, due to the replacement of muscle fibers with connective tissue. There is a change in DNA sequencing resulting in a **low production of the protein dystrophin**, which is needed for muscle stabilization.

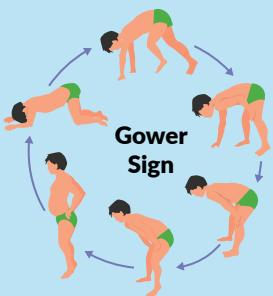


Memory Trick

MD	MD
Muscular Dystrophy	Muscular Damage & Weakness

MD mostly affects **boys between the ages of 2 & 5 years old**, and is considered a progressive disease, meaning it gets worse over time.

Signs & Symptoms



4 EXAM TIPS

1. Walks on **tiptoes**
2. Disproportionately **large calves**
3. Frequently **trips & falls**
4. Places **hands on thighs to stand up** (Gower sign)

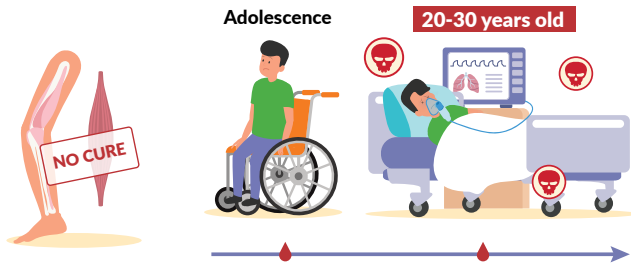
Patho Test Tips

- Motor weakness
- Waddling gait & **difficulty climbing stairs**
- Gower maneuver (Gower sign)
- Kyphoscoliosis
- Respiratory infections
- Cardiomyopathy



Treatment & Nursing Interventions

There is no cure for MD, so children in adolescence are typically wheelchair bound & most **die due to respiratory failure in their 20s or 30s**.



- Remove throw rugs **NCLEX TIP**
- Diet: fluids & fiber
- Gentle exercise: swimming, yoga, walking
 - **NOT** weight-lifting

Pharmacology

NOT muscle relaxants like baclofen - that's more for muscle spasm, which is not present in MD.

Predni**SONE** **SSSS**welling

- **Steroids "-sone"**
 - Predni**sone**

Cast Care & Complications

Pathophysiology Course

CAST CARE

- C** - Clean & Dry **NEVER WET**
 - Cover cast with a **plastic bag** for bathing **NCLEX TIP**
- A** - Above the heart (First 48 hours)
 - **Elevate** extremity **NCLEX TIP**
- S** - Scratch an itch?
 - Use the **hairdryer** on a **cool setting** **NCLEX TIP**
- T** - Take it easy
 - **NO bearing weight** on plaster casts
 - **NO finger indentations** or pressure
 - **NO hard surfaces**

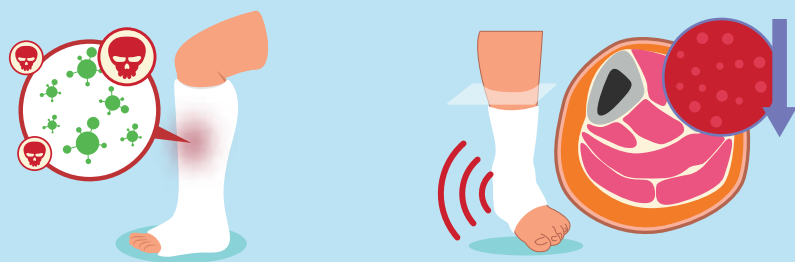


CAST CARE

Complications

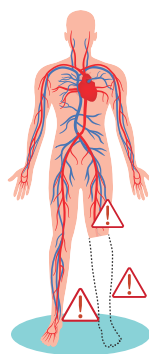
Key terms

- **HOT spots:** infection
- **Compartment syndrome:** decreased perfusion



Compartment Syndrome

Extremely painful condition that happens when pressure within the muscles builds to dangerous levels - **cutting off blood flow & oxygen** resulting in a dead limb.



PAIN

- **Unrelieved** with morphine **NCLEX TIP**
- **Not resolving** with medication
- Extreme pain with **passive movement**

Paresthesia

- "Tingling" "burning" "numbness" **NCLEX TIP**
- **Problems moving or extending** fingers or toes.
- "Great difficulty"

Key Signs

P

Pain



P

Paresthesia



Interventions

- **Notify HCP** immediately
- **Assess** fingers & toes "**neuro checks**"

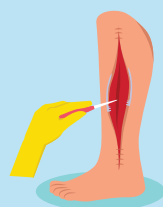
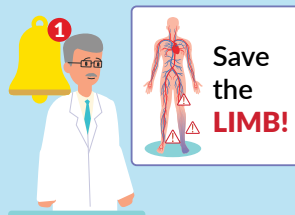
P M S C

- P** - Pulses - **NOT** pulseless
- M** - Movement - grips
- S** - Sensation
 - **NO tingling, numbness**

- C** - Cap refill & Color
 - **NOT** over 3 seconds
 - **NOT** pale "**pallor**"

Temperature

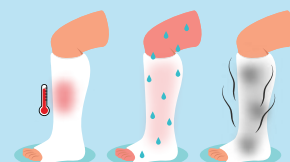
- **NOT** cold or cool



Hot Spots

- "Hot areas" "Hot Feeling" "Foul odors" **Report HCP NCLEX TIP**
- Interventions:
 - Assess circulation in extremity
 - Change position

Key terms



Osteoporosis

Pathophysiology Course

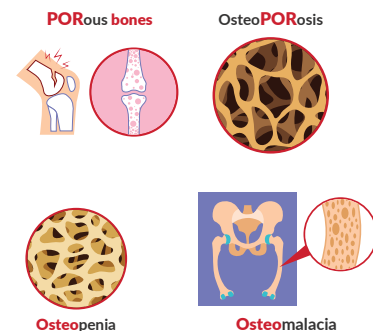
Pathophysiology

Fragile and porous bones. Loss in bone mass resulting in low bone density & very brittle bones. Typically from increased rate of bone resorption where bone loss is increased.

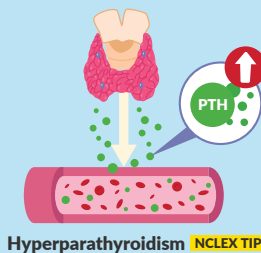
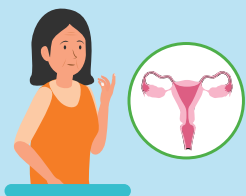
KEY Conditions

- Osteopenia
- Osteomalacia

Osteopenia - loss of bone mass & weaker bones
Osteomalacia - softening of the bones caused by severe vit D deficiency

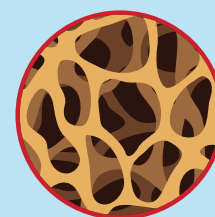
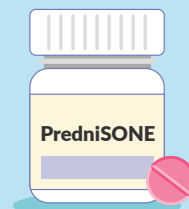


Causes & Risk Factors



Hyperparathyroidism **NCLEX TIP**

- Female gender
 - Older age
 - Postmenopausal **NCLEX TIP**
 - Caucasian & Asian
- **Bad Habits:**
 - Excess caffeine intake
 - Smoking or alcohol abuse
- **Medication:**
 - Anticonvulsants
 - Steroid "-sone" **NCLEX TIP**
Prednisone
- **Diseases:**
 - Hyperparathyroidism **NCLEX TIP**
 - Cushing's Syndrome
 - Diabetes Mellitus



OSTEOPOROSIS

Signs & Symptoms

- Porous bones in the osteoporosis
- Frequent fractures
- Reduced height
- Kyphosis - exaggerated round back (often seen in elderly population)

Pharmacology



- Calcium & Vit. D
- Alendronate



Treatment & Education



Vit D & Calcium supplements

- Go outside in the sun

Activity

- **Weight bearing** exercises
- **Frequent** ambulation

Fall precautions

- Provide **rubber mats** in showers
- Well-lit halls
- **NO** throw rugs

STOP bad habits

- Stop smoking
- Decrease caffeine



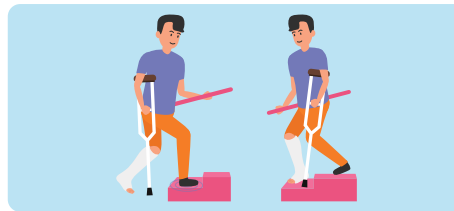
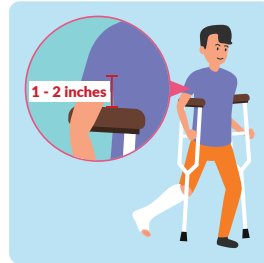
Crutch & Cane Training

Pathophysiology Course

Crutch

Safe Crutch Use

- Weight on Hands & Arms** **NCLEX TIP**
 - **NOT** armpits! = Injury to the brachial plexus nerves
 - **DO NOT** use someone else's crutches
- Technique Gait
 - Step 1: **Both crutches** forward **WITH** injured leg
 - Step 2: Move **unaffected leg** forward
- Stairs **NCLEX TIP**
 - **UP** with the **GOOD** = Upstairs
 - **Down** with the **Bad** = Downstairs



3 types of gaits

- 2-point gait
- 3-point gait
- **4-point gait**: most advanced gait **NCLEX TIP** "most closely resembles normal walking"

Cane



Correct Cane Use

1. **Stronger side** HOLDS the cane
2. Move cane **1st** & weaker leg **2nd**

Memory Trick

- C** - Cane
C - Comes **1st**

Stairs **NCLEX TIP**

Memory Trick:

- UP** with the **GOOD** leg
Down with the **BAD** Leg



UPstairs

1. UP with **Strong leg**
2. Cane moves next
3. Weak leg last

Downstairs

1. **Descend** with Cane
2. Weaker **leg down**
3. Strong leg

Top Missed Exam Question

Client with a right total knee replacement ... correct teaching?

Memory Trick:

- **UP** with the **GOOD** leg
 - **Down** with the **BAD** Leg
 - Cane on **strong** side
1. Full weight on the right leg when going up stairs.
 2. Descend with cane first, strong leg second, and weak leg last when going downstairs.
 3. When going upstairs lead with the left leg first, follow next with the cane and move the right left after.
 4. Hold cane in the right hand while on stairs.



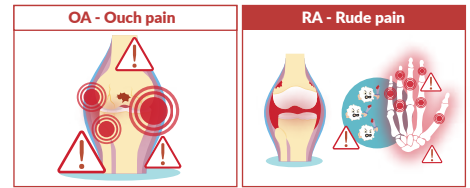
OA: Osteoarthritis

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Pathophysiology

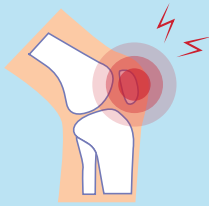
This is progressive degeneration of the protective cartilage cushion on the end of the bones resulting in BONE on BONE rubbing - massive pain.

Memory Trick



Causes & Risk Factors

- **Obese**
- **Smoking**
- **Repetitive** stress on the joints



Pharmacology

- NSAIDs
- Steroids “-sone”
 - **Prednisone**
- Glucosamine

MOST tested

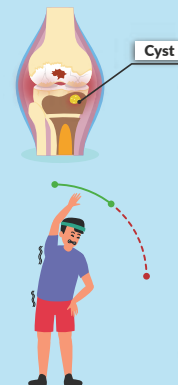


Signs & Symptoms

- **Crepitus** “crunch sound”
- **Pain** **EXAM TIP**
 - **MORE** with activity
 - **Relief** with rest

Patho Test Tips

- Osteophytes & bone spurs
- Cysts (subchondral)
- Loss of ROM (Range Of Motion)
- Pain with weight-bearing
- Weight-bearing joints & fingers are affected most

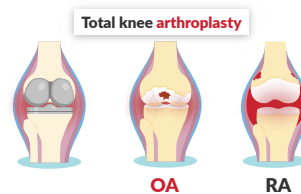


Joints

- Affects **one joint** (usually large joints)
- Node formation
 - Heberden's nodes
 - Bouchard's nodes

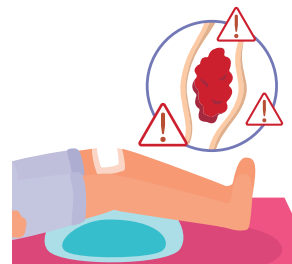
Total Knee Replacement

Common surgical interventions for both RA & OA. Also called a **total knee arthroplasty**, is a surgical procedure to replace the knee joint.



Postop care

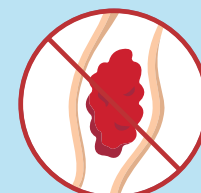
- **NEVER** place a **support pillow** under a new operative knee **EXAM TIP**
- **Early weight bearing** & **flexing** the foot every hour



Clot Prevention

Heparin & Warfarin - prevent blood clots

Key Term: Start both at the same time in the hospital, since Heparin works in a hurry & Warfarin has a weak start, taking a few days to catch up.

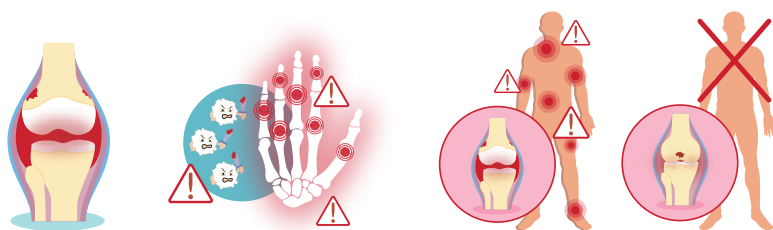


RA: Rheumatoid Arthritis

Pathophysiology Course

Pathophysiology

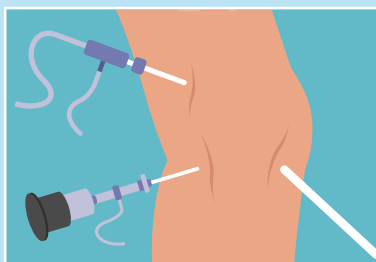
RA is an **autoimmune disorder** where the body attacks the **joints causing major inflammation & deformity**. Mainly seen in the hand joints, but can also involve other organs (skin, eyes, & lungs) with collateral damage as the body attacks itself.



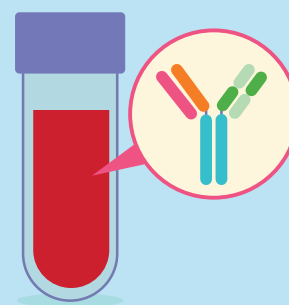
Patho Test Tips

- **Autoimmune** Disorder
- More common in **Women**

Diagnostics



- Synovial fluid aspiration
- **Arthroscopy**
- Blood tests:
 - **RF** - Rheumatoid factor
 - **ESR** - erythrocyte sedimentation rate
 - **CRP** - C-reactive protein



Signs & Symptoms

Early Signs

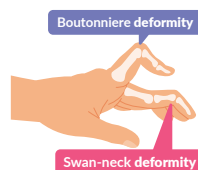
- Fatigue, anorexia (weight loss) & **morning joint stiffness**

Symmetrical **pain** and **swelling** in the **small joints of the hands**

- Fingers: **swan-neck** and a **boutonniere deformity**
- Contractures of joints = **HIGH priority**

Joint pain **EXAM TIP**

- Pain relief with **activity**
- **MORE** pain at rest

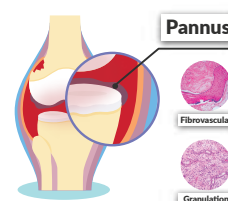


HIGH PRIORITY



Patho Test Tips

- Inflamed synovium
- **Pannus** (hard tissue around joints)
- Loss of cartilage
- **Ankylosis** (stiffening and immobility)
- Iron deficiency anemia



Education

- Pain control - **Assess pain levels**
- **Do NOT elevate** the knees with pillows at night
- Exercise (low impact)
 - **Swimming** **EXAM TIP**
- **Heat & Cold** to affected joints
 - **Warm** shower or bath **before bed**



Pharmacology

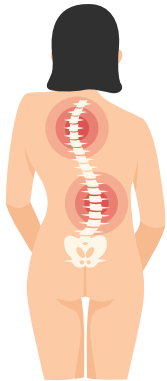
- NSAIDs
- Steroids "**-sone**"
 - **Prednisone**
- Methotrexate



Scoliosis

Pathophysiology Course

Pathophysiology



- **S** - Scoliosis
- **S** - "S" shaped Spine
"lateral curvature" **NCLEX TIP**

Signs & Symptoms

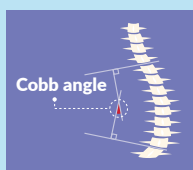
NCLEX TIP

First noticed during **periods of rapid growth** especially in **adolescent females** **ages 10-12**

Mild to severe pain & the stiffened spine can make it hard to move. Severe cases can cause a deformity of the chest cavity.

Diagnosis

Measuring the **Cobb angle** can determine the extent of the deformity & X-rays can be taken as well.



Treatment

- Social interaction
 - **Visit friends** **NCLEX TIP**
- Fixing braces: **Boston Brace**
 - Wear a **cotton shirt under the brace** at all times **NCLEX TIP**



Causes & Risk Factors



Thought to be from a possible defect of intervertebral discs (the squishy shock absorbers between the spine).

Risk factors: often seen in client's with cerebral palsy, muscular dystrophy, & even **Marfan Syndrome**.

Marfan syndrome

- **Avoid** participating in contact sports **NCLEX TIP**

Notes

Neuro

Neuro Patho Key Terms

Patophysiology Course

Key Terms

Vegetative State:

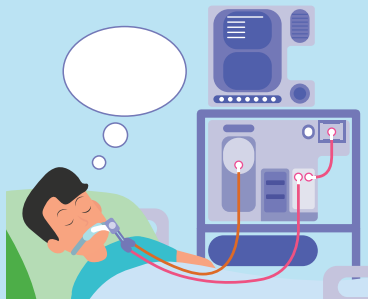
Brain stem damage:
Loss of awareness and mental capabilities

Brain Death:

- Flat EEG - Electroencephalography
- **No** brain stem reflexes
- **No** spontaneous respirations
- Must be **evaluated twice by different providers**

Locked-in Syndrome:

Paralyzed but thinking is not affected
(cannot communicate)



Locked-in Syndrome

The brainstem plays a major role in controlling the **heart rate & respiratory rate**. Clients with disorders that affect the brain stem may need to be placed on a ventilator to keep them alive.

Assessments

A

Alert



V

Responsive to Verbal stimuli



P

Responsive to Painful stimuli



U

Unresponsive (not awake)



O

Oriented x 4 (Person, Place, Time & Situation)



Key Terms

Level of Consciousness:

- A - Alert** (awake)
- V - Responsive to Verbal stimuli**
- P - Responsive only to Painful stimuli**
- U - Unresponsive** (not awake)
- O - Oriented x 4** (Person, Place, Time, & Situation)
- ALOC - Altered level of consciousness**
Change in mental status
Mental status changes

ALOC

Altered level of consciousness



Key Terms

GCS: Glasgow coma scale

GCS Score

- **15** = Highest Score
- **8** = **intubate**
- **3** = lowest score

REPORT Decreasing
GCS score!

Used to objectively describe the extent of impaired consciousness in all types of acute medical and trauma clients. The scale assesses clients according to three aspects of responsiveness:

eye-opening, motor, and verbal responses.

EYE OPENING



Spontaneous > 4
To sound > 3
To pressure > 2
None > 1

VERBAL RESPONSE



Orientated > 5
Confused > 4
Words > 3
Sounds > 2
None > 1

MOTOR RESPONSE



Obey commands > 6
Localizing > 5
Normal flexion > 4
Abnormal flexion > 3
Extension > 2
None > 1

GLASGOW COMA SCALE SCORE

Mild
15-13

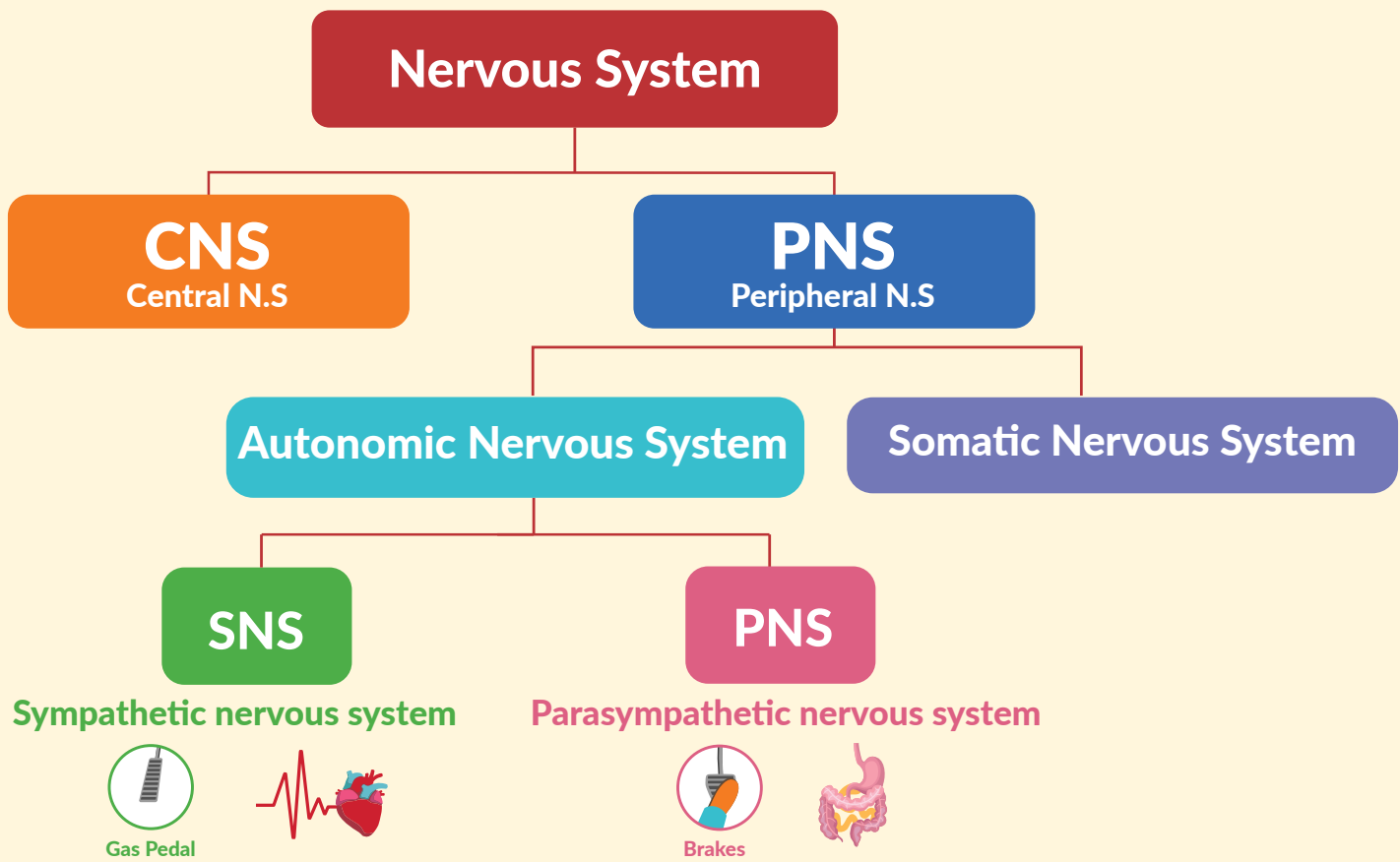
Moderate
12-3

Severe
8-3

Notes

CNS & PNS

Pathophysiology Course



Central Nervous System

- Controls main functions of mind and body
- Contains the spinal cord and brain

Peripheral Nervous System

- Contain nerves coming from the brain, spinal cord to all network body parts
- **Somatic Nervous System:** Contains sensory (afferent) and motor (efferent) nerves to perform reflex actions
- **Autonomic Nervous system:** Part of Peripheral Nervous System that controls involuntary physical actions

Sympathetic Nervous System: Fight or Flight response

MEMORY TRICK

S - Stress nervous system (SNS kicks in during times of stress)
 S - Speeds UP the Vital signs (HIGH heart rate & blood pressure) in order to fight or flight in survival mode!
 Controls Catecholamines made in the adrenals (Epinephrine & Norepi)
 These help to constrict the blood vessels to speed up the vitals

Parasympathetic Nervous system: Rest & Digest

MEMORY TRICK

P - Puts the Brakes on the Vitals (Low heart rate & blood pressure)
 P - Poop nervous system (PNS is used for times of rest & digesting food)
 Controls **cholinergic** effects, making more secretions in the body
 Think ccholinerigics give more secccretions

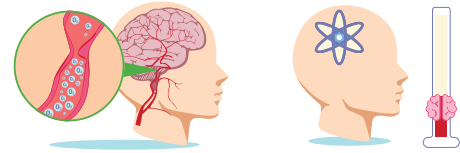
Increased ICP

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Pathophysiology

Increased pressure within the brain compresses blood vessels, leading to cerebral hypoxia & puts loads of pressure on the brain stem, eventually killing the client.

CEREBRAL HYPOXIA (ISCHEMIA)



Causes

1. Bleeding (stroke)
2. Inflammation of brain tissue (meningitis, trauma)
3. Increased CSF
Cerebral spinal fluid
4. Brain Tumors



Signs & Symptoms

Early Sign: **NCLEX TIP**

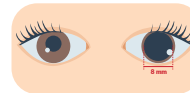
- Altered LOC: Irritability, Restless
- Decreased Mental Status
- Sleepiness
- Flat affect and drowsiness

Moderate Signs:

- Headache - Constant
- Sudden Vomiting "Emesis" Without Nausea = Report to HCP!

Late DEADLY Signs:

- Lungs:
 - Irregular Respirations
 - "Cheyne Stokes Respirations"
- Neck:
 - Nuchal rigidity (stiff neck)
 - "Can not FLEX chin toward chest"
- Brain Stem Affected:
 - Eyes**
 - Pupils "Fixed & Dilated"
 - Unequal
 - 8 mm (Normal 2 - 6 mm)
 - Doll's eyes: this means brainstem is intact!
 - If the eyes stay fixed & dilated when the head is turned, it means BRAINSTEM is affected.
 - Foot**
 - Babinski reflex (Toes fan out when stimulated = BAD) means brain stem herniation! Normal in an infant below 1 year old, NOT NORMAL in adult!
- Seizures & Coma
- Abnormal posturing:
 - Decorticate: arms flex toward core
 - Decerebrate: arms flexed out to sides = Far WORSE!



• Papilledema:

Swelling around optic disc caused by increased pressure of CSF

- Pupils fixed & dilated pressure on cranial nerve III (oculomotor nerve)

Exam Questions

Priority assessment findings for a client recovering from a head trauma?
Select all that apply

1. Eyes that move in the opposite direction when patient is turned.
- ✓ 2. Extremities that contracted to the core of the body.
- ✓ 3. Fixed pupils that remain 8mm when assessed with a pen light.
4. Level of consciousness that has not diminished since admission.
5. Grips 5/5 bilateral.
- ✓ 6. Toes that fan out when the sole of the foot is stroked.

Diagnostics

- Imaging - CT scan
 - 1st test - quick easy picture of the brain - showing the root cause
 - NOT an MRI - they are too long & slow
- NO lumbar puncture (spinal tap)
- ICP monitoring (for long-term patients)
 - Normal ICP: 5 - 15 mmHg
 - HIGH RISK of infection!

Exam Questions

Client found on the floor, appearing lethargic, bleeding at the back of head, heart rate of 45 BPM & BP of 220/88. First action?

- Answer: Immediate C- Spine immobilization & CT scan to rule out intracranial bleed

Increased ICP II

Pathophysiology Course

Complications: Cushing Response

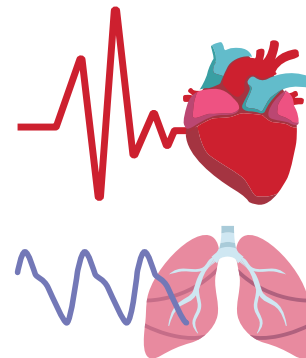
Late DEADLY Signs

Cushing triad **NCLEX TIP**

- Wide pulse pressure
 - HIGH BP** "Hypertension"
 - Low HR** "Bradycardia"
- Low RR** "Decreased Respirations"

MEMORY TRICK

- CUSHing triad think CRUSHing triad
- Crushed HR & RR with Wide blood pressure



PATHO TIP

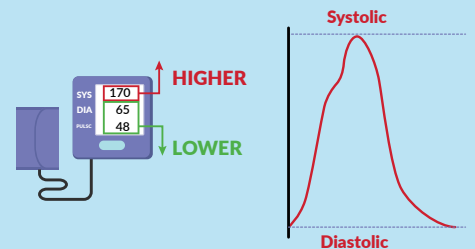
Widening pulse pressure:

The **blood pressure numbers** get further apart, very WIDE! Systolic blood pressure (top number) gets higher & the diastolic blood pressure (bottom number) gets lower.

MEMORY TRICK

The blood pressure gets **WIDE** apart with **WID**ening pulse pressure.

Widening pulse pressure



Nursing Interventions

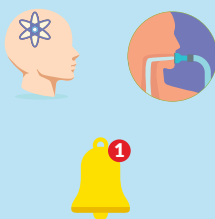
I	Immobilize Head "C-Spine"	C	CO2 LOW	P	Positioning	S	Suctioning
<ul style="list-style-type: none"> Head in neutral position Log Roll "As one unit" 		<ul style="list-style-type: none"> Lower CO2 means Lower ICP. Carbon dioxide vasodilates the brain resulting in more swelling from More blood flow. Hyperventilation decreases CO2 by blowing it out 		<ul style="list-style-type: none"> HOB - Semi-Fowler's 30 - 35 Degrees or higher NO flexion & bending extremities NO coughing, sneezing, blowing nose NO valsalva maneuvers or holding breath 		<ul style="list-style-type: none"> 10 Seconds or Less 100% O₂ before/after suction 	

GCS Score

GCS Score

- 15** = Highest Score
- 8** = intubate
- 3** = lowest score

REPORT Decreasing GCS score!



NCLEX Question

Immediate intervention when client with ICP states...

- "I will turn cough, & deep breathe"

NCLEX Questions

Client recovering from head trauma ... GCS of 14 over 2 hours ago, but now GCS score is 11...

- Report to HCP immediately**

SCORE: 11



Which assessment best demonstrates the GCS?

- Painful stimuli applied, client pulls away = **responsive to pain**
- Client responds to a nurses question = **responsive to verbal**



Treatments: Pharmacology

- Phenytoin: prevent seizures
- Steroids: Dexamethasone
- Phenobarbital: a barbiturate to decrease brain activity
- Mannitol**: osmotic diuretic #1 drug to know
Side effect: edema & s/s of heart failure **NCLEX TIP**



Seizures

Pathophysiology Course

Pathophysiology

Sudden, uncontrolled electrical discharges in the brain. Epilepsy is lifelong episodes of seizures.

MEMORY TRICK

ePILEpsi - like a PILE of seizures that come & go over a lifetime



Causes

Anything that can cause brain swelling or hypoxia

- **Infection:** meningitis
- **Trauma:** TBI, Concussion
- **Brain mass:** BRAIN tumors
- Increased ICP
- Fever in infants = "febrile seizure"
- Withdrawal from drugs & alcohol

Types of Seizures

Generalized

- **Tonic** - Tight & Tense - Tonic
- **Clonic** - convulsions, contraction - clonic clicking
- **Tonic Clonic** - tight & convulsions
- **Atonic**
- Myoclonic
- Absent - "spaced out"



Partial "Focal"

Simple: Fully conscious
Complex: impaired or Loss of Consciousness

- Lip smacking
- Biting
- Picking



Key words

Absence seizures can look like **daydreaming** or staring off into space

Top Missed Exam Question

Client with history of epilepsy, or a client with a VP shunt ... **status epilepticus**.
First intervention?

- ✓ 1. Administer diazepam rectal or IV
- 2. CT scan
- 3. Head to toe assessment
- 4. Neuro assessment

Triggers

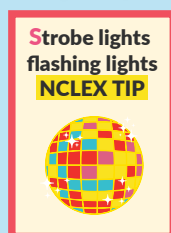
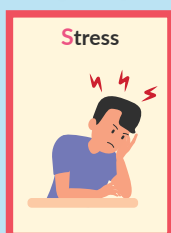
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- Sugar: **below 70** (Hypoglycemia)
MEMORY TRICK think hypogly brain will die
- Sodium: **below 135** (Hyponatremia)

Stages or Phases of Seizure

- **Prodromal phase** Warning signs before a seizure leading to Aura Phase
- **Aura phase** **EXAM TIP** Visual, auditory clue that happens prior to a major seizure
- **Ictal phase = Seizure Phase** THINK ignition phase - the period of the active seizure
- **Postictal Phase** Hangover phase after the seizure - think POST-ignition phase
 - Confused, disoriented, major headache, & typically feels tired or sleepy

Seizures II

Pathophysiology Course

Top Missed Exam Questions

Confusion and headache following a 20-minute-long seizure

This is documented as:
Postictal phase

Prodomal Aura Ictal Postictal

Priority Patient:
Who will the nurse see first?

History of **epilepsy** who reports **having an aura**

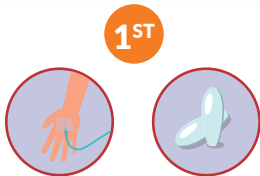


Status Epilepticus

• **Status Epilepticus- MEDICAL emergency!! NCLEX TIP**

- 5 min. or longer - 1 seizure
- 30 min. - Repeated seizure activity
- **#1 Priority = STOP** the Seizure

IV or Rectal benzodiazepine
Lorazepam (brand: Ativan)
Diazepam (brand: Valium)



Diagnostics

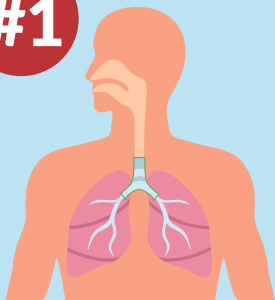
- MRI or CT - to look for abnormalities.
- **EEG** - electroencephalogram **NCLEX TIP**
Assesses electrical activity in the brain by placing sticky electrodes on the scalp
 - Wash hair (before/ after) to make sure it sticks
 - **NO** Caffeine (tea, coffee, soda) or **stimulants: 12 - 24 hours before**
 - **NO** Seizure meds
 - **NO** Sleep - Sleep deprivation is BEST
 - **YES** Eat before test - no need for NPO

MEMORY TRICK

- **EEG** think of EGG head - electrical activity of the EGGhead
- **ECG** - C think C - Cardiac rhythms

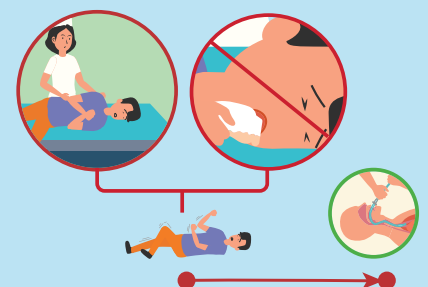
Interventions during SZ

#1

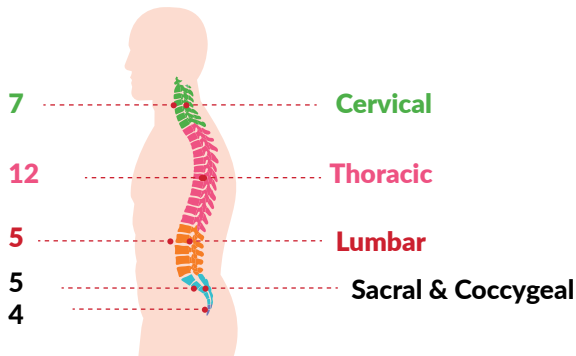


#1 - Airway

- **Turn client to side NCLEX TIP**
- **Prepare for suctioning**
NEVER insert anything in the mouth!
NEVER restrain or "Hold down arms"
- **Call for help & Stay with Client**
#1 Drug = STOP the Seizure
Lorazepam (brand: Ativan)
Diazepam (brand: Valium)
Rectal or IV
- **Loosen** restrictive clothing (Neck & chest)
- **Safety**
Protect - Clear area for any objects
Pad Side Rails
- **AFTER** seizure activity
Record Time
Assess LOC, Neuro, Vitals
Prepare for suctioning



Spinal Cord Injury



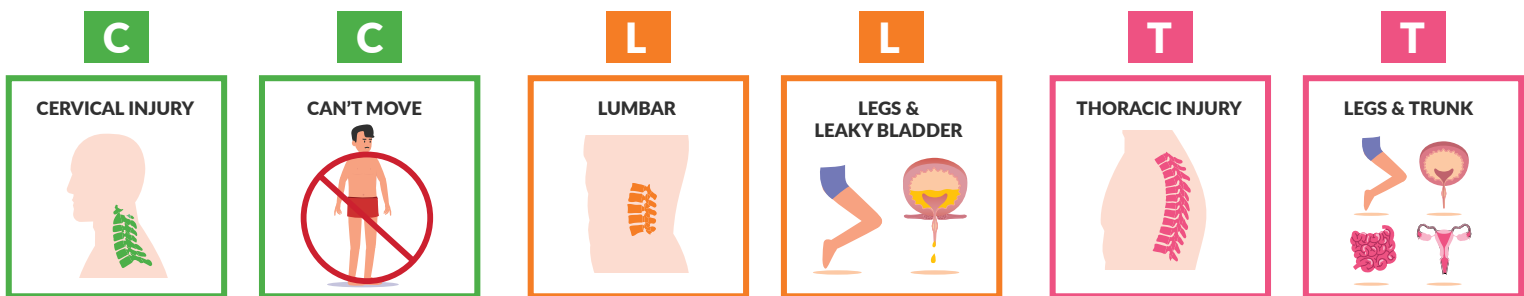
Signs & Symptoms

- **Cervical Injury:** paralysis below neck (level of injury)
 - Quadriplegia: 4 limbs paralyzed
Quad means 4
diplegia= sounds like paralyzed
 - **BREATHING** impaired - Life threatening
Happens to a lot of sports figures
- **Thoracic Injury** - think T for trunk of body
Paraplegic (2 legs)
Legs, pelvic organs
- **Lumbar Injury** - think of double L's
Legs & Leaky bladder

Causes

- Trauma - like a fall from a horse, or slip & fall, car crash etc.

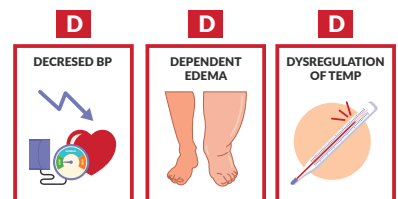
MEMORY TRICK



Critical Complications

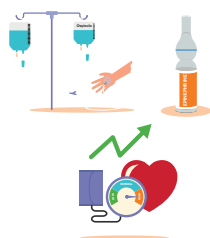
Neurogenic Shock think S for Severe hypotension (low BP)

- **3 Ds**
 - **D**ecreased BP
 - **D**ependent edema
 - **D**ysregulation of Temp.
- **Autonomic Dysreflexia**
 - Abnormal stimulation of the autonomic nervous system below the level of injury



PHARMACOLOGY

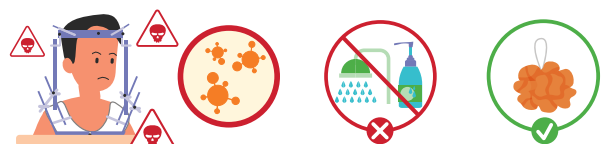
- **Neurogenic Shock**
 - IV Fluids & Vasopressors
Increase BP
- **Steroids "-sone"**
 - Dexamethasone
 - Prednisone
- **Muscle relaxers**



Surgery

Halo traction device (a crown or vest)

- Key priority is Infection risk!!!
- **NO** showers - **ONLY** sponge bath
- Assess pin **sites for infection**
- Red, warm, smelly drainage



Autonomic Dysreflexia

Pathophysiology

- Occurs with Spinal Cord Injury **ABOVE T-6** **NCLEX TIP**
Miscommunication of SNS & PNS in the **autonomic nervous system**. The SNS, speeds up the Vitals via vasoconstriction causing HIGH BP, and the PNS. Puts the brakes on the vitals via vasodilation causing LOW BP resulting in a HUGE risk for STROKE!

Causes

- Bladder** - "Full" "distended" **NCLEX TIP**
- Bowels - constipation
- Tight clothing



Signs & Symptoms

- Severe **hypertension** - Up to 300 systolic
- Throbbing headache**
- Bradycardia - low heart rate from PNS
- Facial flushing
- Nasal congestion



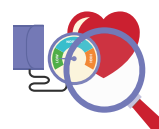
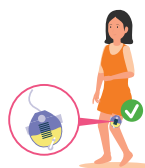
Key term: Spinal injury above T6 & HIGH BP - Think Autodysreflexia

Interventions

1. Notify the HCP

2. Correct the Cause

- Bladder assessment**
 - Palpate bladder **NCLEX TIP**
 - Bladder scanner
 - Check the Foley for Kinks **NCLEX TIP**
- Bowel Assessment**
- Remove** "Constrictive" Clothing **NCLEX TIP**
- Measure **Blood pressure** **NCLEX TIP**



3. BP meds - **AFTER** Assessment

KAPLAN Question

Client with **spinal cord injury** above level T3 reporting **headache** and nasal congestion, **profuse sweating** and **piloerection**.
FIRST action?

Answer: Check urinary catheter for kinks

KAPLAN

ATI

- Bradycardia** (Below 60 bpm)
- Piloerection (Goosebumps)
- Diaphoresis** above injury site

Top Missed NCLEX Question

Priority Patient?

Answer: Patient with **diaphoresis**, **hypertension**, **bradycardia** & history of **T-4 spinal injury**.

NCLEX Question

Initial action ... **cervical spine injury** with throbbing headache, nausea, & **elevated blood pressure?**

Answer: Palpate the bladder

Common NCLEX Question

Priority interventions ... **T-1 spinal cord injury** with **flushing**, **diaphoresis** & pulse of 58? Select all that apply

Correct Options:

- Assess** for **bladder** distention
- Remove** **tight** clothing
- Measure blood pressure
- High Fowler's position

Correct the cause of symptoms FIRST!

ALS - Amyotrophic Lateral Sclerosis

Pathophysiology Course

Pathophysiology

ALS, also called Lou Gehrig's disease, presents as deterioration of motor neurons in the brain & spinal cord, resulting in progressive **TOTAL BODY paralysis**. Eventually clients die in 3 - 5 years from Respiratory Failure.



ALS = Advanced Life Support



MEMORY TRICK

ALS think ALS like Advanced Life Support, since clients will eventually have to go on a ventilator to keep them alive.

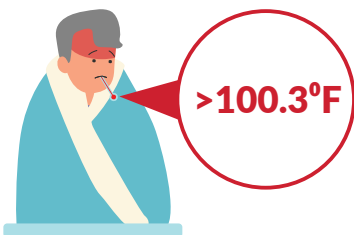
Signs & Symptoms



- Progressive **muscle weakness**
- Dyspnea - **Difficulty breathing**
- Dysphagia - **Difficulty swallowing**
- Dysphasia - Difficulty speaking
- Constipation
- **Respiratory failure #1 Priority**

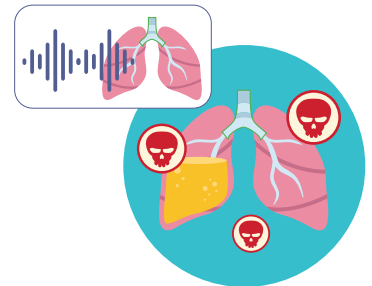


Nursing Interventions



Infection - monitor for pneumonia

- Fever - Temp over 100.3°F
- **Lung sounds - Rhonchi**
 - Not Crackles = Pulmonary edema



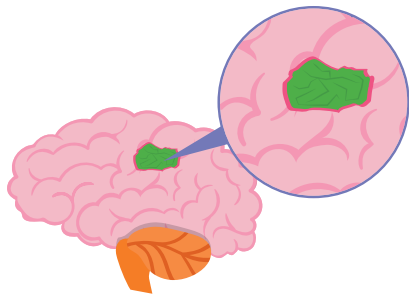
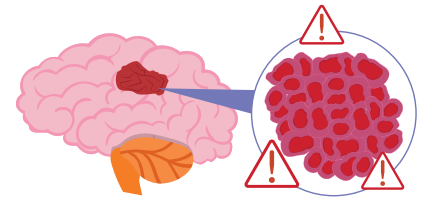
Notes

Brain Tumors

Pathophysiology Course

Pathophysiology

A brain tumor is a mass or growth of abnormal cells in the brain.



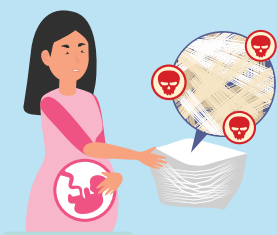
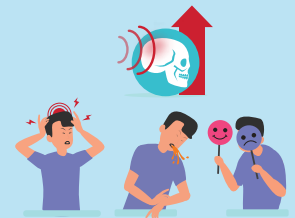
- Benign: Noncancerous
- Malignant: Cancerous



Causes & Manifestations



- **Primary malignant brain tumors:**
Very invasive & difficult to remove
 - **Causes (etiology)**
 - Prenatal exposure to carcinogens & embryonic development
 - Adults: Don't know predisposing factors
 - **Manifestations** (signs & symptoms)
 1. Seizures
 2. Signs of increased ICP
 - Headache
 - Vomiting
 - Mental status changes
"Change in mental status"
 3. Death before general
- Signs & Symptoms (manifestations)



Notes

Dementia vs. Delirium

Pathophysiology Course

Dementia



DeMMentia



DaMMMage

DaMaGe to the brain that is irreversible

DeLirium



DeLLirium



- Limited, short-term confusion that is easily reversible!
- Correct the causes, correct the Delirium.

Causes

Alzheimer's, Parkinson's & even traumatic brain injuries

Tricky Exam Question

Agitated with Dementia!!

1. Acknowledge & Discuss feelings
2. **DO NOT** - Present reality or Rationalize
3. Redirect with new activities



In end stage deMentia, there is too much brain daMaGe making it IMPOSSIBLE for clients to understand reality.

This causes more anxiety & aggression, so interventions revolve around distraction



Causes

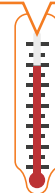
- **Infection** (Sepsis)
 - Temp over 100.3°F **Key Terms**
 - Urine Culture + Positive
 - **Hypoxia** "Low SpO2"
 - Agitation
- Priority action: **"Assess the client"**

Other causes:

- Opioid Pain Meds
- Low sodium (norm: 135 - 145)
- Low blood glucose (norm: 70 - 110)

Priority action: **"Assess the client"**

> 100.3 °F



Common Exam Question

Nurse understands which factors can cause delirium?

Select All That Apply.

- Positive urine culture with 101.°F temp.
- Serum sodium level of 123
- Serum blood glucose level of 120
- SpO2 82%
- Brain damage ... Yo dis too much



G.B. - Guillain-Barré Syndrome

Pathophysiology Course

Pathophysiology

RAPID ascending paralysis starting in the legs & eventually reaching the respiratory system, which kills the client within a few hours to a few days.

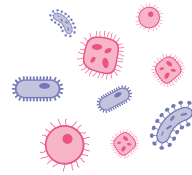
MEMORY TRICK

Ground up barres - paralysis from the legs up



Causes

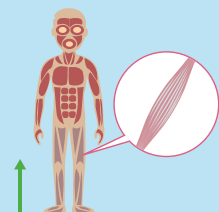
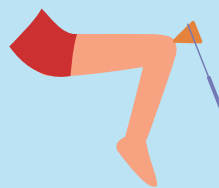
Triggered by an **infection**



Signs & Symptoms

- Ascending Symmetrical muscle weakness
- Lower extremity weakness
- **Absent deep-tendon reflexes**
- Neuromuscular respiratory failure

- **Respiratory failure** - early signs :
 - ♦ Inability to cough **NCLEX TIP**
 - ♦ Inability to lift the head or eyebrows **NCLEX TIP**
 - ♦ Shallow respirations
 - ♦ Dyspnea and hypoxia



Exam Question

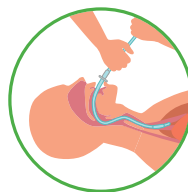
Priority finding:
Client with Guillain-Barré?

- **Inability to lift head or cough**



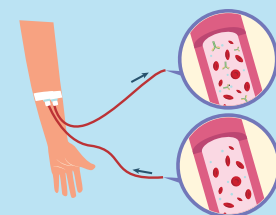
Nursing Interventions

- Intubation setup bedside &
- Mechanical Ventilator



Treatments

- IVIG
- Plasmapheresis (Plasma exchange) to remove antibodies that contribute to the destruction of neurons.



Notes

Head Injuries (TBI & Hematomas)

Pathophysiology Course

Head Injury - TBI

Any injury to the head, can be open & closed traumatic brain injuries (TBI).

OPEN TBI - Basilar skull fracture

Key Sign

- CSF leakage from **Eyes, Ears, Nose**
 - "Clear fluid drainage" **NCLEX TIP**
 - Positive Glucose



CLOSED TBI (skull NOT fractured)

Concussion: Mild brain trauma **EXAM TIP**

- Brief loss of **consciousness** **NCLEX TIP**
- Headache
- Retrograde amnesia

Concussion: Major brain trauma

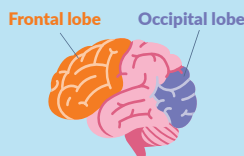
"Coup - Contrecoup"

- Coup
- Coup - Contrecoup
 - Frontal lobe Injury
 - Expressive aphasia "speech"
 - Memory problems
 - Occipital lobe
 - Vision problems



MEMORY TRICK

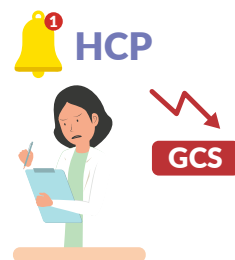
- Frontal lobe** = Front OFFICE controls Speech, memory, & movement.
- Occipital lobe** = Ocular Sight controls Visual perception
- Temporal lobe** = Think **TEMPO** like hearing a beat.
- Parietal lobe** = sensory, touch - Think purrietal like a cat - soft & fluffy to touch.
- Cerebellum** - think cere-**Ba**lance - controls balance
- Brain stem** - controls HR & RR



Interventions

1ST PRIORITY

- Stabilize cervical spine** "C-spine"
- Keep body in perfect alignment
- Assess **GCS**
 - 15** = highest score
 - 8** = intubate
 - 3** = lowest score
- Report Decline in GCS score!**



Head Injuries (Hematomas)

Patho Test Tips Hematomas

Epidural

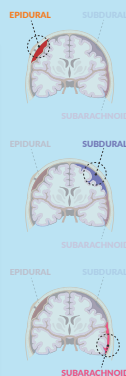
- Bleeding between dura mater & skull
- Signs arise within hours

Subdural:

- Bleeding between dura & arachnoid mater
- CSF (cerebral spinal fluid) may leak into subdural space

Subarachnoid:

- Between arachnoid and pia mater
- Blood mixes with CSF



Patho Test Tips

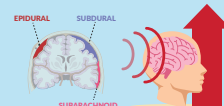
Etiology:

- All hematomas cause **increase in ICP**

Other Signs & Symptoms:

- Seizures**
- Otorrhea or rhinorrhea (CSF leaks from ear or nose)
- Fever

Key Term



Monitor for Increased ICP

Early signs

- Agitation **NCLEX TIP**
- Restlessness/ irritability
- Change in **LOC** **NCLEX TIP**
- Decreased **Mental Status**
- Sudden Vomiting "Emesis" Without Nausea

Late signs

- Seizures
- Posturing (decorticate & decerebrate)
- Cushing triad

EXAM Questions

- Client recovering from head trauma ... GCS of 15 over 2 hours ago, but now GCS score of 14... **First action?**

Answer: **Report to provider immediately**

- Client in C-spine after fall ... priority assessment?

Answer: **Obtain Glasgow Coma Scale score.**

Discharge Teaching

- Return** if having **difficulty walking "Ataxia"**
- Adult** should **stay with the patient**
- No alcohol:** vasodilates & makes brain swelling worse
- NOT** necessary for patient to stay awake **ALL** night

Imaging

- CT scan or MRI to show evidence of bleeding, bruising, or swelling

Meningitis

Pathophysiology Course

Pathophysiology

Meningitis is the inflammation of the **Meninges** (the inner lining of the brain & spinal cord)
Inflammation → massive brain swelling → deadly
↑ ICP → leading to death.



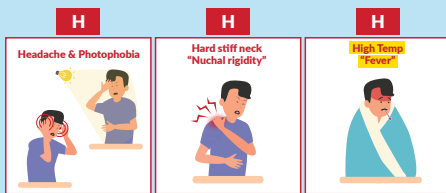
Causes

- Infection, head trauma, & auto-immune diseases (Lupus)

Memory Trick

- Bacterial = Bad news **MOST** contagious
- Viral = Very common- **MOST** tested

Signs & Symptoms



Pediatrics

- **High pitched** Cry
- **Bulging** fontanelle

Adults

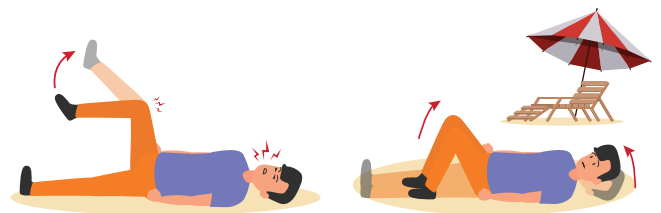
- **Agitation & altered LOC** (1st sign)
- Leads to seizures, coma, & **DEATH!**

Diagnostics

- + **Kernig Sign:** Laying on the back & straightening the leg = very painful.
- + **Brudzinski Sign:** when neck flexes, hip & knees also flex.

Memory Trick

- **Kernig** "Krinkle"
- **Brudzinski** "Beach Chair ski"



Tests

- **CT scan (done first)**
- AFTER LP: Monitor insertion site dressing for **clear fluid**

LP (Lumbar Puncture "spinal tap")

- Test the **CSF** - cerebrospinal fluid for infection
- **Viral - Very clear**
- **Bacterial - Bad cloudy**

Interventions

Droplet

- P** - Pertussis
- I** - Influenza
- M** - Meningitis
- P** - Pneumonia



1. **Surgical Mask** & Goggles
2. Single room

ATI

Teach unlicensed personnel to wear a mask

Airborne



- M** - Measles
- T** - TB (Tuberculosis)
- V** - Varicella (shingles/chicken pox)

1. N95 mask - Staff
2. Neg. Pressure Room
3. Door closed
4. Transport - Patient wears **surgical mask**

Put ON "DON"

GMGG

1. Gown
2. Mask
3. Goggles
4. Gloves



Take OFF "DOFF"

GGGM

1. Gloves
2. Goggles
3. Gown
4. Mask



Memory Trick

- **"A"**ntibiotics
- **"A"**fter blood cultures are taken!

Exam question

- Client admitted for bacterial meningitis with a BP of 78/56... priority action?
 - Admin. **bolus of IV normal saline**

- First action
 - Place client on droplet precautions - **PPE 1st!**
- **LOW** BP will kill!
- **Low** noise - Quiet room
- **Low** light - photophobia
- **Low** pressure all over:
 - NO coughing
 - NO sneezing
 - NO bending extremities
 - **RAISE HOB** at least 30 degrees

- **Low** noise - Quiet room
- **Low** light - photophobia
- **Low** pressure all over

Increased ICP

- Early Sign: **NCLEX TIP**
- Altered LOC: Restlessness, Irritability, Agitation
- **Decreased Mental Status**

M.G. – Myasthenia Gravis

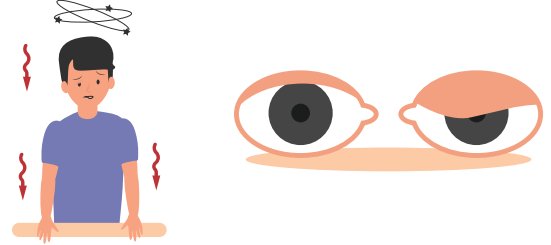
Pathophysiology Course

Pathophysiology

MG is an autoimmune disease where body attacks itself, attacking & destroying the **acetylcholine receptors**, resulting in low acetylcholine. Clients present with a weak muscles & a dry body from low acetylcholine.

MEMORY TRICK

- **MG** - MYasthenia Gravis
- **MG** - DRY-asthenia Gravity



Signs & Symptoms

- **Ptosis** "Droopy eyes" **NCLEX TIP**
Decreased eye & eyelid movements
 - **Diplopia** "Double Vision"
 - **Dysphagia** - difficulty **swallowing**
 - **Dyspnea** - difficulty **breathing**
 - Tiredness with slight exertion
- Myasthenic CRISIS**



Myasthenic Crisis!

1. Airway protection & safety with swallowing

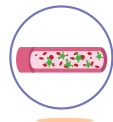
- Intubation set up - BEDSIDE
- Encourage semi-solid foods
- **BEFORE meals: NCLEX TIP**
Pyridostigmine (anticholinesterase drug)



Pyridostigmine

2. CRISIS! = AVOID 4 Ss

- **S - Stress** (exercise, surgery, pregnancy)
- **S - Sun**
- **S - Sickness or Sepsis (infection)**
 - **AVOID** crowds during flu season
 - **Get vaccines** (flu, pneumonia, etc)
 - Fever **100.3°F**
- **S - Smoking**



3. Wear a medic alert bracelet

Common Exam Question

Which client should the nurse see first?

- ✓ Client with myasthenia gravis difficulty swallowing & temperature of 100.7°F

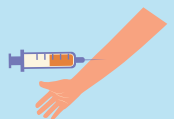


Diagnostics

Tensilon Test

- Edrophonium (brand: Tensilon) injection helps prevent the breakdown of the acetylcholine
- If the drug **INCREASES** muscle strength, then patient has MG.

- **Tensilon Test**
 - **Edrophonium** (brand: Tensilon)



Pharmacology

- **IVIg**: the body attacks this substance instead of itself
- Steroids - Prednisone to decrease swelling
- Immunosuppressants help the body **STOP** attacking itself
- **Neostigmine**: given to treat the dry. Think **Stigmine** adds **Secretions**.



M.S. - Multiple Sclerosis

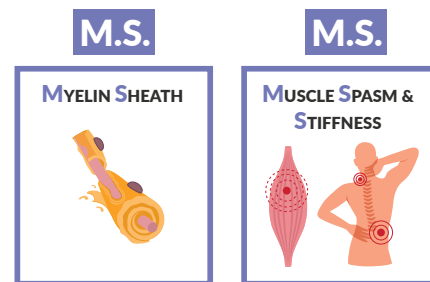
Pathophysiology Course

Pathophysiology

MS is an autoimmune disease where the body attacks myelin sheaths, the sheets of fatty tissue around nerve cells which helps the body move.

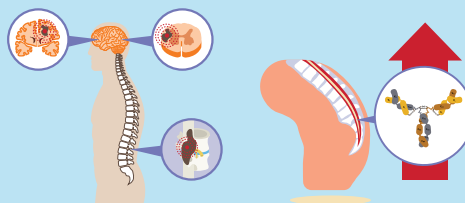
MEMORY TRICK

- MS** - Myelin Sheath destruction
- MS** - Muscle Spasm & Stiffness

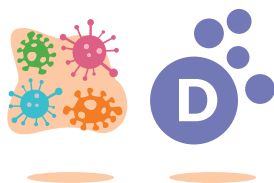


Diagnostics

- **MRI & CT scan** - show plaque on brain & spinal cord
- **Lumbar spinal puncture** - high levels of antibodies



Causes



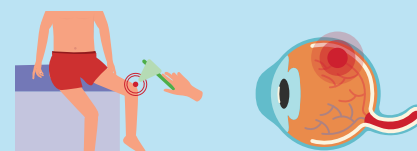
- **Genetics** - female
- **Environmental factors:** infection & vit D

Signs & Symptoms

- **Muscle Spasticity:** seen with bad flare-ups that come & go from Myelin Sheath destruction

Other Signs

- Ataxia**
- Urinary** retention
- Hyperreflexia** of extremities
- Decreased** concentration
- Fatigue & paralysis
- Double vision, blurry, or dark



Nursing Interventions

- **Balance** exercise with rest
- **AVOID 4 Ss** = Trigger Flare Ups
 - **S - Stress** (exercise, surgery, injury)
 - **S - Sickness** or Sepsis
 - **S - Smoking**
 - **S - Sun** & Extreme heat (hot tub, bath, sauna)
- **Promote** Independence = All Neuro Patients
 1. **"SELF** Care ADLs"
 - **NEVER** do "All ADLs for the client"
 2. **Gait training**
 - **Teach 1st** - Gait training
 - **Then offer Cane**
 - Walker
 - Last wheelchair



Pharmacology

- **IVIG** - body attacks this substance instead
- **Interferon** - interferes with body attacking itself
- **Steroids** - Prednisone - decreases swelling
- **Muscle Relaxants** - Baclofen - for muscle spasms
- **Cyclosporine** - immunosuppressant (**most important**)
 - Report signs of infection & bleeding
 - **NOT for pregnant** clients

Interferon Interferes



Parkinson's Disease

Pathophysiology Course

Pathophysiology

A movement disorder with the progressive death of neurons in the brain resulting in **Low dopamine & HIGH acetylcholine**.

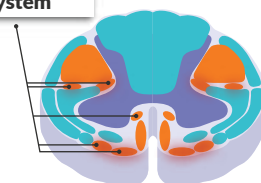
MEMORY TRICK

- Think **NO** dope in the park - low **DOP**amine - in **PARK**-insons
- **HIGH** acetyl**CC**holine - we get **High** se**CC**cretions with lots of drooling

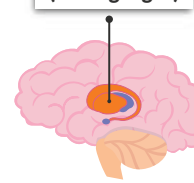
Key Terms

- Dysfunction of **extrapyramidal system**
Involuntary movement disorders
- Disruption of **basal nuclei** (basal ganglia)
Excess stimulation affects movement & posture

Extrapyramidal System



Basal Nuclei (Basal ganglia)



Signs & Symptoms

Patho Test Tip

Top 3 Manifestations

1. Resting **tremors**
2. Muscle **rigidity**
3. Difficulty initiating movement (**shuffling gait**)
 - Dysarthria (impaired speech)
 - Difficulty chewing and swallowing (**dysphagia & drooling**)
 - Mask-like facial appearance



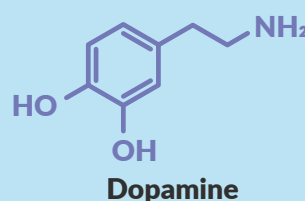
Critical Complications

- **Airway = #1**
 - **Suction set up at bedside** (excess drooling)
- **Eating**
 - Pureed Diet + "Small Bite sized pieces"
 - Tissues readily available during eating
 - "Add **thickening agent to fluids**"
 - **Dysphagia** - Monitor swallowing
 - **HOB up** - High Fowler's "Sit Upright"



Pharmacology

- Increase DOPamine
- Decrease Acetylcholine
- Levodopa
 - Levodopa & Carbidopa (combo drug)
 - **AVOID** protein
- **Memory Trick** LEAVE the protein with LEVOdopa
- Bzotropine - treat resting tremors
- Pramipexole - dopamine agonist - stimulates more dopamine



Side Note

- Selegiline - actually an MAOI antidepressant - increases availability of dopamine & other neurotransmitters in the brain

Parkinson's Disease

Pathophysiology Course

Pathophysiology

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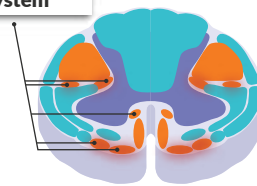
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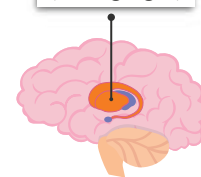
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Extrapyramidal System



Basal Nuclei (Basal ganglia)



Signs & Symptoms

Patho Test Tip

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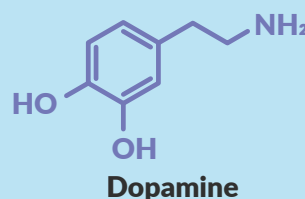
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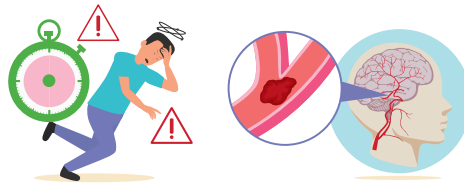
- Selegiline - actually an MAOI antidepressant - increases availability of dopamine & other neurotransmitters in the brain

CVA (Stroke)

Pathophysiology Course

Pathophysiology

Strokes happen when the brain lacks oxygen.
 There are 2 types of strokes: TIA & CVA.
TIA temporarily limits oxygen and resolve on their own.
CVAs are more permanent from long term lack of oxygen.



Types of Strokes

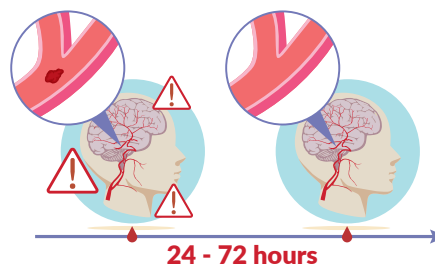
- **TIA - Transient Ischemic Attack** - tiny lack of oxygen
 - Transient: short time frame
 - Ischemic: Low oxygen
 - Attack: Happens suddenly ...TIA's come & go often resolving
- **CVA - Cerebral vascular accident** - no oxygen causing long-term damage!
 - **Ischemic CVA - Clot** = Low O₂ (called embolic or thrombotic stroke)
 - **Hemorrhagic CVA** - Bleed = HIGH ICP (from an aneurysm)

Ischemic CVA Clot = Low O ₂	Hemorrhagic CVA Bleed = HIGH ICP!
<p>Test Tip 5 minutes of ischemia = irreversible nerve cell damage</p>	

TIA: Transient Ischemic Attack **Test Tip**

Temporary reduction of blood flow
 (partial occlusion of an artery)

Resolves in **24 - 72 hours**



Causes

#1 Hypertension (Over 140 sys) MOST TESTED

Most important to PREVENT a stroke:

- Take antihypertensive meds regularly
- 2. **Smoking**: Scars the blood vessels making them weak.
- 3. **Hyperlipidemia** (HIGH cholesterol) creates narrowed blood vessels.
- 4. **Uncontrolled Diabetes**: THICK sugar in the blood puts loads of pressure on the vessels.
- 5. **Increased r/f clots**: Atrial fibrillation & heart valve malfunctions.

Signs & Symptoms

■ Hemiparesis - **Unilateral weakness**

- One sided weakness
- New, Sudden **"Arm Drift"**

NCLEX TIP

Hemorrhagic Stroke

"Ruptured cerebral **aneurysm**"

- **Severe headache**



F	A	S	T
Facial & Smile Droop	Arm Drift "1 sided weakness" NCLEX TIP	Speech Impairment	Time to CALL 911! CT scan Immediately

NCLEX Question

Most concerning patient statement with **diplopia** and **new weakness**, & onset vomiting **without nausea**:

- "I have the **worst headache of my life**"

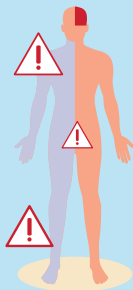
CVA (Stroke) II

Pathophysiology Course

Signs & Symptoms

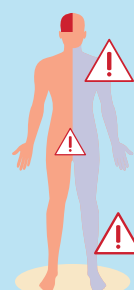
L Left Brain Language & Logic

- Dysphasia
- Reading or writing problems
- **RIGHT Hemiparesis** (1 Sided weakness)
- Right Side neglect



R Right Brain Reckless & Really Creative

- Lack of impulse control
- Behavioral changes
- **LEFT Hemiparesis** (1 Sided weakness)
- Left Side neglect



NCLEX Question

Teaching for families of patients with **right-sided brain injuries**?

- ✓ Answer: **lack of impulse control and behavioral changes.**

Diagnostics

- CT scan immediately!!!
To pinpoint the cause, since treatment will be very different depending on the type of stroke!



NIH Stroke Scale

- **15 item scale** that **measures 11 stroke related deficits**

This tool is used by healthcare providers to objectively measure the physiological impairment caused by a stroke.

When **implemented early** & measured at the **24 hour mark** of when the stroke occurred, it is highly predictive of the long-term outcome (prognosis).

Therefore it is a common diagnostic method for quickly **assessing both severity of a stroke & long-term prognosis.**

Total NIH Stroke Scale Score

- 1a - Level of Consciousness: 1
- 1b - LOC Questions: 1
- 1c - LOC Commands: 1
- 2 - Best Gaze: 0
- 3 - Visual Fields: 0
- 4 - Facial Palsy: 2
- 5a - Left Motor Arm: 2
- 5b - Right Motor Arm: 0
- 6a - Left Motor leg: 1
- 6b - Right Motor leg: 0
- 7 - Limb Ataxia: 0
- 8 - Sensory: 1
- 9 - Best Language: 0
- 10 - Dysarthria: 1
- 11 - Extinction and Inattention: 0

Total NIHSS Score: 10

NIH Stroke Scale Score	Stroke Severity
0	No stroke symptoms
1 - 4	Minor stroke
5 - 15	Moderate
16 - 20	Moderate to severe
21 - 42	Severe stroke

Example of NIH scale use:

This client has a score of 10 indicating moderate stroke severity.

Notes

CVA (Stroke) III

Pathophysiology Course

Treatments: Pharmacology

Strokes caused by Clots
- Give clot busters

■ Thrombolytics - within **4.5 hours of onset of symptoms**

- **tPA**
- “-as” **Alteplase, Streptokinase**



2 Tricky NCLEX Questions:

Question 1:
Interventions for initial plan of care for a patient with **suspected embolic stroke?**
Select All that Apply

- ✓ Obtain a **STAT CT of the head**
- ✓ Perform **neuro assessment**
- ✓ Prepare to initiate **alteplase within 4.5 hours of symptoms onset**

Question 2:
Priority nursing action for a patient with **left sided weakness**, lack of verbal response, and **drooping face?**

- ✓ **Maintain patent airway**
- Stats CT scan
- Neuro assessment
- Give tPA

Strokes - Hemorrhagic (no clot busters)

■ Implement **seizure precautions**
- strict bed rest

■ No Blood thinners

- **NO** Aspirin & Clopidogrel
- **NO** Heparin & Enoxaparin
- **NO** Warfarin
- **NO** Thrombolytics



■ Limit any activity that may **increase ICP:**

- Administer **PRN stool softeners** daily to prevent straining & bearing down during bowel movements

Nursing Care

H HEMIANOPSIA Half Vision Loss

- Risk of Self Neglect
 - “Dress the **weaker side first**”
 - “Apply clothing on **affected side first**”
- Safety
 - “Scan surroundings”
 - “Turn head to affected side”
 - Family - “**approach** patient from **unaffected side**”
- Right Side - Reckless
 - Lack of **impulse** control
 - **Behavioral** changes
 - Educate family that behavioral changes are expected



C COMMUNICATION

- **Broca Aphasia - “Expressive”**
 - Easily frustrated (attempting to **speak**)
 - **Speech limited** to short phrases
- **Wernicke Aphasia - “Receptive”**
 - **Misunderstanding** to verbal cues
 - **Unable to comprehend** speech

KEY TERMS



KEY TERMS



Nursing Interventions

F FEEDING

- **NPO** until **swallow screen** is performed
- Eating
 1. “**Flex neck**” while swallowing
 2. **AVOID** sedation meds before meals
 3. **HOB Up** - High Fowler’s “Upright”
 4. **Dysphagia** (diff. swallowing)
 - Puree diet - **NOT** regular diet
 - Add thickening agent to fluids
- Seizure precautions
- Frequent **neuro assessments**
- **Cluster Care** (prevents sensory overload)



Transferring

- Use a **transfer belt**
- Safe transfer **from Bed to Chair** (ALWAYS transfer toward the **STRONGER SIDE**)



AVOID completing tasks for the client (to promote independence)

1. **Patiently allow time** to understand each instruction
2. **Simple gestures** (point) & **Show Pictures!**
 - Example: shower, toilet, toothbrush
3. Ask **Yes or no questions**
 - Normal voice - **Not Loud**

Big NO NOs!

- **DO NOT** - Complete tasks for the client! Allow them to learn
- **DO NOT** - speak loud, speak normally - allow time for client to **RESPOND**
- **DO NOT** - give complex instructions or questions - simple yes or no questions

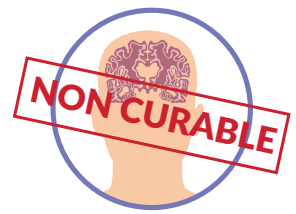


Alzheimer Disease

Pathophysiology Course

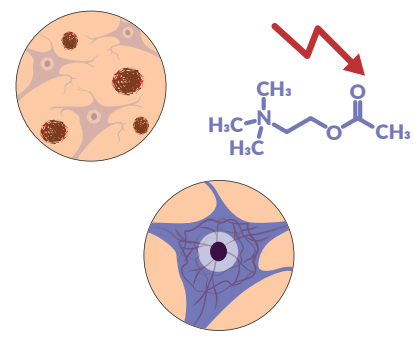
Pathophysiology

Incurable progressive disease, where plaques build up in neuronal-synapses of the brain disrupting brain signaling, which severely impairs memory & personality changes.



Patho Tips

1. Amyloid plaques
2. Acetylcholine (ACh) deficit
3. Neurofibrillary tangles (abnormal accumulations of a protein)



Signs & Symptoms



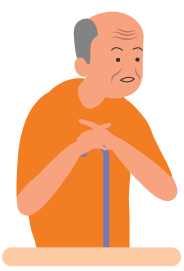
Common Manifestations

1. Irritability & hostility
2. Mood swings
3. Gradual memory loss (inability to recognize family)
4. Lack of environmental awareness



Stage 1

No impairment



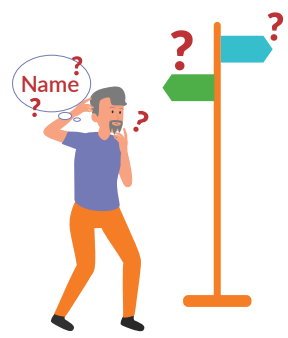
Stage 2

Forgetfulness & short term memory loss



Stage 3

Long Term Memory LOSS



Stage 4

Bed ridden



Notes

Alzheimer Disease II

Pathophysiology Course

Causes & Risk Factors

- **#1 Risk Factor:** Family history of Alzheimer Disease
- **“Regular exercise** reduces the risks of Alzheimers”
- Dementia - a general term for brain damage

MEMORY TRICK



De**M**entia
Da**M**age

Interventions

Fall Safety

- **Remove** **“Throw rugs & clutter”** from floor
- **Grab bars** - installed in showers & tubs
- **Night Light** **“Well lit halls”**

Location & Locked Down

- **“Safe return bracelet”** on wrist
- **Lock** doors:
 - Stairwell Doors - **Fall Risk**
 - Keyed Deadbolt Doors leading to outside
- **Lock** Hazards: toxic chemicals, gas, sharp objects
- Medications **Locked or Out of Reach** - do not put in pill dispenser

Living Areas

- Allow for **free movement**
- Place **frequently used items** within easy reach
- **Pictures or symbols:**
 - Bathrooms
 - Label **Hot vs. Cold** water

Simple Communication

- **NO** open ended Questions - **Yes or No questions**
- **NOT** too many options - Limit choices
- **DO NOT RUSH Client!**
 - Allow plenty of time for ADLs & tasks
 - **“Decrease Anxiety by Decreasing number of choices”**



Diet

Correct nursing action:

Give **half the sandwich** initially and other half later



Tricky Exam Question

Agitated Client with Alzheimer's

1. Acknowledge & Discuss feelings
2. **Redirect with new activities** **NCLEX TIP**
3. **DO NOT** - Present reality or Rationalize

NCLEX Question

Best nursing action Client with **alzheimer's** is **frustrated**, stating they are waiting for their husband to pick them up, but their spouse has been dead for over 10 years now.

- Answer:**
Acknowledge their feelings & **redirect with new activities**

Notes

Renal & Urinary

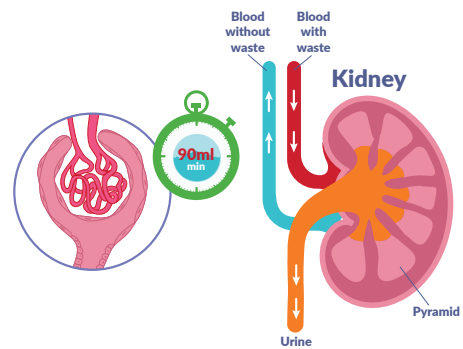
Urinary Key Terms

Pathophysiology Course

Anatomy & Physiology

The kidneys function like 2 washing machines helping to wash the blood from waste through **Filtration**, regulating fluid volume by **Reabsorption**, and also stimulates red blood cell production by producing **Erythropoietin**.

Inside the **nephron** (the functional unit of the kidney) is the **Glomeruli**, a network of small blood vessels that help to filter the blood from waste.

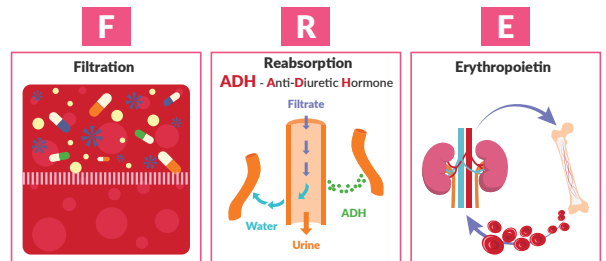


MEMORY TRICK

GFR - Glomerular Filtration Rate
Over **90 ml/min** is normal

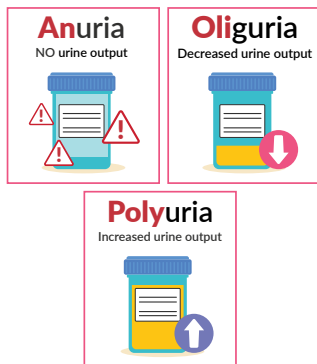
"FRE the PEE"

- F** - Filtration of medications & waste
 - H - Hydrogen ions (too much = High Acidity)
 - U - Urea (BUN - Blood Urea Nitrogen)
 - C - Creatinine (**Over 1.3 = Bad Kidney**)
- R** - Reabsorption **ADH** - Anti-Diuretic Hormone
ADH - Add Da H₂O **MEMORY TRICK**
- E** - Erythropoietin (stimulates RBC production in bone)



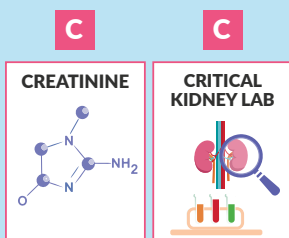
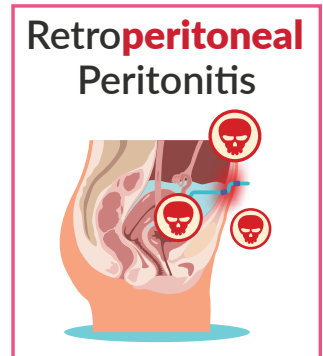
Half Life

The time it takes for half of the medication to be eliminated from the body.

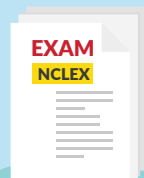
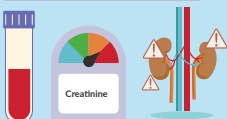


Patho Key Terms

- Anuria**: No urine output
- Oliguria**: Decreased urine output
- Polyuria**: Increased urine output
- Pyuria**: WBC or pus in urine
- Nocturia**: Frequent urination at night
- Nephrotoxic**: Toxic to the kidneys
- Retroperitoneal**: The area outside or behind the peritoneum (the tissue that lines the abdominal wall)
- Azotemia**: High levels of nitrogen waste (urea, creatinine)



Creatinine > 1.3



Top Tested

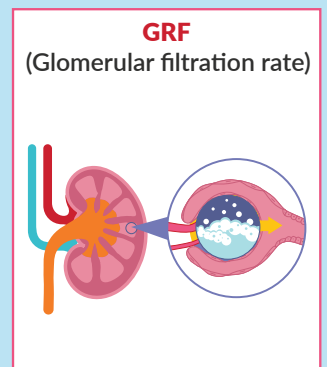
- Creatinine**: a muscle waste product of creatine breakdown

Memory Trick

- C** - Creatinine
- C** - Critical Kidney Lab
- C** - Clogged Kidney

Creatinine **Over 1.3** = Bad Kidney

- BUN** (Blood Urea Nitrogen): Urea is a waste product made by the liver when the body breaks down protein.
- GFR** (glomerular filtration rate):
 - Estimates how much **blood passes through the glomeruli each minute**
 - Glomeruli are the tiny filters in the kidneys that filter waste from the blood.



Urine Analysis & Renal Lab Values

Pathophysiology Course

MEMORY TRICK

The kidneys filter out HUC, since the kidneys sort of look like a pirate hook.



H+

Hydrogen Ions = High Acid
Are very acidic & too much can push the body into Acidosis.
Renal failure & infection causes a back up of H+ Ions

pH BELOW 7.35

U

Urea BUN (Blood **U**rea Nitrogen)

10 - 20 Max

Byproduct of protein waste. Think of a protein bar wrapper, it is trash that the body tosses out. This trash comes in the form of ammonia, which the liver converts into **UREA**, then it's pushed into blood & excreted by the kidneys. Hence the name blood **UREA** nitrogen.



C

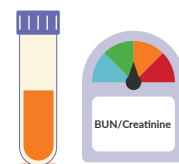
Creatinine = **Critical Kidney Lab!**
Key Numbers:

Over 1.3 = Bad Kidney

Urine Output 30 ml/hr or Less = Kidney distress

Higher creatinine levels in the blood = **Higher renal** impairment.
Creatinine is a waste product produced by the muscles coming from the normal everyday wear & tear.

Creatinine > 1.3



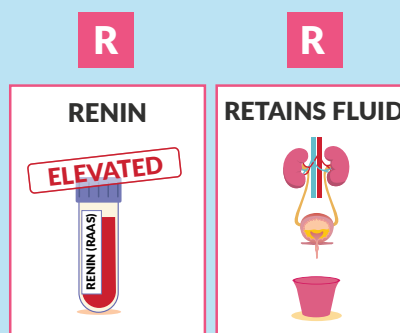
Renal Labs

Blood tests

- **Metabolic Acidosis:** Decreased GFR
- **Anemia:** Decreased erythropoietin secretion
- **Antibody levels:** Post-streptococcal glomerulonephritis
- **Elevated Renin (RAAS):** Kidneys are causing hypertension

Memory Trick

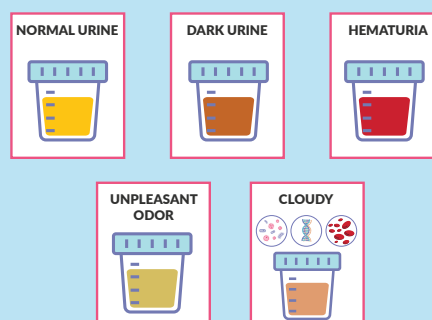
- **R - Renin**
- **R - Retains fluid**



Urine Analysis

Key Terms

- Normal urine: Straw colored, mild odor
- Dark urine: Hematuria (blood), bilirubin (liver disease) or concentrated urine with high specific gravity (Dehydration)
- Hematuria: Hemorrhage (large amount), Infection (small amount)
- Unpleasant odor: Infection
- Cloudy: Bacteria or pus, protein or blood.



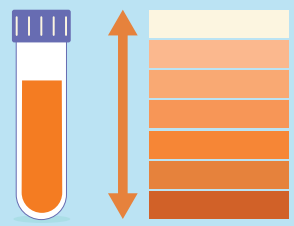
Urine Analysis & Renal Lab Values II

Pathophysiology Course

Urine Analysis

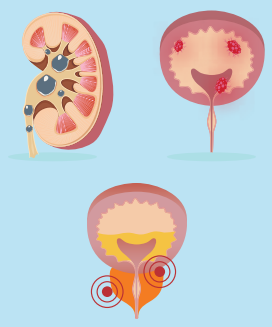
Color

Light = Hydrated
 Darker = Dehydrated
 * (Unless on diuretics or in SIADH or DI)



Specific Gravity 1.003 - 1.030

Low Gravity 1.003 = Liquidy body
 High Gravity 1.030 = Dry body



RBC "blood" (hematuria)

Cause: Kidney stones, bladder cancer, postoperative TURP.

WBC "Leukocytes"

Cause: infection (UTI)

Nitrites - Kidney infection "pyelonephritis"

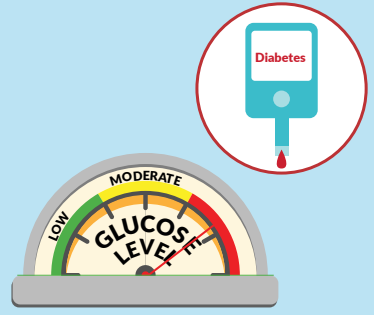
Memory trick: Look for the "N"
 - N - Nitrites
 - N - pyeloNephritis

kidNey pyeloNephritis

Urine Culture & Sensitivity

Culture: which bacteria is causing the infection
 Sensitivity: which antibiotic is the bacteria sensitive to, in order to kill it

Over 10,000 organisms/ml indicates a UTI.



Protein HIGH = Nephrotic Syndrome - Nasty protein loss

Glucose HIGH = Diabetes

Common EXAM Question

List of clients **MOST** at risk for **Metabolic Acidosis?** **Select all that apply.**

- 1. Renal failure
- 2. Pyelonephritis
- 3. Patient waiting for hemodialysis
- 4. Hyperventilation related to anxiety attack
- 5. Child with diarrhea x 2 days

Client with an infected toe due to diabetes is scheduled for cardiac catheterization with contrast, which lab value **should the nurse report** to

- 1. Blood Urea Nitrogen level of 19
- 2. Blood glucose of 155
- 3. Creatinine level of 1.9
- 4. White blood cell count of 14,500

Common EXAM Question

Client with history of diabetes... which does the nurse suspect?

- Dehydration (low fluid intake) & possible UTI.

Exhibit ✕

Spec. Gravity: 1.030

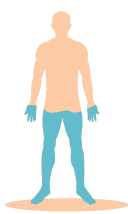
Protein: None

Glucose: High

Red blood cells: None

Leukocytes: Medium

✕ Close



Renal Failure

Pathophysiology Course

Acute Kidney Failure (Acute Renal Failure)

Sudden short-term loss of kidney function. If not stopped & reversed it can lead to chronic renal failure (CRD).

Pathophysiology & Causes

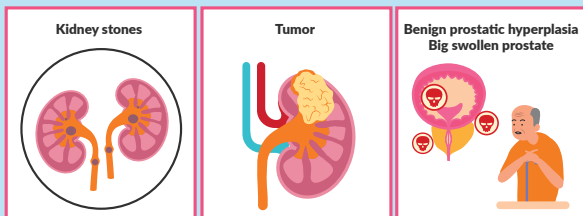
1. Prerenal - think decreased tissue "PRE-fusion"

- **Obstruction**
- **Low Blood Pressure**
Shock = Severely low BP
- **Low Cardiac Output**
Heart Failure = Heart Fails to pump

2. Intrarenal INSIDE the renal

- Acute kidney **infection**
- Nephrotoxins
 - **CT Contrast Dye**
Contrast kills the kidney!
 - **Antibiotics**
- Vancomycin
- Gentamicin
 - Creatinine **over 1.3**
= Bad kidney

3. Post Renal - think Past the Renal



KEY NUMBERS

- Creatinine **Over 1.3** = bad kidney
- BUN **Over 20**
- Urine output **30 ml/hr Less**
= Kidneys in distress
- Metabolic ACIDosis pH **below 7.35**

4 Phases of ARF / Manifestations

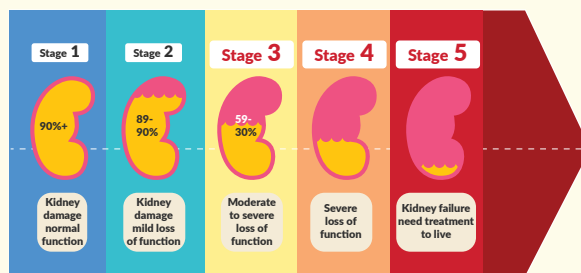
1. Onset of injury (initiation)
2. Oliguric phase
Less than 400ml in 24 hours **LOW** output = thick sticky urine
3. **Diuresis phase**
"Polyuric phase"
Diuresis = Drain urine 3-6 L per day!
4. Recovery phase
SLOW up to 1 year for recovery

Chronic Kidney Disease (Chronic Renal Failure)

Long-term chronic damage to kidneys, over years & years of destruction resulting in permanent damage

Pathophysiology

There are 5 stages of CKD as the kidney gradually loses function.



5 stages of CKD

GFR - Glomerular Filtration Rate
Over **90 mL/min** - normal

- Stage 1: 90 + GFR
- Stage 2: 89 - 60 GFR
- Stage 3: 59 - 30 GFR
- **Stage 4: 29 - 15 GFR**
- **Stage 5: 15 or Less GFR**
= End Stage Renal Disease

Causes of CKD

Top Tested Causes:

- Uncontrolled **Diabetes**
(High blood sugar)
- Long-term Hypertension
(High BP)
- **Nephrosclerosis**
(scarring of kidneys)
- Polycystic kidney disease
(PKD)

Diagnostics

C Creatinine

- **Over 1.3** = bad kidney

Creatinine clearance test

- 24 hours - collect all urine in a container.
- **Discard the FIRST** urine specimen



Renal Failure II

Pathophysiology Course

Chronic Kidney Disease (Chronic Renal Failure)

Signs & Symptoms (Manifestations)

Oliguria - LOW urine output as the kidneys are damaged, resulting in **excess waste & electrolytes** building up in the blood.

W WASTE

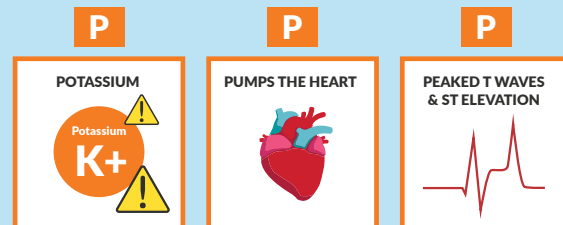
- H⁺ ions (Acid)
 - Metabolic ACIDosis pH **below 7.35**
- Urea
- Uremic frost
- Pruritus

H HIGH ELECTROLYTES

- Sodium Na⁺ **HIGH** (norm: 135 - **145**)
- Phosphorus **HIGH** (norm: 3.0 - **4.5**)
- Potassium K⁺ **HIGH** (norm: 3.5 - **5.0**)

High potassium Over 5.0 think **HIGH PUMPS** in the heart resulting in Peaked T waves, ST Elevation and eventually deadly V-Tach & V-Fib.

MEMORY TRICK



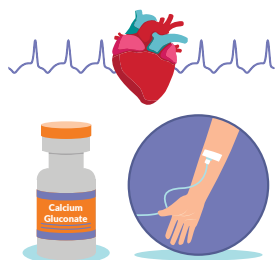
POTASSIUM (3.5 - 5.0)

- Peaked T waves - **6 - 7** mEq/L
- ST elevation - **7 - 8** mEq/L
- Wide QRS complex - **OVER 8**

Priority Treatment for High Potassium

PHARMACOLOGY FOR HIGH K⁺

1. IV Calcium Gluconate = Dysrhythmias
2. IV 50% Dextrose + **Regular INSulin**
3. Kayexalate (**polystyrene sulfonate**)
4. Dialysis



Critical Complications

- **Hypertensive Crisis**
PRIORITY Key Signs!
 1. Headache **NCLEX TIP**
 2. Nausea & Vomiting
 3. Change in mental status

Top 2 Missed Exam Questions

Patient with chronic kidney disease missed 3 dialysis sessions... **potassium level of 8.1** ... **wide QRS complexes, heart rate of 58** & lethargy. Which order should the nurse implement first?

- 1. IV 50% Dextrose & regular insulin
- 2. Sodium polystyrene sulfonate
- 3. Hemodialysis
- 4. IV calcium gluconate

End stage renal disease... **potassium 7.2**, BUN 35, **creatinine of 3.8**, and urine output of 300 ml in 24 hours. Which order is **PRIORITY**?

- 1. IV Regular insulin R & 50% Dextrose
- 2. IV loop diuretic
- 3. Dialysis
- 4. Put in for vacation time?

Signs of Fluid Volume Overload (FVO)

- Crackles in the lungs - wet fluid filled lungs
- JVD - jugular vein distention
- Bounding pulses from that fluid excess!

Anemia - Low RBCs, since kidneys release Erythropoietin, the hormone that stimulates bone marrow to produce red blood cells

Renal Failure III

Pathophysiology Course

Nursing Interventions

- Daily Weighing
 - **1 kg = 1 liter** of fluid retained
- **AVOID:** the top drugs that can cause kidney failure
 - NSAIDS
 - Milk of Magnesia (Antacid)
 - Antibiotics: Vancomycin + Gentamicin
 - CT Contrast dye! Thick cement in washers!



NO Sodium Na+

- **NO** canned / packaged foods
- **NO** processed meats

NO Potassium K+

- **Apples = BEST choice!** NCLEX TIP
- **NO** Salt Substitutes NCLEX TIP
- **NO** leafy veggies (spinach)
- **NO** Avocados, Carrots, Tomatoes
- **NO** Strawberries, Oranges or Bananas

LOW - Phosphorus

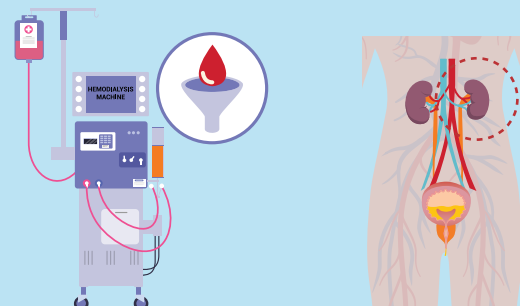
- **NO Dairy:** Yogurt, Pudding, Milk NCLEX TIP

LOW - Protein



Procedures

Hemodialysis: the machine version of the kidney, used to wash the blood. It is only used for a number of years until a **kidney transplant** is available.



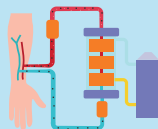
Notes

Dialysis

Pathophysiology Course

Hemodialysis

- Machine version of the kidney
- Helps to clean the blood by filtering waste & flushes out excess fluid and electrolytes



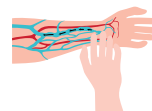
MEMORY TRICK

Any time you see the word "DIAL" think of the soap, it cleans the blood



Before Dialysis

- Assess **Fluid Status**
 - Weight (current & previous)
 - Vital Signs
- Assess **Fistula** (shunt) **NCLEX TIP**
 - Feel a thrill "vibration"
 - Hear a bruit



■ Hold meds:

• Antihypertensives

A	Ace & Arbs Lisino pril , Losartan
B	Beta Blockers Atenolo l NCLEX TIP
C	Ca Channel Blockers Nifedipine, Verapami l , Diltiazem
D	Diuretics Furosemide, Hydrochlorothiazide
D	Dilators Nitroglycerine

• Washed Out:

- Antibiotics
- Digoxin
- Water-soluble vitamins (B, C, and folic acid)

Deadly Complication

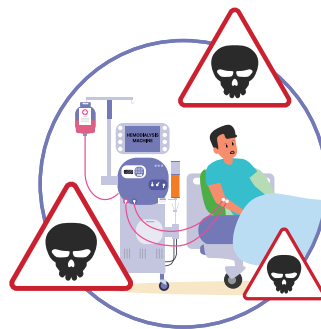
Deadly Complication

Dialysis disequilibrium syndrome (DDS)

- Restless & disoriented
- Vomiting
- Headache

Priority Action

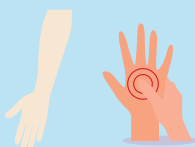
- Stop or slow infusion
- Report to Provider **NCLEX TIP**



Nursing Interventions

Care for Fistula (AV shunt)

- Squeeze or Grip: "Rubber ball" "sponge"
- Pitting edema = Normal



Not Normal

P	P	P	P	P
Pale skin "pallor"	Paresthesia "Numbness or tingling"	Pulses diminished	Poor cap refill	Pain (distal to shunt)

Monitor:

- Infection
- Bleeding
- Feel a thrill

No Nos

- **NO** restrictive clothing or jewelry (watch)
- **NO** BP on affected arm
- **NO** sleeping on arm
- **NO** creams or lotions
- **NO** lifting **over 5 lbs** (**NO** purse)

Dialysis II

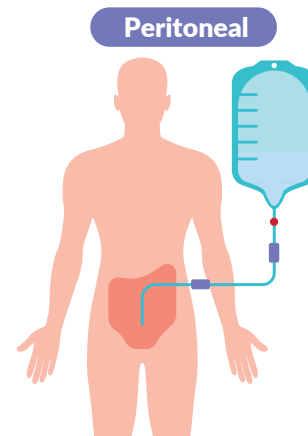
Pathophysiology Course

Peritoneal Dialysis

The peritoneal cavity is filled up with hypertonic solution to PULL solutes out

Before:

1. Take Weight
2. Warm solution



Infection Risk

Sterile technique **PRIORITY**

Peritonitis: Key Signs to REPORT

- Fever
- Tachycardia
- Cloudy drainage

Key Signs

- Crackles in lung bases
- Rapid respirations
- Dyspnea

Priority Intervention:

- First action: Raise HOB



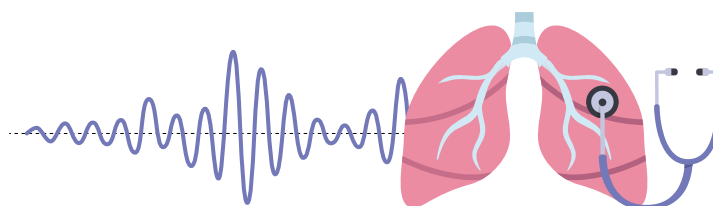
Respiratory Distress - due to rapid infusion or overfilling the abdomen:

Key Signs

- Crackles in lung bases
- Rapid respirations
- Dyspnea

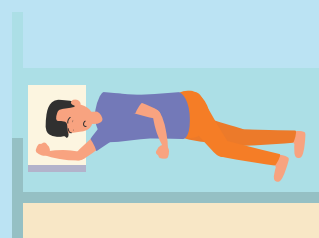
Priority Intervention:

- First action: Raise HOB
- Remember breathing over circulation



Insufficient outflow

1. Assess **Patient** = abdomen: distention & **Constipation**
2. Assess **Device** = catheter **kinks** & **obstructions**
3. **Intervention:** Reposition to **side-lying** position



Urinary Retention & Incontinence

Pathophysiology Course

Pathophysiology

Urinary REtention: Clients REtain urine in their bladder so that it can't get out

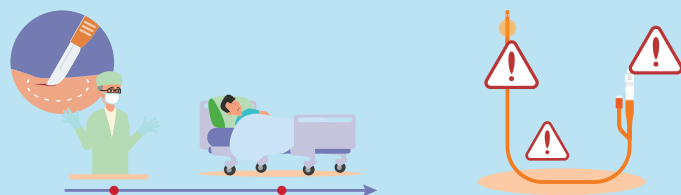
MEMORY TRICK

Big Prostate Holds



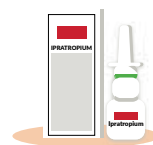
Causes

- After surgery - Post-op
- After Foley Catheter is D/Ced
- Men: Benign prostatic hyperplasia (BPH)

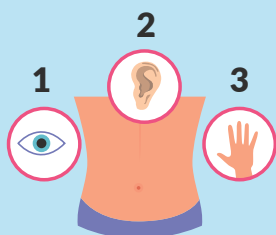


Medications that cause Retention

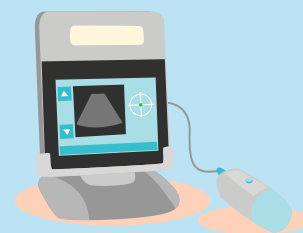
- **Opioids** (makes body low & slow)
 - Morphine & Hydromorphone - look for O's
- **Anticholinergics** (can't see, pee, spit, or shh poop)
 - IpraTropium (respiratory drug - you can't Pee with a TroPium)
 - Atropine - (increases HR - its hard to Pee with a TroPINE)
- **Tricyclic Antidepressants**



Nursing Care



- **Assessment 1st!**
 - Palpate the bladder
- **Intervention:**
 1. Normal Position - "Help client out of bed"
 2. Bladder Scanner
 - **Over 100 mL** = Report to HCP **TEST TIP**
 3. In & out catheter
 - **Hypotension** (low BP)
 - **Bradycardia** (slow HR)



Common Exam Question

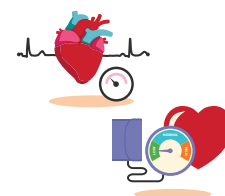
Q1: Patient taking hydromorphone with urinary retention suspected. First action?

- ✓ 1. Palpate the client's suprapubic area
- 2. Check chart input & output for fluid intake
- 3. Offer a bedpan
- 4. Clock out for lunch



Q3: Urgent catheterization for acute urinary retention... nurse places priority on which sign & symptom?

- ✓ 1. Bradycardia
- ✓ 2. Hypotension
- 3. Tachycardia
- 4. Risk for infection
- 5. Painful urination

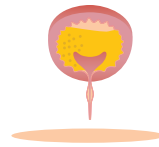


Urinary Retention & Incontinence II

Pathophysiology Course

Pathophysiology

Urinary IN-continence: Client can't hold urine IN



Urinary IN-continence

Types

U URGE INCONTINENCE

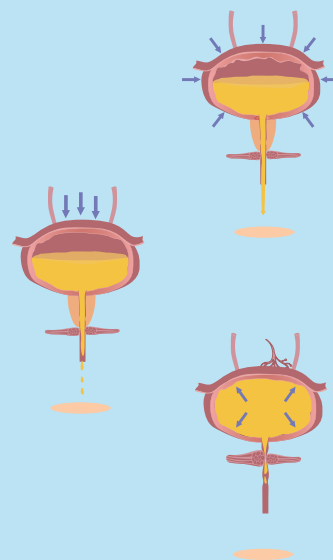
- Sudden URGE to urinate
- Typically known as Neurogenic bladder (loss of bladder control)

S STRESS INCONTINENCE

- Pressure STRESS causes urine to spill out
- Coughing, laughing, sneezing, running, jumping

O OVERFLOW INCONTINENCE

- OVERflow leads to dribbling urine
- Incomplete emptying

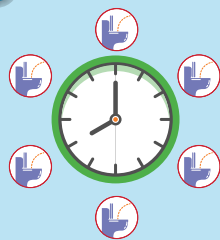


Causes

- Urethra prolapse
- Prostate enlargement (BPH)
- Weak bladder muscles - diabetic neuropathy & spinal cord injury



Management



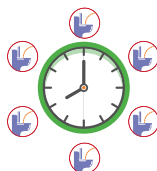
1. **Train Bladder:** Void **regularly** every **2 hours**
2. Weight Loss
3. **Kegel** Exercises 4 x daily
4. **AVOID:** Caffeine, Alcohol, Smoking
5. Anticholinergic Meds:
 - **Oxybutynin**
 - Dry mouth **Side Effect**



Common Exam Question

Priority teaching for a patient newly diagnosed with **stress incontinence**?

- ✓ 1. Voiding every **2 hours**
- 2. Kegal exercises 4 x per day
- 3. Avoid alcohol & caffeine
- 4. Take oxybutynin



The client understands self care of **urge incontinence** with which statements? **Select All That Apply.**

- 1. "I am going to void only in the morning & evening to ensure bladder training"
- 2. "It is ok to have moderate amounts of wine at night"
- ✓ 3. "I understand that taking oxybutynin may result in dry mouth"
- 4. "I understand that having excess weight is ok"
- 5. "I will limit my intake of coffee to only 3 cups per day"
- ✓ 6. "I will do Kegel exercises every day"

Nursing interventions ... **overflow** urinary incontinence? **Select All That Apply.**

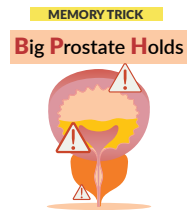
- ✓ 1. Teach to bear down when voiding
- ✓ 2. Teach to wait 30 seconds after voiding to try & void again
- ✓ 3. **Monitor for skin breakdown**
- ✓ 4. **Record output**
- 5. Ask for overtime pay

BPH - Benign Prostatic Hyperplasia

Pathophysiology Course

Pathophysiology

Benign prostatic hyperplasia: prostate enlargement that compresses the urethra & surrounding bladder causing difficulty urinating!



Signs & Symptoms



Urinary Retention

- Sensations of Incomplete emptying
- "Feel the need to urinate again immediately after urinating"

Urinary Frequency & Nocturia

- "Need to awake at night with the urge to urinate"

Straining to void

- "strain to begin a stream of urine"
- "stream of urine - weak or intermittent"

KEY WORDS



Complications (NOT Normal)

UTI (infection)

- "Burning sensation with urination"
- Cloudy or smelly urine



Treatments

- Bladder training & avoid caffeine

- Finasteride (brand Proscar)



MEMORY TRICK

Think of a man with a SWOLLEN prostate riding around on a horse - OUCH - thats a very painful Ride So think - if you want a Fun ride - get **FINasteRIDE** lol

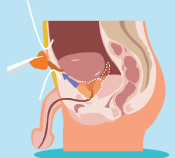
Surgery

- **TURP** - Transurethral resection of the prostate - less invasive as an instrument inserted directly through the urethra to remove the prostate.
- **Prostatectomy** - MORE invasive as a surgical incision is made.

After either procedure - 3 way Foley catheter is used for continuous bladder irrigation. This gives pressure to bleeding tissue & allows urine drainage.



T	TURP (Transurethral resection of the prostate)
P	PROSTATECTOMY



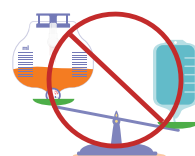
Common Exam Question

Prostatectomy 5 days ago ... small blood clots. First action?

- ✓ Advise client to follow up with HCP immediately

Test Tip

- Assess amount & **urine output**
- **Light pink color** - BEST
- Output = **MORE** than input
- **NOT** "equal to" or "less than"

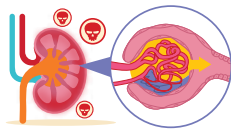


Glomerulonephritis vs. Nephrosis

Pathophysiology Course

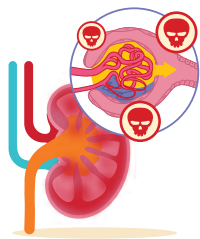
Glomerulonephritis

- inflammation & scarring of the kidney



Causes

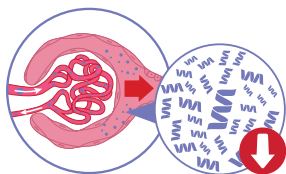
Infection - typically Strep infection and usually gone in 14 days



Signs & Symptoms

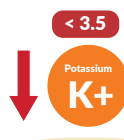
Glomerulonephritis

- UA: lower Proteinuria
- Recent Strep infection
- Fever
- Blood Labs: **WBC HIGH**



Treatment

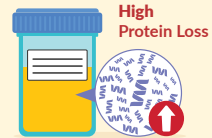
- Educate - finish all antibiotics
- Limit Protein **Exam**
 - A - Ace & Arbs
 - "-pril" - Lisinopril
 - "-sartan" - Losartan
 - B - Betas
 - C - CCB
 - D - Diuretics - "-ide"
 - Loops "FurosemIDE"
 - Thiazide "HydrochlorothiazIDE"



Both are potassium wasters - so watch out for hypokalemia (potassium less than 3.5)

Nephrosis (Nephrotic syndrome)

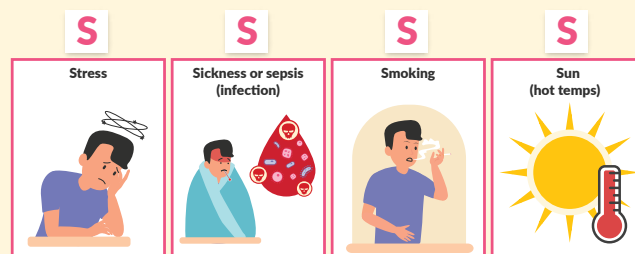
- Inflammation & scarring
- Key difference HIGH massive amounts of protein dumped into urine



Causes

Autoimmune diseases like Lupus where the body attacks itself

Triggers - 4 S's initiates an immune response

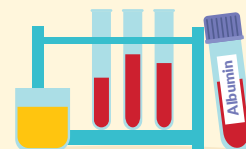


Signs & Symptoms

Nephrotic Syndrome

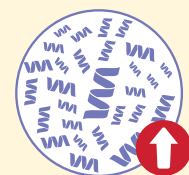
UA: **HIGH Proteinuria**
Blood Labs: **Low Albumin**
"Hypoalbuminemia"

Low Albumin



MEMORY TRICK

- Nephrotic Syndrome
- Nasty protein loss



Deadly Complication

Renal Failure & HTN Crisis!

Report key signs:

- Headache & Mental Status Changes
- Nausea & Vomiting
- Oliguria - NO or low urine output
- New, Sudden, Rapid Weight Gain



Treatment

- Increase Protein **Exam Tip**
- Treat cause & remove trigger
- Steroids "-sone" Prednisone



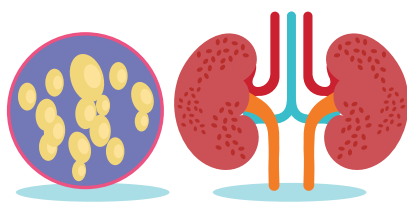
PKD: Polycystic Kidney Disease

Pathophysiology Course

Pathophysiology

PKD is an inherited disorder in which **clusters of cysts** (noncancerous round sacs containing fluid) develop within the body, **mainly the kidneys**, causing hypertrophy & eventually **chronic renal failure**.

Poly = Many
Cystic = Cysts
Kidney Disease



Patho Progression:

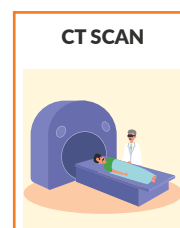
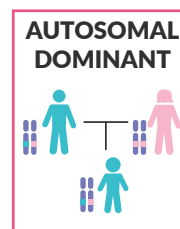
1. Multiple cysts on both kidneys
2. Enlargement of kidneys
3. Chronic renal failure

Causes:

- Autosomal dominant
- Gene 15

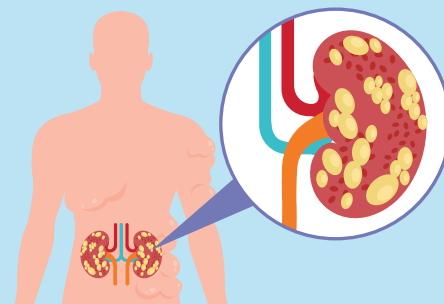
Diagnostics

- CT Scan
- Abdominal MRI



Signs & Symptoms

- Pain that worsens over time in the flank, lumbar back or abdomen
- Enlarged kidneys
- Increased abdominal girth
- Recurrent UTI
- Fever
- Hematuria (blood in urine)
- Proteinuria (protein in urine)
- Kidney stones (renal calculi)
- Hypertension



Pharmacology

- **Analgesics** (pain meds): opioids
- **Antibiotics** (for infections): Ciprofloxacin, Levofloxacin, Bactrim for recurrent UTIs
- **Antihypertensive agents:** (for HTN) Ace inhibitors, ARBs, diuretics

Interventions

- Monitor for hematuria & cyst rupture
- Increase sodium & water intake
- Provide bed rest
- Prepare client for dialysis
- **AVOID** giving NSAIDS due to increased risk of nephrotoxicity

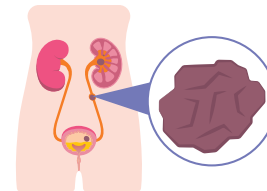
Notes

Renal Calculi

Pathophysiology Course

Pathophysiology

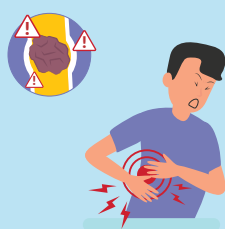
- **Renal Calculi** - hard stone calcified in renal usually made of calcium
Or names with Lith - meaning stone
- **Urolithiasis** - stone in urinary system
- **Renal Lithiasis** - stone in the renal
- **Ureterolithiasis** - stone in the ureter tubes connecting the kidney & bladder



Renal Calculi
Lith = Stone

Signs & Symptoms

- **Extreme PAIN**
- Like knife in the back
- Equivalent to childbirth



Urine Analysis

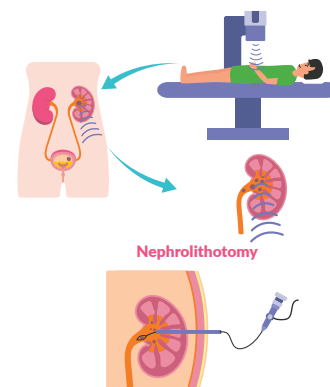
Urine analysis:

Hematuria **NCLEX**
Strain all the urine



Procedures

- **Shock waves** to break up LARGE stones into smaller stones that can be easily passed
- **Percutaneous Nephrolithotripsy**, also called **nephrolithotomy**, the HCP sticks a needle & scope into the kidney to suck out stones. After the procedure, temporary nephrostomy tube & bag to allow any loose stone fragments to pass & in the bottom you expect to see sediment. The bad news is that this drainage tube can get clogged with stones!

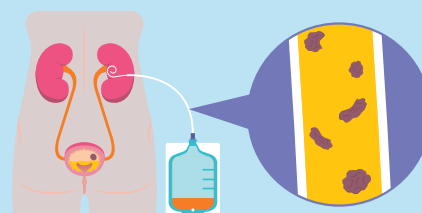


Key Point

PRIORITY

Maintain tube patency

Irrigation of the nephrostomy tube with sterile normal saline



Nursing Interventions After Procedure

Educate

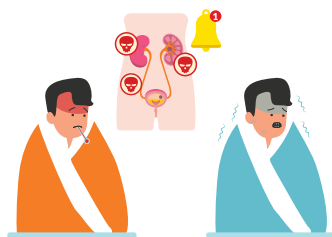
- Increase fluids

NORMAL

- Bruising & pain
- Blood in urine up to 24 Hours

NOT Normal

- Fever or chills



Nursing Interventions

1. Administer analgesics
2. Fluid intake - **3L/day**
3. Strain all urine for stones
4. Ambulation "**Walk & Move**"
5. **NOT** bed rest
6. **NEVER** massage

Diet

- **Restrict Protein: "animal meats"**
- Limit Purines: red meats, organ meats, beer

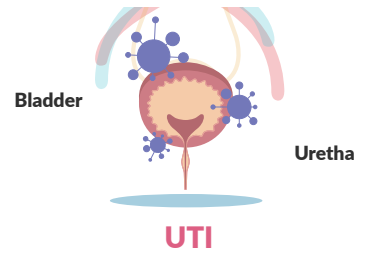
UTI & Pyelonephritis

Pathophysiology Course

UTI - Pathophysiology

- **UTI:** urinary tract infection - urethra, bladder
- **Cystitis:** Bladder infection

If that infection gets bad enough it can migrate & sort of climb up the Ureters to infect the kidneys.



Signs & Symptoms

Signs & Symptoms

- **Fever**
- **Dysuria**
"Burning during urination"
- **Urinary Frequency**
constant feeling of having to void

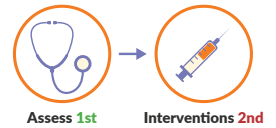


Diagnostics

Urinalysis

- Cloudy & smelly
- WBC
- Nitrites - Kidney infection
- Urine Culture & Sensitivity
Over 10,000 organisms/ml

NCLEX TIPS



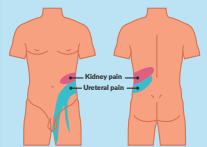
Pyelonephritis - Pathophysiology

Pyelonephritis: aka kidney infection
- more serious infection.



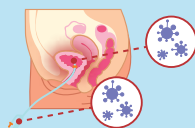
Signs & Symptoms

Dull **Flank** pain
Extending **toward Umbilicus**



Causes

- **Urinary retention**
 - BPH
 - Holding urine too long - nurse bladder
 - Kidney stones - renal calculi - can hold back urine
- **Foley catheters**
 - E Coli - MOST COMMON - bacteria in colon gets into urethra
 - Wiping back to front - scrapes ecoli into urethra



Complication

Confusion, UTI - quickly turns into urosepsis - infection in the blood that infects the brain.



Pharmacology

Treatment
Antibiotics: Sulfonamides & Levofloxacin
& Give analgesics for the pain



Diagnostics

First Action:
Obtain blood and urine cultures
and then begin ANTI-biotics



Nursing Interventions

- Increase **Fluid Intake**
2000 mL water daily
- **Void** after sex
- Take cranberry supplements
- **Avoid:** Caffeine & Alcohol

- **NO** Douching
- **NO** Spermicidal contraceptive
- **NO** Perineal deodorants
- **NO** Synthetic fabrics "Nylon" "Spandex"
- **NO** Bubble Baths
- Wipe **FRONT** to back



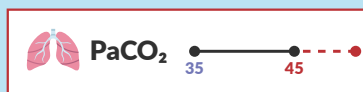
Respiratory

Respiratory Key Terms

Pathophysiology Course

Respiratory Key Terms

HyperCapnia High CO₂



Ventilation:

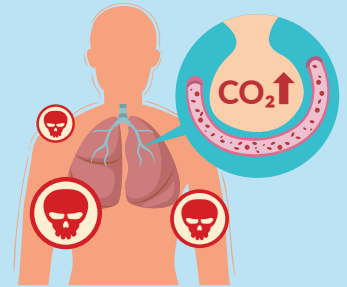
Inspiration and expiration
(active breathing)

Hypercapnia:

Increased CO₂ levels in the blood
with increased rate and depth
of respirations

MEMORY TRICK

- HyperCapnia
- High CO₂ (PaCO₂) above 45



Hypocapnia:

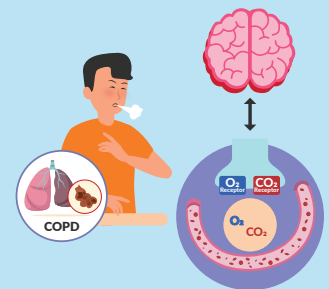
Low CO₂ levels. May be caused by
hyperventilation (blowing off CO₂)

Gas exchange:

Exchange of gas (CO₂ out - O₂ in)
between alveolar air and blood

Hypoxemia:

Decreased oxygen in the blood
(PaO₂ less than 80 mmHg)
Hypoxic drive in patients with chronic
lung disease like COPD



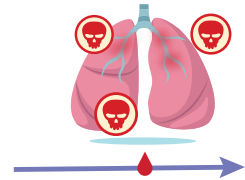
Notes

Asthma

Pathophysiology Course

Pathophysiology

Asthma is a **chronic inflammatory disorder** in the major pathways of the lungs: **Bronchi & Bronchioles**. It comes & goes with flare-ups in the form of **asthma attacks that are reversible!**



MEMORY TRICK

A - Asthma
A - Acute Attacks that come & go

During an **asthma attack 2 key things happen:**

- 1. Bronchoconstriction:**
Bronchi puff up with inflammation & get VERY tight.
- 2. Wet, mucus filled lungs:**
Excessive mucus production from goblet cells that line the respiratory tract.



PRIORITY! Since the respiratory tract is so constricted that **oxygen cannot get in & CO2 cannot get out**, resulting in air trapping and making it hard to exhale.

Signs & Symptoms

A	Accessory muscle use Critical Sign: Paradoxical Breathing
S	SOB & dyspnea Critical Sign: Single word dyspnea
T	Tight CHEST & Tachypnea
H	High-pitched wheezing
M	Minimal "diminished breath sounds"
A	3 A's Absent Breath Sounds (Silent Chest) PRIORITY Acidosis (CO₂ retention) Air trapping - Prolonged exhalation



Patho Test Tip: Acid / Base Imbalances

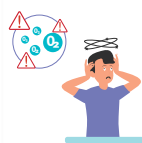
Early Stages	Late Stages
Respiratory Alkalosis Hyperventilation: breathing off CO ₂ Memory Trick: Pant like a dog Alk Alk Alkalosis	Respiratory Acidosis Hypoventilation Retaining CO ₂ Memory Trick: Snoring with low & slow breathing sounds like Acccccidosis

Critical Complications

Hypercapnic respiratory failure = **HIGH CO₂**
Hyper Capnic = **High Carbon** dioxide

ABG (Arterial Blood Gas)

- pH less than **7.35** = **Acidosis**
- PaCO₂ - **Over 45** = **Acidosis**
- PaO₂ - Less than 80! = Hypoxic



- * 1st Sign of Hypoxia = **Mental Status Change**
- Agitation
 - Restlessness **NCLEX TIP**
 - Drowsiness



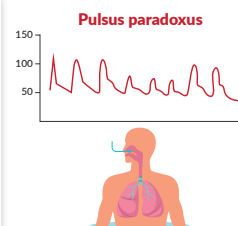
- NCLEX TIP**
- Status Asthmaticus
- Endotracheal Intubation

Key Sign of Status Asthmaticus Test Tip

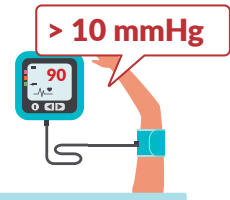
Pulsus paradoxus

Drop in Systolic Blood pressure
More than 10 mmHg

- Decrease in stroke volume
- Decrease in systolic blood pressure (systolic squeeze)
- Pulse wave amplitude during inspiration



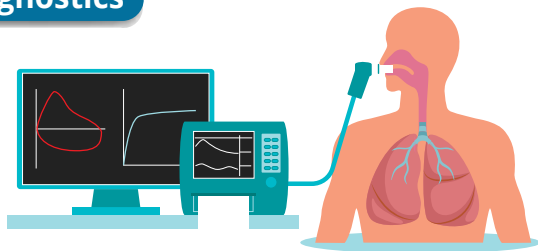
Patho: increased negative pressure within the lungs puts a lot of **added pressure on the left ventricle**, making it difficult for the heart to pump oxygen-rich blood to the body.



Asthma II

Pathophysiology Course

Diagnostics



PFT - Pulmonary Function Test

This diagnostic test shows how well the lungs are working. It measures total lung capacity, volume, gas exchange & rates of flow. This data helps the healthcare provider (HCP) diagnose & treat lung disorders

Peak Expiratory Flow Rate

- Sort of like a weather forecast - we want to anticipate a Severe asthma attack - before it happens!

Green zone

- Green means go.
- Asthma is around 80 - 100% under control.

Yellow zone

- Yellow means mellow.
- Asthma is **NOT** under control here! So there is a HUGE need for additional medication
 - Rescue drug **every 4 hours for 1-2 days**
 - Call HCP (provider)
NEED additional meds or change in treatment

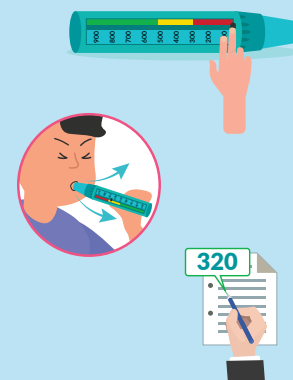


Red zone

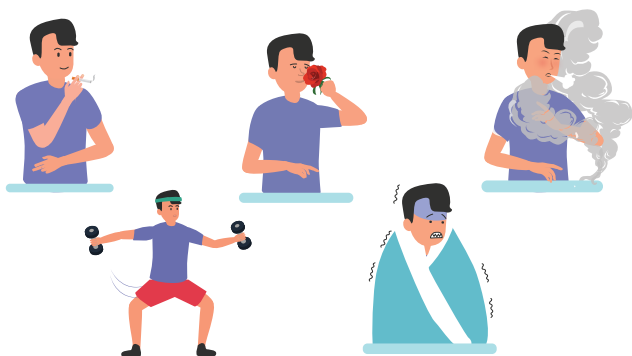
- Red** means **Really** bad!
- Emergency treatment is needed immediately if the level does not return to yellow **RIGHT** after taking rescue drugs!

Correct Order - Peak Flow Meter

- Stand or **sit in upright** position
- Put the flow meter scale to **0 or lowest value**
- Inhale deeply
- Put the mouthpiece in mouth & create a seal with the lips
- Exhale as quickly & forcibly** as possible & record reading
- Repeat 2 more times, with a break of 5 -10 seconds between
- Record 1 score = the HIGHEST** of the 3 attempts



Triggers



Anything that can irritate the sensitive bronchi:

- Cigarette smoke
- Pollen
- Dust
- Strenuous exercise
- Cold weather

MEMORY TRICKS

- A** - Allergens (dander, dust, pollen)
Elevated **Eosinophils**
- S** - Smoking (second hand cigarette smoke)
S - Stress (emotional, physical)

Patho Test Tips

Extrinsic (External)

- Type I hypersensitivity
Immediate allergic reaction

Intrinsic (Internal)

- Airway hyperresponsiveness (Adult onset)
Asthma attacks brought on by:
 - S** - Sickness (Respiratory infection)
 - S** - Stress
 - S** - Severe weather (cold)
 - S** - Strenuous activity (exercise)
 - Drugs

Drugs to AVOID

- N - NSAIDS** Naproxen, Aspirin, **ibuprofen**, indomethacin, & **ketorolac**
- N - Not good for Asthma**



B - Beta blockers

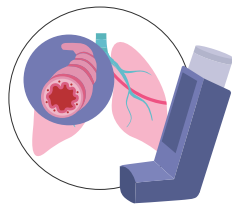
- B - Blocked HR & lungs**
 - Propranolol (Inderal) = Nonselective
 - Atenolol = Selective (cardio "Beta 1" selective)



Asthma III

Pathophysiology Course

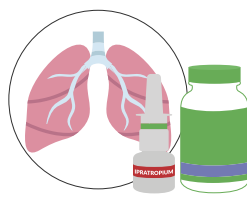
Pharmacology



BRONCHODILATORS

B	Beta 2 Agonist Albuterol
A	Anticholinergics Ipratropium
M	Methylxanthines Theophylline

NCLEX TIP



ANTI-INFLAMMATORY AGENTS

S	Steroids Beclomethasone
L	Leukotriene Inhibitor Montelukast
M	Mast Cell Stabilizers Cromolyn

Bronchodilator - BAM team

- **B - Beta 2 agonist - albuterol** - think buterols for Brutal asthma attacks! It's considered the 1 & only rescue drug for asthma attacks
- **A - Anticholinergics - Ipratropium** - dries out the body, decreasing secretions & dilating the airways - you cant pee - with a tro-pium
- **M - Methylxanthines - Theophylline** - very toxic & very fast HR!
10 - 20 therapeutic range

MEMORY TRICK Phyllines have you Feeling toxic & tachycardic

MEMORY TRICK

AIM for Acute Asthma Attack

- A - Albuterol** 1st
- I - Ipratropium** 2nd
- M - Methyl-predniso-lone** (brand: Solumedrol)

Anti-inflammatory Agents - SLM Team

- **S - Steroids** "-sone" like Beclomethasone -
Top side effects - **3 S's** for **Sone** Steroids
 - **S - Sores** in mouth (oral thrush "candida") so instruct the client to wash out their mouth after every use & inhalers go into the sink, twice per week.
 - **S - Sepsis & sickness** (increased risk for infection) & increases WBC count in the body
 - **S - Sugars increased** (elevated glucose levels)

Last 2 - are NOT highly tested here

- **L - Leukotriene inhibitors** ending in Lukast like Montelukast (Singular) - think Luke likes to sing
- **M - Mast cell stabilizers** - Cromolyn



Metered Dose Inhaler

- **Shake it BEFORE** you take it!
- **Hold breath for 10 seconds after taking**, so that the med can get deep into the airways.



Most Commonly Missed Question

Patient with Severe asthma:

- Tachycardia (>120 BPM)
- Tachypnea (> 30 BPM)
- O2 sat < 90% on RA
- Peak exp. Flow < 40% predicted or best < 150L/min)

Which medication would you give? Select All that apply

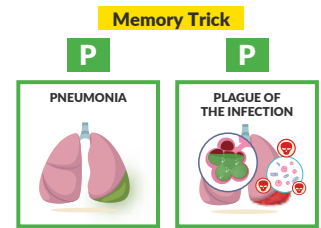
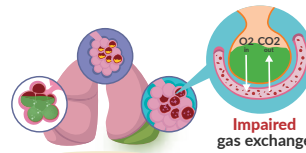
- 1. Inhaled salmeterol
- 2. **Albuterol inhaler**
- 3. **Nebulizer Ipratropium**
- 4. IV methamphetamines
- 5. **IV Methylprednisolone**

Pneumonia

Pathophysiology Course

Pathophysiology

Pneumonia is a **major infection within the lungs** causing severe inflammation & filling the alveoli with mucus, fluid, & debris. This leads to **impaired gas exchange** since carbon dioxide **CO2 can't get out** & oxygen O2 can't get IN, ultimately resulting in **hypoxia (low oxygen)**.



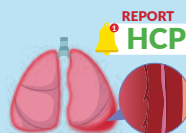
Signs & Symptoms

TOP 6 MANIFESTATIONS

1. Altered Mental Status
Restlessness, Agitation, Confusion
2. **Fever** (Over 100.4°F/ 38°C)
3. Productive cough "**Yellow Sputum**"
4. Fine or Coarse **Crackles**
5. **Dyspnea** "Shortness of Breath"
6. Pleuritic Chest pain
(Pleural friction rub) Report to HCP
"**Sharp** chest pain upon inspiration or coughing"



Big Sign



Common EXAM Question

Priority Patient: who to see first?

- ✓ **Post operative** patient with suspected **pneumonia** temp. of 98.2°F, SpO2 94%
... **becoming restless & agitated.**

Patho Key Points

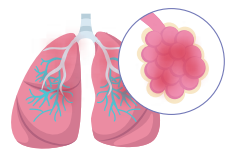
Lobar pneumonia:

- Infection in 1 or more LOBES
- **Cause:** Streptococcus pneumoniae
- **Pleural empyema:**
collection of pus in the pleural cavity
- **Manifestations** (signs & symptoms)
 1. Sudden onset
 2. Rales (crackles)
 3. **Rusty colored sputum**
(caused by exudate)



Bronchopneumonia:

- Diffuse infx in **BOTH LUNGS**
Memory Trick:
B - Bronchopneumonia
B - Both Lungs
- **Cause:** Several different microorganisms
- **Manifestation** (signs & symptoms)
 - **Yellow or green sputum**
 - with productive cough



Diagnostics

1. Chest X-ray (CXR) **Patho Test Tip**
2. Elevated white blood cells (WBC)
Over 10,000
3. Sputum Culture
4. ABGs (respiratory acidosis)

TEST TIP

Blood cultures are always taken first **BEFORE** antibiotics

MEMORY TRICK

A - Antibiotics begin
A - **AFTER** cultures
in order to identify the causative bacteria & choose the best treatment.

1st

CULTURES

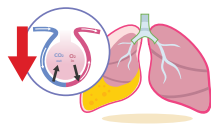


Notes

Pneumonia II

Pathophysiology Course

Critical Complications



1. Pleural Effusion

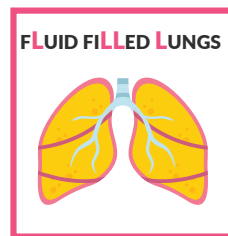
Fluid that fills the pleural space (space between the lung itself & the chest wall). This prevents full expansion of the lung, resulting in decreased gas exchange.

Priority Intervention

- **Thoracentesis:** big needle in the lung space to drain the fluid!
- **2 BIG complications:**
Pneumothorax (popped lung)
Hemothorax (blood in the lung space)
- **PRIORITY** to report:
Asymmetrical chest expansion &
Decreased breath sounds

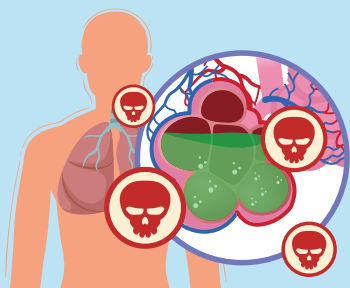
KEY SIGNS

1. D - During **inhalation** = Chest pain
2. D - Dyspnea
3. D - **Diminished** breath sounds
4. D - **Dull** resonance on percussion



2. ARDS (acute respiratory distress syndrome)

ARDS, think **HARDS** - hard stiff lungs



KEY SIGNS

Refractory Hypoxemia = Low PaO₂

MEMORY TRICK

- **RE**sistant to Oxygen
- **RE**fractory Hypoxemia

#1 Sign of **Low O₂** = Altered Mental status

1. Confusion
2. Agitation
3. **Restlessness**



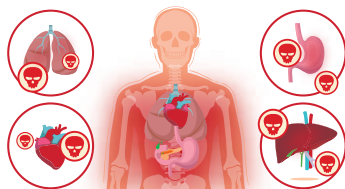
3. Septic Shock



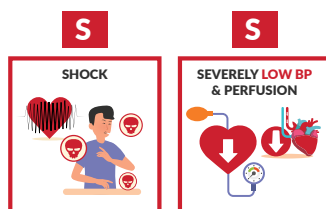
If the infection gets severe, the body releases chemicals into the bloodstream to fight the infection resulting in severe low blood pressure & total body inflammation which can damage multiple organs causing them to fail, known as MODS - multiple organ dysfunction syndrome.

MEMORY TRICK

- S** - Shock
- S** - Severely Low BP & perfusion

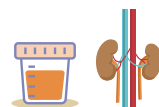


MEMORY TRICK



Key signs

- Hypotension **NCLEX TIP**
 - Systolic < **90 mm Hg**
 - MAP < **65 mm Hg**
- Cap refill over 3 - 4 seconds
- Tachycardia
- Early - Fever (Over 100.4)
- **Late** - Hypothermia (**Under 96.8°F**)
- Elevated WBC (norm: 10,000 or less)
- Decreased Urine Output
 - **30 ml/hr or Less** = Kidney Distress



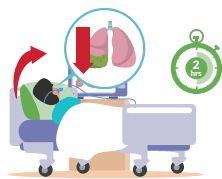
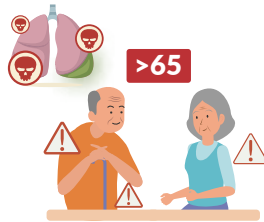
MODS - Multiple Organ Dysfunction Syndrome

Pneumonia III

Pathophysiology Course

Risk Factors & Causes

- #1 - **Advanced AGE**
Over 65 years old
- VAP - "**Ventilator Associated Pneumonia**"
 - Reposition side to side **Q 2 hours**
 - Oral Care & Suctioning **Q 2 hours**
 - Chlorhexidine**
- Best indicators of VAP **NCLEX TIP**
 - Positive sputum culture**
 - Fever**
 - Chest X-ray: new infiltrates



- Prolonged immobility - secretions are not mobilized & get stuck in body
- Post-Operative - Anesthesia - the body is put to sleep which traps infection in the lungs

Common Exam Question

Best indicator of ventilator associated pneumonia (VAP) ?

- ✓ Positive sputum culture

Best blood lab value shows effective treatment of pneumonia after IV antibiotics?

- ✓ White blood Cell count



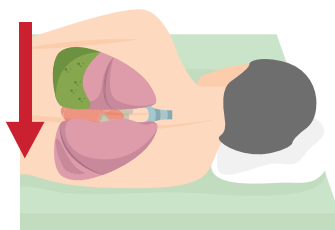
Nursing Care

Mobilize secretions & Expand Lungs

- Chest physiotherapy
- TCDB - turn **cough** & deep breathe!
 - Huff **coughing** technique **NCLEX TIP**
 - AVOID** cough suppressants
- Fluid** 2 - 3 L per day
- Positioning
 - HOB UP! **High Fowler's**
 - Hypoxia** in Unilateral Pneumonia? = Good Lung Down **NCLEX TIP**



Common Exam Questions



Early ambulation

(within **8 hours** after surgery)

Cough with splinting

Hand Washing

Mouth Care Q 12 hour

- Chlorhexidine swab
- Incentive Spirometer **Q Hour**
- GIVE** Pain Meds



Interventions

Mobilize Secretions

- Avoid** cough suppressants
 - Antitussives: Codeine
- Cool mist humidifier** at night
- Increase Fluids

Re-expand Alveoli

- IS - Incentive spirometer** at home

Prevent Reinfection

- Finish oral antibiotics** at home
- Pneumonia vaccine** (Every 5 years)
- Smoking cessation
- Hand Washing
- Schedule follow up** & Chest X-ray
- Report:** increased or Worsening
 - Fever
 - Confusion
 - SOB, cough, sputum

Respiratory Failure & ARDS

Pathophysiology Course

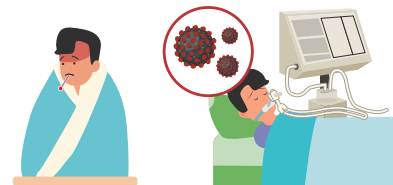
Respiratory Failure

When the capillaries (little blood vessels in the alveoli) cannot adequately exchange CO₂ for Oxygen.



Causes

- Infection causes these alveoli to become swollen, inflamed, & filled with mucus or fluid which blocks gas exchange!
- Clients can present with a common FLU which can progress into pneumonia & eventually into **DEADLY A.R.D.S.** - Acute Respiratory Distress Syndrome



Signs & Symptoms

Hypoxemia LOW O₂

#1 Sign = Altered Mental status **NCLEX TIP**

1. **Agitation**
2. **Restlessness**
3. Confusion

ARDS

Refractory Hypoxemia

Low PaO₂ = **Despite Oxygen delivery**



MEMORY TRICK

REsistant to Oxygen
REfractory Hypoxemia



Lab Values

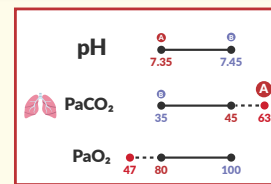
ABG Arterial Blood Gas
Low **PaO₂**
High **CO₂**



Common Exam Question

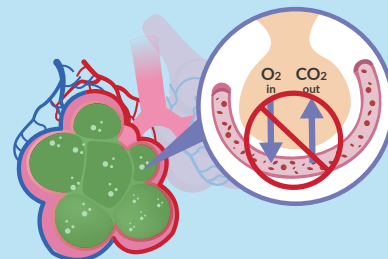
Which arterial blood gas (ABG) values support suspected acute respiratory failure (ARF)?

- 1. PaO₂ 55 mm Hg, PaCO₂ 47 mm Hg
- 2. PaO₂ 62 mm Hg, PaCO₂ 32 mm Hg
- 3. PaO₂ 47 mm Hg, PaCO₂ 63 mm Hg
- 4. PaO₂ 82 mm Hg, PaCO₂ 22 mm Hg



ARDS Pathophysiology

The alveoli become hard due to the capillaries around the Alveoli becoming inflamed & fluid-filled, creating a **leaky barrier**, which eventually fills up the little alveoli sac like a sinking ship! THIS makes it impossible to get oxygen in & to get CO₂ OUT! Eventually clients DIE from hypoxia IF they are not on a ventilator early.



MEMORY TRICK

- ARDS = **HARD** Alveoli

PRIORITY DIAGNOSIS

- Impaired gas exchange

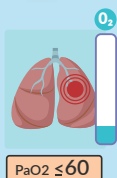
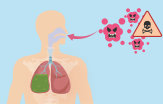
Causes

- **Sepsis** - bloodborne infection that inflames the entire body
- **Respiratory inflammation** - pneumonia, inhaled toxin, or even aspiration.
- **Acute pancreatitis** = HIGH risk for developing ARDS **NCLEX TIP**
accidental release of active pancreatic enzymes & cytokines into the bloodstream - which get sucked into the lungs causing inflammation.

A.R.F. - ACUTE RESPIRATORY FAILURE

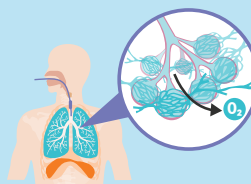
2 types:

- Hyp**OX**emic failure **LOW O₂**
(PaO₂ 60 or LESS)
- Hyper**Capnic** failure **HIGH CO₂**
(PaCO₂ Over 50)



PaO₂ ≤ 60

Nursing Interventions for ARDS



Mechanical Ventilation

PEEP (positive end-expiratory pressure)

- H** High Fowler's position (HOB up)
- O** Oral suctioning & Oxygen
- L** Listen to lung sounds
- Y** Yell for help! Notify HCP "provider"

Oxygen Delivery Devices & Hypoxia

Pathophysiology Course

Hypoxemia (PaO₂ less than 80 mmHg)

Early Signs

NCLEX TIP

Brain: Mental Status Change

- Restlessness
- Agitation "irritability"
- Confusion



Vitals Signs - HIGH

- RR - Tachypnea (over 20 RR)
- HR - Tachycardia (over 100 bpm)
- BP - Hypertension (over 140 sys.)

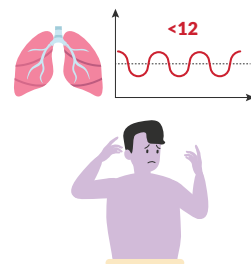


Positioning

- Accessory muscle use
- Paradoxical breathing
- Tripoding

Late signs

- Low Vitals
 - Bradypnea (below 12)
 - Bradycardia (below 60)
 - Hypotension
- Skin Blue
 - **Cyanosis**
- ECG dysrhythmias



CAUTION: Avoid combustion!
Oxygen is **HIGHLY** flammable

NO	NO	NO
Smoking (open flame)	Static (synthetic / wool fabrics) = ONLY Cotton	Flammable material • Alcohol • Acetone (nail polish)

Device	Description
NC - Nasal Cannula 	1 - 6 Liters per minute (LPM) 25 - 45% O ₂ Short-term use: low oxygenation after surgery Long-term use: can dry out mucous membranes in the nose, so we use humidification for long term use.

Device	Description
NRB non-rebreather 	10 - 15 LPM Medical Emergencies 60 - 100% O ₂ Key Points: <ul style="list-style-type: none"> • Used during carbon monoxide poisoning • If the reservoir bag is fully deflated on inspiration = Increase oxygen flow. Don't let the EXAMS trick you: <ul style="list-style-type: none"> • Do not open flutter valves • Do not tighten face mask straps first if the reservoir bag is fully deflated.

Device	Description
Simple Face Mask 	6 - 10 LPM 40 - 60% O ₂ Used in exchange to partial rebreather & non-rebreather.

Device	Description
Venturi Mask 	4 - 10 FiO ₂ Most precise oxygen delivery device Memory Trick: V - Venturi Mask V - Very Accurate O ₂ Typically used for patients with unstable COPD who cannot tolerate changes in oxygen concentration from other devices.

Device	Description
Partial Rebreather 	6 - 10 LPM 35 - 60% Looks very similar to the non-rebreather Key difference is the flutter valves on the sides

Device	Description
Face Tent 	Used facial trauma & burns High humidification <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> F Face Tent </div> <div style="text-align: center;"> F Face Trauma </div> </div>

Oxygen Delivery Devices & Hypoxia II

Common EXAM Question

A patient **recovering from surgery** in the postoperative area suddenly becomes **confused**, pulse ox reading shows a drop from **98% to 90%** on room air. What is the most appropriate intervention?

- 1. Apply non-rebreather
- 2. Apply simple face mask
- 3. **Apply nasal cannula**
- 4. Raise the head of bed



BiPAP (Bilevel Positive Airway Pressure)

Most tested: used for **worsening COPD** with **High levels of CO₂ retention (Hypercapnic)**. Bipap is a positive pressure machine that forcefully PUSHES air Deep into the lungs giving much needed Oxygen while expelling CO₂!! Typically last line oxygen device before endotracheal intubation.

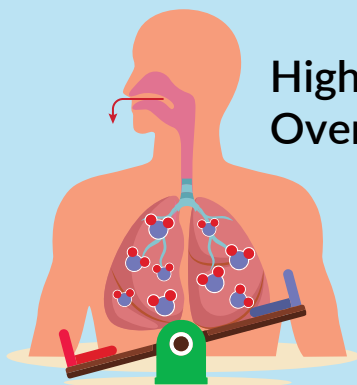
Respiratory Failure:

- **Hypoxemic** respiratory failure = Low O₂
- **Hypercapnic** respiratory failure = **HIGH CO₂** (Over 45)

Priority = BiPap

Memory Trick

HyperCAP
Give BiPAP



Intubation (Endotracheal intubation)

Ultimate solution to keep the airway open!
A tube is inserted directly into the trachea to ventilate the client manually.



Complication:

- VAP - "Ventilator Associated Pneumonia"
 - Reposition side to side **Q 2 hours**
 - Oral Care **Chlorhexidine Q 2 hours**
- **Monitor** Key Signs:
 - **Positive sputum culture**
 - **Fever**
 - Chest X-ray: **new infiltrates**



COPD

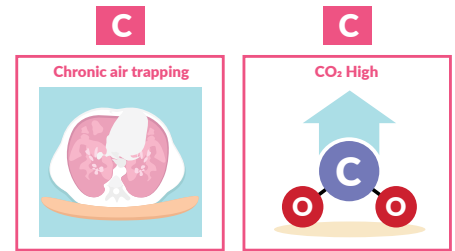
Chronic Obstructive Pulmonary Disease

Pathophysiology Course

Pathophysiology

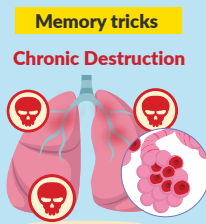
COPD is irreversible damage to the alveoli & bronchi of the lungs. Think "Chronic Obstruction from Chronic Destruction", resulting in decreased gas exchange and leading to the double Cs:

- C - Chronic air trapping** results in reduced gas exchange, due to inflammatory damage to the lungs!
- C - CO2 High!** Clients can't be breathed out due to limited airflow & inability to fully exhale!



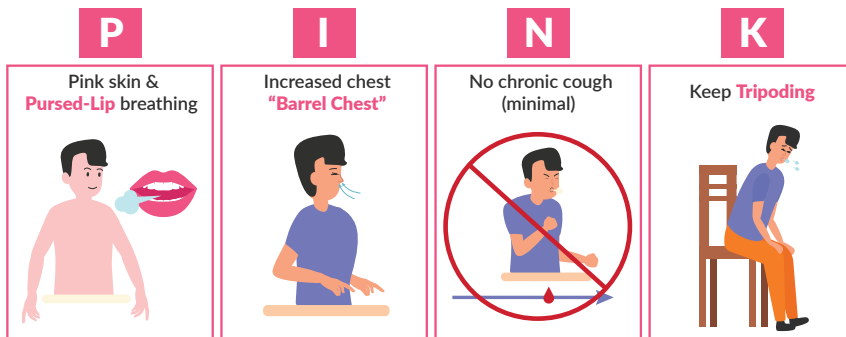
Causes & Risk Factors

- **Smoking**
- Car mechanics



Specific Signs & Symptoms

Emphysema "Pink puffer"



Emphysema results in damage to the alveoli that leads to loss of **lung elasticity & inflation** due to the **loss of surfactant** which helps the lungs stretch. Eventually there is loss of lung tissue recoil & air trapping.

Manifestations

1. **New dyspnea** at rest (shortness of breath)
2. **Weight loss**
3. **Prolonged expiration**
4. **Clubbed fingers** (long-term hypoxia = vasodilation)

Memory Trick

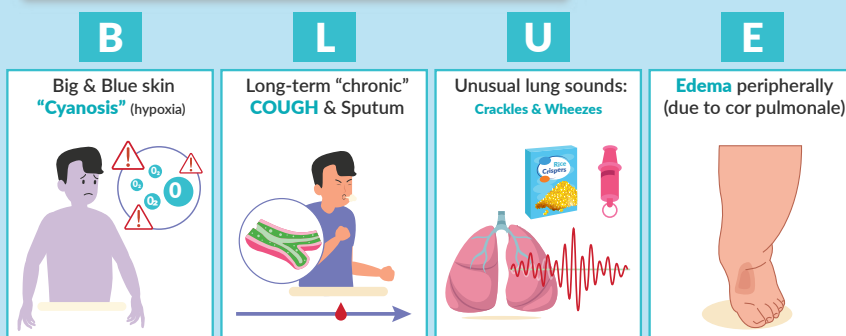
- **L**ong-term hyp**O**xia
- **VasO**dilated fingers (clubbing fingers)

Complications

Advanced emphysema:

- Frequent infections
- Risk for **pneumothorax** due to rupture of blebs

Chronic bronchitis "Blue bloater"



Chronic bronchitis manifests from inflammation of the bronchi (**smooth muscle hypertrophy**) & excessive **mucus production** results in chronic hacking cough, and recurrent lung infections.

Patho Tip

Episodes of coughing:

- Lasting **3 months or longer** **Test Tip**
- Productive cough: thick mucus & purulent secretions
- More **severe in the morning**

Chronic bronchitis "Blue bloater"



COPD II

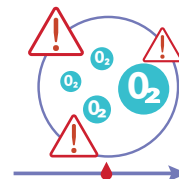
Chronic Obstructive Pulmonary Disease

Pathophysiology Course

General Signs & Symptoms

Clubbing fingers

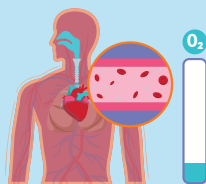
Round fingernail beds from long term chronic hypoxia.



Compensatory Mechanisms

Test Tip

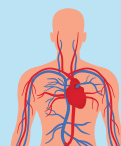
- Severe hypoxia
- Polycythemia for compensation
- Report HIGH hemoglobin levels



Polycythemia:

This refers to the body producing an increased number of red blood cells (RBCs) due to hypoxia (low oxygen) within the body. **Instead of perfusing the body**, these extra RBCs make the blood very thick, causing blood clots like traffic jams with blood vessels, mainly in the brain (CVA - stroke).

This is why we **MUST report any extremely HIGH hemoglobin levels**.



Vascular damage

Cor Pulmonale
(Unique cardiovascular involvement)

Pulmonary HTN
(pressure within the lungs)

Memory Trick

- R - Right sided heart failure
- R - Rocks the body with fluid

Key signs

Edema, JVD & Weight Gain

Lab Values

- Don't get tricked: **Anemia is NOT common** with these patients, rather increased blood count.
- ABG** (arterial blood gas) **Key numbers**

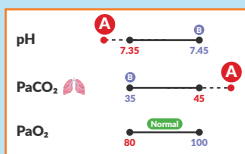
Low PaO₂ 32 = **Hypoxemia**

Below 80 (Normal 80 - 100)

High PaCO₂ = **HyperCapnic**

pH less than **7.35** = **Acidosis**

PaCO₂ - **Over 45** = Acidosis



Memory trick

COPD - CO₂ PrisonerD
Carbon Dioxide
Carbon di**ACID**

Deadly Complication

Respiratory Failure:

Hypoxemic respiratory failure = Low O₂

Hypercapnic respiratory failure = **HIGH CO₂**

Priority = BiPap

Memory Trick

HyperCAP = Give BiPAP

#1 Monitor: **Mental Status Change** **NCLEX TIP**

- Restless
- Decreased LOC
- Confusion



COPD III

Chronic Obstructive Pulmonary Disease

Pathophysiology Course

Priority Question

An elderly client with worsening COPD presents to the emergency department with fatigue and altered level of consciousness. Upon assessment the nurse finds O₂ saturation of 87%, and ABG: pH 7.21, PaCO₂ 75, and PaO₂ 55 mm Hg. Which immediate intervention is best?

- 1. Apply oxygen 4 LPM via nasal cannula.
- 2. Call respiratory for STAT albuterol treatment.
- 3. Sit the patient upright and apply Bilevel Positive Airway Pressure BiPAP
- 4. Start looking for other jobs in cosmetic surgery.

HyperCAPnic (High CO₂) = BiPAP



Nursing Interventions

Diet:

- Oral hygiene **BEFORE** meals to wake up the taste buds!
- Eat **small**, frequent meals (decreases stomach distention)
- HIGH **calories & protein**
 - **AVOID** eating high amounts of **carbohydrates** Kaplan
 - **AVOID** exercise 1 hour Before/After meals
 - conserve oxygen for chewing & swallowing
 - **AVOID** Gassy Foods
 - **NO** carbonated drinks
 - **NO** high-fiber foods (broccoli, beans)

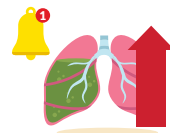


Fluids:

- Increase **fluid** intake **8 glasses (2 - 3L/day)** to thin that mucus
- **AVOID** drinking fluids while eating

Infection:

- **Report increase in sputum**
- Fever, Worsening dyspnea



Vaccines:

- **Pneumococcal every 5 years**
- Flu vaccine **every year**

Meds: Albuterol if short of breath to vasodilate the lungs & allow more air flow

Nursing Interventions

COPD exacerbation

NO Opioids:

- M**O**rphine
- Hyd**O**rmorphone
- Hyd**O**codone
- **O**xy**C**done

Look for the O's to know its an opioid:



Our crazy pam & lam ending drugs



NO Benzos:

- Diaz**e**pam (brand: Valium)
- Loraz**e**pam (brand: Ativan)

EXAM Question

An **82 year old** client with **COPD** presents with **dyspnea, restlessness, pursed lips & in tripod position** complaining of anxiety, pain and "not being able to breathe". The nurse should **question** which order? **Select all that apply**

- 1. Ipratropium
- 2. **Hydromorphone**
- 3. Rescue inhaler
- 4. Oxygen via nasal cannula 3 L/min
- 5. **Diazepam**



Side Note

for our patients with heavy mucus

Bronchitis

- **Before Bed** - Mobilize Secretions
- Guaifenesin (Brand: Mucinex)
- Cool mist humidifier at night to make breathing easier.

Breathing:

Pursed lip breathing

- **Inhale:** 2 seconds via nose (closed mouth)
- **Exhale:** 4 seconds with pursed lips

MEMORY TRICK

- 2 nostrils = 2 seconds INhale like smelling a rose
- Pursed lips for 4 seconds EXhale like blowing a kiss

Huff **coughing** technique

Correct Order:

1. **Sit upright in a chair:** feet shoulder width apart & lean forward
2. **Deep slow inhalation** through mouth using diaphragm muscle
3. **Hold breath:** 2-3 seconds & then **forcefully exhale**
4. Repeat **HUFF** once or twice more & avoid from normal coughing
5. Rest for 5-10 normal breaths & repeat as needed until secretions clear

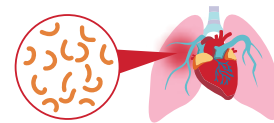


Tuberculosis

Pathophysiology Course

Pathophysiology

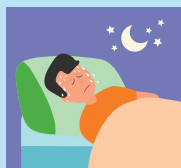
- Bacterial infection in lungs caused by the bacteria M.Tuberculosis
- Spread via the **airborne route**, once inhaled it enters the lungs & spreads to the lymph & blood stream.



Signs & Symptoms

KEY POINTS

- **Night Sweats**
- Anorexia: **Weight loss**
- Cough + Hemoptysis
"Blood tinged sputum" **NCLEX TIP**
- Dyspnea & SOB
- **Fever** & chills



Memory Trick

T

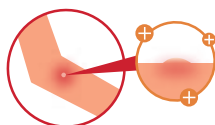
 Terrible cough **"blood tinged"**
B

 Bad infection:
Fever, night sweats, **weight loss**

Diagnostics

- **Intradermal injection** (mantoux test) requires a 2 to 3 day window for reading.

Over **15 mm** induration
= **positive TST**



Patient has a
TB infection

- **Chest X ray & sputum cultures** test for active form.

Key point

Sputum Culture Diagnosis

- **Early morning** sterile sputum specimen
3 consecutive days



Pharmacology (see pharmacology TB study guide)

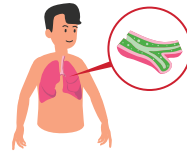
Notes

Cystic Fibrosis

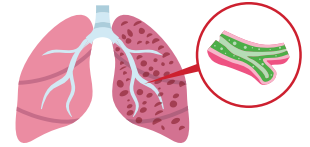
Pathophysiology Course

Pathophysiology

Genetic disorder that causes mucus secretions to be thicker & stickier than normal. This mucus builds up in the lungs leading to recurrent respiratory infections & digestive system leading to poor weight gain & failure to thrive for younger patients.



Serious MuCus
Cystic Fibrosis



Signs & Symptoms

Resp. Failure Priority

= Oxygen Sat. & Airway

- **Low** pulse oximetry reading (norm: 95 - 100%)
- **Sudden drop** in oxygen saturation



Common "Normal" findings

- **Recurrent** lung infections & **Blood**-tinged sputum
- Weight Loss & **Loss of appetite**
- Constipation & loose, **fatty stool** (steatorrhea) due to mucus build up & lack of enzymes to help breakdown fat.



Diagnostics

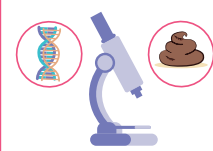
Not commonly tested on exams or boards:

- Sweat chloride test
- DNA, Stool test

Sweat chloride test



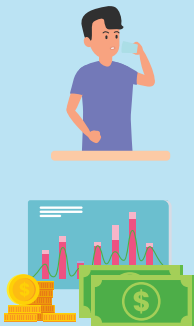
DNA, Stool test



Nursing Interventions

MOST TESTED

1. Diet:
 - High** calories
 - Enzymes **WITH** meals
2. Mucus
 - **Increase fluid intake**
 - Exercise
 - Chest Physiotherapy
 - Postural drainage
3. Financial counseling



Pharmacology

Acetylcysteine

(brand: mucomyst)

Antidote: Acetaminophen (Tylenol) poisoning

Key Point

NOT SAFE

Cause of **Worsens** bronchospasm!

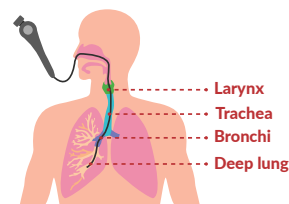


Bronchoscopy

Pathophysiology Course

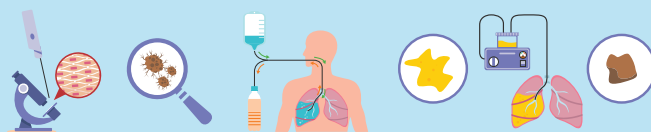
Pathophysiology

A procedure that allows visualization of the larynx, trachea, bronchi & deep lung using a flexible scope. The tube is inserted through the nose, mouth or endotracheal area passing the throat, so naturally a gag reflex & laryngospasm are a big concern!



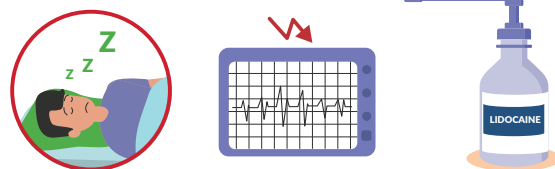
Performed for 3 common reasons

- **Biopsy** of tissue: like when checking for cancer
- **Lavage** to wash out the lungs
- **Suction** for deep sputum or a foreign object



Before the Procedure

- **Mild sedation:** makes the vitals low & slow
- **Topical anesthetic** like lidocaine is applied to the **throat** to prevent the gag reflex



Post-Procedure Care

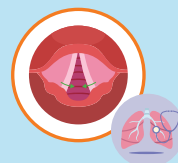
KEY SIGNS

- Laryngospasm "stridor"
- **Bright red blood** tinged sputum
Hemoptysis

PRIORITY



HCP



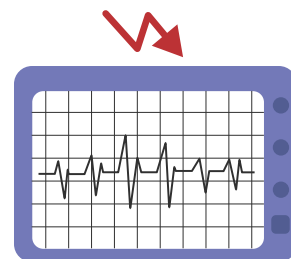
Laryngospasm "stridor"



Hemoptysis

Normal & Expected

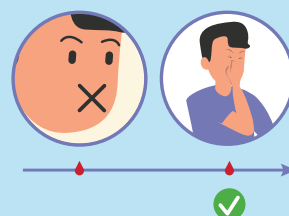
- **Low RR & Low O2 saturation:** the patient has had mild sedation making everything low & slow.
- **Absence of gag reflex:** a numbing agent has been applied to the throat.



Nursing Care

NPO

- Until alert with a positive **gag reflex**

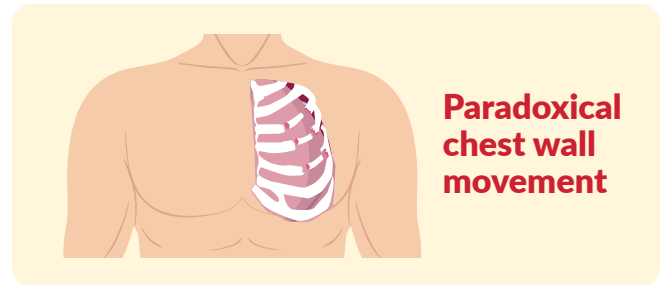


Flail Chest & Rib Fracture

Pathophysiology Course

Pathophysiology

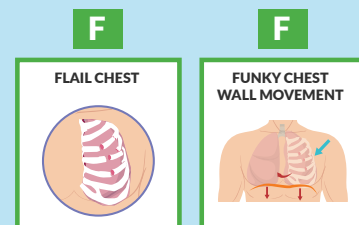
- Broken ribs typically result after any major trauma: car accident, falls & the like.
- **Flail chest:** a segment of the ribcage completely breaks & becomes detached from the rest of the chest wall, a **life-threatening medical emergency**.



Signs & Symptoms

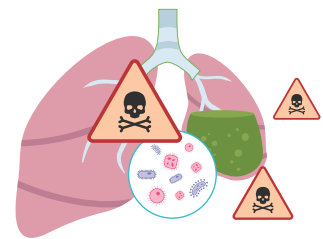
- **Paradoxical chest wall movement** (key sign)
The ribs sort of sucks INward during inspiration & floats out during expiration
 - Extreme chest pain
 - Shallow respirations

MEMORY TRICK



Deadly Complications

- High risk for infection **Pneumonia** is very common
- Hypercapnic respiratory failure from **High CO2 retention**, putting the body in an acidotic state.



Nursing Interventions

1. Priority = Pain Control

YES - Administer prescribed Opioids

- Morphine
- Hydromorphone
- Hydrocodone

2. Pulmonary hygiene only AFTER Pain is controlled

- TCDB - Turn, cough, deep breathing
- IS - Incentive Spirometer to re - expand the lungs & preventing atelectasis


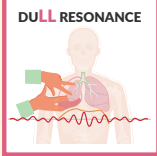
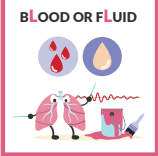
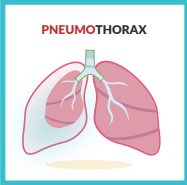
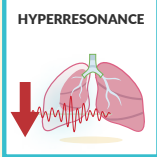

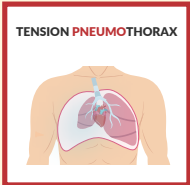
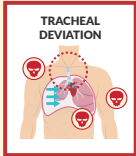

1st PRIORITY



Hemothorax & Pneumothorax

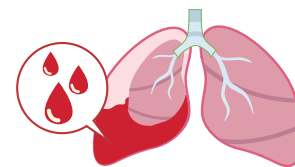
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Key Signs & Memory Trick

Hemothorax		L DULL RESONANCE 	L BLOOD OR FLUID 
Pneumothorax		H HYPERRESONANCE 	H HIGH AIR 
Tension Pneumothorax		T TRACHEAL DEVIATION 	T TENSION PNEUMOTHORAX 

Hemothorax

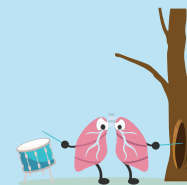
Blood collects in pleural space (space between lung and chest wall) resulting in lung collapse. Think hemo meaning blood like HEMOGlobin.



Pneumothorax

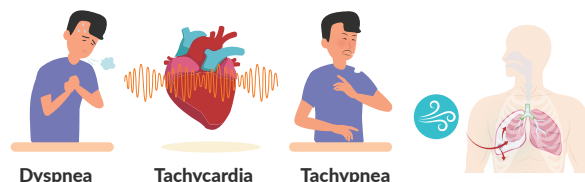
Lung collapses due to AIR in pleural space.

Key sign: hyperresonance - like tapping on a hollow drum or tree.



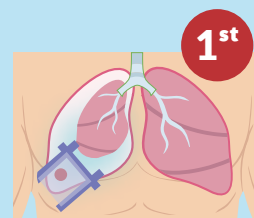
Tension Pneumothorax

Can result from an open pneumothorax, where air gets sucked into the pleural space when breathing in & can't get out, known as a sucking chest wound. All this pressure build up can push organs & **trachea to one side**.



Treatment

- Chest tube
- **Open pneumothorax** "sucking sound"
 - Cover the wound with **occlusive** (petroleum gauze) dressing
 - Tape on **3 sides**



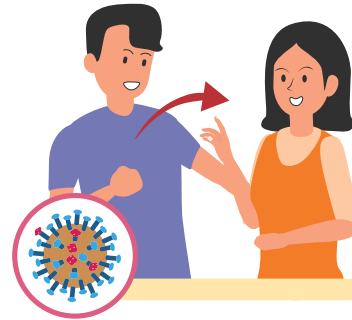
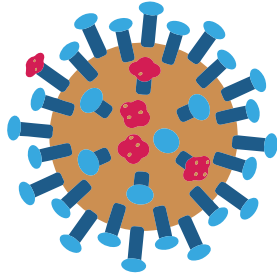
Influenza

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Pathophysiology

Often called the **flu** for short, this infectious disease is caused by the **influenza virus**. It is NOT a bacteria, therefore antibiotics will NOT work to treat this infection.

INFLUENZA



Cause

- Influenza Virus
(Not bacteria = No antibiotics)

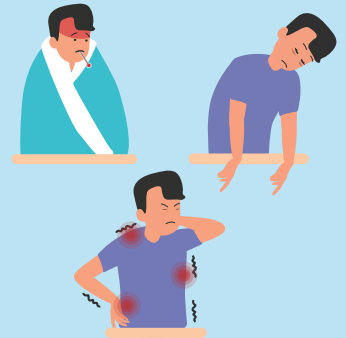
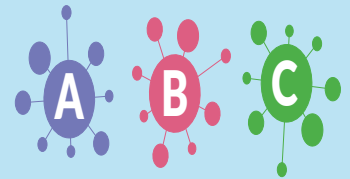
Types

- A,B,C, constantly mutating

Annual Vaccination recommended

Manifestations (signs & symptoms)

- Fever
- Fatigue
- Body aches



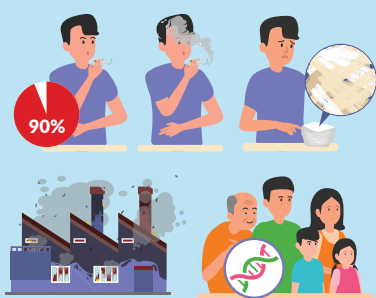
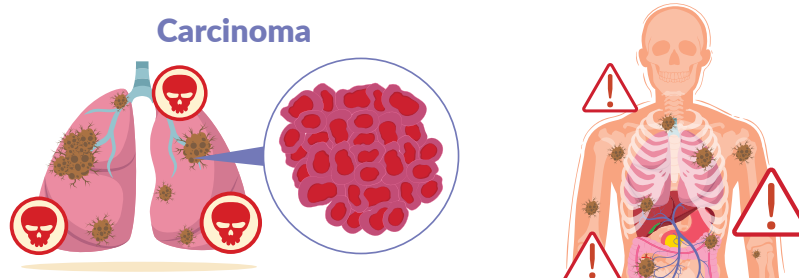
Notes

Lung Cancer

Pathophysiology Course

Pathophysiology

Lung cancer or lung carcinoma is a **malignant lung tumor** characterized by **uncontrolled cell growth** within lung tissue. This growth can spread beyond the lung by the process of metastasis into nearby tissue or other parts of the body.

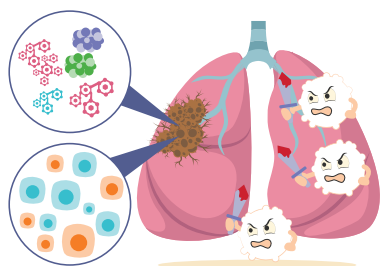
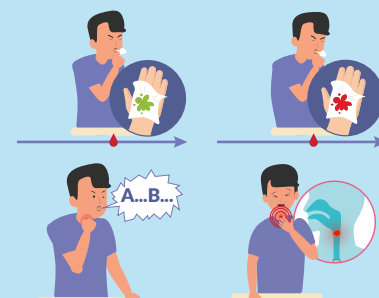


Cause

1. 90% smoking
2. Second-hand smoke
3. Exposure to asbestos & other carcinogens
4. Air pollution
5. Family history of lung cancer (genetics)

Early Manifestations (Signs & Symptoms)

- Persistent, productive cough
- Hemoptysis (coughing blood)
- Hoarseness in voice
- Dysphagia (swallowing difficulties)



Complications

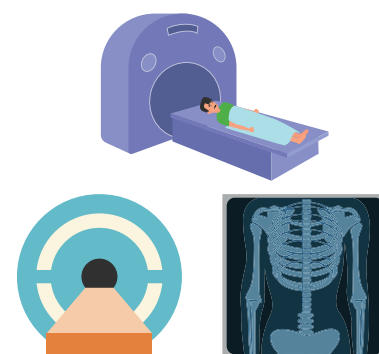
- Paraneoplastic syndromes

Metastases

- Bone pain

Diagnostics

- Imaging: CT scan, MRI, Chest X-ray
- Biopsy (sample of tissue)



Notes

OBS (Obstructive Sleep Apnea)

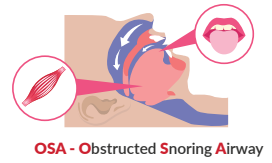
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Pathophysiology

When the tongue or muscles in the pharynx block the airway resulting in moments of no breathing & no airflow, called **Apnea**.

Memory Trick

- O** - **O**bstructed
- S** - **S**norng
- A** - **A**irway



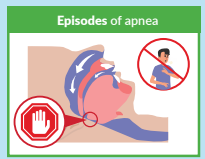
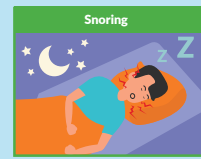
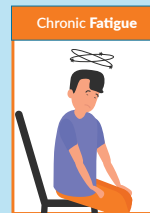
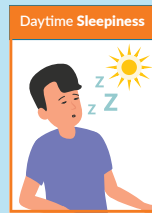
Signs & Symptoms

Daytime:

- Morning headaches
- Daytime sleepiness
- Chronic fatigue
- Irritability, mood swings, depression

Night Time:

- Snoring
- Episodes of apnea

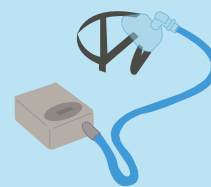


Causes

O	S	A
OBES / OVERWEIGHT 	SEDATIVES BEFORE BED (BENZOS, OPIATES) 	ALCOHOL

Nursing Intervention

- Lose weight / Exercise
- **Limit** alcohol intake
- **NO napping** during the day
- **NO sedatives** at bedtime
- **NO eating** bedtime snacks



CPAP
Continuous positive airway pressure

Intervention

CPAP: Continuous positive airway pressure uses a mask & air pump to push air pressure into the nose & mouth which keeps the pharynx and tongue from collapsing backward.

Key point

- 1st Action:**
Client on **CPAP** with **Low O2 Sat.**
- **Check tightness** of straps and mask.

Side Note

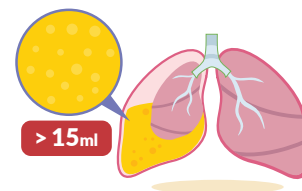
Cpaps give continuous pressure during inhalation & exhalation making it more uncomfortable & BIPAP pressures accommodate for normal breathing

Pleural Effusion & Thoracentesis

Pathophysiology Course

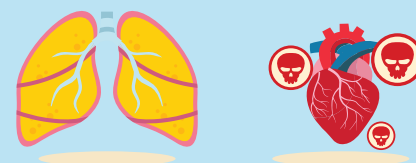
Pathophysiology

Pleural Effusion think Plenty of Fluid in the lung space, specifically fluid collection in the pleural space greater than 15 mls of fluid. This fluid prevents full expansion of the lung & results in decreased gas exchange & atelectasis (collapse of the alveoli).



Causes

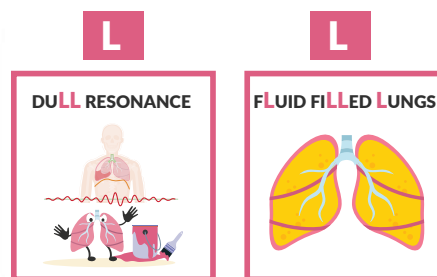
- **Pneumonia** (lung infection), which fills the lungs with fluid.
- **Heart failure** causing pulmonary edema, where heavy fluid builds up in the lungs.



Signs & Symptoms

KEY SIGNS

1. Chest pain during **inhalation**
2. Dyspnea
3. **Diminished** breath sounds
4. **Dull resonance** on percussion



Nursing Interventions

Thoracentesis

1. Provider places a needle through an intercostal space (the space between the ribs) to gently puncture the lung & drain the fluid!
2. Sign a consent form
3. Chest X ray before & AFTER procedure to compare fluid & lung expansion

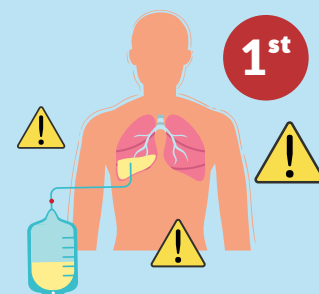
AFTER a thoracentesis:

- Deep breaths to help re-expand the lungs & promote adequate oxygen exchange
- Lie on the unaffected lung to keep BAD LUNG UP!

BEFORE procedure:

STOP all blood thinners:

- **Antiplatelets:** aspirin & clopidogrel
- **Anticoagulants:** Warfarin & heparin (enoxaparin)

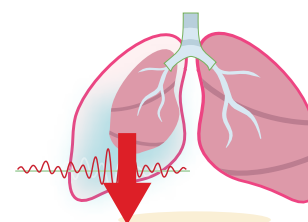
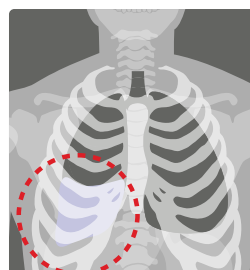


Complications

Pneumothorax

- **Asymmetrical** chest expansion & **decreased** breath sounds on affected side
- Hyperresonance
 - **H** - Hyperresonance
 - **H** - High Air in the lungs
- Deviated Trachea

REPORT to HCP



Hyperresonance

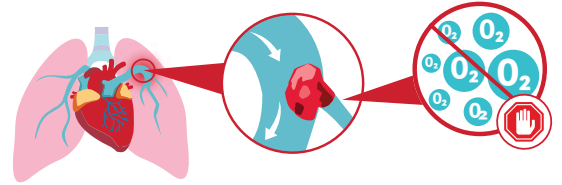
Pulmonary Embolism

Pathophysiology Course

Pathophysiology

A pulmonary embolism (PE) is a **deadly medical emergency!**

It is when a blood clot obstructs a pulmonary vessel within the lung (typically the pulmonary artery), this **blockage prevents blood flow to the alveoli** where gas exchange occurs, eventually leading to **DEADLY hypoxemia (low oxygen)**.



HIGHEST PRIORITY

- Impaired **gas exchange** r/t imbalance of ventilation & perfusion

Signs & Symptoms

Manifestation (signs & symptoms) worsen depending on size of clot:

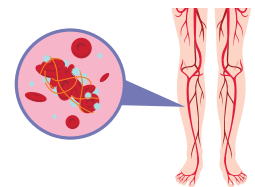
- Transient chest pain (comes & goes)
- Sudden dyspnea, chest pain (constant), hemoptysis (coughing blood)
- Anxiety & restlessness
- Severe crushing chest pain, Hypotension, Loss of consciousness



- #1 Sign = **Hypoxemia**
 1. Restless
 2. Agitation
 3. Mental status change
- **Chest pain**
- **Dyspnea** & SOB
- **Tachypnea**
- **Tachycardia**
- **Anxiety**

Causes

A PE is usually caused by a **DVT blood clot that loosens from another part of the body** (typically the leg). The clot travels to the lung & blocks a pulmonary artery.

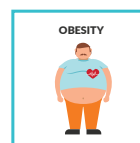


Risk Factors

- Smoking, Obesity, Immobility, & some cardiac issues like Atrial Fibrillation or valve disorders (where the blood swirls in the heart, causing clots)

MOST TESTED

Estrogen birth control "oral contraceptives" leads to increased risk for blood clots



Memory Trick

- E** - Estrogen
- E** - Emboli (blood clots)

Diagnostics

- **High D-dimer** - High risk for blood clots in the body

MEMORY TRICK

- **D** - Dimer (Positive)
- **D** - Dime-sized clot in body



High D-dimer

Pharmacology

Pharmacology

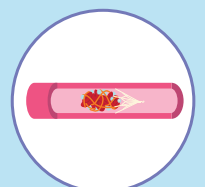
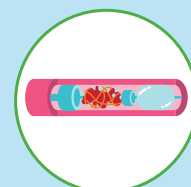
- **Anticoagulants**
 - Heparin
 - Warfarin
- **Thrombolytics**
 - tPA
 - Alteplase
 - Streptokinase



Treatments

Surgery

- **Embolectomy:** surgical removal of the clot
- **Vena Cava filter:** acts like a net to catch any new clots

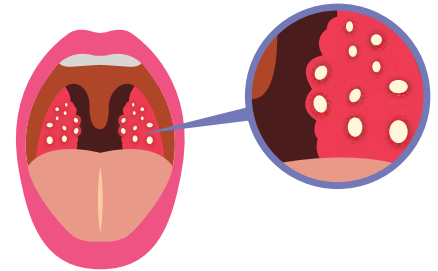


Tonsillitis

Pathophysiology Course

Pathophysiology

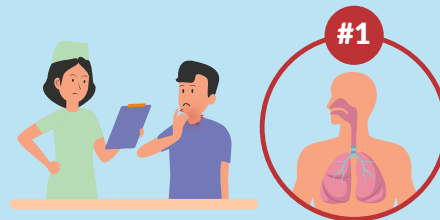
Tonsillitis is the inflammation of tonsils, the little soft tissue masses located near the rear of the throat. When these guys get inflamed it can lead to a life-threatening airway obstruction!



KEY SIGN

Sore throat with
difficulty opening mouth
and swallowing

PRIORITY



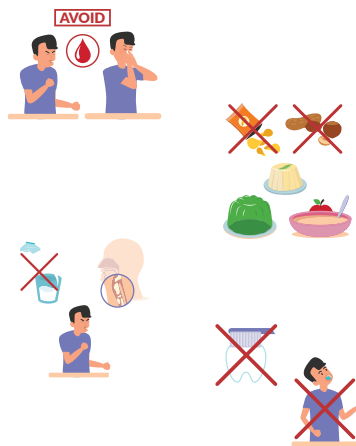
Treatments to avoid bleeding after surgery:

Tonsillectomy: simple surgery to remove the tonsils, HUGE RISK for bleeding.



Nursing Interventions

- **AVOID** coughing, blowing nose
- **AVOID** sharp foods: chips, nuts
- **NO** milk products
- **NO** hard tooth brushing or gargling



Key Signs

Priority Findings
Post-Op tonsillectomy

1. Frequent swallowing
2. Restlessness
3. Persistent Coughing

Notes

Medical Surgical

Fluid & Electrolytes Cheat Sheet

Fluid & Electrolytes Cheat Sheet

Electrolyte	Function	HYPER "HIGH"	Hypo "low"
Potassium 3.5 - 5.0	<p>P - Potassium</p> <p>P - Priority! Since it..</p> <p>P - Pumps the heart & muscles</p>	<p>HYPERkalemia (over 5.0)</p> <p>Heart - TIGHT & CONTRACTED</p> <p>1 ST elevation and Peaked T waves</p> <p>2 Severe = Vfib or Cardiac Standstill!</p> <p>3 Hypotension, Bradycardia</p> <p>GI TRACT - TIGHT & CONTRACTED</p> <p>1 Diarrhea</p> <p>2 Hyperactive bowel sounds</p> <p>NEUROMUSCULAR - TIGHT & CONTRACTED</p> <p>Paralysis in Extremities</p> <p>Increased DTR</p> <p>Profound Muscle Weakness, (General Feeling of heaviness)</p>	<p>Hypokalemia (below 3.5)</p> <p>HEART - LOW & SLOW</p> <p>1 Flat T waves, ST depression, & prominent U wave</p> <p>MUSCULAR - LOW & SLOW</p> <p>1 Decreased DTR</p> <p>2 Muscle cramping</p> <p>3 Flaccid paralysis (paralyzed limbs)</p> <p>GI - LOW & SLOW</p> <p>Decreased motility, hypoactive to absent bowel sounds, Constipation</p> <p>Abdominal distention</p> <p>Paralytic ileus, paralyzed intestines!</p> <p>*PRIORITY* for SB0 (small bowel obstruction)</p>
Sodium 135 - 145	<p>S - Sodium</p> <p>S - Swells the body to maintain:</p> <ul style="list-style-type: none"> • Blood Pressure • Blood Volume • pH balance 	<p>HYPERnatremia (over 145)</p> <p>HYPERNATREMIA = BIG & BLOATED</p> <p>1. SKIN</p> <p>FLUSH "Red & Rosy"</p> <p>EDEMA "waterbed skin"</p> <p>LOW GRADE FEVER</p> <p>2. POLYDIPSIA EXCESS THIRST</p> <p>3. LATE SERIOUS SIGN</p> <p>SWOLLEN dry tongue <small>NCLEX TIP</small></p> <p>GI = nausea & vomiting <small>NCLEX TIP</small></p> <p>INCREASED muscle tone <small>NCLEX TIP</small></p>	<p>Hyponatremia (below 135)</p> <p>HYPONATREMIA - DEPRESSED & DEFLATED</p> <p>NEURO = Seizures & Coma</p> <p>HEART = Tachycardia, & weak thready pulses</p> <p>RESPIRATORY ARREST</p>
Chloride 97 - 107	<p>Sodium's sidekick</p> <p>Maintains:</p> <ul style="list-style-type: none"> • Blood Pressure • Blood Volume • pH balance 	<p>HYPERchloremia (over 107)</p> <p>NEARLY SAME AS HIGH SODIUM</p> <p>1 NAUSEA & VOMITING</p> <p>2 SWOLLEN DRY TONGUE</p> <p>3 CONFUSION</p>	<p>Hypochloremia (below 97) t</p> <p>NEARLY SAME AS LOW SODIUM</p> <p>1 EXCESSIVE DIARRHEA, VOMITING, SWEATING</p> <p>2 FEVER TEST TIP: ONLY DIFFERENCE</p>
Magnesium 1.3 - 2.1	<p>M - Magnesium</p> <p>M - Mellows the</p> <p>M - Muscles (relaxes)</p>	<p>HYPERmagnesemia (over 2.1)</p> <p>1. CARDIAC - CALM & QUIET</p> <p>Heart block</p> <p>Prolonged PR intervals</p> <p>VITALS = bradycardia, hypotension</p> <p>2. DEEP TENDON REFLEXES - CALM & QUIET</p> <p>Hyporeflexia - Decreased DTR</p> <p>3. LUNGS - CALM & QUIET</p> <p>Depressed shallow respirations</p> <p>3. GI - CALM & QUIET</p> <p>Hypoactive bowel sounds</p>	<p>Hypomagnesemia (below 1.3)</p> <p>1. CARDIAC - BUCK WILD!</p> <p>EKG: ST depression, T wave inversion</p> <p>Torsades de pointes</p> <p>SEVERE = V fib</p> <p>VITALS = Tachycardia</p> <p>2. DEEP TENDON REFLEXES - BUCK WILD</p> <p>Hyporeflexia - increased DTR</p> <p>3. EYES - BUCK WILD</p> <p>Abnormal eye movements (nystagmus)</p> <p>4. GI - BUCK WILD</p> <p>Diarhea</p>
Calcium 9.0 - 10.5	<p>Keeps the 3 Bs Strong</p> <p>B - Bone</p> <p>B - Blood</p> <p>B - Beats (heart)</p>	<p>HYPERcalcemia (over 10.5)</p> <p>SWOLLEN & SLOW - MOANS, GROANS & STONES</p> <p>1. CONSTIPATION</p> <p>2. BONE PAIN</p> <p>3. STONES Renal Calculi (kidney stones)</p> <p>4. DEEP TENDON REFLEXES</p> <p>Decreased DTR</p> <p>Severe muscle weakness</p>	<p>Hypocalcemia (below 9.0)</p> <p>1 T - Trousseau's</p> <p>T - Twerking arm with BP cuff on</p> <p>2 C - Chvostek's</p> <p>C - Cheek smile when touched</p> <p>3 Diarrhea</p> <p>4 Circumoral tingling</p> <p>5 Weak bones</p>
Phosphate 3.0 - 4.5	<p>Helps with bone & teeth formation.</p> <p>Helps regulate calcium</p> <p>Ca HIGH = Phosphate LOW</p> <p>Ca LOW = Phosphate HIGH</p>	<p>HYPERphosphatemia (over 4.5)</p> <p>"LOW CALCIUM" BAJA CA+</p> <p>1. TROUSSEAU'S SIGNS</p> <p>2. CHVOSTEK'S SIGNS</p> <p>3. DIARRHEA</p> <p>4. WEAK Bs</p> <p>Strong bones? - WEAK! (fractures)</p> <p>Strong blood clotting? - WEAK! (risk for bleeding)</p> <p>Strong heart beats? - WEAK! (cardiac dysrhythmias)</p>	<p>Hypophosphatemia (below 3.0)</p> <p>Swollen & SLOW - MOAN, GROANS & STONES</p> <p>1. CONSTIPATION</p> <p>2. DECREASED DTR & SEVERE MUSCLE WEAKNESS</p> <p>3. DECREASED HR, RR</p> <p>4. INCREASED BP</p>

*Disclaimer: Values above are based on NCLEX standards, many books & hospitals will differ in their values.

Cardiac

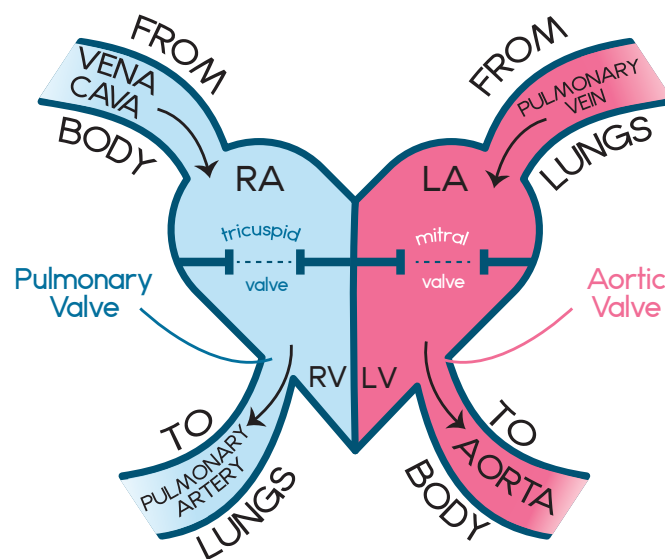
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Anatomy & Physiology Cardiac System

Med Surg: Cardiac

Blood flow of the heart

1. Deoxygenated blood gets **"vacuumed"** back to the **vena cava** (superior and inferior vena cava)
2. Right Atria - Tricuspid Valve - Right Ventricle.
3. Through the **pulmonary valve & pulmonary arteries into the lungs** to drop off CO₂ & pick up O₂ (oxygen) in the capillaries.
4. This oxygenated blood is then pumped through the **pulmonary veins**.
5. Left Atrium - Mitral Valve (bicuspid valve) - Left Ventricle
 - Side note: Left ventricle is the **"BIG momma pumper"** pumping oxygen rich blood **OUT** to the body = cardiac **OUTPUT**
6. **Left Ventricle** pumps O₂ rich blood through the aortic valve & then finally
7. The **Aorta** & out to the body via the "Arteries = pump away".



Anatomy of the heart

Cone shaped organ located in the mediastinal space.

The pericardial sac encases the heart and protects it, lubricates and holds 5-20 ml of pericardial fluid.

This has two layers.

- the parietal pericardium which is the outer membrane.
- the visceral pericardium is the inner membrane attached to the heart.

Consists of 3 layers

- **Epicardium:** outermost layer of the heart.
- **Myocardium:** middle layer of the heart, the contracting muscle.
- **Endocardium:** innermost layer of the heart, lines the inner chambers and the valves.

Function of circulation

Delivers O₂, nutrients, hormones and antibodies to organs, tissues and cells. Removes the end product of cellular metabolism

Function of the heart

Pumps oxygenated blood into the arterial system to supply capillaries and tissue.

Pumps oxygen poor blood from the venous system through the lungs to be reoxygenated.

4 valves

Two atrioventricular valves that close at the beginning of ventricular contraction. They prevent blood from flowing back into the atria.

- **Tricuspid valve:** on the right side of the heart.
- **Bicuspid valve:** on the left side of the heart.

Two semilunar valves that prevent blood from flowing back into the ventricles during relaxation.

- **Pulmonic semilunar valve:** between the right ventricle and pulmonary artery.
- **Aortic semilunar valve:** between the ventricle and the aorta.

Coronary arteries

- **Right main coronary artery:** supplies the right atrium and ventricle, the inferior left ventricle, posterior septal wall, 1SA and AV nodes.
- **Left main coronary artery:** consists of two main branches left anterior descending which supplies blood to the left ventricle and the ventricular septum and circumflex arteries which supply blood to the left atrium and the lateral/posterior aspects of the left ventricle.

4 chambers

- **Right atrium:** carries deoxygenated blood from the body via superior and inferior vena cava.
- **Right ventricle:** carries blood from the right atrium and pumps it into the lungs through the pulmonary artery.
- **Left atrium:** carries oxygenated blood from the pulmonary veins.
- **Left ventricle:** carries oxygenated blood from the left atrium and pumps it into the systemic circuit through the aorta.

Electrical conduction:

- **SA node:** pacemaker of the heart and initiates contraction at 60-100 BPM.
- **AV:** receives impulses from the SA node initiates and sustains impulses at 40-60 BPM.
- **Bundle of His:** continuation of the AV node and branches into the the bundle branches which terminate in the purkinje fibers.
- **Purkinje fibers:** network of conducting strands beneath the ventricular endocardium. They can act as a pacemaker when the SA and AV fail as pacemakers. They can sustain at 20-40 BPM.

Cardiac Tamponade

Med Surg: Cardiac

Pathophysiology

COMPRESSION OF THE HEART

caused by fluid collecting in the pericardial sac.
(weaker pump = less cardiac output)

This is a **medical emergency** as fluid or blood fills the pericardial sac, compressing the heart so that it cannot fill & pump! The result is a **dramatic drop in blood pressure** that can kill the client.

MEMORY TRICK

- **C** - Cardiac Tamponade
- **C** - Compression on the heart
- **C** - Critical client!

Causes

ACUTE

TRAUMA: (Stabbing or MVA)

CHRONIC: Pericarditis



Treatments

PERICARDIOCENTESIS

1. **CARDIAC MONITOR**
2. **CATHETER ATTACHED**
to drainage system
3. **ASSESS DRAINAGE**
(Type & speed of drainage)

Signs & Symptoms

BECKS TRIAD **BEC**

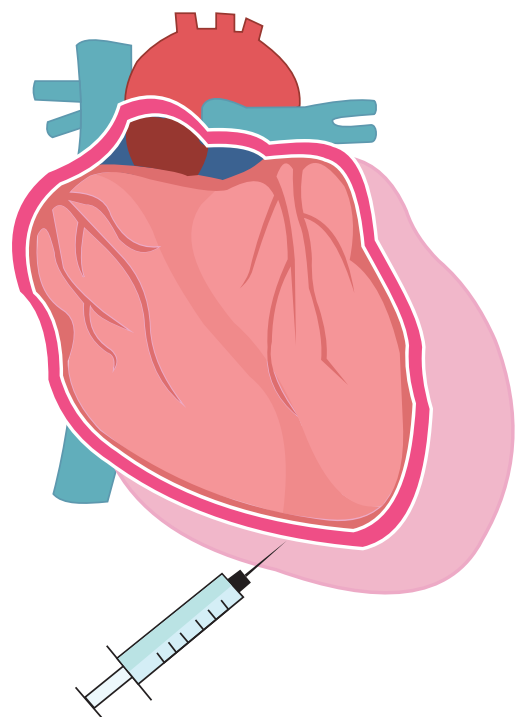
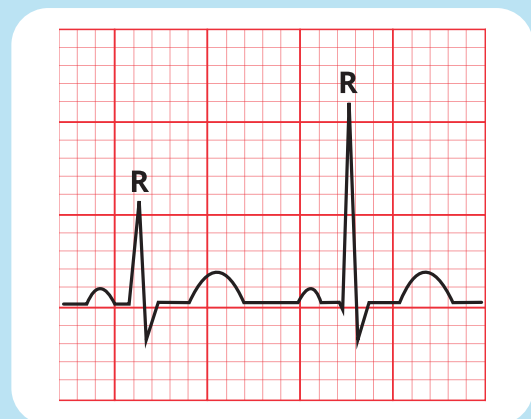
- B** • Big Jugular Veins Distension (JVD)
- E** • Extreme Low BP (Hypotension)
- C** • Can't hear heart sounds (muffled)

PULSE PARADOXES

Systolic drop of 10 mmHg
(120/80 to 110/80)

ECG

QRS complexes
(short & uneven height)



Cardiomyopathy

Med Surg: Cardiac

Pathophysiology

• **Dilated Cardiomyopathy:**
Think "Distended heart muscles", clients present with fibrosis (stiff hard muscles) of the myocardium and endocardium, dilated chambers, making it hard for the heart to pump out oxygen rich blood.

• **Restrictive Cardiomyopathy:**
Think "Rockhard heart muscles", so the heart cannot **RE**-fill with **RE**strictive cardiomyopathy, emboli (blood clots) are common.

• **Hypertrophic Cardiomyopathy:**
Think "**Huge Trophy** like heart muscles" in the middle septum which can obstruct the **aorta** blocking all oxygenated blood out to the body - **very deadly!**

Obstructive = blocks the aortic valve
Non-obstructive = does not block

All problems lead to **LESS cardiac output** meaning **LESS oxygen rich blood OUT** to the body.

Causes

- Hypertrophic = genetics **ONLY** NCLEX TIP
- Dilated & Restrictive
 - Genetics
 - Damage to the heart = radiation

Signs & Symptoms

- Low oxygen
 - Restlessness, agitation, altered level of consciousness NCLEX TIP
 - syncope, dizzy + fatigue
- Heart failure signs
 - Left-sided = lung fluid
 - Right-sided = rocks the body with fluid (edema, ascites, JVD)

Dilated cardiomyopathy

- S3 murmur
- Cardiomegaly (dilated heart)

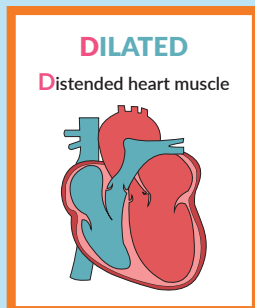
Restrictive Cardiomyopathy

- (same general low oxygen & HF)

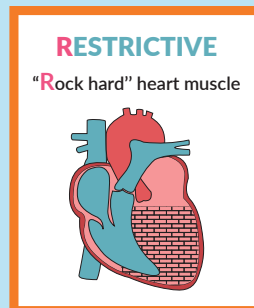
Hypertrophic Cardiomyopathy

- Typically asymptomatic (no s/s) until heavy exercise & then the child **DIES!**

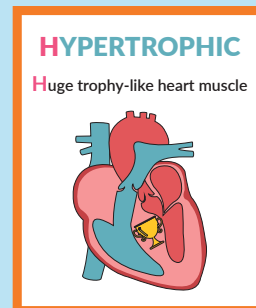
D



R



H



Pharmacology

- A ACE INHIBITORS**
-pril • Lisinopril
- B BETA BLOCKERS**
-lol • Atenolol
- C CALCIUM CHANNEL BLOCKERS**
-dipine, -zem, -amil • Nifedipine, Diltiazem, Verapamil
- D DIGOXIN**
Cardiac Glycoside
- D DIURETICS**
Furosemide & HCTZ

Labs & Diagnostics

- Chest X-ray & MRI
- **Echocardiogram** measures Ejection Fraction (blood pumped out of heart) 55 - 70% = normal 40% or LESS = **BAD** (heart failure)
- **Angiography**
Highlights the coronary arteries to see blockages & rule out ischemic heart disease (low oxygen to heart muscles)
- **BNP**
"B-type or Brain Natriuretic Peptides"
Breaking & Stretching of ventricles

BNP ELEVATED

100 OR LESS - NORMAL

101-299+ MILD ELEVATION

300+ MILD HF

600+ MODERATE HF

900+ SEVERE HF

DIGOXIN NCLEX TIP



HOLD MED IF:

1. **Apical Pulse** 60 ↓
2. **Potassium (K+)** 3.5 ↓
(Risk for Dig Toxicity)
3. **Digoxin Toxicity OVER 2.0**
Vision Changes, N/V, Fatigue "dizzy"



Side note:

Hypertrophic Cardiomyopathy

- B - Beta blockers
- C - Calcium channel blockers

NO DDD

- D - Dilators
- D - Digoxin
- D - Diuretics

NO strenuous activity!

This can block the aorta.

Education

DRESS

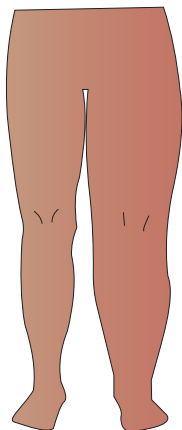
- D DIET** (low sodium & low fat)
- R REST PERIODS**
- E EXERCISE**
- S STOP SMOKING & ALCOHOL**
- S STRESS REDUCTION**

DVT, RAYNAUD'S & BUERGER'S

DVT - Deep Vein Thrombosis

Pathophysiology

CLOT in a deep vein



Signs & Symptoms

COWS

- C** CALF PAIN & CRAMPING
- O** ONE-SIDED SWELLING (Unilateral)
- W** WARM & RED (Blood pooling)
- S** SOB & CHEST PAIN = PE! (Call Doctor)

Treatments

DURING CLOT-DV

- D** Don't Walk (bed rest)
- V** Venous return (eleVate)

CHANT

AFTER CLOT

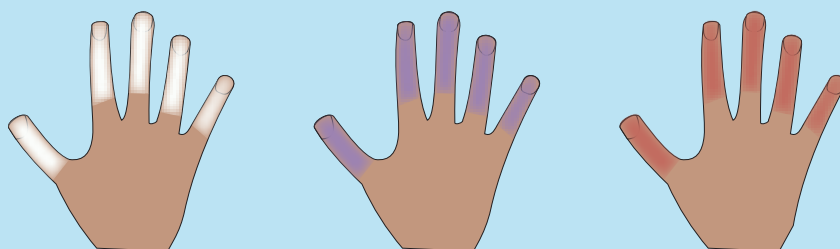
- C** Calf Exercise & Isometrics
- H** Hydration
- A** Ambulation
- N** NO long sitting (Car, Airplane, Bedrest)
- T** Ted & SCDs (AFTER CLOT resolved)

NCLEX TIP

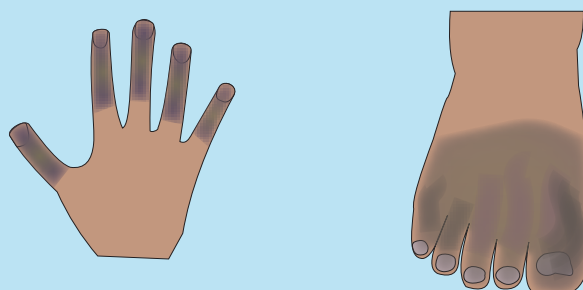
Raynaud's & Buerger's Disease

Signs & Symptoms

R-RAYNAUD'S • R-RING FINGER



B-BUERGER'S • B-BLACK FINGERS & TOES



Endocarditis / Pericarditis

Med Surg: Cardiac

ENDOCARDITIS

Pathophysiology

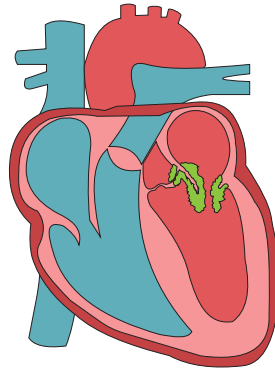
Inflammation **IN**side the heart

- Infective = bacteria (mold on heart valves)
- Noninfective = No bacteria (only inflammation)

Heart valves can't close fully
Less cardiac output = Less oxygen OUT

Signs & Symptoms

- **C** - Clots in the heart & brain
 - Risk for stroke CVA - monitor for "agitation" "change in level of consciousness"
 - NCLEX TIP**
 - Splinter hemorrhages (clots under fingernails)
 - **L** - Lung fluid (crackles)
 - **O** - Overheated (fever)
 - **T** - Too little Oxygen (low cardiac output)
 - Clubbing fingers
- *Roth spots, Osler's nodes, Janeway lesions (body's immune response)



Causes

- Dirty Needles
- Dental visits **NCLEX TIP**
- Heart Surgery: Valve replacements & CABG **NCLEX TIP**
- Untreated Strep Throat

Treatment

- Antibiotics
- Valve repair or Replacement

Education

M **MONITOR** for infection

O **ORAL CARE** brush 2x day **NO FLOSSING**

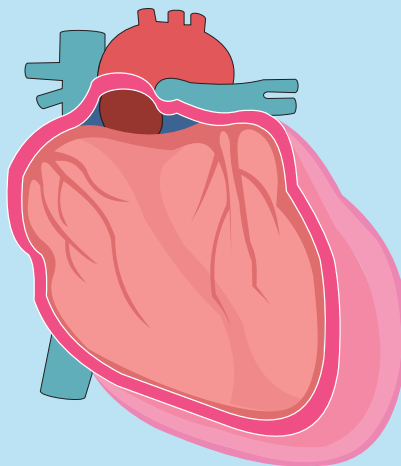
L **LET ALL PROVIDERS KNOW** HX of Endocarditis

D **DENTAL VISITS OR SURGERY** Antibiotic **ADHERENCE** **NCLEX TIP**

PERICARDITIS

Pathophysiology

Inflammation **OUT**side the heart
(heart gets compressed & can't pump)
Less cardiac **OUT**put = Less oxygen OUT



Signs & Symptoms + Labs

- Precordial chest pain
- Elevated WBC (over 10,000)
- C-reactive protein
- **Cardiac Tamponade**
 1. JVD
 2. Muffled heart sounds
 3. Pulsus paradoxus (drop in sys. BP by 10 mmHg)

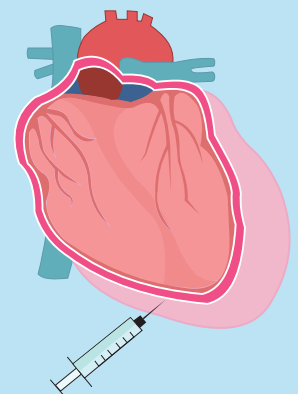
Causes

HAIR

- H** **HEART ATTACK**
Acute MI
- A** **AUTOIMMUNE DISORDERS**
Lupus, Scleroderma, RA (Rheumatoid Arthritis)
- I** **INFECTION**
HIV, Herpes & Bacterial (TB)
- R** **RENAL FAILURE**
Uremia (High BUN)

Treatment

- NSAIDS (indomethacin)
- Steroids (prednisone)
- **Pericardiocentesis (needle in the heart)** used to drain any fluid or blood in the heart sac.



Hypertension

Med Surg: Cardiac

Pathophysiology

Hypertension is chronic high blood pressure, which if not treated can cause damage to organs from all that **high pounding pressure**

- Brain - CVA (**stroke risk!**) **NCLEX TIP**
- Heart - MI (heart attack) & HF (heart failure)
- Kidney - CKD (Renal failure)
- Blood vessels - Atherosclerosis (scared arteries)
- Eyes - **Blindness** (Retinopathy) **NCLEX TIP**

MEMORY TRICK

HYPERtension = **HIGH BP**
"High Tension on the heart and organs"

Signs & Symptoms **NO SYMPTOMS = Silent KILLER**

- A** -Achy head (**Headache**) **NCLEX TIP**
- B** -**Blurred vision** (retinopathy)
- C** -Chest pain (**angina**)

SEVERE: HTN Crisis **OVER 180/120**

Immediate Action:

- **B** - Beta blockers "Blocks Beats"
- **C** - CCBs "C Calms the heart"
- **D** - Dilators (Vasodilators) "Nitro = Pillow"
- **E** - Emergency to ICU!

Imaging

- **Echocardiogram** measure
 Ejection fraction (blood pumped out of heart)
 55 - 70% = normal
Less than 40% = Heart Failure
- ECG & EKG - Tall R peaks from the high pumps
- Side note: 3 BP measurements - 1 week apart, confirms diagnosis

Education

DRESS

- D** **DIET** **LOW SCC** (Sodium, Calories, Cholesterol)
- R** **REDUCE** **ALCOHOL & CAFFEINE**
- E** **EXERCISE: WALKING** (30 min. x 5 days/wk)
- S** **STOP** **SMOKING & ALCOHOL**
- S** **STRESS** **REDUCTION**

Causes

- SODA**
- S** -Stress, Smoking, Sedentary Lifestyle
- O** -Obesity, Oral Contraceptives (birth control)
- D** -Diet (High sodium & cholesterol)
 Diseases
 DM, Renal disease, HF, Hyperlipidemia (Over 200)
- A** -African men & Age (old)

Numbers to know:

HTN CRISIS:
180/120
 (or more)

STAGE 2: 140/90 (or more)

"NORMAL BP"

STAGE 1: 130-139/80-89



ELEVATED: 120-129/80 (or less)

NORMAL: 120/80 (or less)

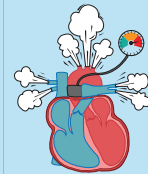
LOW: 90/60 (or less)

120/80

Systolic/Diastolic

"San/Diego"

Squeeze/Decompress



OVER
140/90
OH LORDY!

Labs

BNP - B-type Natriuretic Peptides

- **100 & Less = Normal**
- **300+ Mild**
- **600+ Moderate**
- **900+ SEVERE**

Cholesterol Panel

- Total Cholesterol = **200**
- Triglycerides = **150**
- LDL = Under **100**
- HDL = OVER **40**

NOTE: All should be low, except the HDL
 "Happy - keep them HIGH"

Pharmacology

Blood Pressure Lowering Drugs ABCD

- A** -Ace inhibitors -**pril** Lisinopril
 A-Angioedema
 C-Cough
 E-E+ imbalances (LOW sodium, HIGH potassium)
 ARBS "**-sartan**" Losartan
- B** -Beta blockers (slows HR) "**-lol**" Atenolol
 Blocks Beats
 Caution: **4 B's**
 Bradycardia (60 or Less)
 Bottomed out BP (80/60)
 Breathing problems (COPD, Asthma)
 Blood sugar masking (diabetics)
- C** -Calcium channel blockers
 Calms heart, Controls BP
 Niphe**dipine**, Cardizem, Verapamil
- D** -Diuretics
 D-Drains Fluid "Diurese"
K+ Wasting-Furosemide & HCT
 (caution: Low K+, Eat fruits & green leafy)
K+ Sparing-Spironolactone
 (avoid Salt Substitutes)
- D** -Dilators (vasodilators) (Relieves Pressure)
Nitroglycerin = Pillow (rest & relaxed heart)
Caution: No Viagra = **DEATH**

AC Anti-Clogging of the arteries

- A** -Antiplatelet (Anti Clumping)
 A-ASA
 C-Clopidogrel Caution: Bleeding
- C** -Cholesterol Lowering
 Lovastatin "stay clean"
 Caution: Liver Toxic, NO grapefruit

MI, Angina, CAD

Med Surg: Cardiac

Pathophysiology

Myocardial Infarction (MI) the heart muscles **DIE** "necrosis" from lack of oxygen. This occurs when there is a **blockage of the coronary arteries**, the "O2 tubes" feeding the heart oxygen.

Signs & Symptoms

PAIN-Jaw, back, mid back/shoulder pain, heartburn (epigastric), Substernal

Key words = priority: "Sudden" "Crushing" "radiating" **NCLEX TIP**

- SOB** "dyspnea" "labored breathing"
- NAUSEA** Vomiting "Abdominal pain"
- SWEATING** "Diaphoresis"
- PALE COOL SKIN** "dusky"
- ANXIETY**

Causes

SODDA

- S**-Stress, Smoking, Stimulants (caffeine, amphetamines)
- O**-Obesity-(BMI over 25)
- D**-Diabetes & HTN (over 140/90)
- D**-Diet (high cholesterol) animal fats
- A**-African American males & Age (over 50)
- *Men more than women

Progression

CAM

- C**-CAD "coronary artery disease"
- A**-ACS "acute coronary syndrome"
 - Angina - **Stable** "Safer"- relieved w/rest
 - Angina - **Unstable** "Unsafe" - **Un**relieved
- M**-MI (heart die)



Patient Education

DRESS

- D**-Diet low (sodium & fluids (2g/2L per day) Prevent **HF Heart Failure=Heavy Fluid**
Report "New, Rapid" Weight Gain-Water Gain!
- R**-Reduce Stress, Alcohol, Caffeine, Cholesterol (animal fats)
- E**-Exercise (30 min x 5 days/wk)
- S**-Smoking Cessation
- S**-Sex (2 flights of stairs with NO SOB) **NCLEX TIP**
- ***AVOID** NSAIDS (naproxen, ibuprofens) = increases CLOT risk!

Treatment: Pharmacology

AC-Anti Clogging of Arteries

- A**-Antiplatelet HOLD if: Platelets 50K or LESS "below 50 gets risky" (not INR, not aPTT)
- A**-ASA
- C**-Clopidogrel

C-Cholesterol Lowering "-Statin"

Lovastatin "stay clean"

CAUTION:

- NO** grapefruit
- Liver Toxic-report "clay colored stools"
- Muscle pain (Rhabdomyolysis risk)
- Late night-take at dinner

CHOLESTEROL PANEL

C-CLOGGED ARTERIES (risk)

200 or Less-Total Cholesterol
150 or Less-Triglycerides
100 or Less-LDL

40 or More = HDL

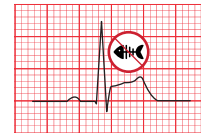
Diagnostics

1st-EKG

(Any chest pain or MI symptoms)



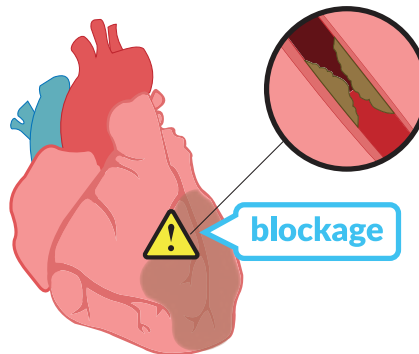
Normal



ST elevation



ST Depression



2nd-LABS

- T**-Troponin (Over 0.5 ng/mL)
- T**-Trauma (**ONLY** indicator of MI)
- Other labs:** Crp, Ckmb, Myoglobin, CRP (inflammation)

Treatment: Pharmacology

DURING-Any Chest Pain

- O**-Oxygen
- A**-Asa
- N**-Nitro-under tongue x 3 Max
- M**-Morphine - Any pain after = MI (injury)

AFTER-MI

Clot Stabilization:

Heparin: prevents CLOT growth (**NOT dissolve** only t-PA)
PTT: 46 - 70 "**3 x MAX**" Antidote: Protamine Sulfate
Memory Trick: "HaPTT" frog

Heart Rest:

- B**-Beta Blockers (-Iol) Atenolol
- B**locks both BP & HR (Lol = Low BP & HR)
- CAUTION:**
 - B**-Bad for Heart Failure patients (CHF)
 - B**-Bradycardia (60 or Less) & BP low (HR LESS than 60)
 - B**-Breathing Problems "wheezing" (Asthma, COPD)
 - B**-Blood sugar masking "hides s/s" (Diabetics)

C-Calcium Channel Blockers

Calms BP & HR-(**AVOID** Low Hr & BP)
(Nifedipine, Diltiazem, Verapamil)
-dipine "declined BP & HR"
-zem "zen yoga for heart"
-amil "chill heart"

D-Dilators (vasoDilators = O2 to heart)

Nitroprusside (only for HTN crisis) & Isosorbide
Nitro "Pillow for heart"
NO viagra "**-afil**" Sildenafil = **DEATH!**
Nitro drip: **STOP** if Systolic BP below 90 or 30 mmHg Drop
SE: HA is Common + SLOW Positions changes "syncope" t

DISCHARGE-GOING HOME

Heart Rest:

- 1st choice **A**-Ace (-pril) Lisinopril "chill pril"
- 2nd choice **A**-ARBs (-sartan) Losartan "relax man"
- Antihypertensive (BP ONLY) ***HOLD**: Low BP (not HR)

Precautions:

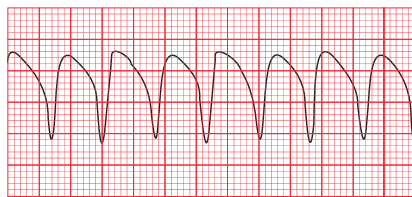
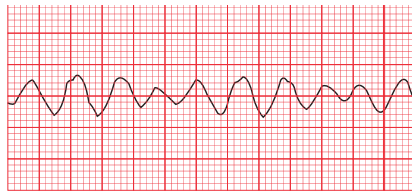
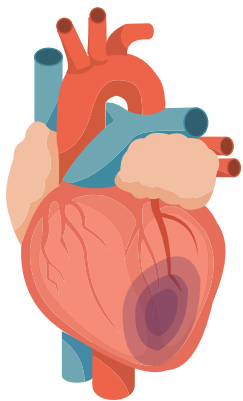
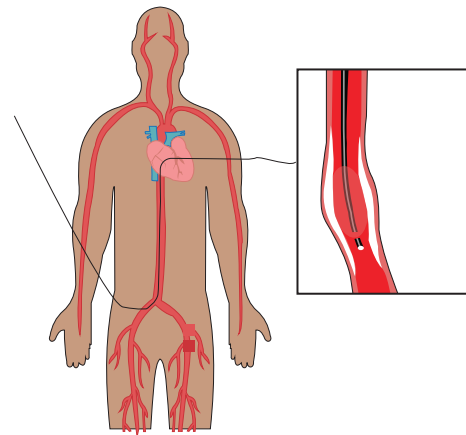
- A**-Avoid Pregnancy
- A**-Angioedema "thick tongue" (Airway Risk) *only Ace **NCLEX TIP**
- C**-Cough *only Ace
Creatinine (Kidney) (normal: 0.9 -1.2) *only Ace
- E**-Elevated K+ (normal 3.5-5.0) **NCLEX TIP**
- AVOID** Salt Substitutes + Green Leafy veggies
 - 1st-Cardiac Monitor
 - High Potassium = High Pump
 - Monitor: muscle cramps, spasms, peaked T waves, ST changes

MI, Angina, CAD II

Med Surg: Cardiac

Cath Lab

- C-Contrast** = Kills Kidneys "Angioplasty, Angiogram, CABG"
- A-Allergy** to Iodine (warm flushing normal)
- B-Bleeding**-direct manual pressure (above site)
NO=heparin, warfarin, ASA, clopidogrel
- C-Creatinine** "Kidney" (normal: 0.9 - 1.2)
REPORT: Creatinine Over 1.3 & Urine **below 30 ml/hr**
STOP Metformin 48 hrs (before/after)
- C-Can't feel pulses** (Pulses = Perfusion O2)
Diminished pulses (4-12 hrs post-procedure) **MAX PRIORITY:**
Non palpable pedal pulse **AFTER** = CALL HCP (Dr.)
Key words: "cool leg, pulse non palpable, present only with doppler US."



Complications After MI

- ACUTE:** (weeks after)
 - Cardiogenic Shock (severe hypotension)
 - V fib/V tach (no pulse) = **DEADLY**
 - D**efibrillate=**D**on't have a pulse
 - C**ardioversion=**C**ount a pulse *synchronize*
- CHRONIC:** (lifetime)
 - Heart failure "Heavy Fluid"
 - Rapid** weight gain (Water Gain),
 - Worsening** crackles (fluid in lungs "pulmonary, edema")
 - Sudden** edema (JVD, peripheral edema "+1 pitting")
 - #1 Priority**-IV Diuretics-Furosemide, Bumetanide "dried"
(**NOT** isosorbide)

Nitroglycerin

O₂ to Heart

NO viagra "-afil" Sildenafil = **DEATH!**
NORMAL ADVERSE EFFECT:
 HA=Normal Side Effect
 Hypotension=Adverse effect
 (need slow position changes)

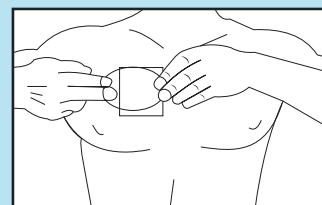
PILL (or spray)

- S-Stable** Angina
- S-Safe** Angina
- S-Stops** when activity **STOPS** (Stress Induced)
*Take Before strenuous activity
- GOAL:**
NO chest pain=Daily activities
"comb hair, fix hair, get dressed, make up, making bed etc."
- TAKING MED:**
CALL 911: PAIN 5 min. After 1st dose.
3 doses max x 5 min apart
NO SWALLOW-SL under
- STORAGE:**
NO LIGHT-NO HEAT
NOT: pill box, car, plastic bag, pocket
YES: purse ok
*Replace every **6 months**



Nitro Patch (Transdermal nitro patch)

- U-Unstable** Angina
- U-Unsafe** Angina
- U-Unrelieved** with rest /Unpredictable (anytime)
1 x daily **NOT PRN**
1 patch at a time **NOT 2 patches**
- YES** Shower is ok
- LOCATION:** Rotate locations **Daily**
"Clean, Dry, shaven area" teach patient to wash hands after application
Upper Body (subclavian, arm, upper chest)
NOT: hairy, scarred, burned, callous
NOT BROKEN SKIN
- *TEST TIP:** Patch fall off? (Over 1 hour ago)
Take nitro (pill/spray) New patch can take 40-60 min.
- *Nurses wear gloves!** Will cause **MAJOR HA** if it comes into contact with skin!



MI, Angina, CAD III

Med Surg: Cardiac

Anticoagulants (clot prevention)

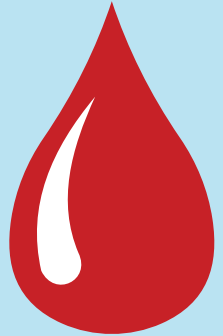
Antiplatelets (**LESS** potent)
 ASA & Clopidogrel
 Platelets **LESS** than 50k = **RISKY** (Normal: 150-400k)
NOT INR or PTT

Anticoagulants (**MOST** potent)
Warfarin = INR "warINR"
 Range: 2.5-3.5 (**3 x MAX range**)
 Antidote: Vitamin K (green leafy veggies) ***NOT** K+ = potassium*

Heparin (Enoxaparin) = aPTT "HaPTT" frog Partial Thromboplastin
 Range: 46-70 (**3 x MAX range**)
 Antidote: Protamine Sulfate

Bleed Risk (Patient Education)

- NO** peptic ulcers (or active bleeds)
- NO** Rugs/dim halls (well-lit halls)
- NO** razors, hard brushing, constipation
- NO** NSAIDS like naproxen/ ibuprofen
- NO** EGGO vitamins
- E-E** Echinacea, Vitamin A
- G-Gingko**, Garlic, Ginseng
- O-O** omega 3

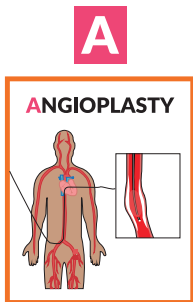


MYOCARDIAL INFARCTION

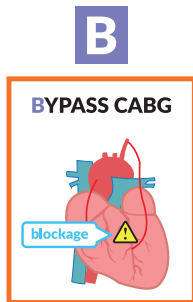
Treatment

(+ Positive Troponin = Heart Attack (MI))
PRIORITY: REMOVE THE CLOT!

"CATH LAB" OR SURGERY
 "PCI" -graphy, -plasty



BEFORE
 NPO 6 - 12 hrs



AFTER
NO heavy lifting-**lie flat**
NO Baths-Shower ok (dont soak)
 Infected Incision
 "red, warm, drainage"

CLOT BUSTER "Thrombolytics, Fibrinolytics"

t-PA: Alteplase, Streptokinase (Allergy risk)
 Dissolves Clot **ONLY** (heparin does **NOT**)

BLEED RISK

- 8 hour duration
- NO** injections (IV, SQ, IM, ABG)
- NOT** via central lines (CVC)
- ONLY** "compressible site" (IV, PICC)
- NOT FOR:**

Active Bleeds:

Peptic Ulcers (but menstruation is safe)

History:

- Arteriovenous malformations
- Intracranial "Cerebral" hemorrhage
- Hypoglycemia (relative contraindication)
- Hypertension (over 180/110) **TEST TIP**

STRESS TEST

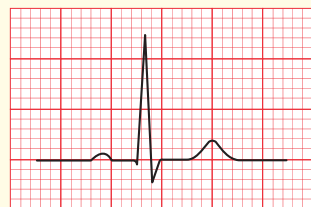
Non MI (non priority) • Spot the Narrowing

TREADMILL STRESS TEST

STOP test:
 chest pain
 ST elevation

CHEMICAL: NUCLEAR PHARMACOLOGICAL STRESS TEST

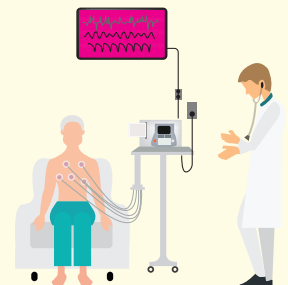
24-48 hours BEFORE
NO Cigarettes, Caffeine (tea, soda, coffee) ***NO DECAF**
NO Meds: Nitro, Beta Blocker, Theophylline (stimulant)
 NPO (nothing oral) **4 hrs** before/after



Normal



ST elevation



Peripheral Vascular

Med Surg: Cardiac

NARROW PVD | VEIN

Signs & Symptoms

VEINY

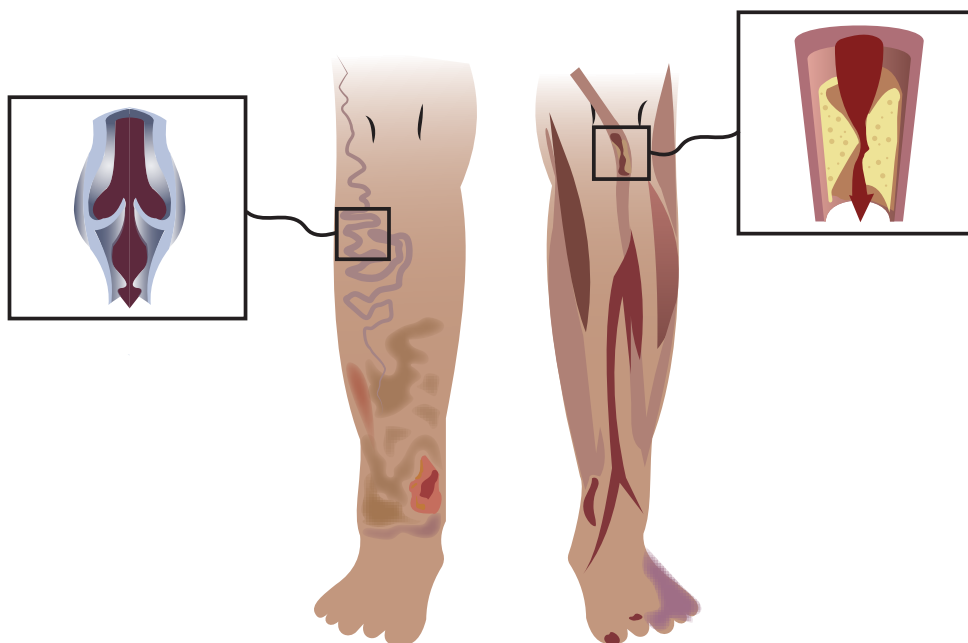
- V VOLUMPTUOUS PULSES** - Warm legs
- E EDEMA** (blood pooling)
- I IRREGULAR SHAPE SORES** (Exotic pools)
- N NO SHARP PAIN** (Dull pain)
- Y YELLOW & BROWN ANKLES**

NARROW PAD | ARTERY

Signs & Symptoms

ARTS

- A ABSENT PULSES**,
Absent Hair (Shiny) = Cool legs
- R ROUND, RED SORES** (blood pooling)
- T TOES & FEET PALE** or BLACK "Eschar"
- S SHARP CALF PAIN**
(intermittent Claudication)
E - Exercise • E-Elevation (recliner chair)



Positioning



PVD

VEINS = ELEVATE
(Vacuum)

Patient Education

PVD & PAD

- C**-Constriction **AVOID**
- C**-Cross legs
- C**-Constrictive clothing
- C**-Cigarettes
- C**-Caffeine
- C**-Cold Temperatures
- T**-Toenails trimmed **ONLY** by Dr.

NCLEX TIP

Positioning

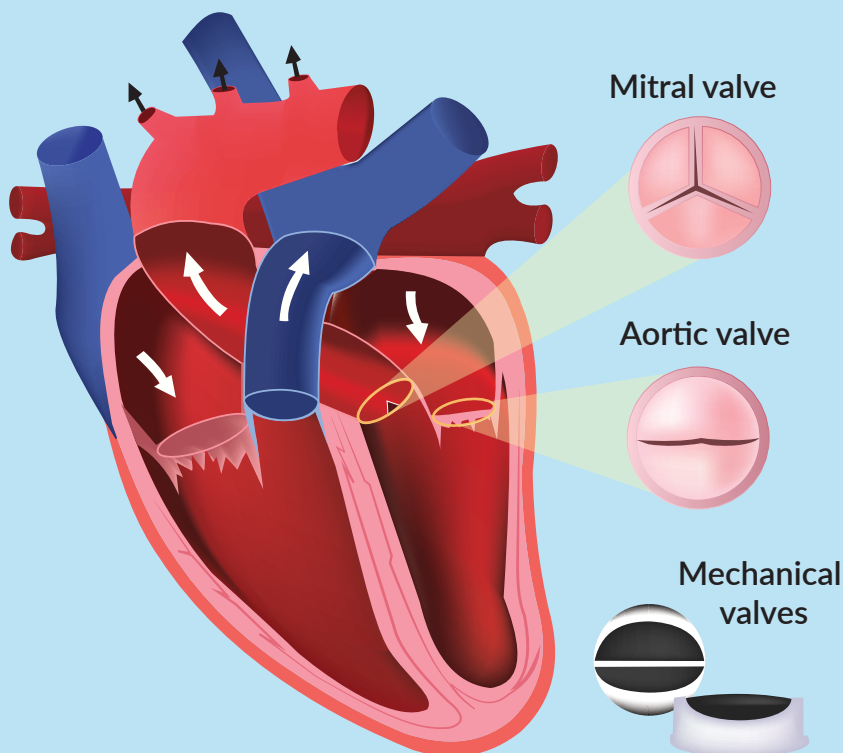


PAD

ARTERIES = HANG
(Away)

Valve disorder

Med Surg: Cardiac



Pathophysiology

The heart is like a 4 bedroom suite. The valves are like doors & the chambers are like rooms. If valves have trouble closing it can result in back flow of blood & insufficient blood flow to the body.

Stenosis: stiff, narrowed, hard valves

Regurgitation: Return of blood or backflow of blood as the valve does not completely close.

Main Types

- Aortic Stenosis
- Aortic Regurgitation
- Mitral Stenosis
- Mitral Regurgitation

Causes

Anything that can damage the heart!

- Congenital heart disease (pre-term babies)
- Cardiomyopathy - a disease of the heart muscle
- Heart Attack - damaged heart muscles
- Infection:
 - Rheumatic fever - ruins the heart
 - Endocarditis - infection in the heart

Signs & Symptoms

Think LOW oxygen from LOW heart pumps.

Regurgitation

- **Aortic**
Tachycardia, dyspnea, fatigue
- **Mitral**
Edema, pleural effusion, enlarged organs & ascites

Stenosis

- **Aortic**
Angina, sys. murmur, syncope, fatigue, orthopnea
- **Mitral**
Cyanosis, activity intolerance, diastolic murmur, s/s of **right** ventricular failure, clear lung sounds

Pharmacology

- **Anticoagulants:** Heparin & Warfarin
- **Antiplatelet:** Aspirin & Clopidogrel
- **Nitroglycerin** for chest pain

Surgeries

- Valve replacement - Warfarin therapy life long
- Balloon valvuloplasty - Stenosis

Patient Education

- **AVOID** dental procedures for 6 months after surgery & take antibiotics before dental exams.
- Warfarin (anticoagulant)
 - Life long drug with "routine blood tests"
 - **2.5 - 3.5** INR (for valve replacements)
 - Even intake of Green leafy veggies (vitamin K) NOT increased & NOT decreased intake - nice & even
- Bleeding precautions
 - **NO** brushing teeth too hard
 - **NO** shaving - only electric shaver
 - **NO** throw rugs & always well lit halls

Heart Failure

Med Surg: Cardiac

https://t.me/nclex_rn_edu

Patho

The heart fails to maintain adequate cardiac output (oxygenated blood pumped OUT to the body) due to impaired pumping ability.

MEMORY TRICKS

- **HF - Heart Failure** (failure to pump blood forward)
 - **HF - Heavy Fluid** (backs up in lungs / body)
- Weight Gain = Water Gain**

Signs & Symptoms

R - RIGHT Sided HF R - ROCKS BODY with fluid	L - LEFT sided HF L - LUNG fluid
<ul style="list-style-type: none"> • Peripheral Edema • Weight Gain = Water Gain • JVD (big neck veins) • Abdominal Growth <ul style="list-style-type: none"> - Ascites (fluid in abdomen) - Hepatomegaly (big liver) - Splenomegaly (big spleen) 	<ul style="list-style-type: none"> • Pulmonary Edema • Crackles in lungs "Rales that don't clear with a cough" • Pink Frothy "blood tinged" sputum • Orthopnea - difficulty breathing when lying flat

Causes

R - RIGHT-Sided HF	L-LEFT sided HF
<ul style="list-style-type: none"> • HTN (high BP) • Pulmonary HTN • Stiff "fibrotic" lungs • Left-sided HF can cause Right HF 	Weak heart = weak pump <ul style="list-style-type: none"> • After a heart attack (MI - myocardial infarction) • Ischemic heart disease - low oxygen to heart muscles (CAD, ACS)

3 Common EXAM Questions:

Patient with **heart failure** who is constipated!
What would the **nurse recommend?**

- ✓ 1. Walking
- ✓ 2. Increase fiber
- ✓ 3. Stool Softeners
- 4. Drink extra water - **NO!**

Which **food item** should the **heart failure patient avoid?**
Select all that apply.

- ✓ 1. Chips - **NO SODIUM!**
- 2. Fruits
- 3. Veggies
- ✓ 4. Grilled chicken & fries - **NO!**
- ✓ 5. Canned beans - **NO!**
- 6. Bread

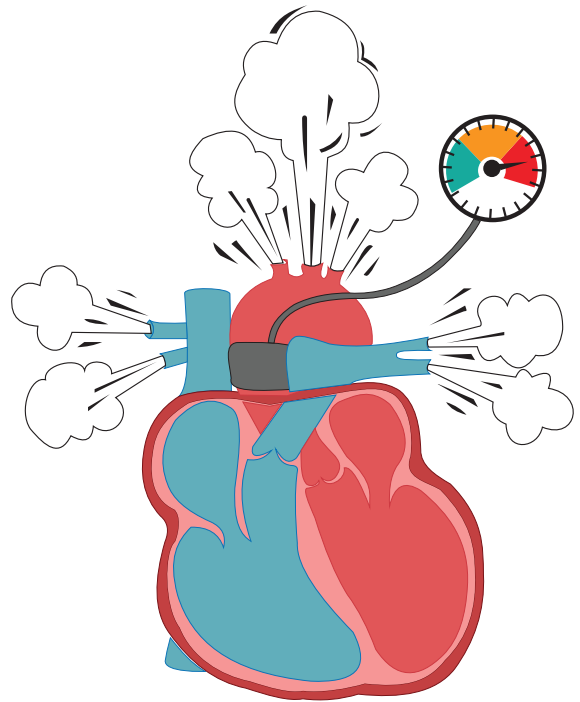
A client with chronic heart failure took **cold medicine** for her flu. She presents with **new** productive cough with **pink frothy sputum** and **worsening crackles**.

What action should the nurse take **first?**

- 1. Assess lung sounds
- ✓ 2. Give bumetanide IV Push - **YES**
- 3. Notify the HCP
- 4. Clock out for lunch

Look for **KEY WORDS**

"New, sudden, worsening, rapid symptoms"
1 Action is Furosemide = "Body Dried"



Risk Factors

1. Hypertension (high BP) is the **#1 risk factor**
2. Atrial fibrillation & other dysrhythmias
3. Mitral valve regurgitation
4. Cardiomyopathy

Diagnostic tests

- **Labs: BNP** (brain type natriuretic peptides)
Memory trick: B - Broken ventricles
Over 900+ = SEVERE HEART FAILURE
- **Echocardiogram** measures **Ejection Fraction** (blood pumped out of heart)
55 - 70% = normal
40% or LESS = BAD (heart failure)
- **Hemodynamic Monitoring**
"Swanz Ganz" (Pulmonary Artery catheter)
Over 8 = is NOT GREAT! (normal: 2 - 8 mmHg)

Priority Interventions

For Pulmonary Edema Crisis (lung fluid)

KEY WORDS

"New, sudden, worsening, rapid symptoms"
1 Action is Furosemide = "Body Dried"

- **H** - HOB **45** degree or higher
(Semi-fowler's, High fowler's, orthopneic position)
- **O** - Oxygen
- **P** - Push Furosemide + Morphine, Positive inotropes
- **E** - End sodium & fluids
(Sodium Swells the body)
NO drinking fluids + **STOP** IV fluids

Heart Failure II

Pharmacology & Care

A	ACE & ARBS (Lowers BP) Lisinopril • Losartan
B	BETA BLOCKERS (Lowers HR & BP) Atenolol
C	CALCIUM CB (Lowers HR & BP) Nifedipine, Cardizem, Verapamil
D	DIGOXIN (Lowers HR) Cardiac Glycoside
D	DILATORS (Vasodilators) Nitroglycerin
D	DIURETICS (Lowers BP) Potassium Wasting & Sparing Milrinone *inotropic drug-LAST LINE therapy-palliative care

Nursing Care & Interventions

DRBEDSS

D	DIET LOW Sodium & Fluid (2L + 2g or LESS/day)
R	RISK FOR FALLS! (Change positions slowly!)
B	BP & BNP (Should NOT be increasing)
E	ELEVATE LEGS (with pillows) High Fowlers
D	DAILY WEIGHTS (3lbs/day or 5 lbs/7 days = Worsening!)
S	SEX (2 flights of stairs with NO SOB)
S	STOCKINGS "TED hose" (decreases blood pooling, Remove daily)

NO OTC meds (Cough or Flu, Antacids or NSAIDS) **NCLEX TIP**

NO Canned or packaged foods (chips, sauces, meats, cheeses, wine)

NEVER massage calves (CHF patients) **NCLEX TIP**

Pharmacology

- A** - ACTS on BP only (**not HR**)
- A** - ACE (-pril) Lisinopril "chill pril" 1st choice
- A** - ARBS (-sartan) Losartan "relax man" 2nd choice
 - A**-Avoid Pregnancy
 - A**-Angioedema (Airway Risk) *only Ace
 - C**-Cough *only Ace
 - E**-Elevated K+ (normal 3.5-5.0)
- B** - BETA BLOCKERS (-lol) Atenolol "LOL = LOW"
 - Blocks both BP & HR (**AVOID** Low HR & BP)
 - Caution: **HOLD IF:**
 - B**-Bradycardia (LESS than 60) & BP low (90/60) only hold if the patient is in an acute exacerbation of CHF
 - B**-Breathing problems "wheezing" (Asthma, COPD)
 - B**-Bad for Heart Failure patients
 - B**-Blood sugar masking "hides S/S" (Diabetics)
- C** - CALCIUM CHANNEL BLOCKERS
 - Calms BP & HR (AVOID Low HR & BP) (Nifedipine)
 - dipine "declined BP & HR"
 - amlodipine "chill heart"
- D** - DIURETICS Drain Fluid
 - D**-Drains Fluid "Diurese" "Dried"
 - K+ Wasting**-Furosemide & Hydrochlorothiazide (caution: Low K+, Eat melons, banana & green leafy veg)
 - K+ Sparing**-Spironolactone "Spare potassium" (AVOID Salt Substitutes, melons & green leafy veg)
- D** - DILATORS (Vasodilators)
 - Nitroglycerin, Isosorbide
 - Nitroglycerin** "Nitro = Pillow for heart"
 - Caution: NO** Viagra "-afil" Sildenafil = **DEATH!**
 - Nitro drip: **STOP** = Systolic BP below 90 or 30 mmHg Drop
 - Adverse effect:
 - HA= side effect
 - Low BP= adverse effect (SLOW position changes)
- D** - DIGOXIN (Inotropic)
 - Digs for a DEEP contraction
 - Increased contractility
 - Apical Pulse x 1 minute
 - Toxicity (over 2.0) Vision changes, N/V **TEST TIP**
 - Potassium 3.5 or less (higher r/t toxicity)

Endocrine

Hormone Hall of Fame

Med Surg: Endocrine

Hormone	Source	Effect on target	Stimulus for release
ACTH Adrenocorticotropic hormone	Anterior Pituitary	Stimulates adrenal cortex to release aldosterone and cortisol.	Stress
FSH Follicle stimulating hormone	Anterior Pituitary	Stimulates growth of ovarian follicles containing eggs and sperm production.	GnRH
GROWTH HORMONE Somatropin	Anterior Pituitary	Anabolic metabolism, cartilage growth catabolism of fat, blood glucose and other insulin effects. Enhances T3 and T4.	GHRH from low blood glucose
Luteinizing hormone	Anterior Pituitary	Stimulates ovulation and formation of a corpus luteum. Production of testicular and ovarian hormones.	GnRH
PRL Prolactin	Anterior Pituitary	Stimulates production of milk in the breast.	Estrogen, pregnancy, and nursing
TSH Thyrotropin / TSH	Anterior Pituitary	Stimulates thyroid to release T3 and T4.	Thyroid releasing hormone

Hormone	Source	Effect on tissue	Stimulus for release
Insulin	Pancreas	Lowers blood glucose.	High blood glucose
Glucagon	Pancreas	Increases blood glucose.	Low blood glucose

Hormone Hall of Fame II

Med Surg: Endocrine

Hormone	Source	Effect on tissue	Stimulus for release
ADH Antidiuretic hormone	Posterior Pituitary	Causes kidneys to reabsorb more water. Produce smaller amounts of more concentrated urine.	High osmolality of body fluids, decreasing BP, pain
Oxytocin	Posterior pituitary	Stimulates uterine contractions. Causes milk let down.	Stretch of uterus or cervix or infant nursing at breast

Hormone	Source	Effect on tissue	Stimulus for release
Melatonin	Pineal gland	Causes sleepiness during night time.	Darkness or lack of bright light

Hormone	Source	Effect on tissue	Stimulus for release
Thymosin	Thymus	Influences development of lymphocytes. Most active in childhood.	Unknown

Hormone	Source	Effect on tissue	Stimulus for release
PTH Parathyroid hormone	Parathyroid gland	Increases blood calcium levels.	Low blood calcium levels
Calcitonin	Thyroid gland	No known role Given for paget's disease.	Excessively high blood calcium levels
TH Thyroid hormone T3/T4	Thyroid gland	Increase metabolism, increase temp, increase energy production. Regulates tissue growth and development.	TSH

Hormone Hall of Fame III

Med Surg: Endocrine

Hormone	Source	Effect on tissue	Stimulus for release
Aldosterone	Adrenal cortex	Increases retention of sodium and increases secretion of potassium. Levels are low in Addison's. Levels are high in Cushing's.	Low sodium Low BP stress
Cortisol	Adrenal cortex	Helps keep glucose up between meals. Anti-inflammatory, depresses immune system.	Stress Hypoglycemia

Hormone	Source	Effect on tissue	Stimulus for release
Epinephrine and Norepinephrine	Adrenal medulla	Sympathetic nervous system stimulation used for shock.	Fight or flight response

Hormone	Source	Effect on tissue	Stimulus for release
Estrogen and progesterone	Ovaries	Controls changes in the endometrium during menses.	Fluctuating levels of FSH & LH
Testosterone	Testes	Sperm production, growth of facial and chest hair.	LH

Addison's vs. Cushing's

Med Surg: Endocrine

Addison
Absent Steroids **LOW**
Small, Weak, Tanned

Pathophysiology

- A • **ADD** "some steroids" (Cortisol & Aldosterone)
- A • **ADDED** Stress will **KILL!**

Causes

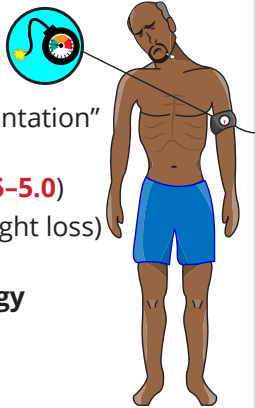
- A • **AUTOIMMUNE** (body kills adrenals or Pituitary)
- D • **DISEASES:** Cancer, Infections (TB/HIV)
- D • **DAMAGE:** Adrenal Hemorrhage (Trauma)

Signs & Symptoms

LOW BP, Wt, Glucose, Temp, Hair, Mood, Sodium, Energy
HIGH Skin Tan (bronze) + Potassium (K+) Over 5.0

ADDS

LOW BP - TICKING TIME BOMB



- A • **ADDED Tan**
"Bronze pigmentation" "hyper pigmentation"
 - A • **ADDED Potassium**
"Hyperkalemia" **Over 5.0** (normal 3.5-5.0)
 - D • **DECREASE Weight** (Water loss = weight loss)
NOT TRUNCAL OBESITY
 - D • **DECREASED BP, hair, sugar & energy**
"fatigue" "alopecia" "hypoglycemia"
"hypotension"
 - S • **SODIUM loss 135 or LESS**
(135-145 normal)
 - S • **SALT craving**
- *NOT hairy NOT "Hirsutism" = hair suit &
*NOT thin skin is Cushing's

Treatment

- A • **Add Steroids "-sone"** Prednisone)
Increase the Dose during **Stress, Surgery, Sepsis**
- D • **Diet HIGH** in Protein, Carbs & Sodium
- D • **Don't "Abruptly" STOP** Steroids! (Crisis)
- D • **Don't** believe this medication will cure you
- I • **Indefinitely:** "Lifelong" hormone replacement

ADDisonian "Adrenal" Crisis

Caution: No Steroids = DEATH!

- A • **Addisonian Crisis**
- D • **Drop in BP 89/40 LESS** (Normal: 120/80)

1ST NURSE ACTION

ADD steroids (IV push)
"-sone" hydrocortisone prednisone

Cushing
Cushion of Steroids **HIGH**
Big, Round, Hairy

Pathophysiology

- C • **C**ushing (HIGH Cortisol Steroids)
- C • **C**ushion Pillow 'Air Bag'

Causes

STERIODS Prednisone **LONG TERM** Therapy (asthma + RA)
TUMOR (Pituitary/Adrenal)
SMALL CELL LUNG CANCER **NCLEX TIP**

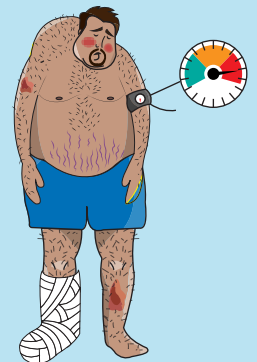
Signs & Symptoms

BIG BP, Infections, Wt, Hair, Belly, Brittle Bones

CUSH

HIGH BP

- C • **CUSHION**
TRUNCAL Obesity + Moon Face + Buffalo hump
- U • **UNUSUAL HAIR Growth**
"Hirsutism" (hairy suit)
- S • **SKIN**
"Purple Striae" "butterfly mark"
- H • **HIGH Sugar, BP, Weight**



Treatment

SURGERY Cut out Tumor **RE**move organ = **RE**place Steroids
SLOWLY decrease Steroids "taper off gradually"

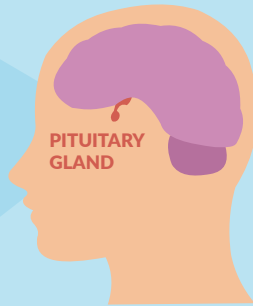
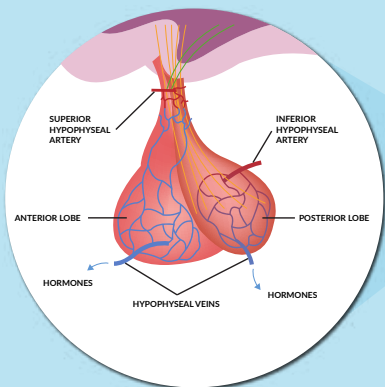
NCLEX Question

Which clinical manifestation(s) would be observed in a patient with Cushing's syndrome? Select all that apply:

- 1. Easy bruising
- 2. Increased blood glucose
- 3. Increased blood pressure
- 4. Increased potassium
- 5. Increased abdominal girth
- 4. Decreased weight

SIADH vs. DI (Diabetes Insipidus)

Med Surg: Endocrine



ADH
Anti-Diuretic Hormone
Adds **Da H₂O**

Nursing Care

- D** **DAILY WEIGHTS** (NOT weekly)
- W** **WEIGHT GAIN** = Water Gain

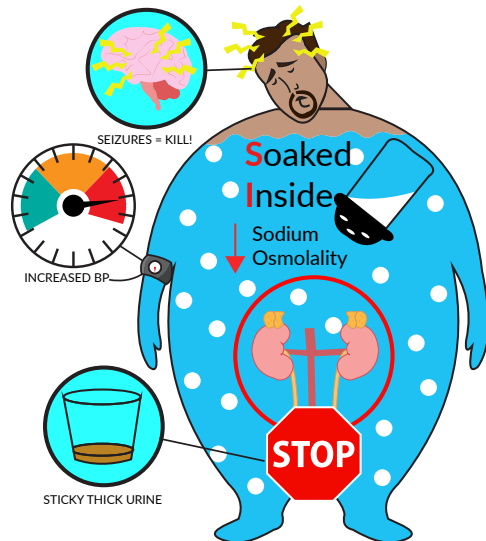


SIADH "Soaked"
"Yes" **ADDS DA H₂O**
Syndrome of Inappropriate Antidiuretic Hormone

Patho, S/S, Treatments

- S** **STOPs** urination (**LOW** urine output)
- S** **STICKY & THICK** "urine" **HIGH Sp. Gravity 1.030+**
- S** **SOAKED** Inside "Low & Liquidy" Labs
HYPO osmolality (**LOW**) **NCLEX TIP**
HYPOnatremia below **135 Na+** (**LOW**)
- S** **SODIUM** Low!! (**Headache** Early Sign) **NCLEX TIP**
- S** **SEIZURES**- **NCLEX** key words: Headache, Confusion
- S** **SEVERE HIGH** blood pressure
- S** **STOP ALL FLUIDS + GIVE Salt + Diuretics**
(**NO IV** or drinking) + (**IV 3% Saline + Eat Salt**)

SIADH "Soaked Inside"



Causes

- S** • **S**mall cell lung cancer **NCLEX TIP**
- S** • **S**evere Brain Trauma (trauma/surgery)
- S** • **S**epsis infections of brain (meningitis)

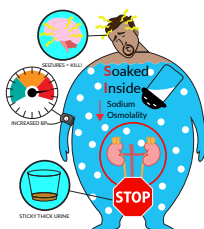
Labs

- SOAKED** Inside "Low & Liquidy" Labs
HYPO osmolality (**LOW**)
HYPOnatremia below **135 Na+** (**LOW**)
- STICKY** thick urine" Outside • **LOW** urine output (**STOPs** urine)
HIGH specific Gravity **1.030+**

Common NCLEX Question

What does the nurse expect to find in a patient with syndrome of inappropriate antidiuretic hormone? Select all that apply

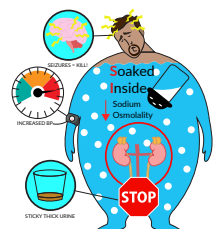
- 1. Low blood osmolality
- 2. Increased serum osmolality
- 3. Low urine specific gravity
- 4. Hyponatremia
- 5. Decreased urine output



Common NCLEX Question

When caring for a patient with SIADH, what does the nurse expect to implement? Select All That Apply

- 1. IV maintenance fluid 0.9% normal saline
- 2. Fluid restriction
- 3. Sodium restriction
- 4. Seizure precautions
- 5. Monitor urine I & O (intake & output)
- 6. Measure weight weekly



Siadh vs. DI II

Med Surg: Endocrine

DI "Dehydrated"
 "Die" ADH
 Diabetes Insipidus

Patho, S/S, Treatments

- D** **DIURESE** "Drain" fluid (**HIGH** urine output)
- DD** **DILUTED** urine Low specific Gravity (**1.005**)
- DDRY** **I**nside "High & Dry" Labs
 - HYPER** osmolality (**HIGH**) **NCLEX TIP**
 - HYPER**natremia over **145 Na+** (**HIGH**)
- D** **DRINKING** a lot "thirsty"
- D** **DEHYDRATED** Dry Mucosa & Skin
- D** **DECREASED** blood pressure
- D** **DESMOpressin** "Vasopressin" (ADH)
 - Decrease Urine Output **NCLEX TIP**
 - Death by **Headache!** (Low Na+) **135 or Less**

Treatment

- D** • **Desmopressin/Vasopressin** (synthetic ADH)
- D** • **Decreases** Urine Output "**Pressin**" the BP Up!
- CAUTION:** "Headaches" Priority!
- Low Na+ (**135 or less**) > Seizures > **DEATH!**

Causes

- D** • **D**amage to brain
(Tumors, Trauma, Surgery)

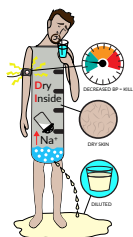
Labs

- Dry** **I**nside "High & Dry" Labs
 - HYPER** osmolality (**HIGH**)
 - HYPER**natremia over **145 Na+** (**HIGH**)
- D**iluted o**U**TSIDE "High urine output (**D**rain urine)
LOW specific Gravity **1.005**

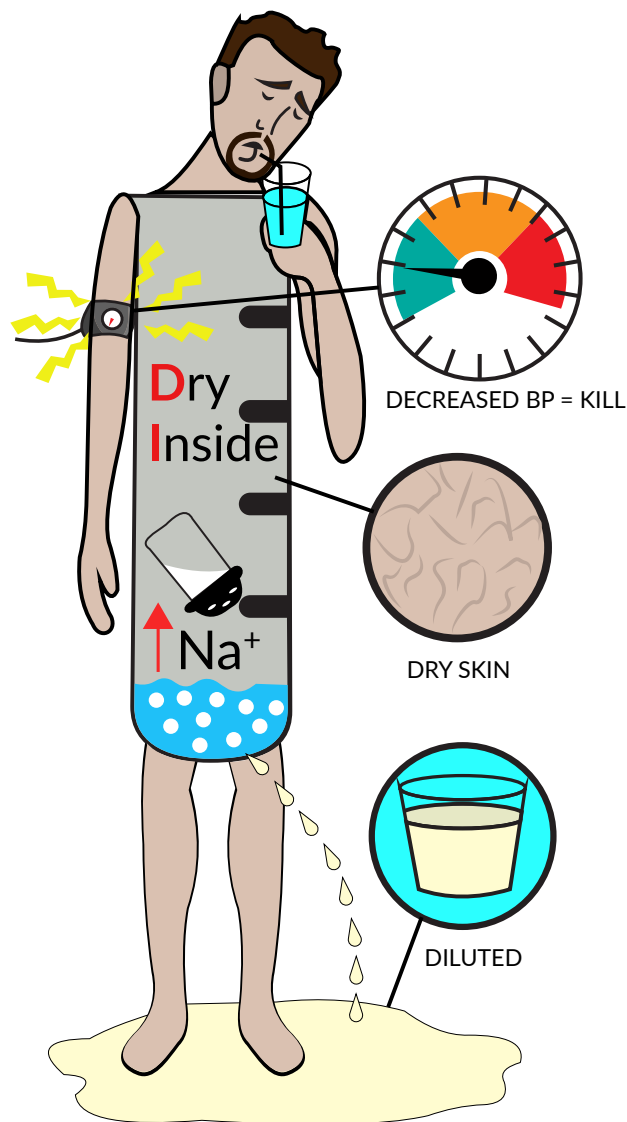
Common NCLEX Question

A client with a brain tumor develops **diabetes insipidus**, which data should a nurse **expect to find**?
 Select All That Apply

- 1. Dark urine with increased specific gravity
- 2. High blood serum osmolality
- 3. Weight gain with edema
- 4. Increased thirst
- 5. Sodium level below 135
- 6. Urine output 30 ml/hr or less.



DI "Dry Inside"



Common NCLEX Question

A client is newly prescribed **desmopressin** nasal spray, which statement by client indicates **further education is needed**?
 Select All That Apply

- 1. Frequent headaches are normal
- 2. I will make sure to restrict my water intake
- 3. This drug is used to decrease my frequent urination
- 4. I am glad this drug is able to treat my syndrome of inappropriate antidiuretic hormone.
- 5. I will record my output closely while taking this drug.
- 6. I will make sure to weigh myself weekly.

Steroids

Drug name:

S



S



S - **S**TERIODS
S - **S**tress & Swelling hormone

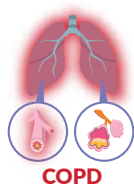
"-Sone"

- Predni**son**e
- Dexametha**son**e
- Hydrocorti**son**e
- Fludrocorti**son**e



Indication:

Given to help the body respond to inflammation & STRESS!
 Commonly for:



- Inflamed Lung like **COPD**
- Inflamed joints like **Rheumatoid Arthritis**
- Inflamed SKIN like **Psoriasis**
- Inflamed body - like **Lupus** where the body attacks itself
- **Allergic** reaction where EVERYTHING swells UP



Also given to **Addison** clients

We need to **ADD some** steroids

ADDISON TREATMENTS:

7 Ss STEROID PRECAUTIONS

"-sone" predni**son**e, hydrocorti**son**e, dexametha**son**e

S **SWOLLEN** (Water gain = Weight gain)

KEY TERMS: "Sudden" "excessive", "rapid"

REPORT: 1 Lb. in 1 day, or 2-3lbs in a few

S **SEPSIS** (Infections or Illness)

"Low WBC" Fever is **PRIORITY** **NCLEX TIP**

S **SUGAR INCREASED**

"Hyperglycemia" **NCLEX TIP**

S **SKINNY**

Muscle & Bones "Osteoporosis" (R/F Fx)

S **SIGHT**

(Cataracts risk) refer to Optometrist

PREVENT CRISIS:

S **SLOWLY** taper off

(**NEVER** abruptly stop) **NCLEX TIP**

S **STRESS** or Surgery

(increase dose)

TOP 3 MISSED Questions:

The nurse should be concerned when the client states: "I have a **sore on my leg that won't go away**".

Which medication should be reviewed with HCP.

Select all that apply

- 1. Naproxen
- 2. Dihydromorphinone
- 3. Dexamethasone
- 4. Hydrocodone
- 5. Hydrocortisone

Which priority teaching is required for a patient prescribed **prednisone** for Lupus?

- 1. Report slight increases in blood sugar to HCP immediately.
- 2. **Increase dose before surgery or during times of stress.**
- 3. Monitor weight weekly.
- 4. Take with full meal at breakfast.

Which of the following is an indication that the client needs additional teaching, while taking **fludrocortisone**?

- 1. I will not discontinue this medication abruptly
- 2. **New bilateral pedal edema is normal**
- 3. The most important value to monitor is my weight.
- 4. I will report signs & symptoms of infection

DKA vs. HHNS

Med Surg: Endocrine

DKA

Patho & Causes:

- TYPE 1**—FASTER & YOUNGER
"D COMES 1ST IN ALPHABET"
- S**—SEPSIS (INFECTION) **NCLEX TIP**
- S**—SICKNESS "STOMACH VIRUS & FLU"
(MOST COMMON)
- S**—STRESS (SURGERY)
- S**—SKIP INSULIN EASIER FIX

Signs & Symptoms

- D**—DRY & HIGH SUGAR **250-500+** **NCLEX TIP**
- K**—KETONES & KUSSMAUL RESP.
(DEEP/RAPID/REGULAR RESPIRATIONS AND FRUITY BREATH) **NCLEX TIP**
- A**—ABDOMINAL PAIN
- A**—ACIDOSIS METABOLIC **LESS THAN 7.35**
(NORMAL 7.35—7.45)
- HYPERKALEMIA (ABNORMALLY HIGH K+)

Treatment

- D**—Dehydration **FIRST!** (0.9% normal saline) **NCLEX TIP**
- K**—Kill the sugar (**SLOWLY**) prevent low sugar
Hourly BS checks "land the plane slow & smooth"
Over 250: IV Regular **insulin ONLY** (bolus 1st)
Below 200 (or ketones resolve): SQ insulin + 1/2 NS with D5W IV
- A**—Add Potassium K+ (Yes even if norm: 3.5 - 5.0)
During IV Insulin **NCLEX TIP**
IN-sulin = sugar & K+ IN the cell

Common NCLEX Question

Q: Child is nauseous NOT eating—maybe vomiting—do you still give INSULIN?

A: Yes, we give sick day insulin to prevent DKA... because glucose is HIGH during times of illness.

Re-Assessment

Blood Glucose **Hourly**

Re-Hydration Signs:

- BP stable & Cap Refill (3 sec or less)
- Skin color & warm temp (NOT cool/pale)
- 30ml/hr + Urine Output
- Low spec gravity (1.005–1.030)

NOT Apical pulse **NOT** Lung sounds **NOT** Pupils

Potassium IV (Normal 3.5 - 5.0)

- First Action = Heart monitor
- Never push = **DEATH**
- 10–20 mg MAX per hour IV!! (IV Pump)
- Site (central) and Slow infusion

HHNS

Patho & Causes:

- TYPE 2**—SLOWER & OLDER "H COMES 2ND IN ALPHABET"
- ILLNESS
- INFECTIONS
- OLDER AGE HARDER TO FIX

Signs & Symptoms

- H**—HIGHEST SUGAR **OVER-600+**
- H**—HIGHER fluid loss & **Extreme dehydration** **NCLEX TIP**
- H**—Head change—LOC, Confusion, Neurological Manifestations
- N**—No ketones **No Acid**, (NO fruity breath/ ketones)
- S**—Slower Onset & Stable Potassium (3.5-5.0)

Treatment

- H**—Hydration—0.9% NS 1st, then HYPOTonic **NCLEX TIP**
- S**—Stabilize Sugars (Insulin)
- CAUTION:** Insulin IV = **ONLY Regular Insulin** **NCLEX TIP**
- IV bolus
- IV titration
- SQ injection & IV
- SQ only

DKA patients DIE from hypokalemia whereas HHNS patients die from hypovolemia

Potassium Pumps Muscles

High Potassium (5.0+)

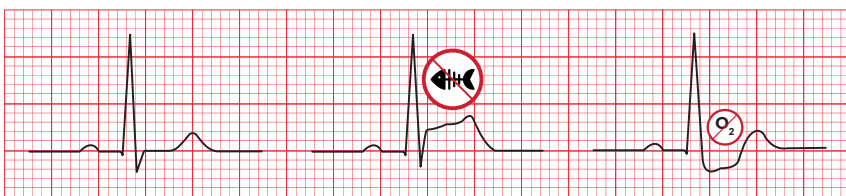
High Pump

Peaked T waves, ST elevation

Low Potassium (Below 3.5)

Low Pump

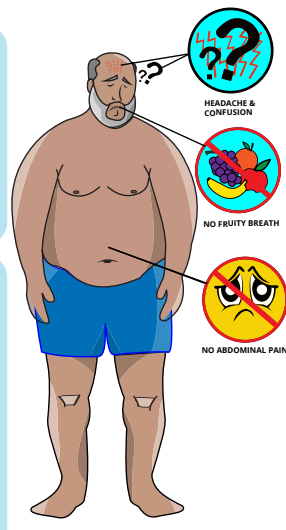
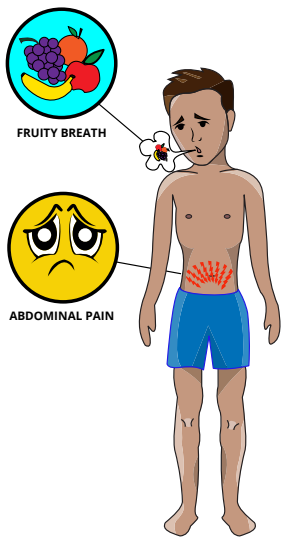
Flat T wave, ST depression, U wave



Normal

ST elevation

ST Depression



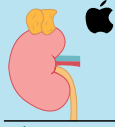
Hyperaldosteronism & Pheochromocytoma

Med Surg: Endocrine

Hyperaldosteronism

Pathophysiology

Hypersecretion of aldosterone hormone from the adrenal gland. Aldosterone's function is to maintain blood pressure by retaining sodium & water, but also lets potassium out of the kidneys



Memory Trick for Aldosterone



AL
A • ADDS SODIUM & WATER **IN**
L • LETS POTASSIUM **K+** **OUT**

Signs & Symptoms

- Hypertension
- **Hypernatremia** (sodium **OVER 145**)
 - Polydipsia (extreme thirst)
 - Swollen dry tongue
 - Increased muscle tone **NCLEX TIP**
- **Hypokalemia** (potassium **under 3.5**)
 - ST depression & U waves
 - Decreased DTRs
 - Constipation & hypoactive bowels
- Polyuria & low urine gravity

MEMORY TRICK

HYPER AL

H- **HYPERTENSION** (Over 140/90)
Y- **YIELDING DTRS & BOWEL SOUNDS** (low & slow)
P- **POLYURIA & POLYDIPSIA** (excess urination & thirst)
E- **ECG U WAVE & ST DEPRESSION**
R- **RAINING URINE** (low SG less than 1.005)
A- **ADDING SODIUM** (Over 145 mEq/L)
L- **LOSING POTASSIUM** (3.5 mEq/L or Less)

Causes

Primary Inside Adrenals	Secondary Outside Adrenals
<ul style="list-style-type: none"> - Conn's Syndrome (benign tumor) - Genetics 	<ul style="list-style-type: none"> - CHF (congestive heart failure) - Renal artery stenosis

Treatment

Goal = lower fluid volume & increase K+

- Potassium supplements
- Spironolactone = potassium sparing diuretic
- Adrenalectomy + steroid treatment

Watch for Addison's CRISIS!
 Low Blood pressure that it will KILL!

Nursing Interventions

- Sodium restriction
- Monitor: blood pressure, Intake & Output, potassium & sodium levels

Pheochromocytoma

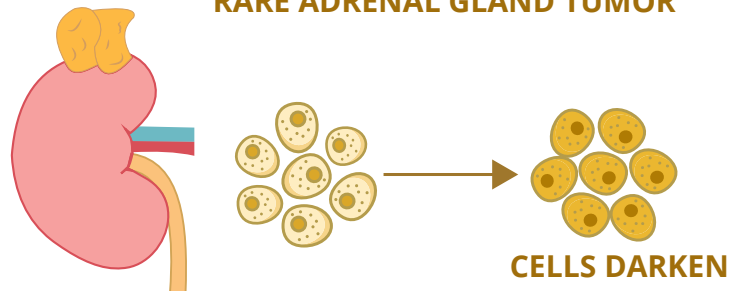
Pathophysiology

Tumor in the adrenal gland that can pump out high amounts of catecholamines, like epinephrine, which can increase the BP leading to **hypertensive crisis - blood pressure so HIGH it can kill the client!** This tumor can be benign or malignant.

Signs & Symptoms

- High BP with palpitations & chest pain
- Hyperglycemia
- Hypermetabolism
- Other signs from high catecholamines: Sweating, heat intolerance, tremors, blurred vision, nausea & vomiting

RARE ADRENAL GLAND TUMOR



Nursing Interventions

- Monitor vitals - especially blood pressure!
- No stimulants: smoking & caffeine.
- **No changing positions suddenly** or rapidly, as it can put pressure on the tumor & squirt out some catecholamines.
- Give beta blockers as ordered

Parathyroid - Hyper & Hypo

Med Surg: Endocrine

https://t.me/nclex_rn_edu

Parathyroid's Function

The parathyroid glands are mainly responsible for controlling the **regulation of blood calcium**.



MEMORY TRICK

PC

P • PARATHYROID
C • CALCIUM

(9.0-10.5 mg/dL)

Hyperparathyroid = Hypercalcemia (over 10.5)
Hypoparathyroid = Hypocalcemia (under 9.0)

It does with the help of **PTH - Parathyroid hormone**, so just think PTH - "Puts The calcium **HIGH** in the blood". When blood calcium is low - PTH increases to increase blood calcium & when blood calcium is HIGH - PTH decreases.

HYPER HYPER **P** arathyroid
C alcemia
Hypo Hypo **P** arathyroid
C alcemia

PTH

Parathyroid Hormone

P • PUTS
T • THE CALCIUM
H • HIGH in the blood

Hyperparathyroidism

Pathophysiology

Increased production of **PTH - Parathyroid Hormone**, resulting in **HIGH calcium!**

MEMORY TRICK

Hyperparathyroid = Hypercalcemia (over 10.5)

Signs & Symptoms

Think **HIGH calcium** in the blood. PTH makes bones weak by taking calcium from its storages.

HYPER Ca+

STONES = Kidney Stones
MOANS = Fractured Bones
GROANS = Constipation



Causes

- Tumor **NCLEX TIP**
 - Adenoma - **NOT** cancerous
 - Malignant - Cancerous
- Vitamin D deficiency (since it helps Ca absorb)
- GI issues = Malabsorption of calcium
- Renal failure

Treatment

- **Lower** the high blood calcium
 - IV furosemide & saline to flush out Ca
 - IV phosphate to lower Ca
- Parathyroidectomy - cut the tumor out

Hypoparathyroidism

Pathophysiology

Decreased production or resistance of **PTH - Parathyroid Hormone**, resulting in **LOW calcium!**

MEMORY TRICK

Hypoparathyroid = Hypocalcemia (under 9.0)

Signs & Symptoms

Think **LOW calcium** in the blood, signs include: '

1. **T - Trousseau's Sign:**
T - Twerk with BP cuff
2. **C - Chvostek's Sign**
C - Cheeky smile when stroking the face
3. Diarrhea

Causes

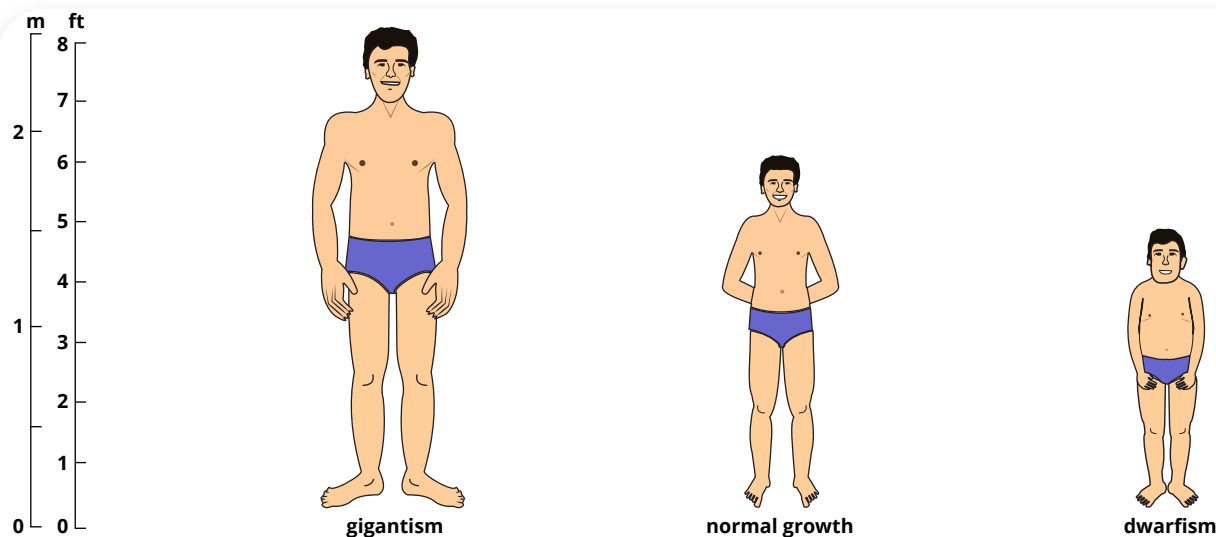
- Thyroidectomy **NCLEX TIP**
- Low Mag+ (Hypomagnesemia)
- Autoimmune - body attacks the parathyroids
- Radiation Treatment - damages thyroid

Treatment

- **Increase** the low blood calcium
 - IV Calcium gluconate
 - Vitamin D (helps absorption of Ca)
- Seizure precautions & phenobarbital to decrease neuronal excitability

Pituitary Disorders

Med Surg: Endocrine



Hyperpituitarism

Pathophysiology

Increased secretion of **GH - growth hormone** by the anterior pituitary gland, typically caused by a tumor.

- **Acromegaly:** occurs after puberty
- **Gigantism:** occurs before puberty (Puberty generally occurs around 8 - 14 years old)

Signs & Symptoms

- **Hyper think HIGH**
- High blood pressure
- Tall height, long hands & feet
- Enlarged organs

MEMORY TRICK

HE'S TALL

H - Hypertension & Height
E - Enlarged Organs
S - Sweating & oily skin
T - Too much pain in joints
A - Arthritis
L - Long hands & feet
L - Long protruding jaw

Pharmacology

- NSAIDS - for joint pain
- Growth Hormone receptor antagonists - they work by blocking GH
- Dopamine Agonists - work by stopping release of GH

Surgery

- **Hypophysectomy** (1st line treatment)
Complications post-operation: **ICP**, meningitis (infection in the brain), hypopituitarism, CSF leakage

Interventions Post Op

- Monitor **ICP**, vital, neuro status
- Elevate the head of bed - to decrease ICP
- NO sneezing, coughing or blowing nose - for ICP
- Monitor for **diabetes insipidus** - too much urination, indicates pituitary damage

Hypopituitarism

Pathophysiology

Decreased secretion or production of hormones within the pituitary, typically caused by a tumor, trauma, stroke etc.

Signs & Symptoms

- **Hypo think low**
- Hypotension - low BP
- Low cardiac output
- Low height & energy
- Low sex drive & infertility
- Obesity - from low metabolic rate
- Headaches

Pharmacology

- Corticosteroids: to replace steroid hormones ending in "**-sone**"
 - Predn**isone**
 - Hydrocort**isone**
- **Levothyroxine:** to replace thyroid hormones
- GH - Growth Hormone replacement

Diabetes

Med Surg: Endocrine

Pathophysiology basics

INsulin = puts **IN**to the cell (sugar & K+)
GLycogen = Stored **GL**ucose in Liver



Patho & Causes

Type **ONE**

None: body does **NOT** produce insulin
 Autoimmune (body attacks the pancreas)
SON: heredity "you can pass it on"



Type **TWO**

FEW-insulin receptors work
 "Insulin resistance" (Diet)
YOU: your diet (high simple sugars)
 & sedentary lifestyle



Risk Factors

"MetaBOLic Syndrome"-Increased risk for diabetes, heart disease, stroke

- B-B**P meds or HTN (over 130 sysolic)
 - B-B**lood Sugar Meds (insulin, oral diabetics) or High Blood Sugar (over 100+)
 - O-O**bes (waist size: 35+ Female 45+ Male)
 - L-L**ipids HIGH Total Cholesterol/Triglyceride/LDL 200-150-100—HDL 40 (higher LDL and lower HDL are risk factors)
- *3 or MORE criteria***

Top Missed NCLEX Question

Which clients are **MOST** at risk for developing **metabolic syndrome**? Select all that apply

- 1. 35 year old male with triglycerides of 140
- 2. 48 year old female with fasting blood glucose of 105
- 3. 55 year old female with waist size of 40 inches
- 4. 28 year old male with blood pressure of 135/85
- 5. 42 year old female with high density lipoprotein (HDL) level of 55

Diagnostic labs

	RANDOM	FASTING	GTT "TOLERANCE"	HgB _{A1c}
NORMAL	70-115	UNDER 100	UNDER 140	UNDER 5.7
PRE-DM	X	100-125	140-199	5.7-6.4
DM	200+	126+	200+	6.5+

Signs & Symptoms

HIGH sugar

hot and dry = sugar high
"Hyperglycemia" (blood turns to mud)
3 P's: Polyuria
 Polydipsia
 Polyphagia

LOW sugar (70 or LESS)

cold and clammy need some candy
Hypoglycemia
MORE SEVERE! "Hypogly Brain will Die!"
 • Cool, pale "pallor", sweaty, clammy = candy **NOT** hot or flushing
 • Trembling, Nervous, Anxious
 • HIWASH = Headache, Irritable, Weakness, Anxious, Sweaty, Shaky, Hungry

Causes

HIGH sugar (115 or MORE)

- Sepsis (infection #1 cause),
 - Stress (surgery, hospital stay),
 - Skip insulin
 - Steroids (predniSONE)
- TREATMENT:** Insulin

LOW sugar (70 or LESS)

- Exercise
 - Alcohol
 - Insulin PEAK times
- MOST DEADLY!** "Hypogly brain will DIE!"
1st TREATMENT:
 Awake? Ask to eat:
 Juice, Soda, Crackers, Low Fat Milk
NOT high fat milk or peanut butter
 Sleep? Stab them (D50 given IV/IO)



2 Common NCLEX Question

A client with type 1 diabetes is **only responsive to painful stimuli** with a blood sugar of 42, what is the first action taken by the nurse

- 1. Repeat the blood sugar assessment
- 2. Give dextrose IV push
- 3. Call the HCP (doctor)
- 4. Clock out for lunch - dis too much...

LOW Sugar
 "hypOglycemia"
 70 or LESS

Awake = Ask them to eat
 Sleeping = Stab with IV D50 (dextrose 50)

Which medication could increase risk for **hyperglycemia**?

- 1. Labatolol
- 2. Albuterol
- 3. Spironolactone
- 4. Prednisone

Tricky NCLEX Question

The non-diabetic client is admitted for a kidney **infection** that has now turned **septic**. The blood sugars have increased from **150 to 225**, what is the best answer to give a family member who is asking why insulin is used?

- 1. The client now has type 2 diabetes because of the infection.
- 2. Insulin is given to control the hypoglycemia.
- 3. High sugar is common during infection and stress to the body, the insulin will help lower the sugar until the infection resolves.
- 4. Be QUIET & let me do my job

Diabetes II

Med Surg: Endocrine

Treatment - Patient Education

D-DIET -Low carbs

AVOID: Simple Sugars (soda, candy, white bread/rice, juices)

- Good High Fiber = BROWN (bean, rice, bread, peanut butter)
"whole" wheat/grain/milk"
- Bad Low fiber = White (bread, rice, bread potatoes (fries), low fat milk)

D-DIABETIC FEET "Delicious Feast for bacteria"

GOAL: Clean, Dry, Injury Free

AVOID

- F**-Flip Flops, high heels, Nylon,
- O**-OTC corn removal
- O**-Overly **HOT** (baths, pads etc.)
- T**-Toe Injuries — cut nails STRAIGHT

NCLEX KEY WORDS:

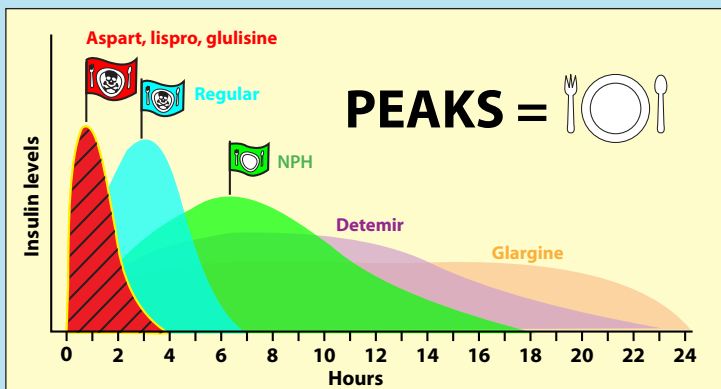
- Daily inspection — **NOT** weekly
- Shoes fit properly — **NO** sandals
- SOFT** Cotton Socks — **NOT** nylon
- Nails trimmed-cut straight — **NOT** curved angles
- Non healing skin wounds — Report to HCP (Dr.)

- NO** callous removal
- NO** heavy Powder — light powder
- NO** rubbing feet hard "vigorously"
- NO** HOT baths or HOT pads — warm is ok



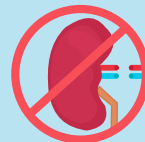
Insulin Types

LONG ACTING	NPH	REGULAR	RAPID
NO Peak NO Mix • Detemir • Glargine • Levemir = Long acting	iNtermediate NEVER IV drip or IV bag Mix clear to cloudy Given 2x per day	Ready to go IV Regular goes right into the vein ONLY IV insulin	Aspart/Lispro/Glulisine
NO PEAK	PEAK 4-12 hour	PEAK 2-4 hour	PEAK 30-90 minutes ONSET 15 minute MOST DEADLY



Complications

- KIDNEY**-Nephropathy (High Creatinine **OVER 1.3**)
- EYE**-Retinopathy (blind)
- HEART**-HTN & Atherosclerosis
- BRAIN**-CVA (strokes)
- NERVES**-Neuropathy (loss of feeling)

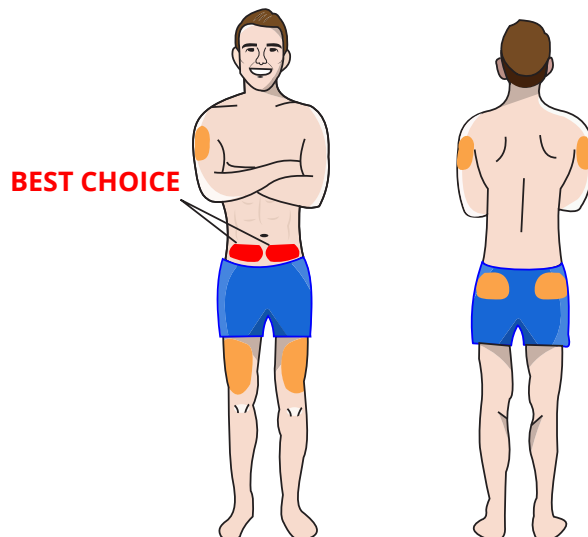


Oral Hypoglycemics (Type 2 Only)

- DIET & EXERCISE** BEFORE oral meds and insulin
- METFORMIN**-Minimal chance of Low Sugar "hypoglycemia"
 1. Weight Loss
 2. Lactic Acidosis: **NO** Alcohol + **STOP** 48 hours before and after cath
IV Contrast = Kills Kidney
- GLIPIZIDE GLYBURIDE**-Heart can **DIE** (bad for CHF)
LOW blood sugar (Avoid alcohol "**ETOH**" = hypoglycemia)
TOXIC: Renal, Liver & elderly population
Sun Burns = sunscreen & protective clothing
- THIAZOLIDINEDONE** (TZD) Pioglitazone (**ONE** heart)
NO Heart Failure patients-new pitting edema, crackles (lungs)
NO Liver failure patients "Cirrhosis" "Liver Failure"

7 Insulin Tips

- Peaks + Plates** = Food during PEAK times (prevent **HYPOgly**=brain die)
- NO Peak NO Mix** = Long acting "old guys"-Detemir & Glargine
- IVP or IVPB ONLY** = Regular insulin "ready to go IV"
- Draw Up:** Clear to Cloudy "you want **CLEAR** days before cloudy ones"
- Rotate locations-Macarena-**BEST** on abdomen (2 inches from: Umbilicus, Naval, "belly button")
- DKA** - Type 1-"sick days"-**YES INSULIN** without food!!!
- Hypoglycemia (**70** or LESS)
 - Awake** = **A**sk them to Eat (soda, juice, low fat milk)
 - Sleeping** = **S**tub with IV D50 (dextrose 50)
"Unresponsive" "Responsive **ONLY** to pain"



Hyperthyroid / Hypothyroid

Med Surg: Endocrine

HYPERthyroidism

Graves = **G**AINS "**H**IGH"

EMERGENCY CONDITION:

Thyroid Storm "**thyrotoxicosis**"

VERY HIGH = "Agitation/Confusion" + HTN crisis!

HYPOthyroidism

Hashim**O**tos | **L**OW & **S**LOW

EMERGENCY CONDITION:

Myxedema Coma (Mini hypothyroid)

VERY Low/Slow:

Airway, Breathing, Low BP = **DEATH!**

Patho & Causes

HIGH T3 & T4 Thyroid Hormones

- Too much Iodine
- Too much Thyroid Med (**Levo**thyroxine)
- Autoimmune: Grave = GAINS "HIGH"

AUTOIMMUNE: Graves = **GAINS "HIGH"**

Labs

HIGH T3 & T4 HYPER

Low—TSH

(look at T3 & T4 levels **FIRST**)

Signs & Symptoms

HIGH & HOT!

CLASSIC SIGNS - NCLEX KEY WORDS

- G** **GRAPE EYE "Exophthalmos"**
(Use Eye patch/Tape Eyelids down) **NCLEX TIP**
- G** **GOLF BALLS** in throat "**Goiter**" **NCLEX TIP**
- HIGH BP**-HTN Crisis **180/100+**
(MI,CA, Aneurysms)
- HIGH HR**-Tachycardia **100+** (normal **60-100**)
- HEART PALPITATIONS** + Atrial Fibrillation
- HIGH TEMP. = NOT DRY!**
HOT & Sweaty Skin "diaphoresis"
Heat Intolerance **NCLEX TIP**
- HIGH GI** "Diarrhea"

Critical Complication

PRIORITY: EXTREME HIGH = **Thyroid Storm**
"Agitation & confusion" early sign

Diet

- HIGH METABOLISM**
- HIGH** calories (4,000-5,000 per day) **NCLEX TIP**
- HIGH** protein & carbs (meals & snacks)
- NOT** high fiber = **LOW FIBER!** (unless constipated)
- NO** caffeine (coffee, soda, Tea)
- NO** spicy food

Patho & Causes

LOW T3 & T4 Thyroid hormones

- Low Iodine, Antithyroid Treatments
- Pituitary Tumor **NCLEX TIP**
- **AUTOIMMUNE:** Hashim**O**tos | **LOW & SLOW**

Labs

Low T3 & T4 hypo

- HIGH TSH

"TSH always opposite of T3 & T4"

Signs & Symptoms

LOW & SLOW = HYPO

CLASSIC SIGNS

- LOW** energy "fatigue, weakness, muscle pains, aches"
- LOW** metabolism—Weight **GAIN**/Water **Gain** (Edema eyes)
- LOW** digestion "**Constipation**" **NOT** diarrhea
- LOW** **HAIR LOSS** "alopecia" **NOT** hirsutism **NCLEX TIP**
- LOW** mental—forgetful, ALOC (altered)
- LOW** mood—depression, "apathy, confusion"
- LOW** Libido—Low sex drive, infertile
- SLOW DRY** skin turgor **NCLEX TIP**
- LOW & SLOW**—menstruation "**irregular**" **NCLEX TIP**
- NO** period "missed"—**Amenorrhea** "**AMEN** no period!"
- SLOW** heavy period—**Hypermenorrhea**
(**Hyper Menstruation**)

Critical Complication

PRIORITY: EXTREME LOW = **Myxedema Coma**
Low RR—**Respiratory FAILURE**

PRIORITY: Place "Tracheostomy Kit" by bedside **NCLEX TIP**

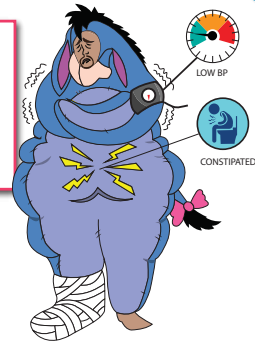
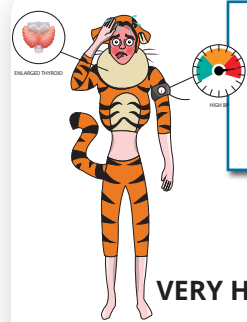
KEY WORD: "**Endotracheal Intubation set up**"

Low BP & HR "hypotension" "bradycardia" (below 60)

Low Temp. "cold intolerance" **NO** electric blankets

Diet

- LOW** Metabolism
- LOW** Calories
- LOW** Energy "Frequent rest periods" **NCLEX TIP**



Hyperthyroid / Hypothyroid II

Med Surg: Endocrine

HYPERthyroidism
Graves = **GAINS** "HIGH"

HYPOthyroidism
Hashim**O**tos | **LOW** & **SL**OW

Pharmacology

- SSKI** (Potassium Iodide)
 - S**-Shrinks the Thyroid
 - S**-Stains Teeth (use straw + juice)
 - K**-Keep 1 hour apart of other meds
- METHIMAZOLE**
 - NOT** baby safe
- PTU**-Propylthiouracil **MEMORY TRICK**
 - "Puts Thyroid Underground"
 - Baby safe
 - REPORT:** Fever/Sore Throat
- BETA BLOCKERS** "-lol" Propranolol
 - L**-Low BP
 - L**-Low HR



Treatments

RAIU-Radioactive Iodine Uptake (Destroys the Thyroid)

BEFORE:

- Pregnancy test before
- REMOVE** neck jewelry & dentures
- 5-7 days before** Hold antithyroid Meds
- AWAKE-NO** anesthesia or Conscious Sedation
- Diet: Before-NPO 2-4 hrs
- After-NPO 1-2 hrs



AFTER: AVOID EVERYONE!

- NO** pregnant people **NO** crowds
- NOT** same restroom (Flush 3 x) **NOT** same food utensils
- NOT** same laundry as your family

Patient Education

- E**-Exophthalmos" (grape eyes)
 - Eye **E**xercise "full range of motion" (**YES MOVE EYES**)
 - Eye Drops "artificial tears in conjunctiva" (NO dry eye)
 - Dark** Sunglasses (avoid irritation) **NO** Massaging
- T**-Tape the eyelids closed or use Eye Patch **NCLEX TIP**
- AVOID 5 S's**
 - Can Trigger **THYROID STORM!** **NCLEX TIP**
 - NO** Sodium (eye swelling) + HOB Up (drain the eyes)
 - NO** Stimulants (Cluster care/ Dim Lights)
 - NO** Smoking, Stress, Sepsis "sickness" (infection)
 - *Don't Touch Neck... release MORE T3 & T4*

Thyroidectomy Surgery

- Risk for **THYROID STORM!** **NCLEX TIP**
- Priority: Stridor/Noisy breathing** **NCLEX TIP**
 - A**-Airway-Endotracheal Tube bedside #1 Priority Tracheostomy Set
 - B**-Breathing-Laryngeal Stridor "Noisy breathing"
 - Keywords:** "Monitor Voice strength & Quality"
 - C**-Circulation-bleeding around pillow & Incision site
 - Neutral head & neck alignment **NCLEX TIP**
- **NOT SUPINE!** HOB 30-45 degree
- **NO FLEXING** or Extending Neck **NCLEX TIP**
- C**-Calcium **LOW below 8.6** (normal: **8.6-10.2**)
 - Chvostek** (Cheek Twitch when touched)
 - Trousseau** ("Twerk arm" with BP cuff x 3 min.)
 - Tingling** around mouth/Muscle Twitching **NCLEX TIP**
 - MEMORY TRICK:** "Remove the **T** (thyroid) Check the **C** (calcium)"



Pharmacology

L-Levothyroxine (Lev**O** = HYP**O**)
"Leaves" T3 & T4 in the body **MEMORY TRICK**

- L**-Life Long + Long slow onset (3-4 weeks till relief)
- E**-Early morning /Empty stomach x 1 daily (**NOT** at night)
- V**-Very active (HIGH HR & BP) **Report** "agitation/confusion"
- O**-Oh the baby is fine! (pregnancy safe)
 - NO FOOD**-take 1 hour **BEFORE** breakfast
 - NO** Cure-med will **NOT** cure, only treat
 - NO** Doubling doses (missed dose? Take it!)
 - NEVER** "abruptly" **STOP** = Myxedema Coma

L

E

LIFELONG

+ Long slow onset
(3-4 weeks till relief)



**EARLY MORNING
EMPTY STOMACH**

x 1 daily (**NOT** at night)



V

O

VERY HYPER

(HIGH HR, BP, Temp.)
REPORT "agitation/confusion"



OH BABY IS FINE

(Pregnancy safe)



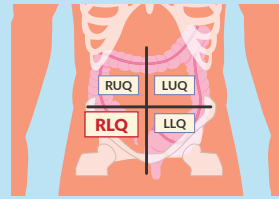
Gastrointestinal

Appendicitis

Med Surg: GI - Gastrointestinal

Pathophysiology

Inflammation of the appendix, located in the **RLQ** (Right Lower Quadrant) of the abdomen.



RLQ - **R**ight **L**ower **Q**uadrant



Signs & Symptoms

- **Fever** low-grade
- **RLQ** pain with **rebound tenderness**
"Pain between the **right hip area** & belly button"



Rebound tenderness

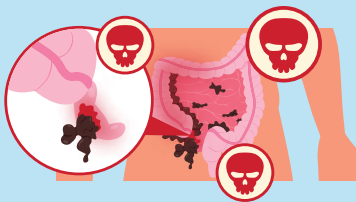
Common NCLEX Question

What is the typical **pain presentation** of a client with **appendicitis**?

- 1. Pain starts in the left side below the belly button
- 2. Pain is diffuse and all over the abdomen
- 3. Pain starts in the left upper quadrant radiating to the shoulder
- 4. Pain starts around the **umbilicus** and then moves to the **right lower quadrant**

Complications

Perforation = Peritonitis
Medical Emergency!



NCLEX TIPS

- **High** Fever
- Tachycardia, Tachypnea
- **Rigid "board-like abdomen"**
- **Rebound tenderness**

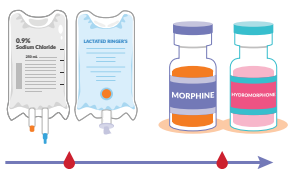
- NO** heat pad or blanket
- NO** laxatives
- NO** enemas



Interventions

1. NPO
2. **IV normal saline** or **LR (Lactated Ringers)**
3. Pain meds:
IV morphine / hydromorphone
NEVER give pain medications **until seen by the surgeon.**

PRIORITY



Side note

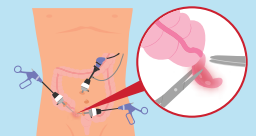


Surgery

Appendectomy

Post-Operative

- **Avoid** lifting heavy objects
- Prevent **Pneumonia**
 - Assist with **early ambulation**
 - **Deep breath & Cough**
 - Incentive spirometer
- Prevent **Infection**
 - **NO** baths - shower **ONLY**
 - Report **redness, swelling, & drainage** at incision sites



Appendectomy

PRIORITY



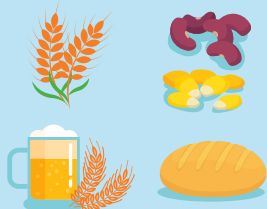
Celiac

Med Surg: GI - Gastrointestinal

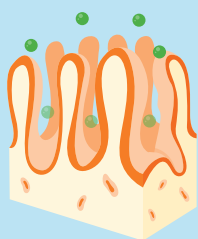
Pathophysiology

Gluten

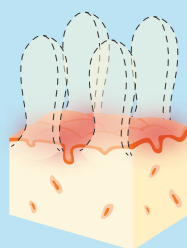
- **Whole wheat**, Grains, & Beer (Rye & Barley)
 - Dinner roll
 - Breaded meat
 - Spaghetti



An immune reaction to eating **gluten** (a protein found in wheat, grains & beer). **Inflammatory damage** in the small intestine (absence of intestinal villi) resulting in **malabsorption** of fats & nutrients as well as slow growth in children.



Normal

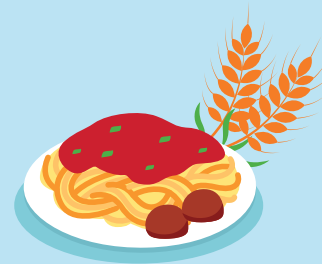


Celiac disease

HESI Question

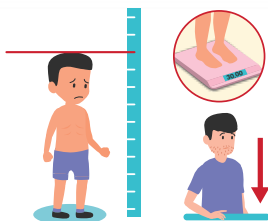
Which meal ordered by a patient with a new diagnosis of **celiac disease** indicates a need for **further dietary instructions**?

- Spaghetti with meat sauce and **whole wheat noodles**

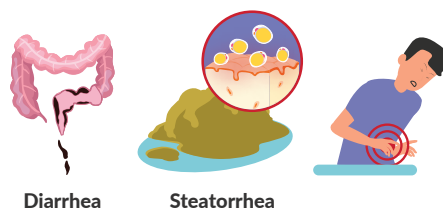


Signs & Symptoms

Weight loss, stunted growth, & delayed puberty in **children**



- Diarrhea
- Steatorrhea - fatty stools as fats are not absorbed
- Abdominal pain



Diarrhea

Steatorrhea

Education

Fat-soluble vitamins - as nutrients are not easily absorbed.



Fat-soluble vitamins

- Vitamin A, D, E, K

Memory trick



Gluten Free Foods - anything without WHEAT like:

- Plain meats (fish, beef, chicken, turkey)
- Grains: Rice, Corn, Potatoes, Soy, Quinoa
- Nuts, Beans, Legumes
- Fruits & veggies

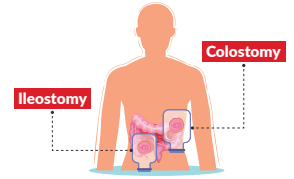


Colostomy & Ileostomy

Med Surg: GI - Gastrointestinal

Procedure & Indication

It is a surgical procedure that creates an opening in the abdominal wall to allow for the passage of stool. This is done in order to bypass a blocked or diseased portion of the bowel. We are basically creating a rectum in the abdomen by cutting the intestines & placing an opening as a stoma on the surface of the abdomen.



Key Differences

The main difference is the location.

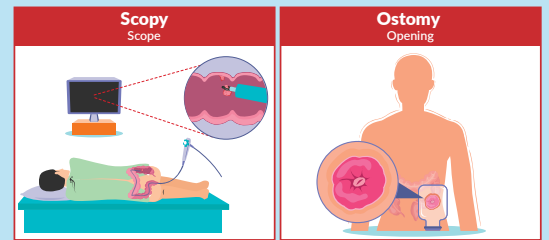
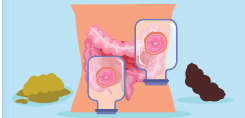
Ileostomy: opening in the Ileum (small intestine) in the RLQ

Colostomy: opening in the colon

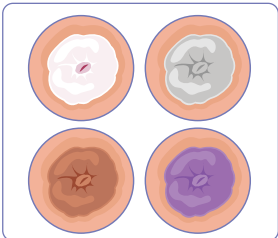


Memory Trick

- Green / Yellow - **Ileostomy**
- Brown is "Down" - **Colostomy**



Care of Ostomy



GOOD

- Red "beefy" - After Surg.
- Pink - long term
- Moist & Shiny

BAD

- Report to HCP**
- Cold
 - **Any Discoloration**
Pale, **Grey**, Dusky, **Purple**

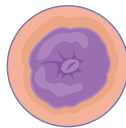
DIET

- **AVOID** High Fiber / Gassy Foods
- **4 - 6 weeks Post-Op** **NCLEX TIP**
 - **NO Broccoli**/ Brussel sprouts
 - **NO Cauliflower**
 - **NO Beans**
 - **NO Multigrain** bread
 - **NO eggs**
 - **NO Dairy** - cheese, milk
- **AVOID** Hard to digest foods
 - NO Popcorn
 - NO seeds, nuts

Saunders

The nurse is providing care for a client with a recent transverse **colostomy**. Which observation requires **immediate notification** of the primary health care provider?

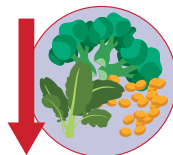
- **Purple discoloration** of the stoma



Common NCLEX Question

Client who has a **new colostomy**. The nurse should encourage which diet for the first **4 to 6 weeks** postoperatively?

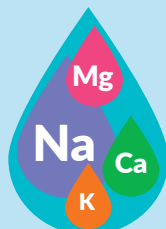
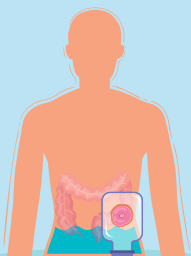
- ✓ **Low fiber**



- Fluid Intake
 - **3,000 mL/day** (3 L)
- Irrigation
 - Use **500 to 1000 mL** of **warm tap water** (NOT COLD)
 - Place bag **above ostomy** (shoulder height)
 - Cramping: **STOP** fluid
- Empty when pouch is **one-third full** 1/3
- Skin Breakdown **RISK!**
 - Cleanse the peristomal skin **meticulously**
- Psychological **RISK!**
 - Disturbed body image

Complications

Fluid & electrolyte imbalances



Saunders

A client just had surgery to create an ileostomy. The nurse assesses the client in the **immediate postoperative period** for which **most frequent complication**?

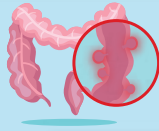
- **Fluid and electrolyte imbalance**

Diverticulitis

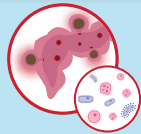
Med Surg: GI – Gastrointestinal

Pathophysiology

Diverticulosis = little pouches of stress bubbles



Diverticulitis = inflammation of diverticula



Diverticulosis:

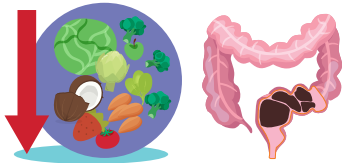
Little pouches of stress bubbles called diverticula form on the walls of the colon. Typically caused by a diet that lacks fiber, resulting in constipation & increased pressure within the bowels.

Diverticulitis:

Inflammation of diverticula (the little pouches) resulting in infection & swelling!

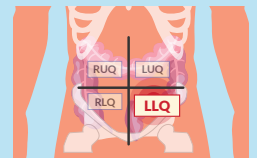
Causes

- **Low Fiber** (constipation)
- Popcorn, Seeds, Nuts



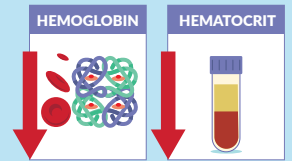
Signs & Symptoms

- Fever & chills
- **Pain LLQ** (descending & sigmoid colon)



Labs

- Decrease H/H
- Increase WBC



Complications

Peritonitis

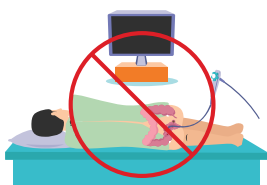
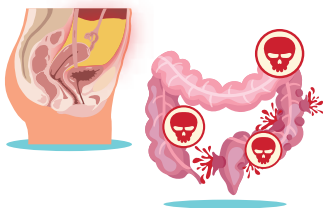
REPORT to HCP **NCLEX TIP**

- **Abdominal pain LUQ**
- **Rigid "board-like abdomen"**

NO barium enema = increases abdominal pressure

NO colonoscopy

Medical Emergency!



Nursing Care

Highly tested

1. **Avoid** constipation & **straining**
2. **NPO** (nothing per oral)
3. Pain meds = Morphine, Hydromorphone
4. IV normal saline

NPO



Diet

Diverticulitis - flare up:

- NPO
- Clear liquid diet: jello, broth, juices
- **Low fiber diet**
- Eventually high fiber again

Diverticulosis:

- High Fiber diet = Clean bowels & **Avoid constipation**
- **AVOID:** Popcorn, Seeds, Nuts



Dumping Syndrome & GI Surgery

Med Surg: GI - Gastrointestinal

Pathophysiology

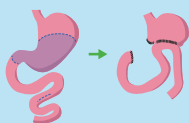
Occurs when the **stomach empties too quickly into the duodenum** (small intestines) after eating. This **DUMPING** causes a **massive fluid shift** leading to severe pain, low blood pressure, & nausea/ vomiting **30 minutes after eating**. Commonly seen after **any type of bariatric surgery** like a **gastric bypass or gastrectomy** (removal of the stomach), typically done for our bariatric clients who are morbidly obese.



Causes

Key terms

- **Gastrojejunostomy** (Billroth II surgery)
- Partial **Gastrectomy**
- Sleeve **Gastrectomy**

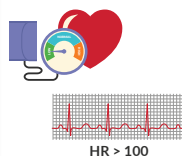


Signs & Symptoms

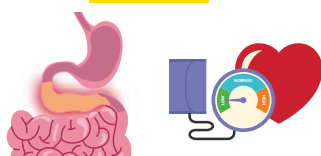
PRIORITY ACTION

Report to HCP / Surgeon

- Hypotension & **Tachycardia**
- **Sweating**, Dizziness, Severe **abdominal pain**, N&V
- **30 minutes AFTER** eating



MEMORY TRICK

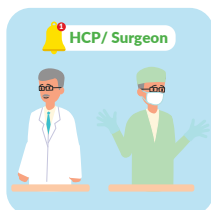


Think for Dumping syndrome- we see DUMPing of Blood pressure

Common NCLEX Question

A client recovering from a **partial gastrectomy** presents with vomiting, severe abdominal pain, **blood pressure 105/62**, heart rate of **122/min**, temperature of **100.5 F**. Which **action** should the nurse take?

- 1. Administer a bolus of IV fluid
- 2. Assess blood glucose for hypoglycemia
- 3. **Immediately notify the HCP or surgeon**
- 4. Insert nasogastric tube



GI SURGERY

Gastrectomy

1. **NPO** until **bowel sounds return** **NCLEX TIP**
2. **Apply SCD** (sequential compression devices)
3. Early ambulation
4. Incentive spirometer Q Hour
5. Teach **splinting the incision** when coughing

Priority action:

Dehiscence / Evisceration

1. Stay with client & call for help
2. Position: **Low Fowler's with knees bent** **NCLEX TIP**
3. **Sterile gauze** & saline to cover the wound
4. Report to HCP / Surgeon

Education

4 NCLEX TIPS

1. **HIGH** protein, fiber, & fats foods
Low **carbohydrates**
2. **Small**, frequent meals
3. **LIE DOWN after eating** (left side)
4. **No fluids** with meals
(30 min before / after food)

KAPLAN

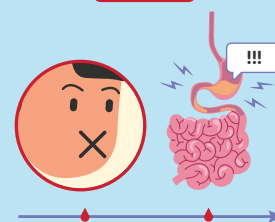
Priority action for a client with **bowel protruding** through abdomen

- **Call for help** (the client needs emergency surgery and the nurse should not leave the client)



Post-Operative Care

Priority



NCLEX TIPS



HESI

Following a **gastrectomy** ... What **instructions** should the nurse include ... to **prevent dumping syndrome**?

- Divide meals into **6 small feedings**

Which **nursing action** is important after a patient has a **partial gastrectomy** to prevent further complications?

- Measure the patient's serum **vitamin B12** level

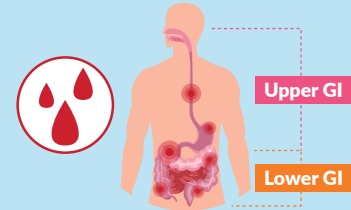


GI Bleed

Med Surg: GI - Gastrointestinal

Pathophysiology

Bleeding anywhere inside the GI tract. Classified as **upper** or **lower** GI bleed - one of the biggest problems is knowing the exact location of the bleed!



Causes & Risks

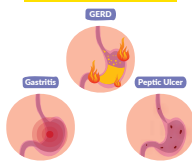
Upper GI

- Gastritis, GERD, Peptic ulcer **NCLEX TIP**
- Esophageal varices

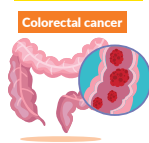
Lower GI

- Hemorrhoids
- Colorectal cancer **NCLEX TIP**
- Diverticulosis
- Ulcerative colitis

NCLEX TIPS



NCLEX TIP



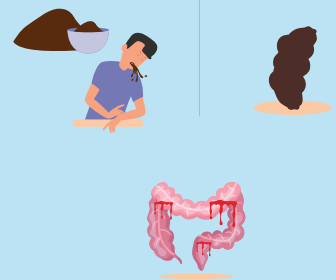
Signs & Symptoms

Upper GI bleed **NCLEX TIP**

- Vomiting: **Hematemesis** "coffee ground emesis"
- Stool: **Melena** "dark or black tarry stools"

Lower GI bleed

- Bright red bleeding



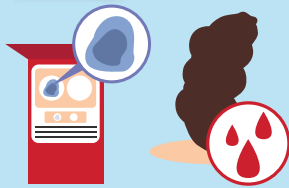
Diagnostics

Guaiac Fecal Occult Blood Test

NCLEX TIP

- Step 1** Gather supplies, wash hands, non-sterile gloves
- Step 2** Open & apply stool samples to the boxes on the slides
- Step 3** Open the back of the slide & apply 2 drops of developing solution
- Step 4** Wait 30-60 seconds
- Step 5** Document the results

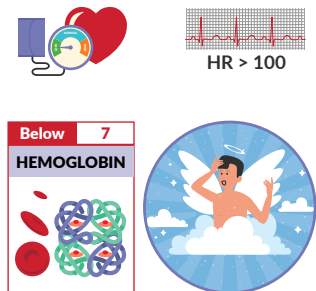
Positive



Complications

Hypovolemic Shock! (hemorrhagic shock)

- Hypotension** (Low BP)
- Tachycardia** (High HR)
- Pale skin** Cool, Clammy "diaphoretic"
- Fatigue & dizzy
- Low CBC Labs:** Low H/H
- Hemoglobin Less than 7 = Heaven** **NCLEX TIPS**



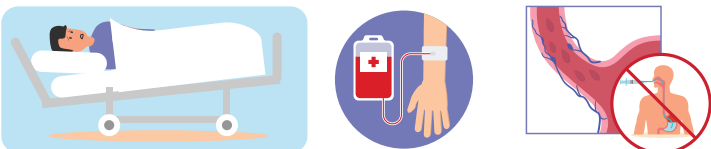
Intervention

Priority Actions

- Lower head of bed** **NCLEX TIP**
- IV Normal Saline = Stabilizes Blood Pressure
- Oxygen
- Blood Transfusion**
Hemoglobin **Less than 7** **NCLEX TIP**

Upper GI bleed:

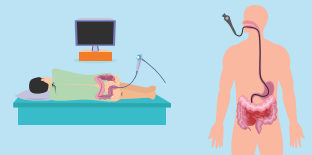
- Nasogastric lavage (NGT) **NCLEX TIP**
- NO NGT** for gastroesophageal varices



Surgery

Includes procedures to locate & stop the bleeding. They put a little camera tube to scope out the bowels.

- Endoscopy** - Upper GI
- Colonoscopy** - Low GI



AFTER "-Scopy"

- Clear liquids:
- Apple juice
 - Broth soup
 - Tea (unsweet)



Notes

GI Cancers

Med Surg: GI - Gastrointestinal

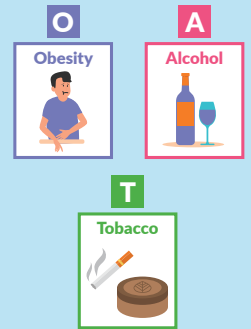
Esophageal Cancer

There is cancer within the esophagus, the food tube, that takes food from the mouth into the stomach.



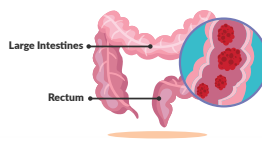
Risk Factors

- **Acid Reflux (GERD)** **NCLEX TIP**
- **O - Obesity (BMI over 30)**
- **A - Alcohol**
- **T - Tobacco** (smoking, chewing tobacco)



Colon & Colorectal Cancer

Cancer of the colon - the large intestines & the rectum - the exit door of the GI tract.



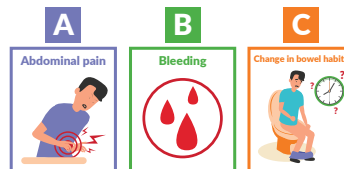
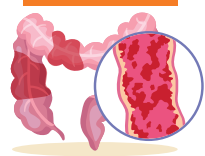
Risk Factors

- Diverticulosis
- **Ulcerative colitis** (long-term)
- **Family history** of colorectal cancer
- **O - Obesity (BMI over 30)**
- **A - Alcohol**
- **T - Tobacco** (cigarettes & cigars)

Colorectal Cancer

- **Unexplained weight loss** **NCLEX TIP**
- **A - Abdominal pain**
- **B - Bleeding:**
 - Blood in stools
 - Low Hemoglobin
- **C - Change in bowel habits**

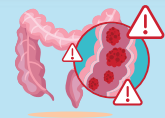
Ulcerative Colitis



HESI

Which disorder does the nurse suspect in an elderly patient with a history of **diverticulosis** who reports **rectal bleeding**?

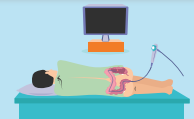
- Colon cancer



Common NCLEX Question

Client with a **family history of colorectal cancer** ... with **unexplained weight loss**, **change in bowel habits**, & a hemoglobin value of **9** compared to **14** just 12 months earlier.... Which **diagnostic test** is expected?

- ✓ **Colonoscopy**



KAPLAN

Dietary alterations for clients with family hx of **colorectal cancer**:

- Add **cabbage** to the diet to **reduce** risks of **colorectal cancer**

Diagnostics

Colonoscopy

Scope up the rectum to inspect the colon for cancerous tumors, polyps & used for other GI issues like ulcerative colitis & crohn's disease.



EMERGENCY



Before

- clear liquid diet, laxatives
- **Polyethylene Glycol** (brand: GoLyteLy)
- **NPO** after midnight

After

Perforated bowel = Peritonitis
Medical Emergency! NCLEX TIP

1. **Fever**
 2. Tachycardia, Tachypnea
 3. Abdominal distention
- Rigid "board-like abdomen"**

Tachycardia



Tachypnea



Patient Education

- High fiber = **Cabbage**
- **O - Obesity** = **LOSE Weight**
- **A - Alcohol** = **STOP!**
- **T - Tobacco** = **Smoking cessation**

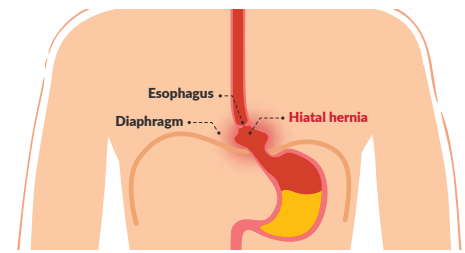


Hiatal Hernia

Med Surg: GI - Gastrointestinal

Pathophysiology

Protrusion of part of the **stomach through the diaphragm** & is now stuck in either the esophagus or to the side of the esophagus.

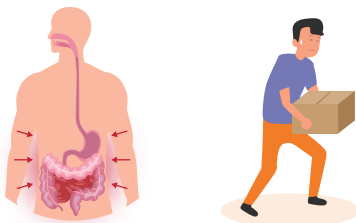


Signs & Symptoms

- **Dysphagia** - difficulty swallowing
- Gastric **Reflux**:
 - **Heartburn** "epigastric pain"
 - Chest pain & SOB



Causes & Risk



- Increased abdominal pressure
 - **Straining / Lifting** heavy objects
 - "**Weightlifting** exercises"
- Obesity



Nursing Care

1. Avoid **lifting / straining**
2. **NO** tight clothing "**Girdle**" **NCLEX TIP**

Diet:

3. **Avoid** fatty foods / alcohol
4. **NO tobacco, caffeine,** chocolate, peppermint
5. **Small,** frequent **low fat** meals **NCLEX TIP**
6. Sit up "**elevate HOB**" after eating / at night

NCLEX TIP



NCLEX TIP



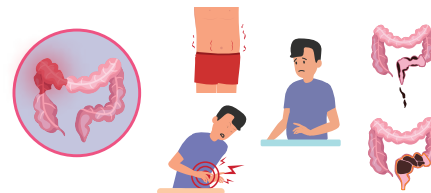
Notes

Irritable Bowel Syndrome (IBS)

Med Surg: GI - Gastrointestinal

Pathophysiology

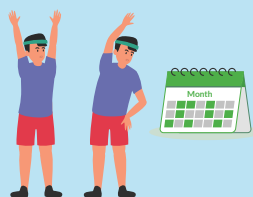
IBS is an intestinal disorder that affects the large intestines, causing cramping, pain, bloating & either diarrhea or constipation. Keep in mind that IBS is **NOT IBD** (Inflammatory bowel disease: UC & Chron's)



Education

Key point

- Keep a **journal** of symptoms, diet, & **stress** levels
- Perform exercise **3 x per week**



Diet

- **Increase** Fiber & Fluid intake
- **Limit** "reduce intake" Gas producing foods:
 - **Legumes** (beans)
 - Eggs
 - Dairy products (**Yogurt**)
 - **Fruits**
- **Reduce**
 - Alcohol
 - Caffeine



Common NCLEX Question

A client with **irritable bowel syndrome** ... which meal choices demonstrates **correct understanding** of diet guidelines?

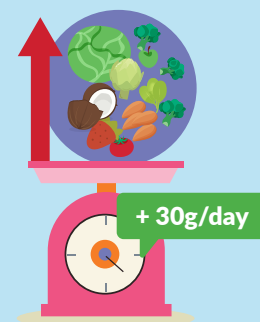
- 1. Beans
- 2. Cornbread
- 3. Fruit salad
- 4. Steak
- 5. Tomato basil soup
- 6. Yogurt with granola



Kaplan Question

Priority **instructions** for a client with **IBS**?

- **Increase fiber intake** to at least 30 g per day

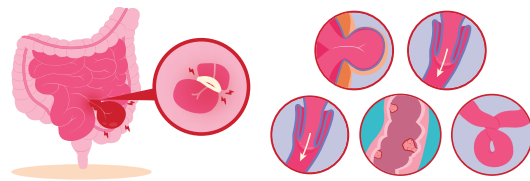


Small Bowel Obstruction

Med Surg: GI – Gastrointestinal

Pathophysiology

A small bowel obstruction is a blockage in the small intestines.



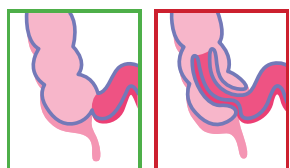
Causes & Risks

Non-Mechanical obstruction

- Paralytic Ileus

Mechanical obstruction

- **Adhesions** (scar tissue) from surgery
- Hernias
- Intussusception
- Tumor (cancer)
- Volvulus (twisting of bowel)



Normal Intussusception



Adhesions

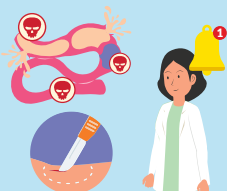
Complication

Peritonitis Medical Emergency!

NCLEX TIP

- **Fever**
- Tachycardia, Tachypnea
- Abdominal distention

Rigid "board-like abdomen"



Common NCLEX Question

Client with a **small bowel obstruction** ... suddenly develops **tachycardia** and **tachypnea** with a **high fever**. What is most likely the problem?

- 1. Pulmonary embolism
- 2. **Bowel perforation notify HCP**
- 3. Pneumonia
- 4. Atelectasis

Surgery

Patients that fail to improve will need a **bowel resection** to cut out the problem area & may have an ostomy placed until bowels heal

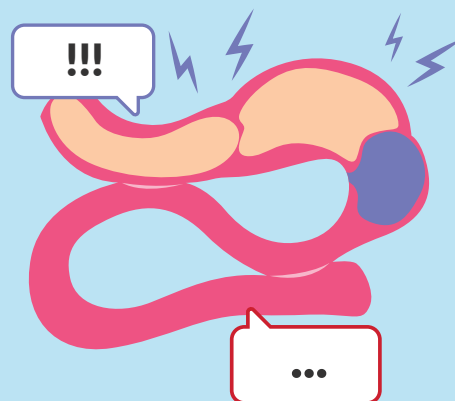


Signs & Symptoms

RAPID Onset

Key point

- **Frequent** vomiting & nausea
- **Abdominal** distention
- **Colicky** "intermittent" **abdominal pain**
- Bowel sounds
 - Hyperactive = **ABOVE** obstruction
 - Hypoactive = Below obstruction

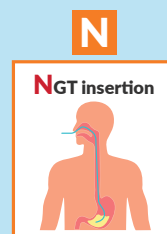


Treatment

1. **NPO**
2. **NGT insertion** (nasogastric tube)
3. IV fluids
4. Semi-Fowler's position
5. Pain control (**non-opioids**)

AVOID Opioid analgesics:

- Morphine
- **Hydrocodone**
- Hydromorphone

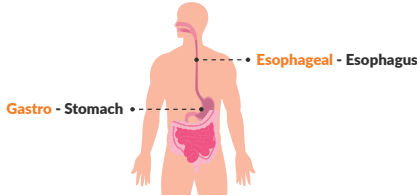


GERD

Med Surg: GI - Gastrointestinal

Pathophysiology

Gastro Esophageal Reflux Disease



Gastroesophageal Reflux Disease

Fancy words for heartburn or acid reflux where stomach acids burn the esophagus, leading to pain, inflammation, & even CANCER called Barrett's esophagus (if the chronic acid reflux is not treated)

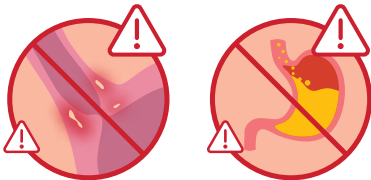
Signs & Symptoms

- Dyspepsia "heartBURN"
- Worse pain = Lying down



Causes & Education

Anything that can weaken or damage the **LES** (Lower Esophageal Sphincter) the muscle that closes the opening between the stomach & esophagus.



- **AVOID Eating** **NCLEX TIP**
 - **Fried Foods** (Fries, **fried chicken**)
 - **Fatty Foods** "low fat diet = BEST"
 - Citrus (Acidic)
 - Dairy (milk, cheese)
 - **Chocolate**
 - **Peppermint / Spearmint**
- **NO Caffeine** (**coffee**)
- **NO Cigarettes** (tobacco)
- **NO Alcohol**

▪ **AVOID eating before lying down** (3 hours after meals)

- Sit up after meals
- Elevate HOB **at night**
- Eat Small meals



Pharmacology

Acid reducers

- Antacids
- Histamine receptor blockers
 - **Ranitidine**
- PPIs: Proton pump inhibitors
 - **Omeprazole**



HESI

What advice would the nurse give to a patient experiencing heartburn after meals?

- Identify and **avoid causative foods**



Saunders's

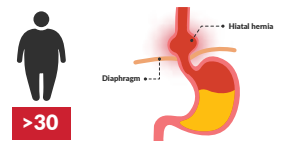
When teaching a client with gastroesophageal reflux disease (GERD) about substances to avoid, which items should the nurse include on this list? Select all that apply.

- Coffee
- Chocolate
- Peppermint
- Fried chicken



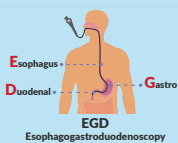
Risk Factors:

- Stress
- Obese (BMI over 30)
- Hiatal hernia



Procedures

- Upper gastrointestinal endoscopy
- Esophagogastroduodenoscopy (EGD)



HESI

A patient has persistent gastroesophageal reflux disease (GERD) despite diet changes and proton pump inhibitors. Which test does the nurse anticipate being performed to determine lower esophageal sphincter (LES) competence?

- Upper gastrointestinal endoscopy



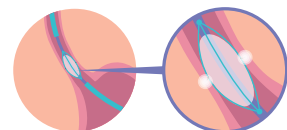
Peritonitis PRIORITY Report to HCP!

- **Fever** (over 100.3F) > 100.3 °F
- **Rebound tenderness**
- **"Rigid" or "board-like abdomen"**
- Increasing Pain, tenderness
- Restless
- Fast HR & RR (tachycardia / tachypnea)

Surgery

The main goal here is to tighten up the LES - Lower esophageal sphincter

Stretta procedure - delivers radiofrequency energy waves through electrodes to tighten the LES.



Fundoplication - wrap the upper curve of the stomach called the fundus around the esophagus & sew it shut. Helping to tighten this esophageal sphincter.



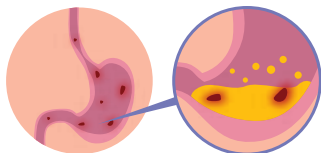
PUD - Peptic Ulcer Disease

Med Surg: GI - Gastrointestinal

Pathophysiology

PUD (Peptic Ulcer Disease) happens when gastric acids erode the gastric lining creating open sores / holes in the esophagus, stomach, or duodenum.

Peptic Ulcer Disease



Signs & Symptoms

- G** Gastric Ulcer
- G** Gut Pain with food
- D** Duodenal Ulcer
- D** Don't have pain with food

- **Dyspepsia:** Burning Pain "Epigastric" "Back"
- **Gastric Ulcer (stomach)**
 - **PAIN Increased** with food **NCLEX TIP**
 - 30 - 60 min. after meals
 - **Weight LOSS**
 - **Vomits** blood "Hematemesis"
- **Duodenal Ulcer (intestine)**
 - **PAIN Decreased** with food **NCLEX TIP**
 - 2 - 3 hours after meals
 - **Worse at NIGHT**
 - **Weight Gain**
 - **Blood in stool** "melena" (dark tarry stool)

Complication

Perforation = Peritonitis & Sepsis Report to HCP!

- **Fever** (over 100.3F)
- **Rebound tenderness**
- **"Rigid" or "board-like abdomen"**
- Increasing Pain, tenderness
- Restless
- Fast HR & RR (tachycardia / tachypnea)

Hemorrhage (bleeding)

- **Melena** (black **tarry** stools)
- **Hematemesis** (vomiting of blood)

Gastric outlet obstruction

Saunders's

Client with ... a **peptic ulcer**. Which assessment finding would **most likely** indicate perforation of the ulcer?

- A rigid, board-like abdomen

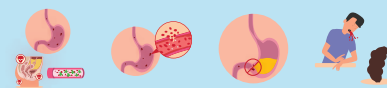


HESI

Which complications does the nurse monitor for while assessing a patient with **peptic ulcer disease (PUD)**?

Select all that apply.

- Perforation
- Hemorrhage
- Gastric outlet obstruction
- Hematemesis and melena



Diagnostics

- Esophagogastroduodenoscopy (EGD)
- **Perforation** = Peritonitis & Sepsis
 - **PRIORITY** - Report to HCP!
 - **Fever** (over 100.3F)
- Upper GI Series with **barium contrast**



Client Education:

- **NPO** (no eating or drinking) No smoking **8 hours BEFORE** the procedure
- **Expected:**
 - During: Abdominal cramping
 - After: Chalky white stool
- **Flush the Contrast**
 - Increase fluid intake **Kaplan**
 - **Take Laxatives**

Causes & Risk

1. **H. Pylori** bacteria
2. **NSAIDs**
 - Naproxen
 - Indomethacin
 - Ibuprofen
3. **Stress** (prolongs the ulcer) - Nursing school / NCLEX



Pharmacology

- **Antibiotics: H. Pylori bacteria**
 - Amoxicillin
 - Clarithromycin
 - Tetracycline
 - Metronidazole
 - Bismuth (brand: Pepto-Bismol)
- **Acid reducers**
 - Antacids
 - Histamine receptor blockers
 - Ranitidine
 - PPIs: Proton pump inhibitors
 - Omeprazole
- **Mucosal protectants**
 - Sucralfate
 - Misoprostol

HESI

A patient ... is diagnosed with **Helicobacter pylori (H. pylori) peptic ulcer disease**. The nurse anticipates administering which drugs? Select all that apply.

- Bismuth
- Tetracycline
- Metronidazole

HESI

Which classes of drugs are used to reduce the symptoms of **peptic ulcers**? Select all that apply.

- Antacids
- Mucosal healing agents
- Proton pump inhibitors
- Histamine receptor blockers

Patient Education

- **Diet**
 - **Avoid** Spicy, Fatty, Fried, **Acidic** foods
 - **NO** Caffeine (**coffee, Soda, tea**)
 - **NO** Alcohol
 - **NO** Cigarettes (**tobacco**)
- **Decrease Stress**
- **Avoid NSAIDs**
 - Naproxen
 - Indomethacin
 - Ibuprofen
- Report **black tarry** stools to HCP!

Common NCLEX Question

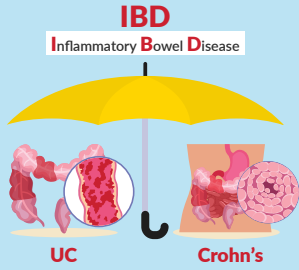
The nurse is educating the client on **peptic ulcer prevention**. Which statement by the client shows **correct understanding**? Select all that apply.

- ✓ 1. "I will not drink beer at the party this weekend"
- ✓ 2. "I will avoid using naproxen"
- ✓ 3. "I should avoid drinking excess coffee or soda"
- ✓ 4. "I will start smoking cessation"
- 5. "I will avoid spicy foods but fried chicken is ok"

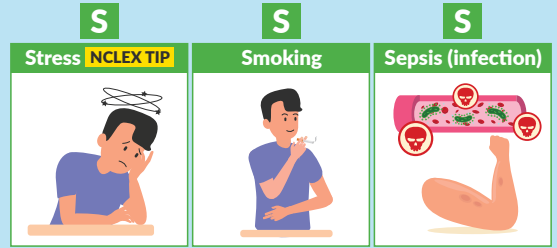
Ulcerative Colitis (UC) & Crohn's Disease

Med Surg: GI - Gastrointestinal

Causes & Triggers



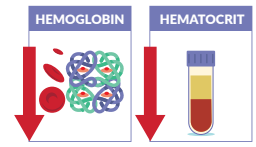
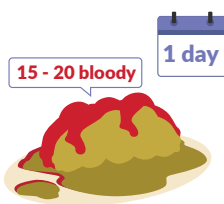
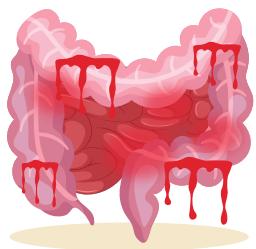
Both conditions are autoimmune diseases (the body is attacking itself), so naturally signs & symptoms come & go during times of stress, smoking & sepsis (infection).



ULCERATIVE COLITIS

Pathophysiology

Inflammation & ulcers in the colon (big long open sores that bleed) leading to decreased hemoglobin



Signs & Symptoms

- 15 - 20 **bloody** liquid stools per day
 - Anemia
 - Decreased H/H** (hemoglobin & Hematocrit)
- Rebound tenderness **Report to HCP**

Saunders

The nurse is caring for a client with **ulcerative colitis**. Which finding does the nurse determine is consistent with this diagnosis?

- Decreased hemoglobin

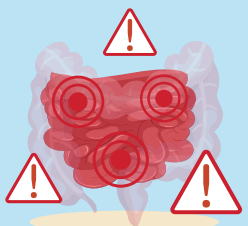
The nurse is caring for a hospitalized client with a diagnosis of **ulcerative colitis**. Which finding, if noted on **assessment** of the client, should the nurse mention to the primary health care provider (PHCP)?

- Rebound tenderness

CROHN'S DISEASE

Pathophysiology

Inflammation granulomas (bumps & lumps) from mouth to anus, but mainly in the small intestines that **do not bleed**. This deep inflammation can lead to fistulas, which are open tunneling of the GI tract that can contaminate the body.



Memory trick

Crohn's disease
Crown's disease



Signs & Symptoms

- 5 loose stools /day (mucus/pus)
- Steatorrhea (fatty stools)



Notes

Ulcerative Colitis (UC) & Crohn's Disease II

Med Surg: GI - Gastrointestinal

Nursing Care

Fluid & E+

- Strict I & O monitoring
- **2 Liters** of water daily + more with diarrhea
- **Hypokalemia** low potassium: **3.5 or less**
- Daily multivitamins containing **Calcium**

Diet

- **High:** Protein & Calories
- **Low:** Fiber
- **Keep food journal NCLEX TIP**
- Small frequent meals

- **Pain** - administer analgesics
- **AVOID** Alcohol
- Reduce **Caffeine** (coffee, tea)
- PsychoSocial
 - **Stress** reduction
 - Encourage clients to **discuss feelings**



Common NCLEX Question

Client with **ulcerative colitis** ... interventions? **Select all that apply.**

- 1. **Discuss plans to decrease client's stress**
- 2. **Give analgesics as prescribed**
- 3. Limit fluids to 500 ml per day
- 4. **Increase protein foods with meals**
- 5. **Monitor Input & Output closely**
- 6. Recommend high fiber and low calorie diet



Complication

Peritonitis **NCLEX TIP**

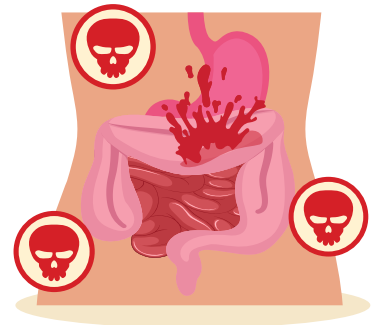
Report to HCP!

- **Fever** (over 100.3F)
- **Rebound tenderness**
- **"Rigid" or "board-like abdomen"**
- Increasing Pain, tenderness
- Restless
- Fast HR & RR (tachycardia / tachypnea)



Bowel rupture from a toxic megacolon, which can lead to **peritonitis** (deadly infection in the peritoneal cavity).

Toxic megacolon



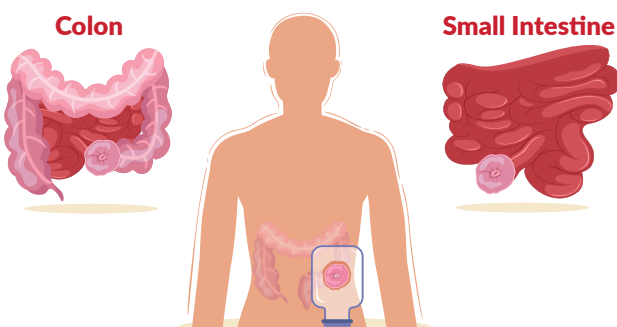
Saunders

The nurse is providing discharge teaching for a client with newly diagnosed **Crohn's disease** about **dietary** measures to implement during **exacerbation episodes**. Which statement made by the client **indicates a need for further instruction?**

- "I should **increase the fiber** in my diet"

Surgery

Most clients get a **colostomy** or **ileostomy** after a bowel resection, where we cut out the part of the bowel causing the problem.



Pharmacology

- **Sulfasalazine** "**STOPS** body attacking itself"
- **Steroids** "**Sooth the Swelling**"
 - **PredniSONE**
- Antidiarrheal:
 - **Loperamide** "**Low** bowel movements"
 - **Dicyclomine** "**Dry Cycle**"




Hematology

Blood Product Admin

Med Surg: Hematology

PRBC

Packed Red Blood Cells



Low H&H
Hgb below 7
= **Heaven**

What is it?

Whole blood, given to **increase hemoglobin & hematocrit (H&H)** when blood count is low from anemia, trauma or surgery. PRBCs **MUST** be given **within 4 hours** after being taken out of the refrigerator.

Hemoglobin

KEY NUMBERS

Normal **12 - 18**

Risky **8 - 11**

Below **7**

PRBC (Packed Red Blood Cells)

Hgb 8 - 11
REPORT to HCP & Surgeon
(if before surgery)

Hgb below 7 = Heaven!
NEED blood transfusion or die (shock)

Top S/S for shock:

1. **Pale skin:** pallor, dusky skin signs
2. **Cool Clammy skin**
3. Fatigue, Weakness

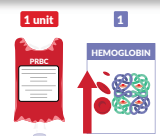
HESI

Q1: A child involved in a motor vehicle accident has a **thready pulse, decreased blood pressure**, rapid respiration, and **clammy skin with pallor**. The child is not responding to secondary fluid bolus. Which **treatment** would the nurse anticipate administering to ensure the safety of the child?

- Red blood cells


Q2: A nurse is caring for a patient with **hemoglobin (Hgb) of 8 g/dL** and hematocrit (Hct) of 35%, who is receiving an infusion of **1 unit of packed red blood cells**. The nurse anticipates which results on the patient's next lab work?

- Hgb 9, Hct 38



PLT

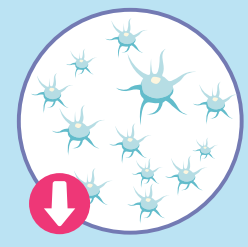
Platelets



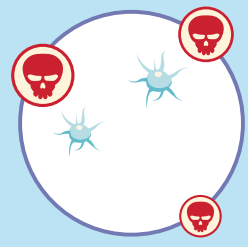
150,000 or LESS =
Thrombocytopenia
50,000 = DEADLY!

What is it?

Proteins that **help the blood to clot** & form scabs to stop bleeding. Given to clients with low platelets. Low platelet count typically results from cancers, & certain types of anemia.





150K OR LESS
Thrombocytopenia



50k or less
Deadly

FFP

Fresh Frozen Plasma

What is it?

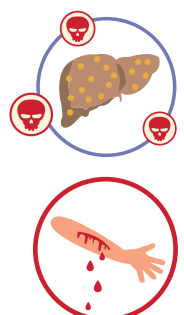
Clotting factors that **act like glue**, helping to **stick all the platelets together** in order to form a clot & stop bleeding.

Given to clients with **low clotting factors**:

- Hemophilia
- Liver disease (Cirrhosis & Hepatitis) since the liver helps make clotting factors.

Side Note:

It is **important to know the difference** between low platelets vs. low clotting factors, since giving a bunch of platelets to a client with hemophilia (low clotting factors) is not going to do anything if they lack the glue that holds it all together.



Transfusion Reactions & Priority Interventions

Med Surg: Hematology

4 Types of Reactions

- F** FEBRILE REACTION (mild allergic rx)
- A** ANAPHYLACTIC REACTION
- C** CIRCULATORY OVERLOAD
- H** HEMOLYTIC

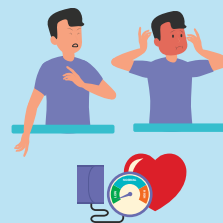
F FEBRILE REACTION (mild allergic rx)

- Flushing (redness)
- Itchy



A ANAPHYLACTIC REACTION

- Wheezing
- Hives
- Hypotension (low BP)



C CIRCULATORY OVERLOAD

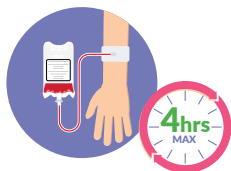
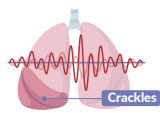
- Signs & Symptoms
 - Lung crackles
 - Restlessness
 - Dark Urine
 - SOB & Dyspnea
 - JVD (jugular vein distention)

- Risk: HF - Heart Failure
HF - Heavy Fluid

- Action: **SLOW** the infusion- 4 hours max

NCLEX TIP

- Wait **2 hrs** between infusions
- **H** - HOB Elevated "SIT UP!"
- **O** - Oxygen
- **P** - Push Diuretics (Furosemide)
- **E** - End all IV fluids



ATI

Difficulty breathing and crackles after administration of PRBCs ... priority actions?

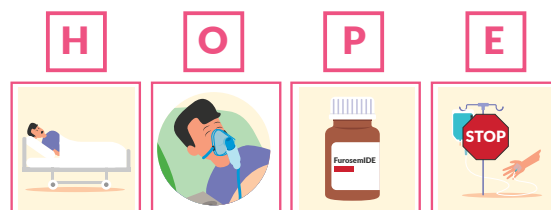
Select all that apply

- Administer **furosemide** 40 mg IVP
- Elevate HOB** at least to 45 degrees
- Monitor** for HTN, tachycardia, tachypnea, hypoxia
- Notify HCP**

KAPLAN

The nurse is caring for a patient who is receiving a **blood transfusion**. The client begins to exhibit **dyspnea, crackles** in lung bases, and becomes **restless**. Which **action** should the nurse anticipate?

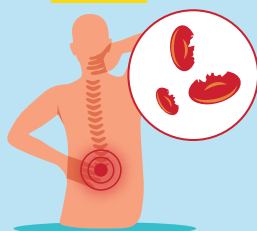
- **Slow the infusion rate**



H HEMOLYTIC

- Hypotension (Low BP)
- **Low back pain**
- Fever
- Tachycardia (Fast HR)
- **Urine specimen:** "check for hemolyzed RBC" **NCLEX TIP**

KEY TERM



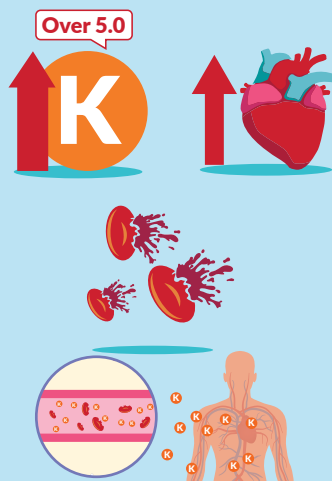
KAPLAN

Which of the following indicates a hemolytic reaction?

- **Low back pain** and apprehension

PRIORITY Interventions

1. Slow or **STOP** the infusion
2. Using new tubing **0.9% sodium chloride** (normal saline)
3. **Report to HCP** immediately
4. **Assess:**
 - Vital signs
 - **Urine specimen:** "check for hemolyzed RBC" **NCLEX TIP**



Hemolyzed RBCs

- High Potassium (Hyperkalemia) **Over 5.0**
 - **Potassium Priority Pumps** heart
 - **Peaked T Waves** on ECG **NCLEX TIP**

ATI

Ordered Response: Reaction to blood transfusion

1. **STOP** transfusion
2. Hang **new IV infusion set**
3. Start **0.9% sodium chloride** infusion
4. Call **HCP**
5. Assess BP, HR, RR
6. Obtain blood and urine specimens

Blood Transfusion & Autologous Transfusion

Med Surg: Hematology

5 Steps of Transfusion

BEFORE

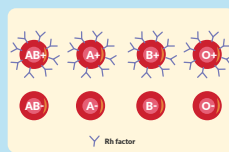
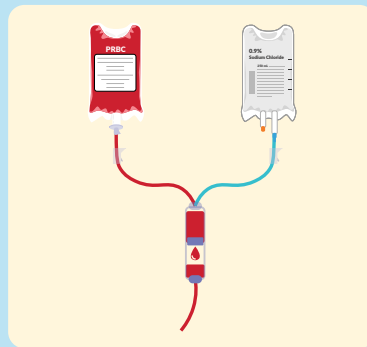
- 2 RNs** verify order:
Name & blood product (blood type & Rh factor)
- Vital signs**
(every 15 minutes for first hour)
- Prep:**
 - 18 G - IV catheter
 - 2 Tubings
 - Blood tubing with filter
 - 0.9% sodium chloride (normal saline) **ONLY**
 - NO LR, NO dextrose**

DURING

- STAY** at bedside **15 minutes**
Reaction? (slow / stop infusion)

AFTER

- 0.9% sodium chloride (normal saline)



HESI

Q1: Safe administration of PRBCs?
Select all that apply

- 1. Prime tubing with 0.9% sodium chloride (normal saline)
- 2. Obtain and document a full set of Vital Signs
- 3. Check name and blood product with second nurse
- 4. Administer 0.9% sodium chloride after infusion
- 5. Monitor for s/s of transfusion reaction like volume overload

Q2: A nurse is preparing the transfusion of a unit of blood to a patient with anemia. The nurse knows which intervention is most important to prevent a transfusion reaction?

- Double-checking the blood product's type for compatibility with the patient's blood type

KAPLAN

Q1: The nurse is preparing to administer a blood transfusion to a client who has anemia. Which action should the nurse take first?

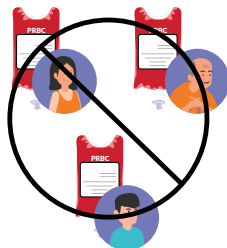
- Check for the type and number of units of blood to administer

Q2: A nurse is preparing to administer a unit of PRBCs to a client. Which action should the nurse take?

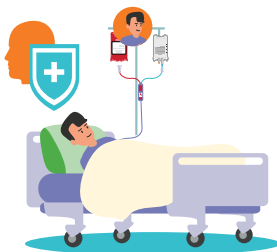
- Remain with the client for the first 15 minutes

Autologous Transfusion

Jehovah Witness



Collection of blood from a single patient that is **retransfused back into the same patient** when needed, typically done for clients with particular religious views like **Jehovah Witnesses** who can not have other people's blood.



HESI

The nurse is teaching about **autologous transfusion** of blood to a group of student nurses. Which **statements** should the nurse **include** in the teaching plan?

Select all that apply.

- Blood is stored in **frozen** conditions
- Blood is stored for **as long as 3 years**
- Blood **may not be rejected** by the patient's immune system

Top 3 Missed Question

Q1: When preparing to administer a unit of packed red blood cells to a client with anemia, which nursing actions are appropriate?
Select all that apply.

- 1. Ensure that the patient has a functioning central venous access catheter.
- 2. Have two licensed nurses verify the prescription.
- 3. Assess the patient's HgB and Hct.
- 4. Auscultate the patient's heart and lung sounds.
- 5. Prepare a bag of lactated Ringer's to administer with the blood.

Q2: Which is the priority nursing action for a patient who develops a high fever and tachycardia during administration of a unit of packed red blood cells?

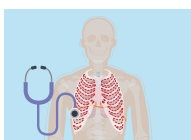
- 1. Administer 650 mg acetaminophen PO.
- 2. Notify the provider.
- 3. Assess the remainder of the patient's vital signs.
- 4. Stop the infusion.



Q3: Which is the most appropriate nursing intervention when preparing to administer synthetic erythropoietin to a patient with anemia from chronic renal disease?

- 1. Give the drug in the patient's right deltoid muscle.
- 2. Hold the dose for a HgB less than 10 g/dL.
- 3. Assess the patient's blood pressure prior to administration.
- 4. Check the patient's urine output to ensure an output of at least 30 mL/hr.

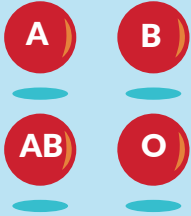
Highest PRIORITY



Blood Types & Rh Factor

Med Surg: Hematology

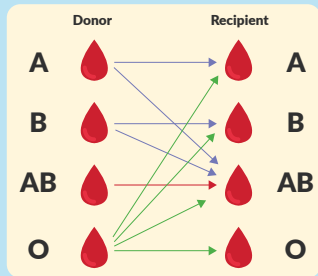
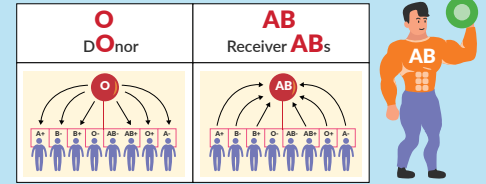
Blood Types



The main blood types are **A, B, AB, O**. The most tested key point for donating & receiving blood:

- O - can be given to everyone.
- AB - receives blood from everyone.

Memory trick



* Don't focus on memorizing this chart, it's **NOT** often tested on the NCLEX.

HESI

Q1: A nurse is caring for a patient with **type AB** blood who requires a blood transfusion. However, the blood bank sends up **type A** blood. Which action should the nurse take first?

- Infuse blood according to agency protocol

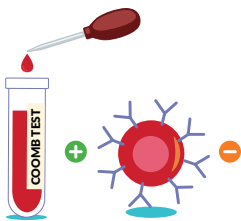
Q2: A patient with anemia states... "I'm a **universal donor**" ... patient has which blood type?

- O type

Universal DOnor	O
Universal receiver	AB

Rh Factor (ANTIBODIES)

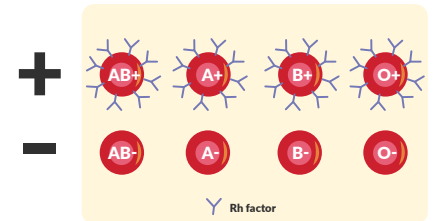
Rh Factors are the positive & negative **antibodies** on the blood's surface. An indirect coomb's test is done to see if the blood is positive or negative & make sure blood can be given or received.



SAUNDERS

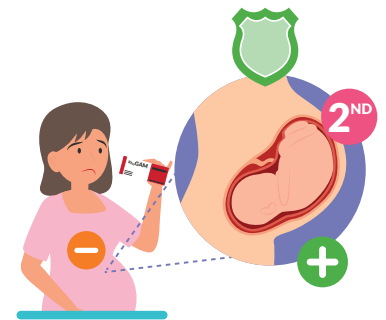
A client is **donating blood** ... The nurse tells the client that an **indirect Coombs' test** will be performed on the blood. The client asks the nurse about the **purpose of the test**. Which response should the nurse provide to the client?

- "The test detects circulating **antibodies against red blood cells (RBCs)**."

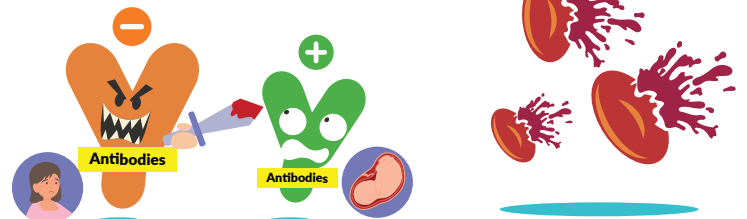
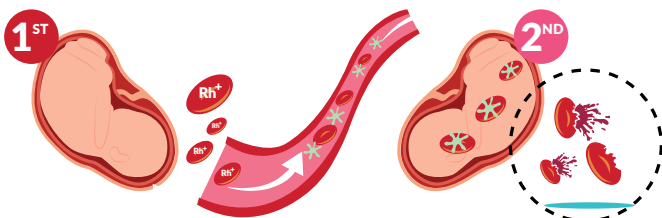


Rhogam is given to **Rh negative pregnant** mothers to **protect the baby** from a deadly complication called **Hemolytic Disease of the Newborn (HDN)**.

This happens when the mother is Rh - and the baby is Rh +. The Mom's negative antibodies can attack the babies positive Rh & cause this deadly hemolysis or hemolytic anemia, so this is why we give **RhoGAM to shield & protect the baby** from this deadly reaction.



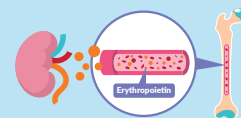
HDN - Hemolytic Disease of the Newborn



Erythropoietin (epoetin alfa)

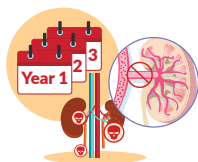
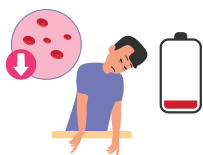
Med Surg: Hematology

Erythropoietin is a hormone produced by the kidneys that **stimulates bone marrow to produce red blood cells (RBCs)**.



Indication

- **Anemia:** low blood count (typically for hemoglobin <10g/dL). Given to alleviate signs & symptoms like fatigue, so that clients will have more energy.
- **Chronic kidney disease:** broken kidneys & these clients can not release erythropoietin, so we give it to prevent anemia.



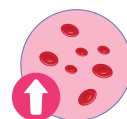
ATI Question

- Correct understanding of **Erythropoietin**?
- Increased energy levels



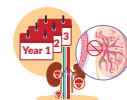
Kaplan Question

- Erythropoietin
- Indication: **Stimulates RBC production** in anemic pts with **chronic kidney disease**



HESI Question

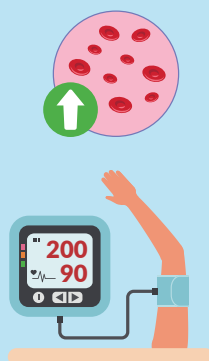
- Epoetin alfa:
- Treats anemia related to **chronic renal failure**



Contraindication

NCLEX TIP

- **Uncontrolled Hypertension**
Always monitor blood pressure prior to admin!
- Since this drug increases blood production, it will increase blood pressure too

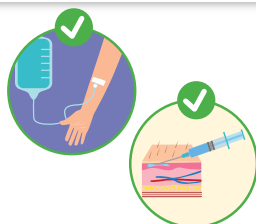


Kaplan Question

- Epoetin (Erythropoietin)**
- Monitor for **Increased blood pressure** while taking this medication

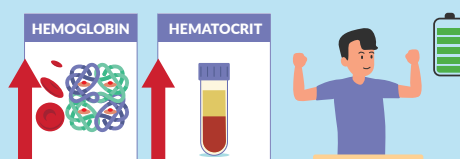
Administration

- ONLY IV, SQ
- **NOT IM** (intramuscular)
 - **NO** ventrogluteal, deltoid, vastus lateralis



Desired Outcome

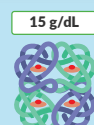
- Increased H/H (hemoglobin & hematocrit)
- More energy



HESI Question

The nurse reviews the blood reports of a patient who is receiving **epoetin alfa (Epogen)** and finds that the medication is **effective**. Which finding in the **blood lab report** enables the nurse to reach this conclusion?

- Hemoglobin levels of **15 g/dL**



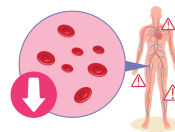
Notes

Anemia Overview & Iron Deficiency Anemia

Med Surg: Hematology

Anemia Pathophysiology

Anemia is where the body lacks enough RBCs (Red Blood Cells) to carry **oxygen** around the body to perfuse the tissues. Clients present tired, fatigued & pale skin, with shortness of breath and dizziness, as the body lacks oxygen.



- Top Tested**
1. Iron deficiency Anemia
 2. Sickle cell anemia
 3. Pernicious Anemia

Anemia Causes

- **Blood loss:** surgery, trauma, excessive menstruation ect.
- **Chemotherapy & Immunosuppressants:** which suppress the bone marrow where the RBCs are made.
- **Lack of iron, B12 & other building blocks:** like with iron def. anemia & pernicious anemia

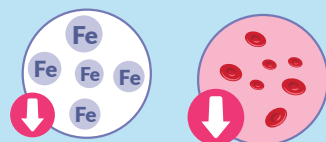
NCLEX TIP

Hemoglobin

- Normal: 12 +
- Bad: 8 - 9
- **Less than 7 = Heaven**

Iron Deficiency Anemia

The body lacks iron (Fe) a critical building block to help make RBCs - red blood cells. This is the most common anemia globally



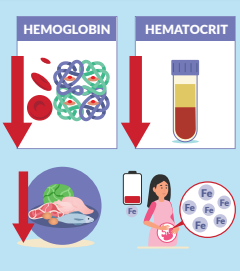
Kaplan Question

The nurse understands which is the most common type of anemia?

- Iron-deficiency anemia

Causes

- **Diet low in:** meat, fish, & poultry
- Gastric bypass surgery
- **Pregnancy:** fetus stores iron
- **Pica**
 - **LOW hematocrit and hemoglobin levels** **NCLEX TIP**



Infants & Children

1. Premature birth
2. Insufficient oral intake
3. **Excessive intake of milk** **NCLEX TIP**
4. Preterm infants **exclusively bottle-fed** with breast milk
5. **Vegan diet** **NCLEX TIP**
 1. Fortified breads & cereals
 2. **HIGH** iron foods with **HIGH vitamin C**
 3. Calcium & Vitamin D



Treatment

Rich in iron

1. Meat, Fish, Poultry
2. Spinach "green leafy" & whole grains

Infants & Children

- Limit **EXCESSIVE** milk intake
- Iron + Vit. C**
- HIGH** iron foods
HIGH vitamin C



Kaplan Question

The nurse counsels a client diagnosed with **iron deficiency anemia**. The nurse determines teaching is effective if the **client selects which menu?** Select all that apply

- **Flank steak** & green leafy vegetables
- **Liver** & onions, spinach



Signs & Symptoms

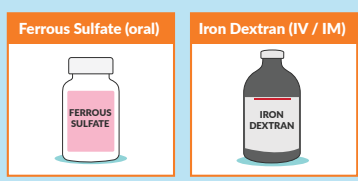
- **Dyspnea**
- **Pallor "pale skin"**
- **Tachycardia**

HESI Question

When assessing the patient's **integumentary** system, which **dermatologic** manifestation may indicate **anemia**?

- Pallor **NCLEX TIP**

Pharmacology



KEY POINTS

- Dark or black stools = **Normal & Expected** NOT GI BLEED
- Empty stomach **1 HOUR BEFORE** medications

HESI Question

A nurse is educating a patient with **iron deficiency on foods high in iron**. Which meal, if chosen by the patient, demonstrates an understanding of **iron-rich foods**?

- **Grilled chicken thigh**, sauteed spinach, and wholegrain bread



HESI Question

A patient with **iron deficiency anemia** is to be discharged home with **iron replacement therapy**. Which instruction would be most important to **maximize iron absorption**?

- **Glass of orange juice**

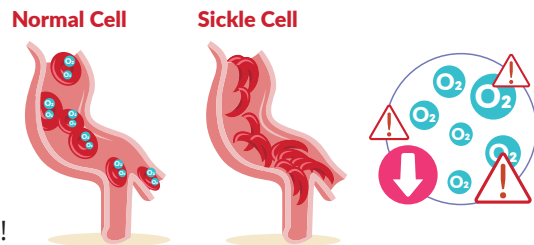


Sickle Cell Anemia & Pernicious Anemia

Med Surg: Hematology

Sickle Cell Anemia

The RBCs have a distorted shape, transforming from a nice round plumb shape to a **skinny sucked in sickle shape**. These misshaped RBCs die quicker than normal RBCs, **carry less oxygen** to the body & get clogged in tiny blood vessels - **blocking or occluding the blood supply** causing ischemia (low oxygen) to the organs. A vaso-occlusive crisis or **“sickle cell crisis”** can occur, causing **extreme pain** from the lack of oxygen!



Signs & Symptoms

- **One-sided** arm weakness
- Swelling of the feet and hands (Dactylitis)

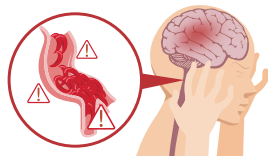
NCLEX TIP

- **New-onset** paralysis of extremities
- **Sudden** inability to be aroused

Kaplan Question

Client experiencing a **vaso-occlusive crisis**. The nurse determines care is appropriate if which observation is made?

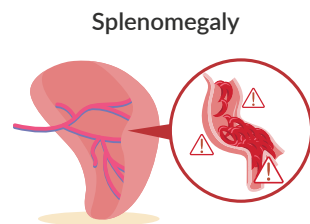
- The client receives regular **neurological assessments**



Complication

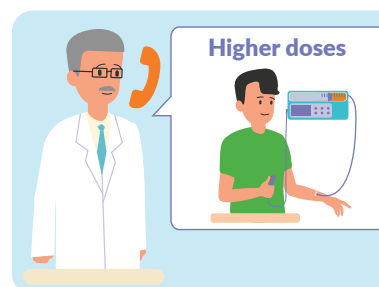
Splenic sequestration crisis

- Rapidly enlarging spleen
- Low blood pressure



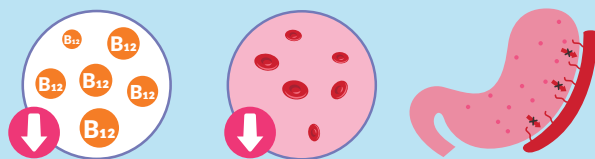
Treatment

- Hydration: **IV fluids**
- Bed rest
- **Pain Control NCLEX TIP**
 - PCA - patient control analgesia pump
 - **Call the HCP for Higher doses**



Pernicious Anemia

The body **can not absorb B12**, which is a vital building block to create RBCs. Clients **lack intrinsic factor** in the GI tract, which **helps the body take in B12**.



HESI Question

Which factor results from **pernicious anemia**?

- The **absence of intrinsic factor** secreted by the gastric mucosa

Signs & Symptoms

- Glossitis: **EXAM TIP**
 - Inflamed red smooth tongue
- Extreme weakness
- Jaundice: “pale yellow skin”

Kaplan Question

Clinical manifestations of **pernicious anemia**?

- Glossitis: A **smooth, red tongue**

HESI Question

The nurse is caring for a patient who reports **extreme weakness and glossitis**, and the nurse identifies **pale yellow skin**. Which type of **anemia** does the nurse anticipate in the patient?

- Pernicious anemia



Treatment

- **B12** - Injection: IM or IV
- NOT orally (PO)

HESI Question

A nurse is caring for a patient with **pernicious anemia** secondary to total gastrectomy. The nurse would **question which provider's order**?

- **Vitamin B12 supplement, PO**



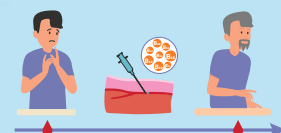
Kaplan Question

Client diagnosed with **pernicious anemia** asks why vitamin B12 cannot be **given in pill form**. Which response by the nurse is **best**?

- “**Stomach doesn't secrete** the necessary substance for **B12 to be absorbed orally**.”

A client asks the nurse **how long injections of vitamin B12** will be needed. Which response by the nurse is best?

- You may need **lifelong injections**

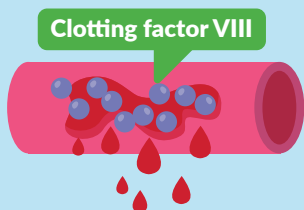


Hemophilia

Med Surg: Hematology

Pathophysiology

Inherited bleeding disorder in which the **blood doesn't clot normally**, increasing the risk of **excessive bleeding** after any type of small injury like a paper cut or a fall on the ground.



Hemophilia A



Hemophilia B

Hemophilia A

- Lack of clotting factor **VIII** (8)

Hemophilia B

- Lack of clotting factor **IX** (9)

HESI Question

A nurse is caring for a patient diagnosed with **hemophilia A**. The nurse knows this type of hemophilia is caused by an **absence of which clotting factor?**

- VIII

Signs & Symptoms

- Pain, Bruising, & Petechiae
- Ineffective tissue perfusion
- Joint stiffness & Lack of mobility

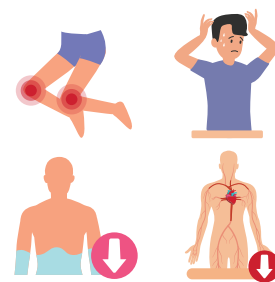


HESI Question

A nurse is caring for a patient with **hemophilia**. Which concerns would be expected on the nursing care plan?

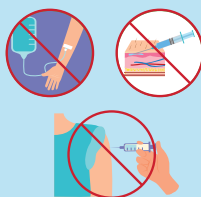
Select all that apply.

- Pain
- Anxiety
- Deficit of fluid volume
- Ineffective tissue perfusion



Treatment

- **AVOID Injections:** IV, IM, SQ
- Administers **coagulation replacement factors**
- **Ice packs** & **Elevate** the affected area



Kaplan Question

Q1 Client with **hemophilia** develops painful swelling of the knee after **bumping the leg**... which **initial action** is most appropriate for the nurse to take?

- Apply ice to the knee and elevate the leg

Q2 The nurse reviews the medical record for a client diagnosed with **hemophilia**. It is most **important** for the nurse to **question** which entry?

- Meperidine 75mg IM q 4 hr for severe pain



Education

- **NO NSAIDS**
- **NO Razors**
- **NO Contact sports**



HESI Question

Which statement by a patient with **hemophilia** indicates the **need for further teaching?**

- "I can learn to play **contact sports** for exercise."



Thrombocytopenia

Med Surg: Hematology

Pathophysiology

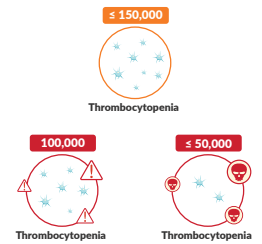
Thrombocytopenia occurs when clients have low platelets.

Platelets

Normal: 150,000 - 400,000

Thrombocytopenia:

- 150,000 or less
- 100,000 = MAJOR RISK
- 50,000 or Less = DEADLY



Signs & Symptoms

Huge risk for hemorrhaging, like a ticking time bomb. Any small bump or fall will cause **major bleeding**

- Bleeding gums
- Tachycardia
- Petechiae (tiny red brown-purple spots on the skin)

HESI Question

Which sign is observed in a patient with **thrombocytopenia**?

- Petechiae



Petechiae

Causes

- Immunosuppressants
- Liver disease (Hep. / Cirrhosis)
- ITP - Immune **thrombocytopenia** purpura



NCLEX

Complication

Bleeding - Huge risk for injury, like a ticking time bomb



PRIORITY



Kaplan Question

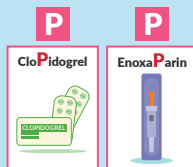
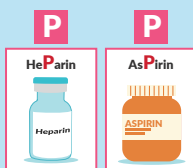
The nurse cares for a client diagnosed with immune **thrombocytopenia** purpura. Which nursing diagnosis is a **priority** when caring for this client?

- Risk for injury

Interventions

Platelets Less than 100k

- Hold the P's
 - HeParin
 - AsPirin
 - CloPidogrel
 - EnoxaParin
- Notify the HCP
- Obtain vital signs



The NCLEX will give lab values & ask for priority action! THINK: **what KILLS the patient first!**

Immunosuppressants & Surgery	Labor & Epidural	Cirrhosis
<p>Exhibit</p> <p>Laboratory result</p> <p>WBCs 3,000</p> <p>Hemoglobin 9.5 g/dL</p> <p>Platelets 68,000</p>	<p>Exhibit</p> <p>Laboratory result</p> <p>Blood group A+</p> <p>Rh factor Negative</p> <p>WBCs 18,000</p> <p>Platelets 75,000</p>	<p>Exhibit</p> <p>Laboratory result</p> <p>Albumin 2.7 g/dL</p> <p>Bilirubin Negative</p> <p>Platelets 45,000</p> <p>Ammonia 125</p>

Teaching

- **NO** Razors
- **NO** NSAIDS over the counter



1. Look for the most critical lab!
All are less than 100,000, but cirrhosis is the lowest - less than 50,000.
2. It's **your JOB as a nurse to SAVE LIVES!**
The NCLEX will make sure you do.
3. This is why **you MUST know your numbers.**

Disseminated Intravascular Coagulation

Med Surg: Hematology

Pathophysiology

DIC is a deadly complication that begins rapidly, causing both **severe bleeding & blood clots** inside blood vessels leading to organ failure. These abnormal clots **use up the blood's clotting factors**, which leaves the body with no means to stop bleeding!

Signs & Symptoms

Think bleeding & blood clots!

- **Severe bleeding** everywhere
 - Skin bleeding **Petechiae & Purpura** (purple spots on skin)
 - Eyes, gums, nose bleeding (**epistaxis**)
 - Urine blood (**hematuria**)
 - Stool blood "black tarry stool" (**Melena**)
- **Blood Clots**
 - Brain = **CVA** (stroke) 1 sided weakness, slurred speech, facial droop
 - Heart = **MI** (heart attack) chest pain, diaphoresis
 - Lung = **PE** (pulmonary emboli) difficulty breathing
 - Leg = **DVT** (deep vein thrombosis) Unilateral leg swelling
 - 1 leg bigger than the other

Labs

- Prolonged clotting time for **PT, aPTT, INR**
- Decreased **Platelets** (norm: 150 - 400k)
- **D-dimer** elevated (indicates clot risk)

Causes

DIC is not a disease itself, it occurs as a complication from another disease like:

- Infection & **Sepsis** (blood infection)
- After major **trauma**
- **Shock** (severely low blood pressure)
- **Cancer** & Neoplastic disease (tumors)
- OB complications

Treatments

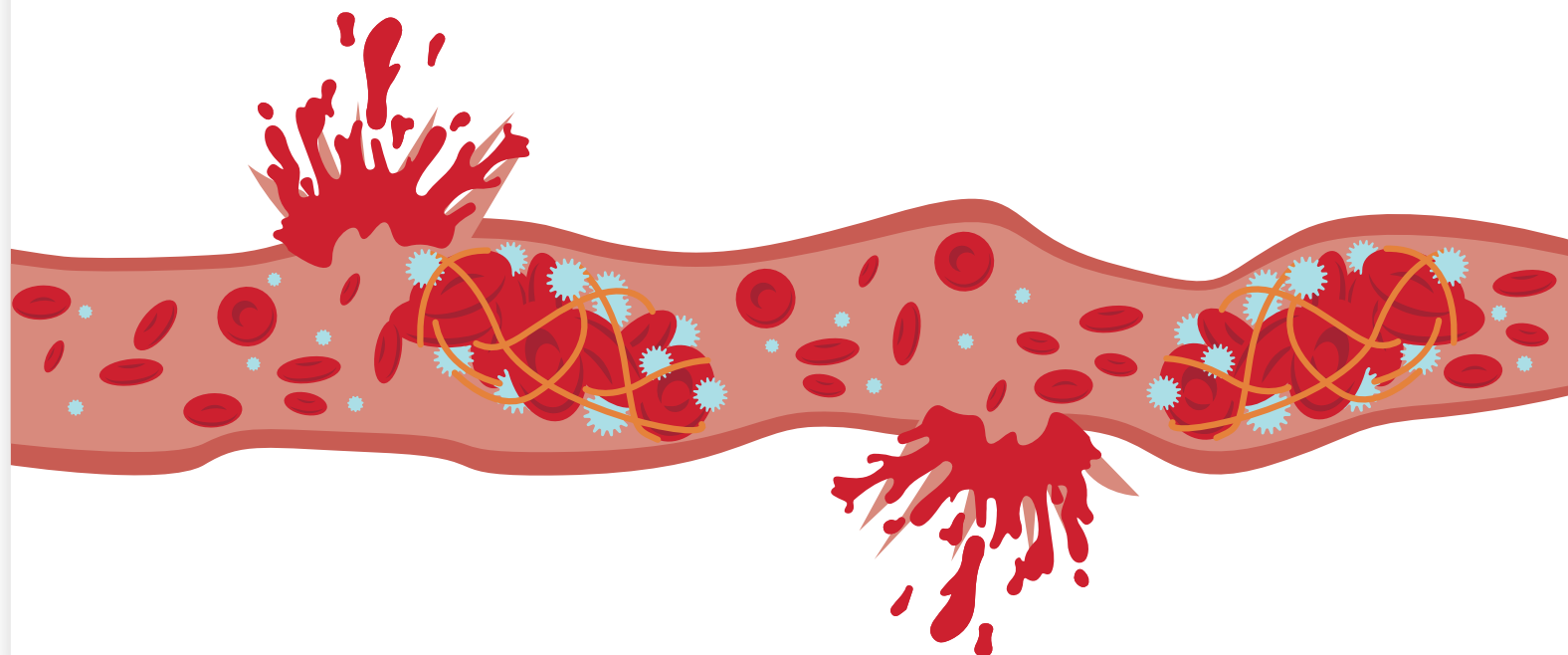
Priority = Treat underlying cause!

Then blood transfusion

- Packed RBC (to replace blood loss)
- FFP - Fresh frozen plasma (replaced deficits in coag factors)
- Platelets
- Cryoprecipitate (replaces fibrinogen)
- Heparin (to decrease the many clot formations)

Education & Interventions

- Monitor for bleed & do not clean clot formations
- Educate on bleeding risk!
 - **No** razor shaving - only electric razor
 - **No** brushing teeth hard - only soft bristle
 - **No** flossing



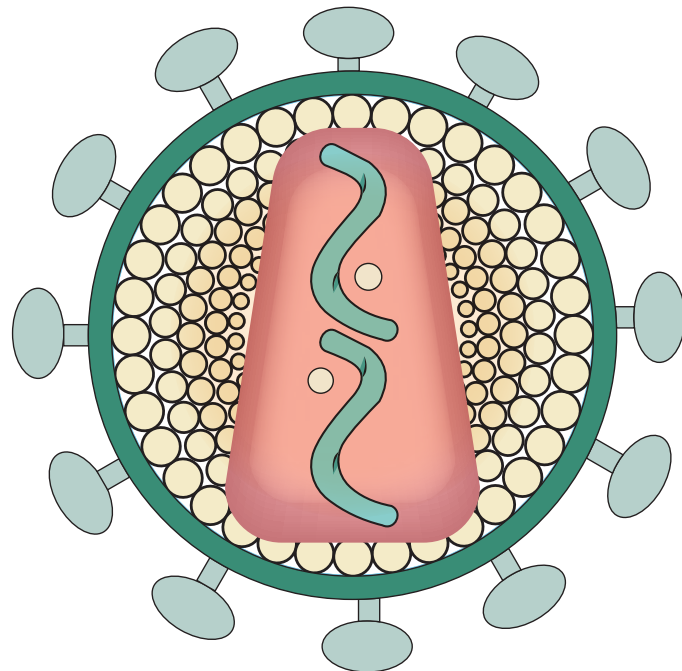
Human Immunodeficiency Virus

Med Surg: Hematology

Pathophysiology & Causes

HIV is a **virus that attacks the body's immune system** & if not treated, it can lead to **AIDS** (Acquired Immunodeficiency Syndrome), which interferes with the body's ability to fight infections. The virus can be transmitted through contact with infected **blood, semen or vaginal fluids**; commonly from unprotected sex, blood transfusions, hypodermic needles & from mother to child (during pregnancy).

Once exposed the virus replicates inside the body by hijacking or taking over & killing the **CD4+ cells (T helper cells)**. These cells are vital in fighting off infections & diseases. Since HIV cannot reproduce on its own, it attaches itself to these **T-helper** cells & fuses together with it becoming one. **HIV** belongs to a group of viruses known as retroviruses, which carry their genetic material in the form of ribonucleic acid (RNA) rather than deoxyribonucleic acid (DNA).



Signs & Symptoms

Within a few weeks, flu-like symptoms appear:

- Fatigue
- Fever & night sweats
- Sore throat
- Weight loss
- Diarrhea
- Then **asymptomatic (no signs / symptoms)** until it progresses to AIDS (late stage of HIV).
- **AIDS s/s - Frequent infections** as CD4+ cells decrease (decreased immunity)

Diagnostic Procedures

- **EIA:** Antibodies are detected, resulting in positive results and marking the end of the window period from initial contraction.
- **Western blot:** Also detects antibodies to HIV; used to confirm EIA
- **Viral load:** Measures HIV RNA in the plasma
- **CD4/CD8:** These are markers found on lymphocytes. HIV kills CD4+ cells, which results in a significantly impaired immune system

Education & Interventions

- Monitor for **fever, cough, sore throat etc.** could mean deadly infection is setting in & CD4+ count is dropping
- Monitor declining hemodynamic measurements & weight.
- Compliance with medication regimen (HAART therapy)

Stages of HIV to AIDS

- **Stage 1 - HIV Primary Infection**
Initially upon contracting HIV, there is a period during which HIV tests appear as a false **negative on the HIV antibody blood test**, although clients are infected & highly infectious. Characterized by high levels of viral replication with destruction & dramatic drops of CD4+ T-cells counts. Once viral load stabilized, there are no signs & symptoms as the virus goes dormant until CD4+ levels drop below the 200 count.
- **Stage 2 - AIDS**
When **CD4+ T-cells drop below 200 cells/mm³** the client is considered to have AIDS.

Treatments: HAART Therapy

- **HAART** - Highly Active Antiretroviral Therapy multiple drugs that act on different viral targets is known as
- **Zidovudine:** is given to pregnant women to prevent HIV crossing the placenta

Notes

Immune

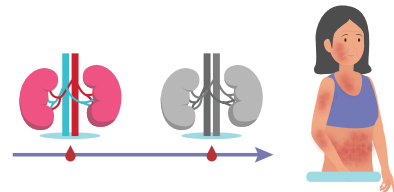
https://t.me/nclex_rn_edu

Lupus

Med Surg: Immunology

Pathophysiology

Systemic Lupus Erythematosus (SLE) is an **autoimmune disorder** where the body attacks itself, causing major **inflammation** in the skin, joints, kidneys, & heart resulting in **organ failure over time**, most often in the kidneys.



Triggers

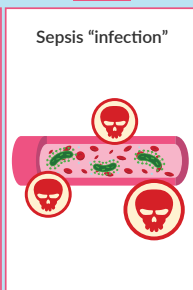
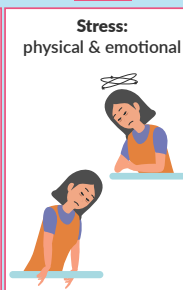
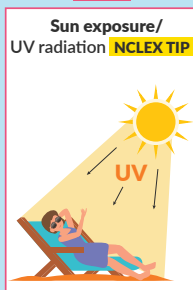
Avoid anything that can irritate the body

S

S

S

S



Causes & Risks

- Cause is unknown
- Most cases: Women 14 - 45 years.
- **UV radiation from the sun makes it worse**

Signs & Symptoms

1. **A butterfly-shaped rash** (cheeks & nose) **NCLEX TIP**
2. **Fever** higher than 100°F **Report to HCP**
3. **Joints** (painful & swollen)



Labs

- Creatinine **over 1.3** = Bad Kidney **NCLEX TIP**
- Decreased **WBC** (norm: 5,000 - 10,000)
- Inflammation:
 - Increased ESR (erythrocyte sedimentation rate)
 - CRP (C Reactive Protein)

Creatinine = **1.3**



Client Education

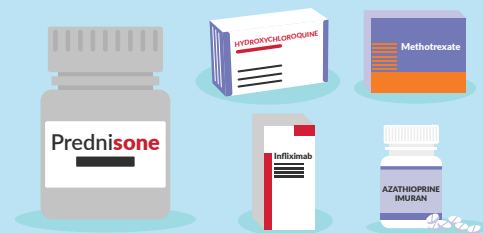
AVOID the 4 Ss **NCLEX TIP**

- S - **Sun exposure** / UV light
- S - Smoking
- S - **Stress:** physical & emotional
- S - Sepsis "infection"

Notify the HCP for **fever***

Pharmacology

- **Steroids "-sone"** Prednisone
- **Immunosuppressants:**
 - Hydroxychloroquine
 - Methotrexate
 - Infliximab
 - Azathioprine (brand: imuran)



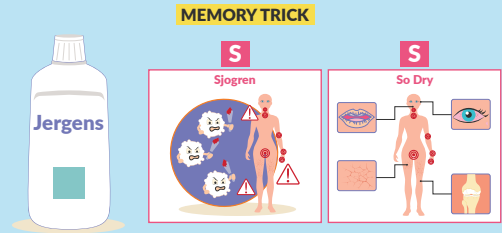
Notes

Sjogren's Syndrome

Med Surg: Immunology

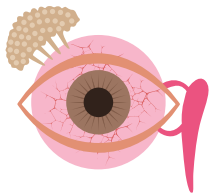
Pathophysiology

Autoimmune disorder where the body attacks itself - mainly drying out the skin, eyes, joints, & mouth



Signs & Symptoms

- **Dry** Eyes **NCLEX TIP**
- **Dry** Mouth
- **Dry** Skin, Vaginal, & Nasal Septum
- **Joint pain**



Causes & Risks

Typically occurs in people with one or more known risk factors, including:

- Over 40 years old
- Women 10X more likely
- Rheumatic disease

Education

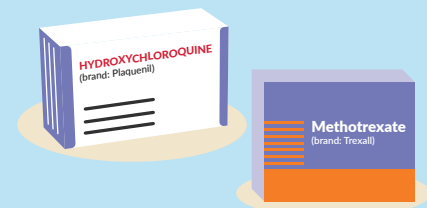
- Eyes: Artificial **tears**
- Nasal: humidifier
- Skin: **NCLEX TIPS**
 - **AVOID harsh soaps** & hot showers "lukewarm"
 - Lubricants: Vagina
- Mouth: **NCLEX TIPS**
 - Regular **dental exams**
 - Artificial **saliva**/chew **gum**
 - Increase fluid intake



Pharmacology

Immunosuppressants

- Hydroxychloroquine (brand: Plaquenil)
- Methotrexate (brand: Trexall)



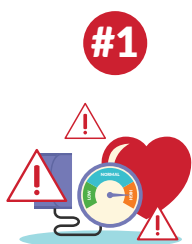
Notes

Scleroderma

Med Surg: Immunology

Pathophysiology

Rare **autoimmune disorder** where the body makes too much collagen protein resulting in **very thick tight skin** leading to scars on the lungs & kidneys. The **blood vessels** may become too thick as well leading to **high blood pressure**, which can result in a **CVA stroke** - 1 of the first signs being a **headache**.



KEY POINT



Priority NCLEX TIP

- **Abrupt onset** hypertension & headache

MEMORY TRICK

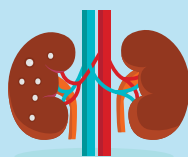
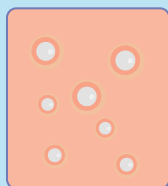


ScleroDerma
Scarred Hard Derma

Signs & Symptoms

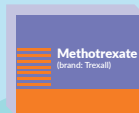
It progresses slower & eventually affects the internal organs much later. This is known as **Crest Syndrome**

- C** - Calcinosis - calcium deposits in the skin & organs
- R** - Raynaud's Phenomenon - blue cold finger tips
- E** - Esophageal dysfunction - Difficulty swallowing & heartburn
- S** - Sclerodactyly - Fingers curl inwards due to the thickened tight skin
- T** - Telangiectasia - red threadlike marks



Pharmacology

- Immunosuppressants
- **ACE** Inhibitors to lower Hypertension
 - **"-pril"** Lisinopril
- Calcium Channel Blockers for Raynaud's Phenomenon



Notes

Integumentary

Pressure Injury (pressure ulcer)

Med Surg: Integumentary - Skin

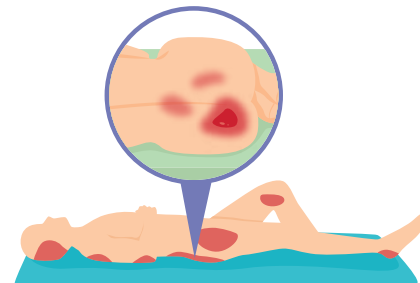
Pathophysiology

Damage to the **skin** and/or the **underlying tissue** over a **bony prominence**, common with bed-ridden clients who are not turned adequately or from a medical device (oxygen therapy)

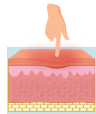
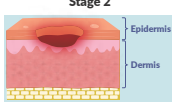
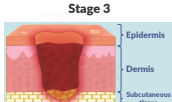
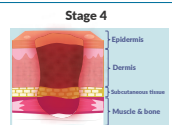

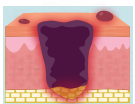
Most common areas:

- lower back & buttocks (sacrum & coccyx)
- heels & ankles
- hip bones
- shoulder area & elbows

MOST tested

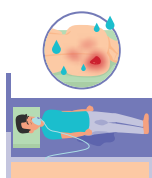


6 Stages of Pressure Injuries

	<p>Stage 1 = 1 layer of damage (epidermis) Red skin that is NON blanchable & NOT broken</p>
<p>Stage 2</p> 	<p>Stage 2 = 2 layers of damage Open wound: affecting both the epidermis & dermis. Wound bed is red / pink & shiny or dry.</p>
<p>Stage 3</p> 	<p>Stage 3 = 3 layers of damage (epidermis, dermis, & subcutaneous) Full thickness skin loss into the subcutaneous fat; wound may tunnel under the edges of the wound bed</p>
<p>Stage 4</p> 	<p>Stage 4 = 4 layers of damage Extends all the way down into muscle, bone, or tendon.</p>
<p>Unstageable NCLEX TIP</p> <ul style="list-style-type: none"> • Eschar (black / brown) • Slough (yellow stringy) 	<p>Eschar (black / brown) dead necrotic tissue MEMORY TRICK: EsCHARCOAL</p> <p>Slough (yellow stringy) MEMORY TRICK: Slough = skin of a chicken</p> <p>*These wounds need to be debrided before a stage is made</p>
<p>Deep tissue</p> 	<p>The fatty tissue is injured below the skin (dark purple, & sometimes open wound)</p>

Causes & Risks

- **Bed ridden**
- **Incontinence**
- **Poor nutrition**
- **Diabetic neuropathy**
- **Liver cirrhosis = Low Albumin**



Treatments

- Assess skin & document (**first 24 hours**)
 - Turn every **1 - 2 hours**
 - Nutrition: **Protein & Fluids** (2 - 3 L / day)
 - **Urine output 30 mL/hr** or Less = Kidney Distress
 - **Albumin** (norm: 3.5 - 5.0)
 - **Monitor:**
 - Stage, Size, Color
 - Braden Scale
- MEMORY TRICK:**
- **BS - Braden Scale** monitors for risk factors
 - **BS - Broken Skin**

3.5 - 5.0



Kaplan Question

The nurse is teaching a client with a **stage 1 pressure injury** on the greater trochanter of the left hip. What should be included in teaching?

- Change positions every hour

Kaplan Question

Which finding contributes to delayed wound healing in a client with a stage 3 pressure injury:

- Urine output 25 mL/hr

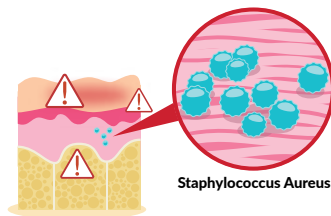
Cellulitis

Med Surg: Integumentary - Skin

Pathophysiology



Bacterial skin infection of the deep dermis and subcutaneous tissue, typically cause a staph infection - staphylococcus aureus.



Normally found in the lower limb, like near the tibia for example.

HESI

Swab culture from a cellulitis infection ... The nurse **anticipates** the culture will grow which **causative species of bacteria**?

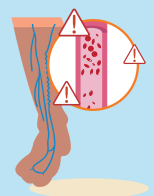
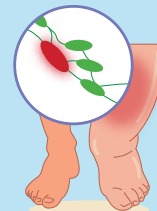
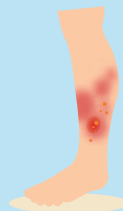
- Staphylococcus aureus



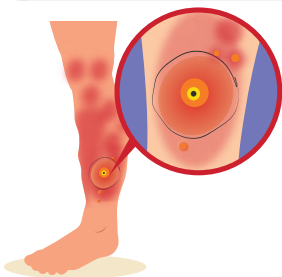
Risk Factors

Risk factors include patients with:

- Trauma,
- History of diabetes,
- Cellulitis,
- Tinea Pedis (athletes foot),
- Lymphedema,
- Obesity,
- Venous insufficiency - where blood flow is limited to the lower legs



Signs & Symptoms



- Think infection: **Fever**, redness, pain, warm & tender, **swelling**, & **erythema**
- **Abscess** if untreated

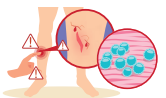
HESI

Q1: A patient with a fever has erythema, pain, and tenderness over an area of the leg. Which infection does the nurse suspect in the patient?

- Cellulitis

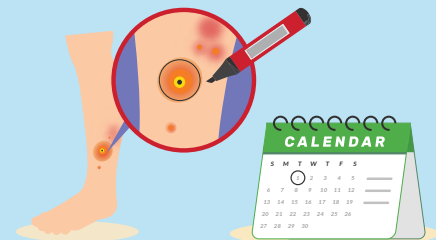
Q2: Which statements regarding cellulitis are true? Select all that apply.

- Complications can include sepsis
- It can lead to an abscess if left undiagnosed and untreated
- It occurs when bacteria enters the body through a break in the skin
- It can be spread by direct contact with an open area on a person who has an infection



Treatment

Antibiotics, such as Penicillins, cephalosporins, or clindamycin. Good way to monitor if the infection is getting better or worse is to draw a border around the infection site with a marker, and date it, then see if it gets larger or smaller.



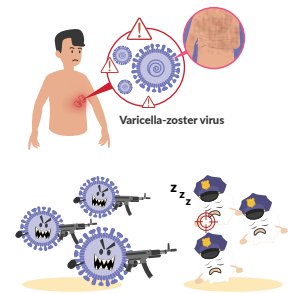
Notes

Shingles

Med Surg: Integumentary – Skin

Pathophysiology

Caused by reactivation of the **varicella-zoster virus** (the virus that causes **chickenpox**), those that have had chickenpox as a child are most likely to get **shingles**. This kind of virus is an opportunistic infection meaning that it waits till the body's defenses are weak, before attacking.



Risk Factors

- Clients whose defenses are down
- Compromised immune system
- Weak immune system like clients on immunosuppressants, or chemo
- Clients who are fighting off another infection like pneumonia where the immune system is preoccupied
- Poor nutrition, or even too much stress, fatigue

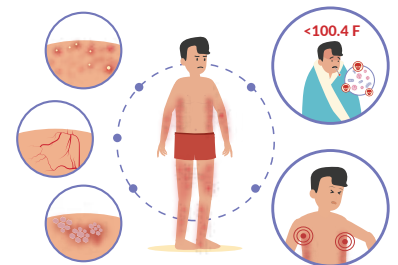
HESI

... risk factors for a shingles outbreak?
Select all that apply.

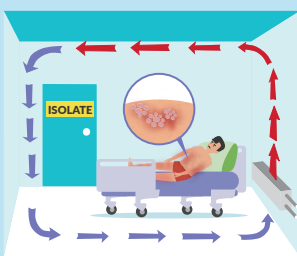
- Had **chickenpox as a child**
- Admitted to hospital for **pneumonia**
- **Stressed** about finances because of spouse's battle with cancer

Signs & Symptoms

Rash that runs horizontally along the left or right side of the torso. A rash can present vascular, pustular, or crusting with a low grade fever and paresthesia, burning, numbness, & tingling.



Treatment



- Isolate the patient:
negative airflow room
- Avoid exposure



Notes

Fungal Infections (Tinea)

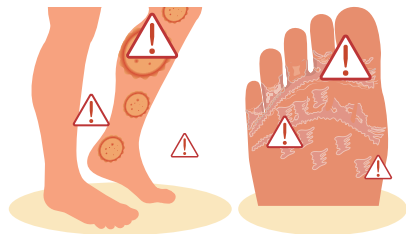
Med Surg: Integumentary - Skin

Pathophysiology

Both are very contagious fungal infections that live on the surface of the skin.

Tinea - ringworm infection

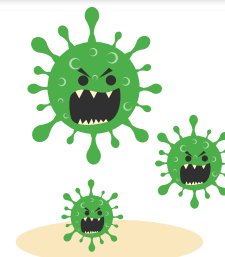
- **Tinea** pedis - athlete's foot infection



HESI

Tinea capitis, tinea corporis, and tinea pedis are examples of which type of infection?

- Fungal infections



Signs & Symptoms

- Circular rash
- Scaly
- Pruritus (itchy)

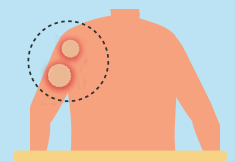
HESI

Q1: A patch of skin that itches on the right forearm... a well-defined circular rash with a red border and clear center. The nurse anticipates a diagnosis of which skin disorder?

- Tinea corporis

Q2: A patient with tinea pedis has increased moisture and pruritus around the toes. Which instructions does the nurse give? Select all that apply.

- Wear cotton stockings
- Use warm soaks for the toes
- Keep your toes clean and dry
- Soak the toes in Burow's solution



Education

PRIORITY: Tinea Corporis **NCLEX TIPS**

- **Most important** to teach ways to prevent the spread

Ringworm is spread very easily (HIGHLY tested) So we **must educate the clients NOT to share personal items** like brushes, towels, hats, clothes, & anything else.

Treatment

Griseofulvin = Tinea corporis (Ringworm)

Key Points

- **Take** weeks to months
- **DO NOT discontinue** once itching stops
- **BEST** absorbed after eating a high fat meal

HESI

The nurse is caring for a patient with **tinea capitis**. The nurse anticipates administering which drug?

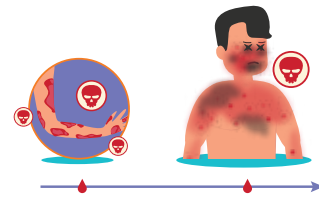
Griseofulvin

Steven Johnson

Med Surg: Integumentary – Skin

Pathophysiology

Steven Johnson Syndrome (SJS) is a very deadly skin disorder that can result in the more severe Toxic Epidermal necrolysis (TEN)



Signs & Symptoms

Typically associated with a reaction to medication



- flu-like symptoms
- painful rash
 - Widespread erythema
 - Skin peeling & blisters
- **Denuded** skin & mucosa

Complication

Sepsis - severe infection, which is a major cause of death.

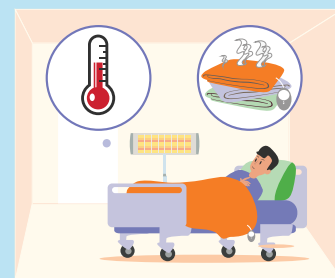


Intervention

Interventions are very similar to severe burn clients, everything must be sterile to prevent infection.

NCLEX TIPS

1. **Infection prevention:** Reverse **isolation**
2. Wound care: **sterile**, moist dressings
3. **Warm room**
4. Eye care: cool compresses & **eye lubricants**



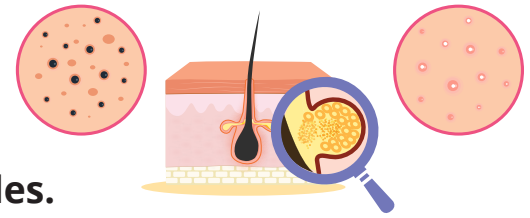
Notes

Acne

Med Surg: Integumentary – Skin

Pathophysiology

Acne is a common skin disorder where **obstructed sebaceous glands** within the skin results in blackheads & white heads. When bacteria settles in, it can cause inflammation resulting in **pustules & papules**.



Causes & Risks

- **Puberty & pregnancy** (explosion of hormones)
- Bacteria overgrowth
- Genetics
- Stress



Education

- **AVOID: NCLEX TIPS**
 - **Vigorous scrubbing** / washing
 - **Squeezing or picking** lesions
 - **Antibacterial soap**
 - Smoking
- Wash hair & skin frequently “gently”
- Apply
 - Moisturizer
 - Skincare products **“non-comedogenic”**
- Diet:
 - **“well-balanced”**
 - **Fluid** intake: 8 glasses of water / day

HESI

The nurse is teaching .. **interventions** to maintain healthy skin. Which teaching does the nurse include?

Select all that apply.

- Refrain from **smoking** any tobacco
- **Wash your hair and skin** frequently
- **Apply moisturizer** after showering
- **Drink eight glasses of water** per day



Treatment



- Tetracycline
- Isotretinoin



Notes

Eczema

Med Surg: Integumentary – Skin

Pathophysiology

Eczema is a chronic disorder of the skin in which the skin becomes red, itchy, & dry. It's common in children but can occur at any age. It tends to flare up periodically when exposed to allergens.

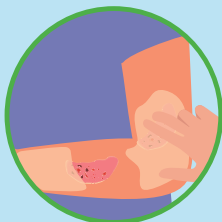
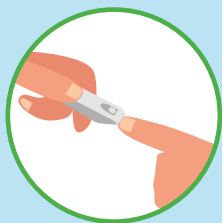


HESI

Eczema... The nurse knows the **treatment plan** is centered on which concept?

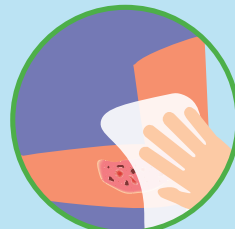
- **Decreasing** exposure to the **allergen**

Interventions



NCLEX TIPS

- Trim **nails**
- Lukewarm "tepid" **sponge baths** with soap
 - **Pat dry** with towels
 - Apply **moisturizer immediately** after bathing
- **Cotton** clothing (soft)
 - **NOT** wool clothing



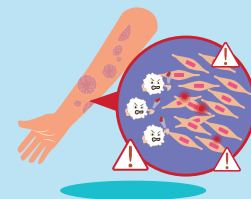
Notes

Psoriasis

Med Surg: Integumentary - Skin

Pathophysiology

Autoimmune disease where the body attacks normal healthy tissue, causing **rapid cell division of epidermal cells** (skin cells) resulting in key signs below



Signs & Symptoms

- **Silver plaques** & “reddening skin”
- Rough, raised **flat top**

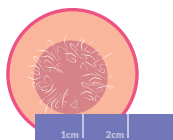
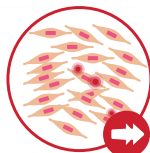
HESI

Q1: plaque psoriasis... The nurse would expect to see which type of lesion?

- Elevated lesion with a rough, flat top that is greater than 1 cm in diameter

Q2: plaque psoriasis... The patient demonstrates an understanding of the disease by stating that the **symptoms are caused** by which change to normal skin?

- Rapid cell division



Causes & Risks

Triggers:

- Food allergen
- Trauma
- S - Stress
- S - Sickness
- S - Sepsis (infection)
- **NOT Sun exposure**

Sun is GOOD!



S

S

S

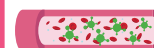
Stress



Sickness



Sepsis



Education

NCLEX TIPS

1. Exposure to **sunlight = GOOD!**
2. Moisturize frequently!

LOTS OF STUDENTS

ANSWER WRONG



Pharmacology

- Steroids “-sone” Predn**isone**
- Immunosuppressants:
 - Methotrexate
 - Infliximab



MOST TESTED



Notes

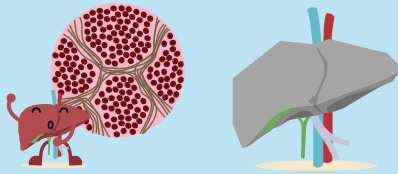
Liver, Gallbladder and Pancreas

Cirrhosis

Med Surg: GI - Gastrointestinal

Pathophysiology

Liver cirrhosis THINK liver Scarrrrrosis.
 Since normal healthy tissues get replaced with **SCAR** tissue, making the liver hard like a rock!



Causes

Anything that causes inflammation & scarring to the liver:

- **Alcohol** abuse
- Chronic **Hepatitis** (inflammation)
- **Cystic fibrosis** (serious mucus clogs the entire body & the liver)



Liver

4 major roles & responsibilities

Producing	Detoxing ammonia	Drug metabolism	Storing Glycogen
<ul style="list-style-type: none"> • A - Albumin • B - Bile • C - Coagulation factors 			

Albumin

Albumin

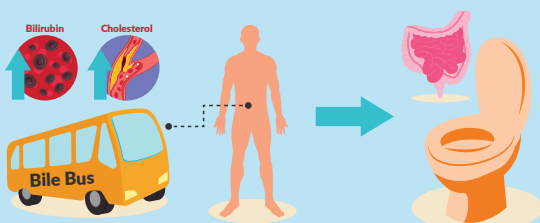
Transports drugs in the body 	Also attracts water 	Binds with Calcium
---	--------------------------------	-------------------------------

A - Albumin
A - Attracts water, drugs & binds with calcium

Bile

Which we call the **Bile Bus** helping to scoop up excess **Cholesterol** & **Bilirubin** and take them from the body to the toilet via the bowels.
 When the liver fails we get higher cholesterol & high bilirubin. Bilirubin causes jaundice in the body. This is seen as yellowing of the skin & the eyes, specifically the white part of the eye called the sclera.

Memory Trick



Clotting Factors

In liver disease, the blood can't clot fast enough & leads to a HUGE risk of bleeding.
 Our #1 concern is the **BLEEDING!**

HESI Question

Which complication is a patient with **cirrhosis** at risk for?
 • Bleeding



Cirrhosis II

Med Surg: GI - Gastrointestinal

Signs & Symptoms

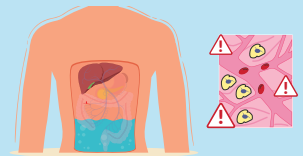
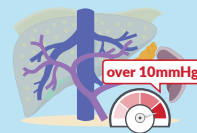
Jaundice

Yellow skin & eyes from build up of bilirubin (dead RBCs) as bile can not take it from the body into the toilet.



Portal Hypertension

Is high pressure in the portal vein, since the liver is hard like a rock! Naturally, blood flow will back up & fluid now spills over into the **abdomen called ascites** (third spacing)



Ascites

Huge fluid filled abdomen as fluid backs up from the hard liver & now spills into the third space. Clients will look pregnant with fluid.



A - Ascites
A - Abdominal fluid

Esophageal Varices

The **enlargement of veins in the esophagus!** As blood backs up from the liver it forces major pressure on the esophagus causing the vessels to bulge to the max! Like a ticking time bomb of blood it can explode & blood can block the airway - **VERY DEADLY!**

Key point

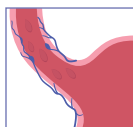
- **NO** nasogastric tube (NGT)
- **NO** straining (bowel movement)



Kaplan Question

First action when a client with **cirrhosis** begins **vomiting blood** after a meal:

- Obtain **vital signs** (probable esophageal varices)



Common NCLEX Questions

Client with a history of cirrhosis ... with suspected **gastroesophageal varices**. Which order would the nurse **question**?

- ✓ **New nasogastric tube** insertion



Client with cirrhosis ... **portal hypertension, ascites, and esophageal varices**. Which of the following is **correct** patient teaching?

- ✓ **Avoid straining** when having a bowel movement



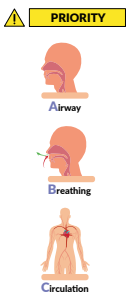
HESI Question

Which nursing intervention would be the highest priority in managing a patient with ruptured **esophageal varices**?

- **Protecting the airway**

A patient with cirrhosis and esophageal varices is vomiting, and the nurse notes hematemesis. Which action should the nurse take first?

- **Place the patient in the side-lying position**



Hepatic Encephalopathy

Cloudy brain from ammonia (protein waste). The liver can not detox the ammonia & now it builds up in the blood.



Hepatic encephalopathy

Twitching extremities in the arms & legs = Asterixis.

Mental status changes:

- **Confusion** & bizarre **behavior**.
- Sleepiness.

Key Assessments:

- Assess **hand movements** with **arms extended**.
- Assess **mental status** with those from previous shifts.
- Assess recent **blood draws** for **ammonia** levels.

Saunders

A client with **cirrhosis** ... shows signs of **hepatic encephalopathy**. The nurse should plan a dietary consultation to limit .. which ingredient?

- **Protein**



Top Missed NCLEX Questions

Which **assessments** would indicate if a client with cirrhosis has progressed to **hepatic encephalopathy**?
Select All That Apply

- ✓ **Ask the client for their date of birth, name, date, and location**
- ✓ **Tell the client to extend their arms**
- ✓ **Compare ammonia blood levels** with that of previous shifts



Lab Values

The ABCs of the liver will be low. Including **Low Calcium** from the low albumin leading to the 2 classic signs - Trousseau's & Chvostek's

LIVER FAILURE LABS NCLEX TIP

- Ammonia **HIGH** → Hepatic Encephalopathy
- **A** Albumin **Low** (under 3.5) → Calcium **Low** Low platelets
- **B** Bilirubin **HIGH**
- **C** Coagulation Panel (clotting time **HIGH**) **HIGH** PT, PTT, INR
- **Elevated** ALT & AST



Common NCLEX Questions

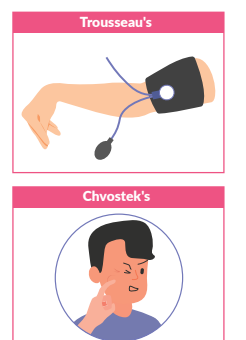
Which **blood lab** values are expected to be **elevated** in a client with worsening liver **cirrhosis**?

Select all that apply

- ✓ **1. Ammonia**
- ✓ **2. Bilirubin**
- ✓ **3. Prothrombin time (PT)**
- 4. Albumin
- 5. Calcium



2 classic signs of hypocalcemia



Cirrhosis III

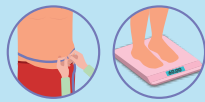
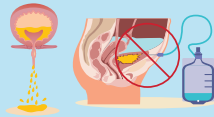
Med Surg: GI - Gastrointestinal

Interventions

Ascites = Paracentesis

- A - Ascites
- A - Abdominal fluid

1. Empty the bladder
2. Vital Signs
3. Measure abdominal circumference & weight
4. HOB UP - High fowlers



Always tested

HESI

A nurse is assisting with a paracentesis for a patient with ascites caused by cirrhosis. Which action should the nurse take first?

- Have the patient empty their bladder



Albumin IV

- Increased BP & Bounding pulses
- Assess vital signs! **NCLEX TIP**
- Must remain within normal limits = albumin has been effective



NCLEX TIP



NCLEX

NORMAL

Students get this wrong all the time

Pruritus - itchy skin

1. Apply a cool moist cloth to affected areas
2. Apply moisturizing cream over unbroken skin
3. Wear longsleeved clothes & cotton gloves
4. Trim fingernails short



Pruritus



Common NCLEX Questions

A client with worsening liver failure presents to the med-surg floor... which assessment findings should the nurse expect?

Select all that apply

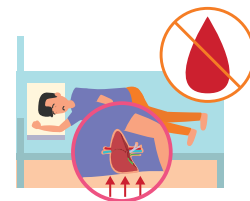
- 1. Enlarged abdomen from ascites
- 2. Bruise marks on the skin
- 3. Fatigue and possible confusion
- 4. Sclera that appears yellow
- 5. Reports of itchy skin



Diagnostics

Liver biopsy

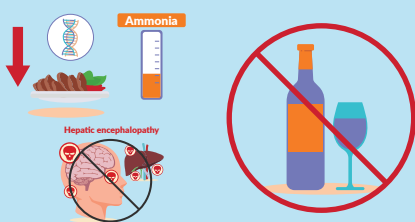
- After procedure Lay on **RIGHT SIDE** to prevent bleeding



Nursing Care

Diet

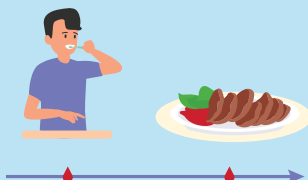
- Low Protein = Low Ammonia prevents **Hepatic Encephalopathy**
- Low Sodium & Fluid = Low Swelling **Ascites**
- **NO** Alcohol



HESI

The nurse is caring for a patient with severe liver cirrhosis and imbalanced nutrition. Which nursing intervention would prevent malnutrition in this patient?

- Provide oral care before meals



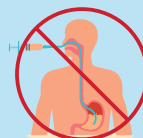
Bleed Risk

- Soft toothbrush
- Electric razor
- Monitor blood in stools



Esophageal Varices

- **AVOID** Valsalva Maneuver: NO bearing down (bowel movements)
- **NO** new NGT **nasogastric tube**



Pharmacology

- Neomycin
- Lactulose
 - Lose the ammonia
 - Loose bowels
 - Lose potassium (**hypokalemia**)



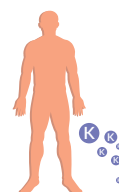
KAPLAN

Lactulose:

- Monitor for **hypokalemia**



Hypokalemia



Hepatitis

Med Surg: GI - Gastrointestinal

Pathophysiology

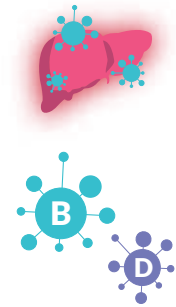
Refers to an inflammatory condition of the liver, commonly caused by a viral infection.

Non-viral causes are:

- Alcohol
- Autoimmune disease where the body attacks itself

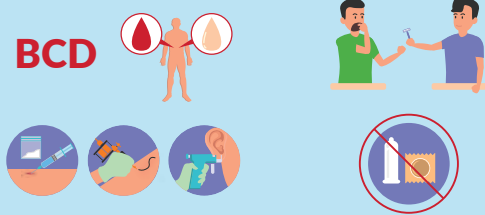
There are 5 types, but the most tested are the **B & C**

Type	Transmission
A	Fecal-oral (contaminated food)
B	Blood & body fluids
C	Blood & body fluids
D	Co-infection with Hep B
E	Fecal-oral Contaminated drinking water



Causes & Risk

- BCD - blood & body fluids
- IV drug use, tattoos, body piercings
- Sharing razors
- Unprotected sex



MEMORY TRICK

- **A** - Anus to mouth
- **BC** - Blood Cultures & Sex
- **E** - E. Coli water (contaminated water)

Signs & Symptoms

- Headache
- Fever
- Fatigue (malaise)
- N/V

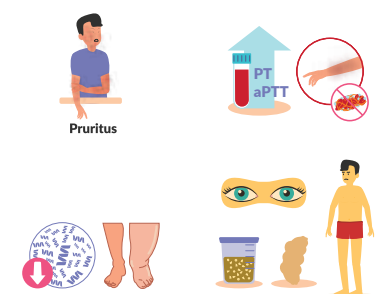
Elevated Liver Enzymes

- ALT & AST
- Bilirubin



Normal Liver Disease Signs

- Itching "pruritus"
- **Elevated** bilirubin
 - Jaundice
 - Dark colored urine
 - Clay color stools "Pale stools"
- **Elevated** PT & aPTT
 - Bruising
- **Low** Albumin
 - Edema



Diagnostics

Liver biopsy

- After procedure Lay on **RIGHT SIDE** to prevent bleeding

Complications

- Acute liver failure
- Cirrhosis
- Liver cancer
- Gallbladder issues



Treatments

A - typically resolves on its own with bed rest

B - treated with antiviral medications

Education

1. Small **frequent meals** to prevent nausea
 - **Low Protein** (all liver disease)
 - Low fat foods (until nausea subsides)
2. Frequent **rest periods**
3. Protected sex!
4. **AVOID** drinking alcohol / Acetaminophen (tylenol)
5. **AVOID** sharing shaving razors, toothbrushes



Saunders

The nurse is teaching the client with **viral hepatitis** ... this disease is characterized by which **specific assessment findings**? Select all that apply.

- Jaundice
- Clay-colored stools
- **Elevated bilirubin** levels
- Dark or tea-colored urine

Saunders

The nurse should incorporate which **dietary plan** to ensure optimal nutrition... during the acute phase of **hepatitis**? Select all that apply.

- Consume multiple **small meals throughout the day**
- Allow the client to **select foods** that are **most appealing**
- **Eliminate fatty foods** from the meal trays until nausea subsides

Common NCLEX Question

Modes of transmission for hepatitis C? Select all that apply.

- 1. Blood
- 2. Contaminated water
- 3. Fecal oral
- 4. Semen
- 5. Vaginal secretions

Common NCLEX Question

A client is admitted with **hepatitis** and complains of constant **itching**. What **interventions** would the nurse recommend? SATA

- 1. **Apply a moisturizer**
- 2. **Avoid the sun**
- 3. **Apply a cold compress**
- 4. Apply a hot pad

Common NCLEX Question

A client has **hepatitis** ... What advice should the nurse include regarding **personal living**?

- Do not share** personal care products



Pancreatitis

Med Surg: GI - Gastrointestinal

Pathophysiology

Inflammation within the pancreas that happens when enzymes begin to digest the pancreas (autodigestion)

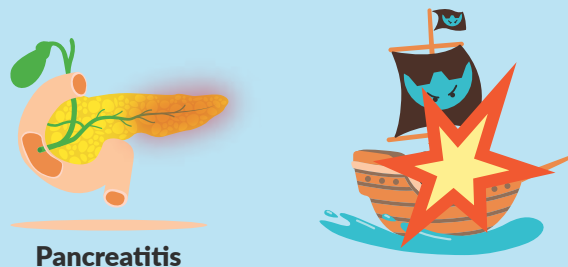
Functions of the Pancreas

- Exocrine: Produce Digestive enzymes
- Endocrine: Secrete Insulin & Glucagon



3 enzymes

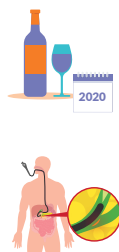
- Protease - protein
- Lipase - fat
- Amylase - carbs



Pancreatitis

Causes

- Alcohol abuse
- Gallbladder disease
- Cystic fibrosis
- ERCP procedure
endoscopic retrograde cholangiopancreatography



Common NCLEX Question

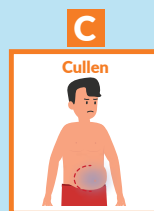
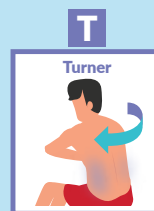
Which client should the nurse assess first?

- ✓ Epigastric pain after endoscopic retrograde cholangiopancreatography (ERCP)

Signs & Symptoms

PAIN NCLEX TIP

- Epigastric pain
- LUQ pain "radiates to the back"



Bruising

- Turner's sign
- Cullen's sign



Saunders

A client admitted to the hospital ... Which assessment findings would be consistent with acute pancreatitis? Select all that apply.

- Gray-blue color at the flank
- Abdominal guarding and tenderness
- Left upper quadrant pain that radiates to the back

Diagnostics

LABS

- Elevated enzymes
 - Amylase
 - Lipase
- Elevated Glucose "Hyperglycemia"
- Elevated WBC (over 10,000)
 - Fever
- Elevated Coagulation Time
 - PT & aPTT
- Elevated bilirubin



Interventions

- NPO
- Insert a nasogastric tube (NGT) for suction
- IV pain meds hydromorphone
 - NO morphine
- IV fluids
- Monitor glucose
 - Hyperglycemia = Insulin
- Pharm:
 - Antacids
 - Proton Pump Inhibitors Pantoprazole
 - H2 Blockers famotidine



Diet

- LOW fat & LOW sugars
- Enzymes with meals



Common NCLEX Question

After performing a physical assessment and obtaining vital signs for a client with acute pancreatitis, which nursing intervention is the priority?

- ✓ IV fluids and pain control

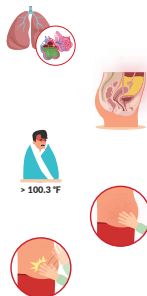


Complication

ARDS (Acute respiratory distress syndrome)

Peritonitis NCLEX TIP

- Report to HCP!
- Fever (over 100.3F)
 - Rebound tenderness
 - "Rigid" or "board-like abdomen"
 - Increasing Pain, tenderness
 - Restless
 - Fast HR & RR (tachycardia / tachypnea)



HESI

Which food would be most appropriate for a patient who recently had a bout of acute pancreatitis? Select all that apply.

- Fried chicken
- Potato chips
- ✓ Grilled chicken and a baked potato
- ✓ Reduced fat cheese and whole wheat crackers
- Whole milk with cookies

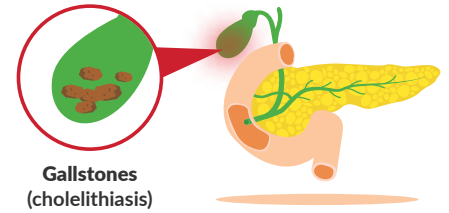


Cholecystitis

Med Surg: GI - Gastrointestinal

Patho & Causes

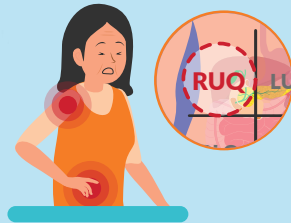
Inflammation of the gallbladder. Typically caused by gallstones also called cholelithiasis that block the ducts leading out of the gallbladder resulting in a backup of bile which causes inflammation.



Signs & Symptoms

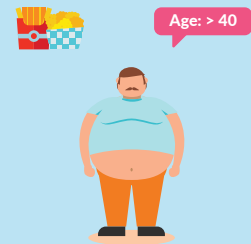
Highly tested

1. **RUQ pain** "radiates to the **RIGHT** shoulder"
2. **Fever** with chills
3. Tachycardia



Risk factors

- High fat diet
- Obesity
- Age over 40



Priority Intervention

Nothing per oral - NO eating or drinking since eating can cause more pain & complications



Treatment

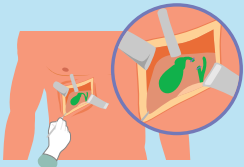
Lithotripsy - shock waves to break up the stones but if the stones are too large then we can do surgery



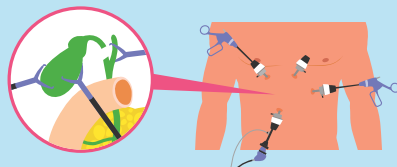
Surgery

Cholecystectomy - surgical removal of the gallbladder.

Open cholecystectomy



Laparoscopic cholecystectomy



HESI Question

Following a laparoscopic **cholecystectomy** ... which instructions would the nurse include?

Select all that apply.

- Take a **shower**
- Wait **1 week** after surgery before returning to work
- **Notify** the surgeon of any **redness/swelling** at the **incision sites**

Kaplan Question

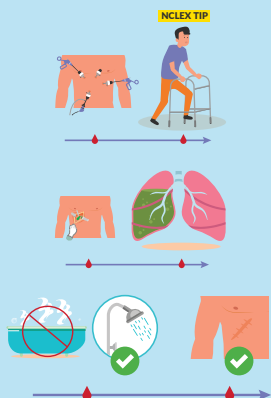
Priority action for a client scheduled for an open **cholecystectomy**:

- Demonstrate ways to **deep breath and cough**



Post Operative

- Assist with **early ambulation** **NCLEX TIP**
- Prevent Pneumonia
 - **Deep breath & Cough**
- Prevent infection **NCLEX TIP**
 - **NO baths** - shower **ONLY**
 - Report **redness/swelling** at incision site



Patient Education

- Lose Weight
- Avoid fatty fried foods



HESI Question

A nurse caring for a patient who recently had the **gallbladder removed** knows the patient will have **difficulties digesting** large amounts of which type of nutrients?

- **Fats**



Fats

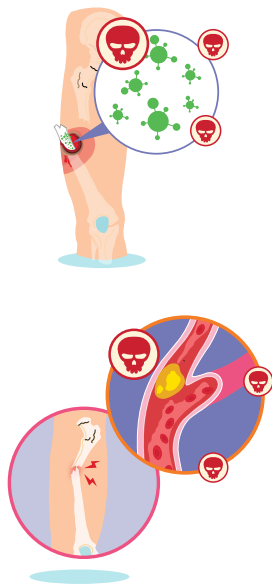
Musculoskeletal

Fractures

Med Surg: Musculoskeletal

Types of Fractures

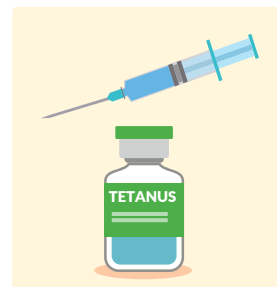
- Closed Fracture:
 - Does not break skin
- Open Fracture "Compound"
 - Skin surface broken
- Complete fracture
- Incomplete fracture "GreenStick"
- Spiral fracture
- Oblique fracture
- Compression fracture "Impact"
- Crush "Compression" fracture



Saunders

The nurse ... is **assessing** a client with an **open leg fracture**. The nurse should inquire about the last time the client had which done?

- Tetanus vaccine



Causes & Risks

- Bed rest
- Osteoporosis
- Steroids "-sone" **NCLEX TIP**
 - Prednisone
- Trauma



HESI

A nurse is caring for a patient on **bed rest**. Which long-term effect of bed rest on the **musculoskeletal system** would concern the nurse the most? **Select all the apply**

- Bone fracture
- Loss of muscle tone and atrophy

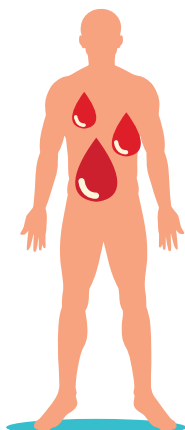


Signs & Symptoms

- Pain & swelling (bruising)
- Crepitus
- Muscle spasms

Priority Findings: NCLEX TIP
Internal bleeding

- Hypotension
- Tachycardia
- Hematuria



Basilar skull fracture

CSF "**cerebrospinal fluid**" (rhinorrhea)

- Clear liquid drainage: **nose area**

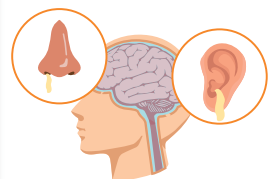
Spine fracture (T-6 or higher)

Neurogenic shock

- Hypotension
- **Bradycardia**
- Skin: pink & dry

Mandibular Fracture

- Bleeding & drooling from the mouth
- **Suction the mouth**



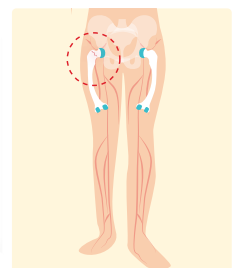
HESI

Pelvic fracture... which is the most **serious physical assessment finding** for the nurse to **report**?

- **Hypotension**, tachycardia, and hematuria

Hip Fracture **NCLEX TIP**

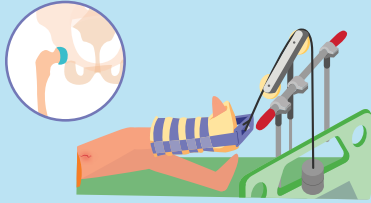
- **Shortening** of leg on the **affected area**
- **Muscle spasm** around the affected area
- **Ecchymosis** on thigh and hip
- **Groin & hip pain** when weight bearing



Buck's Traction & Postoperative Care

Med Surg: Musculoskeletal

Buck's Traction



Used short term before surgery to **realign hip & femur fractures**, and to stop muscle spasms. This device pulls bones back into place with free hanging weights.

KEY POINTS

- **Weights: free hanging at all times**
- **Traction ropes TIGHT!**
 - **NOT loose**
 - **NOT resting** "on bed or floor"
 - Reposition: hold weights
- Keep limb in **neutral position**
- Assess for **skin breakdown**
- **Neuro checks** on limb: P,M,S,C
- **Supine position (flat) NCLEX TIP**
 - **DO NOT elevate HOB** Over 25 degrees

KAPLAN

The nurse provides care for the client in **Buck's traction**. Which is the **most important nursing action** to maintain effective traction?

- Allow weights to **hang freely** at all times

Saunders

Q1: Skin traction... The nurse should monitor which **priority finding** in this client?

- Signs of **skin breakdown**

Q2: A client has Buck's extension traction applied to the right leg. Which intervention should the nurse plan to **prevent complications** of the device?

- **Traction ropes rest** against the footboard

Q3: Client in traction ... The nurse ... should include which **action** in the plan?

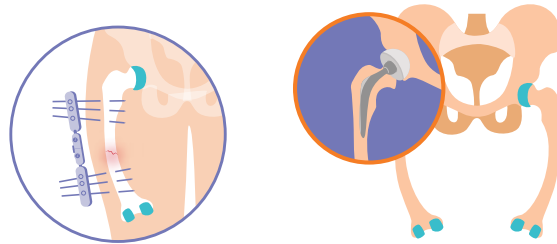
- Check the **weights** to ensure that they are **off the floor**

Hip Replacement Postoperative Care

KEY WORDS

Hip & Femur Surgery

- **Total hip** replacement
- **ORIF** "open reduction internal fixation"
- External fixation



PRIORITIZE the order

1. Bleeding
2. Infection
3. Positioning Education

Hemoglobin

Normal 12 - 18

Risky 8 - 11

Below 7

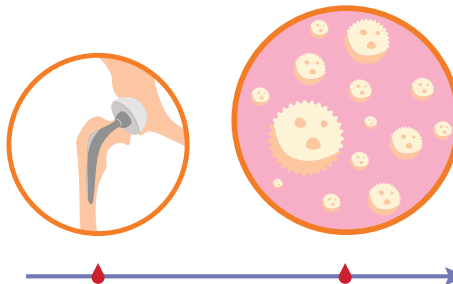
1. Bleeding NCLEX TIP

- Hemoglobin **Less than 7** = HEAVEN Report to HCP!!
- Monitor **pulses** distal to injury
- Hypotension & tachycardia

2. Infection

- **Elevated WBC NCLEX TIP** (norm: 5,000 - 10,000)
- Assess drainage: **color, amount & odor**
- Perform pin care with a **sterile solution**
 - **3 times per day**

WBC 17,000



Positioning Education

- **Total hip arthroplasty: NCLEX TIP**
- **Abducted legs:** Place a pillow between the legs **Kaplan**
- **NO** crossing legs
- **NO** leaning forward (**NO tying shoes**)
- **NO** sitting in chairs (**90 degree angle**)



Saunders

... after **internal fixation** of a fractured **right hip** ... which **method to reposition** the client?

- A pillow to keep the right leg **abducted** during turning

KAPLAN

A nurse is caring for a client who is postoperative **total hip arthroplasty**. Which of the following **laboratory values** should the nurse **report to the provider**?

- **HgB 8 g/dL**

HESI

Which **interventions** will the nurse include in **postoperative** nursing care for a patient who has undergone a **hip fracture repair**?

- **Wound assessment** with special attention to **pain** and to **color, amount, and odor of exudate**.

Saunders

Skeletal traction ... When **evaluating the pin sites**, the nurse would be **most concerned** with which finding?

- **Thick, yellow drainage** from the pin sites

KAPLAN

Total hip arthroplasty ... Following surgery, it is **most important** to place the patient in which **position**?

- **Abducted** with toes pointing upward

HESI

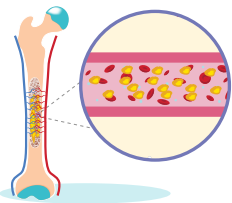
The nurse is providing care for an elderly patient who has an **internal fixation device after surgery** for a **hip fracture**. Which interventions should the nurse implement while providing care for this patient? **Select all that apply.**

- Turn the patient **every 2 hours**
- Provide **assistive devices** for walking, such as a walker
- Instruct the patient **not to cross legs**
- **Elevate the head** of the bed to 45-degrees

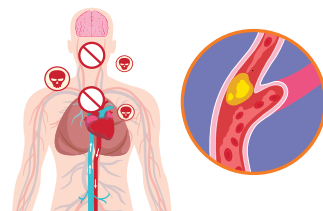
Fat Embolism Syndrome & Osteomyelitis

Med Surg: Musculoskeletal

Fat Embolism - Pathophysiology



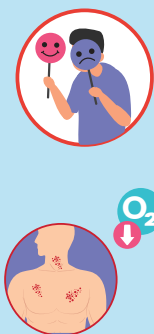
Fat Embolism Syndrome is a major complication with **crushing fractures & long bone injuries** (femur, pelvic & hip fractures). The bones release **fat globules** into the bloodstream & just like a blood clot, this fat emboli could cause a **deadly** blockage in the brain (CVA), heart (MI), or lung.



Signs & Symptoms

KEY SIGNS

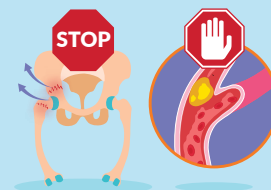
- **Mental Status** changes **NCLEX TIP**
 1. Confusion and restlessness
 2. Altered mental status
- Dyspnea & **chest pain**
- Low pulse ox
- **Petechiae** over neck & chest



Intervention

- Minimize movement of the fracture

#1 MOST TESTED



KAPLAN

An older adult client is diagnosed with a **fractured femur**. The nurse recognizes which observation is an **early sign of fat embolism**?

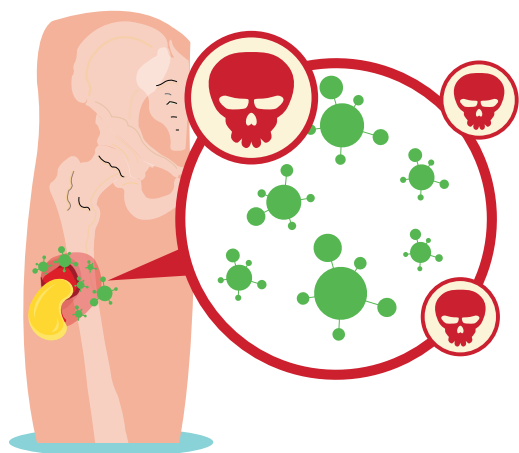
- Altered mental status

Saunders

.. the **most** favorable indication of resolution of the **fat embolism**?

- Clear mentation

Osteomyelitis - Pathophysiology



Bone infection, caused by a bacteria that enters the blood via:

- Open fracture
- After surgery
- Puncture wound like a dog bite
- Contaminated needles like with a bone marrow aspiration.

Signs & Symptoms:

high fever, pain & even pus or yellow drainage from a puncture site.

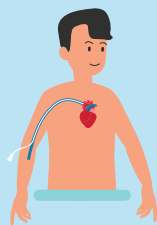
Kaplan Question

Several days following a bone marrow aspiration, the nurse notes a client has a **temperature of 103° F (39.5° C)**, and there is **yellow drainage** from the aspiration site. Which interpretation by the nurse is most accurate?

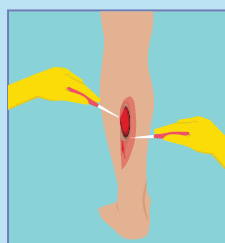
- The client has developed **osteomyelitis**

Osteomyelitis - Treatment

IV antibiotics for weeks or months, so clients will go home with a **PICC line** & a nurse will visit to give the IV antibiotics.



Surgical debridement to drain any abscesses & to remove necrotic dead bone tissue.



Amputation may be done if not responsive to therapy.



Cast Care & Complications

Med Surg: Musculoskeletal

CAST CARE

- C** - Clean & Dry **NEVER WET**
 - Cover cast with a **plastic bag** for bathing **NCLEX TIP**
- A** - Above the heart (First 48 hours)
 - **Elevate** extremity **NCLEX TIP**
- S** - Scratch an itch?
 - Use the **hairdryer** on a **cool setting** **NCLEX TIP**
- T** - Take it easy
 - **NO bearing weight** on plaster casts
 - **NO finger indentations** or pressure
 - **NO hard surfaces**



Saunders

Which cast care instructions ... plaster cast applied to the right forearm? Select all that apply.

- Keep the cast clean and dry
- Allow the cast 24 to 72 hours to dry
- Keep the cast and extremity elevated

Itching under the cast... client statement indicates an understanding of appropriate measures?

- "I can use a hair dryer on the low setting and allow the cool air to blow into the cast."

Kaplan Question

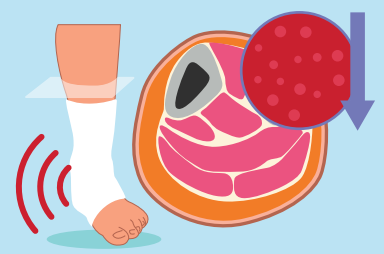
Newly applied plaster cast to the lower extremity. The nurse takes which action?

- **Elevates the leg on pillows and leaves the cast open to air**

CAST CARE Complications

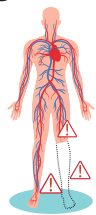
Key terms

- **HOT spots:** infection
- **Compartment syndrome:** decreased perfusion



Compartment Syndrome

Extremely painful condition that happens when pressure within the muscles builds to dangerous levels - **cutting off blood flow & oxygen** resulting in a dead limb



PAIN

- **Unrelieved with morphine** **NCLEX TIP**
- **Not resolving** with medication
- Extreme pain with passive movement

Paresthesia

- "tingling" "burning" "numbness" **NCLEX TIP**
- **Problems moving or extending** fingers or toes.
- "Great difficulty"

Key Signs

P

Pain



P

Paresthesia



Interventions

- **Notify HCP** immediately
 - **Assess fingers & toes "neuro checks"**
- P M S C**
- P** - Pulses - **NOT** pulseless
 - M** - Movement - grips
 - S** - Sensation
 - **NO tingling, numbness**
 - C** - Cap refill & Color
 - **NOT** over 3 seconds
 - **NOT** pale "pallor"
- Temperature
- **NOT** cold or cool

Kaplan Question

A nurse is assessing a client for compartment syndrome who has a short leg cast. Which would the nurse identify as a finding of this condition?

- **Pain that increases with passive movement**

Saunders

Suspected impairment ... of the client's casted extremity if which findings are noted? Select all that apply.

- Client reports **severe, deep, unrelenting pain**
- Client reports **pain** as nurse assesses **finger movement**
- Client reports **numbness and tingling sensation in the fingers**

Saunders

Plaster cast placed on the lower extremity .. which instructions should be given to the client?

- **Notify the HCP** immediately for **numbness or swelling** or if the foot becomes **cold and pale**.

To assess for signs of compartment syndrome, the nurse should perform which action?

- **Assess capillary refill, temperature, color, and amount of pain**

Hot Spots

- "Hot areas" "Hot Feeling" "Foul odors" **Report HCP NCLEX TIP**
- Interventions:
 - Assess circulation in extremity
 - Change position

Key terms



Kaplan Question

Three hours after arriving in the orthopedic unit, a client reports a hot feeling under the cast. Which action does the nurse take first?

- **Assess the circulation** in the casted extremity and change the client's position



Saunders

The nurse is assessing the casted extremity of a client. Which sign is indicative of infection?

- Presence of a "hot spot" on the cast

Crutch & Cane Training

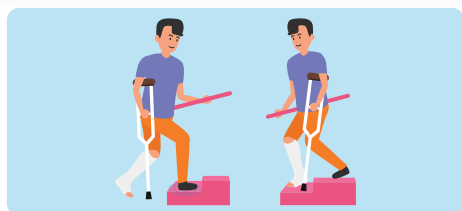
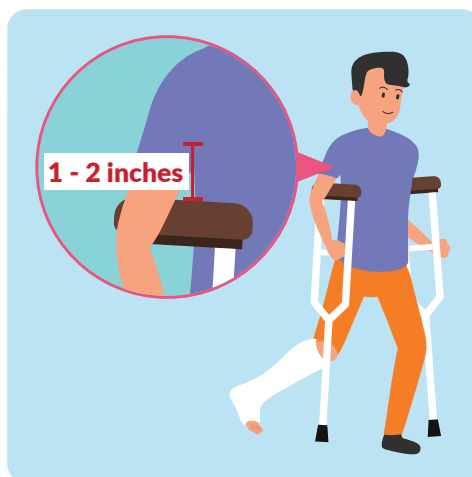
Med Surg: Musculoskeletal

Crutch

Safe Crutch Use

- Weight on Hands & Arms** **NCLEX TIP**
 - **NOT** armpits! = Injury to the brachial plexus nerves
 - **DO NOT** use someone else's crutches
- Technique Gait
 - Step 1: **Both crutches** forward **WITH** injured leg
 - Step 2: Move **unaffected leg** forward
- Stairs **NCLEX TIP**

UP with the **GOOD** = Upstairs
Down with the **Bad** = Downstairs



3 types of gaits

- 2-point gait
- 3-point gait
- **4-point gait:** most advanced gait **NCLEX TIP** "most closely resembles normal walking"

Saunders

"Why the crutches **cannot rest up underneath the arm**" ... The nurse responds knowing which would most likely result .. ?

- Injury to the brachial plexus nerves

Use of crutches... which would indicate that the client understands how to perform this type of gait?

- The client moves **both crutches forward**, along with the **affected leg**, and then moves the unaffected leg forward

Going down the stairs with the crutches ... How should the nurse demonstrate this technique?

- Crutches and the **affected leg** **down** (**BAD**), followed by the **unaffected leg** (**GOOD**)

Kaplan Question

Crutches while climbing stairs... Correct sequence?

1. Place **body weight** on crutches
2. Advance the **unaffected leg** (**GOOD**) onto the stair
3. Shift weight from crutches to **unaffected leg** (**GOOD**)
4. Bring the crutches and the **affected leg** (**BAD**) up to the stair



Cane



Correct Cane Use

1. **Stronger side** HOLDS the cane
2. Move cane **1st** & weaker leg **2nd**

Memory Trick

- C** - Cane
- C** - Comes **1st**

Stairs **NCLEX TIP**

Memory Trick:

- UP** with the **GOOD** leg
- Down** with the **BAD** Leg



UPstairs

1. UP with **Strong leg**
2. Cane moves next
3. Weak leg last

Downstairs

1. **Descend** with Cane
2. Weaker **leg down**
3. Strong leg

Top Missed NCLEX Question

Client with a right total knee replacement ... correct teaching?

Memory Trick:

- **UP** with the **GOOD** leg
- **Down** with the **BAD** Leg
- Cane on **strong** side

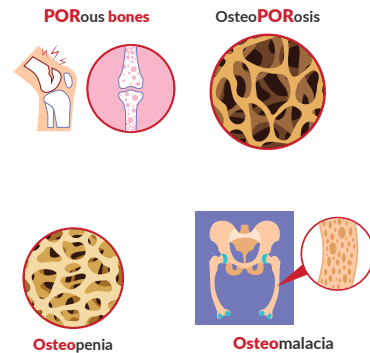
1. Full weight on the right leg when going up stairs.
2. Descend with cane first, strong leg second, and weak leg last when going downstairs.
3. When going upstairs lead with the **left leg first**, follow next with the **cane** and move the **right leg** after.
4. Hold cane in the right hand while on stairs.



Osteoporosis

Pathophysiology

Fragile and porous bones. Loss in bone mass resulting in low bone density & very brittle bones. Typically from increased rate of bone resorption where bone loss is increased.



KEY Conditions

- Osteopenia
- Osteomalacia

Osteopenia - loss of bone mass & weaker bones
Osteomalacia - softening of the bones caused by severe vit D deficiency

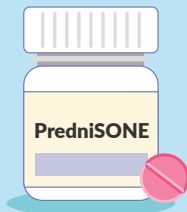
Causes & Risk Factors

- Female
 - Older age
 - Postmenopausal **NCLEX TIP**
 - Caucasian & Asian
- **Bad Habits:**
 - Excess caffeine intake
 - Smoking or alcohol abuse
- **Medication:**
 - Anticonvulsants
 - Steroid "-sone" **NCLEX TIP**
 - Prednisone
- **Diseases:**
 - Hyperparathyroidism **NCLEX TIP**
 - Cushing Syndrome
 - Diabetes Mellitus

Kaplan Question

Teaching about **osteoporosis** prevention. The nurse should instruct the client that which of the following **medications** can increase their **risk** for the development of **osteoporosis**?

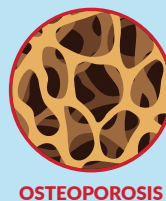
- Prednisone



HESI Question

Which disease has an increased chance of occurrence in a **60-year-old postmenopausal** patient?

- Osteoporosis



OSTEOPOROSIS

HESI Question

Which are the **risk factors** for **osteoporosis**?

Select all that apply.

- Steroid use
- High intake of caffeine
- Being a **white** or **Asian**
- Postmenopausal state
- Anticonvulsant therapy for seizure disorders

Signs & Symptoms

- Porous bones in the osteoporosis
- Frequent fractures
- Reduced height
- Kyphosis - exaggerated round back (often seen in elderly population)

Pharmacology



- Calcium & Vit. D
- Alendronate



Treatment & Education

Vit D & Calcium supplements

- Go outside in the sun

Activity

- **Weight bearing** exercises
- **Frequent** ambulation

Fall precautions

- Provide **rubber mats** in showers
- Well-lit halls
- **NO** throw rugs

STOP bad habits

- Stop smoking
- Decrease caffeine

Kaplan Question

A nurse is providing **education** for a client who is at **risk for osteoporosis**. Which of the following **instructions** should the nurse include?

- **Walk** for 30 minutes 4 times per week



HESI Question

Which **interventions** should the nurse implement while providing care for an elderly female patient with **osteoporosis**?

Select all that apply.

- Encourage frequent **ambulation**
- Provide **rubber mats** in showers
- Encourage **weight-bearing exercises**
- Encourage the patient to **stop smoking**

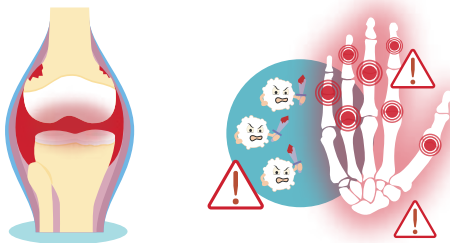


Rheumatoid Arthritis (RA)

Med Surg: Musculoskeletal

Pathophysiology

RA is an **autoimmune disorder** where the body attacks the **joints causing major inflammation & deformity**. Mainly seen in the hand joints, but can also involve other organs (skin, eyes, & lungs) with collateral damage as the body attacks itself.



HESI Question

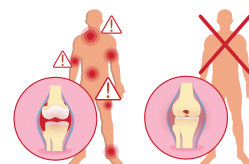
A patient with **rheumatoid arthritis** asks the nurse about her condition. On which knowledge does the nurse base **patient teaching**?

- **Rheumatoid arthritis** is thought to be an **autoimmune disorder**.

Kaplan Question

A client asks the nurse, "What is the **difference between rheumatoid arthritis and osteoarthritis**?" Which response by the nurse is **best**?

- **Rheumatoid arthritis** is a **systemic disease** and osteoarthritis is not



Diagnostics

- Synovial fluid aspiration
- **Arthroscopy**
- Blood tests:
 - **RF - Rheumatoid factor**
 - **ESR - erythrocyte sedimentation rate**
 - **CRP - C-reactive protein**



HESI Questions

A patient arrives at the clinic with **left knee pain** that began 1 month ago. The X-ray examination and magnetic resonance imaging (MRI) were inconclusive. The nurse anticipates which **procedure** will occur next?

- **Arthroscopy**

Which tests ... performed to confirm **rheumatoid arthritis (RA)** and **rule out** other diseases? **Select all that apply.**

- Synovial fluid aspiration
- Rheumatoid factor (RF)
- Erythrocyte sedimentation rate (ESR)

Signs & Symptoms

Early Signs

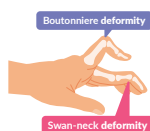
- Fatigue, anorexia (weight loss) & **morning joint stiffness**

Symmetrical **pain** and **swelling** in the **small joints of the hands**

- Fingers: **swan-neck** and a **boutonniere deformity**
- Contractures of joints = **HIGH priority**

Joint pain **NCLEX TIP**

- Pain relief with **activity**
- **MORE** pain at rest



HIGH PRIORITY



SAUNDERS Question

Suspected **rheumatoid arthritis (RA)**. The nurse would expect to note which **early signs and symptoms**?

Select all that apply.

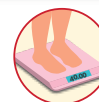
- Fatigue
- Morning stiffness



SAUNDERS Question

Assessment on a client with ... **rheumatoid arthritis (RA)**. The nurse checks for which assessment finding that is associated with RA?

- **Systemic symptoms** such as fatigue, anorexia, and weight loss.



Education

- Pain control - **Assess pain levels**
- **Do NOT elevate** the knees with pillows at night
- Exercise (low impact)
 - **Swimming** **NCLEX TIP**
- **Heat & Cold** to affected joints
 - **Warm shower or bath before bed**



Kaplan Questions

A nurse is assessing a client who has a **diagnosis of rheumatoid arthritis**. Which of the following nonpharmacological **interventions** could the nurse suggest to help reduce pain?

- Alternate **applying heat and cold** to the affected joints.

Which nursing **intervention** is most appropriate for a client diagnosed with **rheumatoid arthritis** and reporting generalized pain?

- Assist the client with **heat application and range of motion exercises**.



Pharmacology

- NSAIDs
- Steroids "**-sone**"
 - **Prednisone**
- Methotrexate



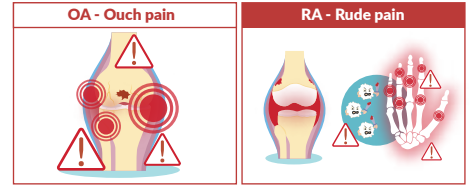
Osteoarthritis (OA) & Total Knee Replacement

Med Surg: Musculoskeletal

OsteoArthritis

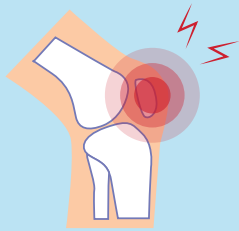
This is progressive degeneration of the protective cartilage cushion on the end of the bones resulting in BONE on BONE rubbing - massive pain.

Memory Trick



Causes & Risk Factors

- **Obese**
- **Smoking**
- **Repetitive** stress on the joints



Pharmacology

- NSAIDs
- Steroids “-sone”
 - Predn**isone**
- Glucosamine

MOST tested



Signs & Symptoms

- **Creptus** “crunch sound”
- **Pain** **NCLEX TIP**
 - **MORE** with activity
 - **Relief** with rest

SAUNDERS Question

Client with **osteoarthritis**... which clinical manifestations are associated with the disorder? **Select all that apply.**

- Joint pain that **diminishes after rest**
- Joint pain that **intensifies with activity**

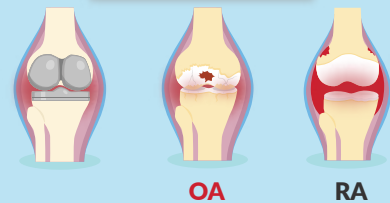
Joints

- Affects **one joint** (usually large joints)
- Node formation
 - Heberden's nodes
 - Bouchard's nodes

Total Knee Replacement

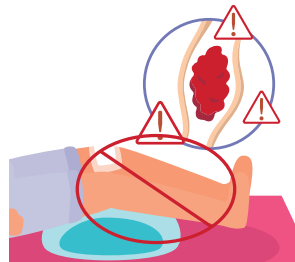
Common surgical interventions for both RA & OA. Also called a **total knee arthroplasty**, it is a surgical procedure to replace the knee joint.

Total knee arthroplasty



Postop care

- **NEVER** place a **support pillow under** a new operative knee **NCLEX TIP**
- **Early weight bearing** & **flexing** the foot every hour



Kaplan Question

A nurse is providing **teaching** for a client who had a **total knee arthroplasty**. Which of the following instructions should the nurse include?

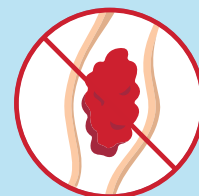
- **Flex** the foot every hour when awake



Clot Prevention

Heparin & Warfarin - prevent blood clots

Key Term: Start both at the same time in the hospital, since Heparin works in a hurry & Warfarin has a weak start, taking a few days to catch up.

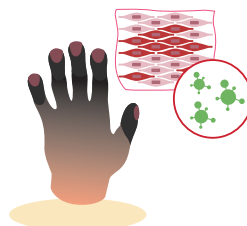
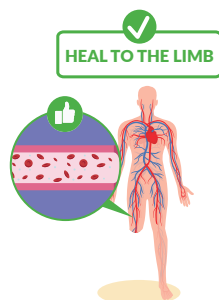


Amputations

Med Surg: Musculoskeletal

Amputations are when we cut off an extremity. Very common with clients who have diabetes & get bad infections from sugary blood. The most tested type of amputation is a **below the knee amputation**, since it results in better circulation & healing to the limb.

The Most Tested



KAPLAN

Client type 1 diabetes ... **right below-the-knee amputation** due to gangrenous toes. The client asks the nurse why the amputation is so extensive... nurse's **response** is based on which **understanding**?

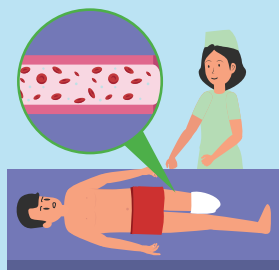
- A below-the-knee amputation results in **better circulation and healing**



Stump Care (Residual Limb Care)

After Surgery

- Do **NOT** elevate limb **NCLEX TIP**
- Keep limb in **dependent position**
- Phantom limb pain



KAPLAN

Immediately following a **right below-the-knee amputation**... the nurse is **most concerned** when **which observation** is made?

The client reports **persistent pain at the operative site**



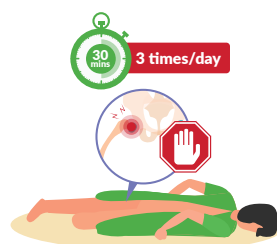
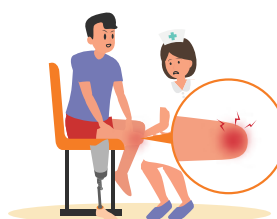
Discharge Teaching

Residual limb **Daily Care** **NCLEX TIPS**

- Assess: **redness & irritation**
- **Wash limb** every day w/ **soap & water**
- **Expose to air**

Lay on stomach "Prone" **NCLEX TIPS**

- **30 min. x 3 times** per day
- Push stump into the bed
- Limb socks & wraps:
 - **Clean & Dry**



KAPLAN

Q1: The nurse **evaluates** care given to a client after a **left below-the-knee amputation**. The nurse **intervenes** if which observation is made?

- The **dressing** to the surgical site is dated **two days prior**

Q2: The nurse teaches a client with a **below-the-knee amputation** to care for the **residual limb** at home. The nurse advises the client to take which action?

- Expose the **residual limb to air**

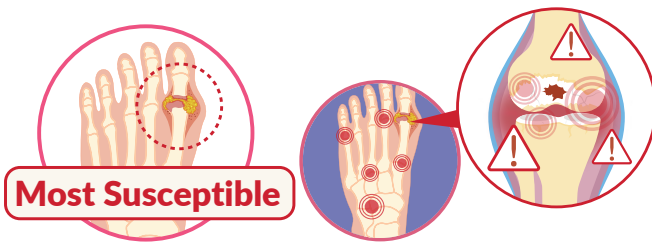
Notes

GOUT

Med Surg: Musculoskeletal

Pathophysiology

Uric acid accumulation causes **pain & inflammation in the joints** which leads to destruction & eventually arthritis (bone on bone pain from loss of cartilage).



Causes & Risk Factors

High **purine** foods

- **Meats:** chicken, steak, liver
- **Alcohol:** Wine, beer, liquor
- **Seafood:** crabs, lobster, shrimp



Signs & Symptoms

KAPLAN

A client experiences an acute bout of **gouty arthritis**. The nurse expects the client's affected foot to have which appearance?

- Red



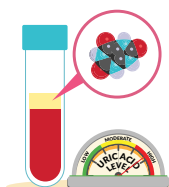
Diagnostics

- **Labs:** Serum Uric Acid Levels

HESI

Pain and swelling of the **right great toe**... Which **test** will the nurse expect the primary care provider to order?

- Serum uric acid levels



Treatments

Prevent Gout **NCLEX TIPS**

- **Lose** weight: "achieve healthy **weight**"
- **AVOID** high purine foods!
 - Meats, Alcohol, Seafood
- **INCREASE** fluid intake
- Monitor fluid I & O

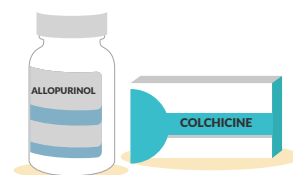
HESI

Which **interventions** should the nurse implement .. for a patient with gout? **Select all that apply.**

- Increase the patient's **fluid intake.**
- Document the patient's **fluid intake and output.**
- Observe for **medication side effects.**

Pharmacology

Allopurinol & Colchicine



BIG KEY DIFFERENCE

Allo**P**urinol Prevents Gout Colchicine **A**Cute Gout Attacks

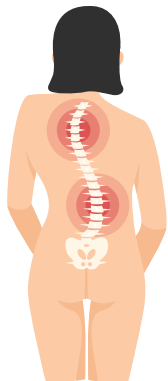


Notes

Scoliosis

Med Surg: Musculoskeletal

Pathophysiology



- **S** - Scoliosis
- **S** - "S" shaped Spine
"lateral curvature" **NCLEX TIP**

Signs & Symptoms

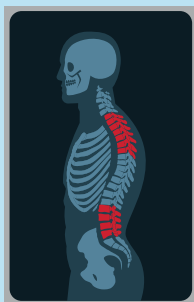
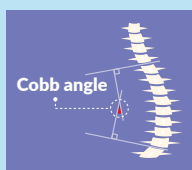
NCLEX TIP

First noticed during **periods of rapid growth** especially in **adolescent females** **ages 10-12**

Mild to severe pain & the stiffened spine can make it hard to move. Severe cases can cause a deformity of the chest cavity.

Diagnosis

Measuring the **Cobb angle** can determine the extent of the deformity & X-rays can be taken as well.



Treatment

- Social interaction
 - **Visit friends** **NCLEX TIP**
- Fixing braces: **Boston Brace**
 - Wear a **cotton shirt under the brace** at all times **NCLEX TIP**



Causes & Risk Factors



Thought to be from a possible defect of intervertebral discs (the squishy shock absorbers between the spine).

Risk factors: often seen in clients with cerebral palsy, muscular dystrophy, & even **Marfan Syndrome**.

Marfan syndrome

- **Avoid** participating in contact sports **NCLEX TIP**

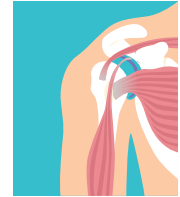
Notes

Rotator Cuff Injury

Med Surg: Musculoskeletal

Pathophysiology

The rotator cuff helps the arms move around & rotate.
When 1 of the 4 tendons in the arm is violently stretched or torn resulting in **shoulder pain with arm abduction or rotation**



Signs & Symptoms

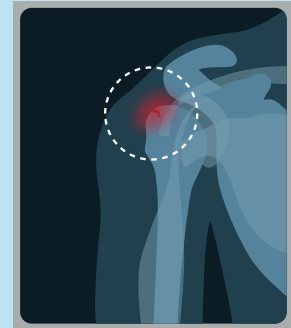
Shoulder pain with **arm abduction or rotation** **NCLEX TIP**



Ab-duction

Diagnostics

X-ray or MRI can be done to identify abnormal bone spurs or narrowed space between the humerus and acromion, fancy words for arm bone & tip of the shoulder bone point here.



Causes

Severe cases: happen suddenly, like when lifting something heavy or falling on an outstretched arm.



Mild cases: chronic tears often seen in people that tend to repeat the same motion over and over, like baseball players, tennis players, & even swimmers.



Treatment

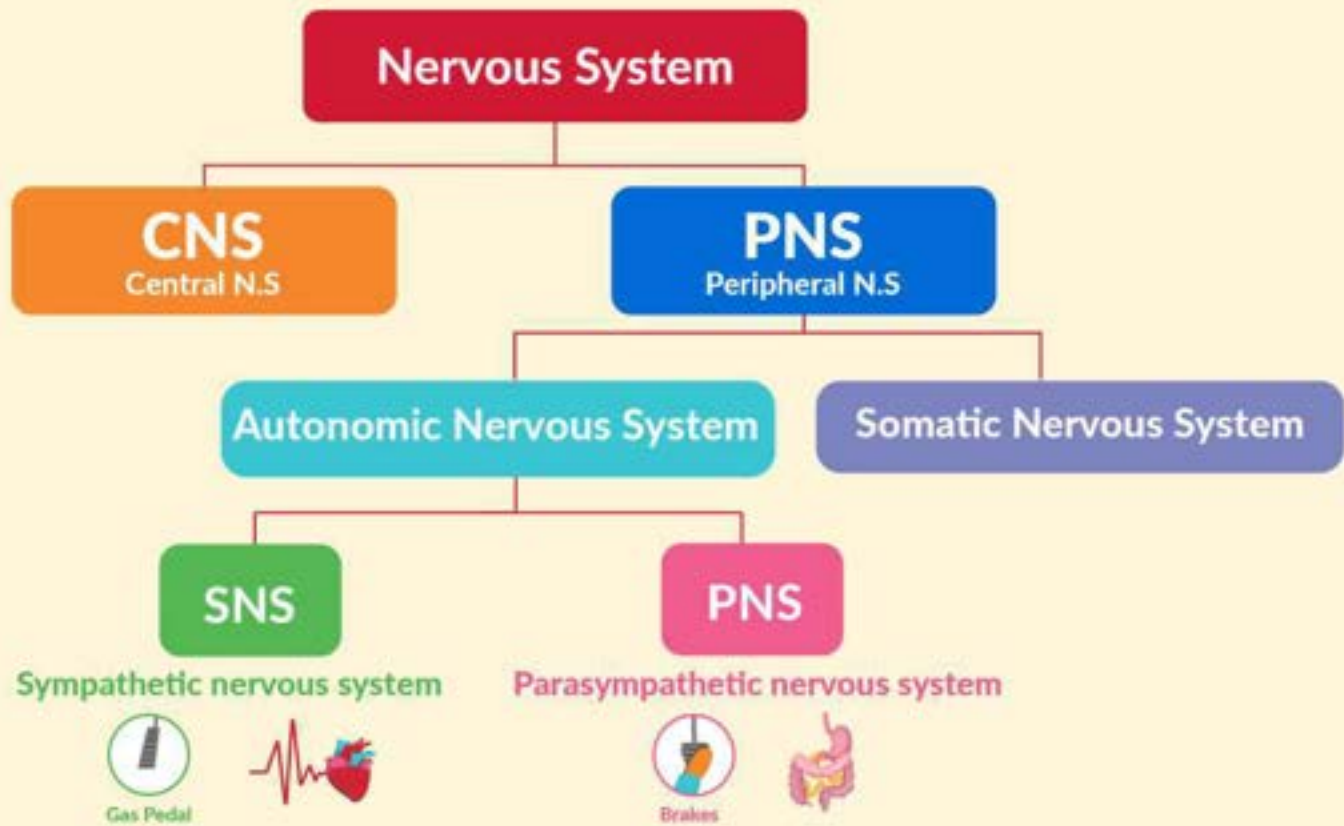


- R** Rest
- I** Ice
- C** Compress
- E** Elevate? **Sling instead**



Notes

Neurological



Nervous System

Central Nervous System:

- Controls main functions of mind and body
- Contains the spinal cord and brain

Peripheral Nervous System:

- Contain nerves coming from the brain, spinal cord to all network body parts
- **Somatic Nervous System:** Contains sensory (afferent) and motor (efferent) nerves to perform reflex actions
- **Autonomic Nervous system:** Part of Peripheral Nervous System that controls involuntary physical actions

Sympathetic Nervous System: Fight or Flight response

Memory Tricks

S - Stress nervous system (SNS kicks in during times of stress)
S - Speeds UP the Vital signs (HIGH heart rate & blood pressure)
in order to fight or flight in survival mode!

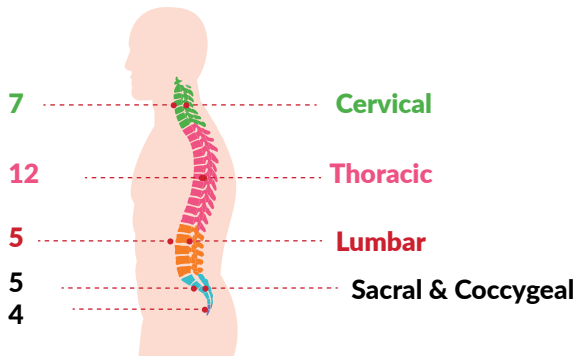
*Controls Catecholamines made in the adrenals (Epinephrine & Norepi)
These help to constrict the blood vessels to speed up the vitals*

Parasympathetic Nervous system: Rest & Digest

Memory Tricks

P - Puts the Brakes on the Vitals (Low heart rate & blood pressure)
P - Poop nervous system (PNS is used for times of rest & digesting food)
*Controls cholinergic effects, making more secretions in the body
Think cccholinergrics give more secccretions*

Spinal Cord Injury



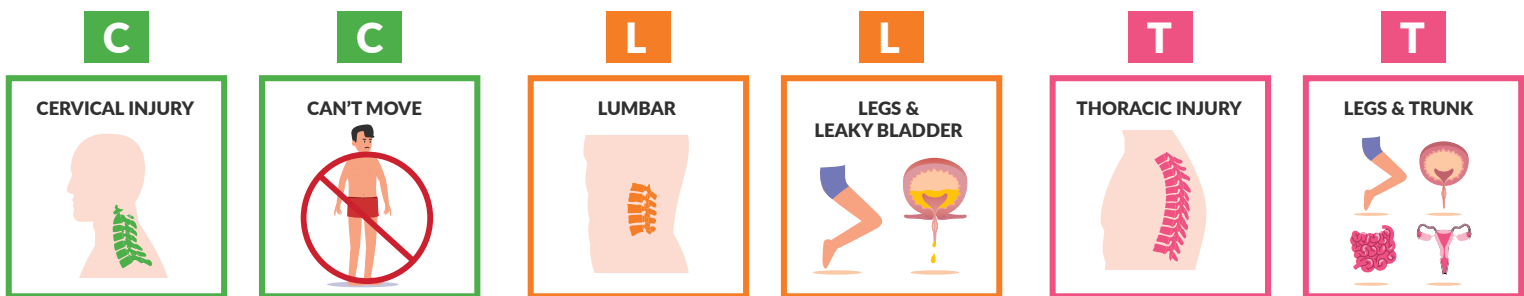
Signs & Symptoms

- **Cervical Injury:** paralysis below neck (level of injury)
 - Quadriplegia: 4 limbs paralyzed
Quad means 4
diplegia= sounds like paralyzed
- **BREATHING** impaired - Life threatening
Happens to a lot of sports figures
- **Thoracic Injury** - think T for trunk of body
Parapalegic (2 legs)
Legs, pelvic organs
- **Lumbar Injury** - think of double L's
Legs & Leaky bladder

Causes

- Trauma - like a fall from a horse, or slip & fall, car crash etc.

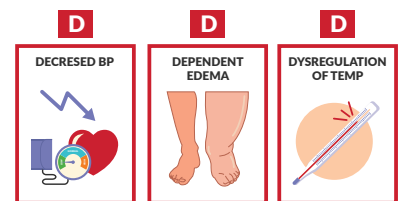
MEMORY TRICK



Critical Complications

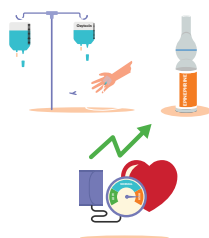
Neurogenic Shock think S for Severe hypotension (low BP)

- **3 Ds**
 - **D**ecreased BP
 - **D**ependent edema
 - **D**ysregulation of Temp.
- **Autonomic Dysreflexia**
 - Abnormal stimulation of the autonomic nervous system below the level of injury



PHARMACOLOGY

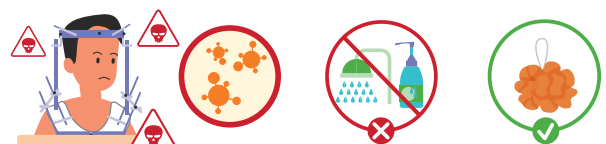
- **Neurogenic Shock**
 - IV Fluids & Vasopressors
Increase BP
- **Steroids "-sone"**
 - Dexamethasone
 - Prednisone
- **Muscle relaxers**



Surgery

Halo traction device (a crown or vest)

- Key priority is Infection risk!!!
- **NO** showers - **ONLY** sponge bath
- Assess pin **sites for infection**
- Red, warm, smelly drainage



Autonomic Dysreflexia

Pathophysiology

- Occurs with Spinal Cord Injury **ABOVE T-6** **NCLEX TIP**
Miscommunication of SNS & PNS in the **autonomic nervous system**. The SNS, speeds up the Vitals via vasoconstriction causing HIGH BP, and the PNS. Puts the brakes on the vitals via vasodilation causing LOW BP resulting in a HUGE risk for STROKE!

Causes

- Bladder** - "Full" "distended" **NCLEX TIP**
- Bowels - constipation
- Tight clothing



Signs & Symptoms

- Severe **hypertension** - Up to 300 systolic
- Throbbing headache**
- Bradycardia - low heart rate from PNS
- Facial flushing
- Nasal congestion



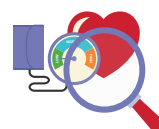
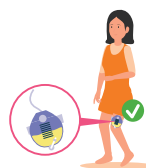
Key term: Spinal injury above T6 & HIGH BP - Think Autodysreflexia

Interventions

1. Notify the HCP

2. Correct the Cause

- Bladder assessment**
 - Palpate bladder **NCLEX TIP**
 - Bladder scanner
 - Check the Foley for Kinks **NCLEX TIP**
- Bowel Assessment**
- Remove** "Constrictive" Clothing **NCLEX TIP**
- Measure **Blood pressure** **NCLEX TIP**



KAPLAN Question

Client with **spinal cord injury** above level T3 reporting **headache** and nasal congestion, **profuse sweating** and **piloerection**.
FIRST action?

Answer: Check urinary catheter for kinks

KAPLAN

ATI

- Bradycardia** (Below 60 bpm)
- Piloerection (Goosebumps)
- Diaphoresis** above injury site

Top Missed NCLEX Question

Priority Patient?

Answer: Patient with **diaphoresis**, **hypertension**, **bradycardia** & history of **T-4 spinal injury**.

NCLEX Question

Initial action ... **cervical spine injury** with throbbing headache, nausea, & **elevated blood pressure**?

Answer: Palpate the bladder

Common NCLEX Question

Priority interventions ... **T-1 spinal cord injury** with **flushing**, **diaphoresis** & pulse of 58?
Select all that apply

Correct Options:

- Assess** for **bladder** distention
- Remove** **tight** clothing
- Measure blood pressure
- High Fowler's position

Correct the cause of symptoms FIRST!

Stroke "CVA"

Pathophysiology

Cerebral Vascular Accident (CVA) happens when the brain lacks oxygen resulting in long-term permanent damage. Typically resulting from a blood clot, narrowed blood vessels (arteriosclerosis) or a ruptured blood vessel (aneurysm).



Causes

#1 Hypertension (Over 140 sys) MOST TESTED

Most important to PREVENT a stroke:

- Take **Antihypertensive Meds** regularly

HESI Question

Highest risk for stroke
142/94 mmHg.

KAPLAN Question

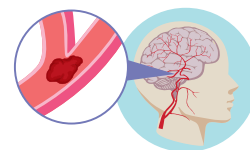
Hypertension =
highest risk factor for
CVA

Smoking: Scars the blood vessels making them weak
Hyperlipidemia (HIGH cholesterol) create narrowed blood vessels

Uncontrolled Diabetes: THICK sugar in the blood puts loads of pressure on the vessels

Types of Strokes

- **TIA - Transient Ischemic Attack** - tiny lack of oxygen
 - Transient: short time frame
 - Ischemic: Low oxygen
 - Attack: Happens suddenly ...TIAs come & go often resolving
- **CVA - Cerebral vascular accident** - no oxygen causing long-term damage!
 - **Ischemic CVA - Clot** = Low O2 (called embolic or thrombotic stroke)
 - **Hemorrhagic CVA** - Bleed = HIGH ICP (from an aneurysm)



Tricky NCLEX Question

For clients recovering from Stroke with **HIGH BP:**

Over 200 systolic **Intervention:**

- Keep Systolic BP above **170 mmHg** for the first 24 - 48 hours

Signs & Symptoms

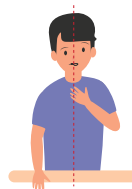
■ Hemiparesis - **Unilateral weakness**

- One-sided weakness
- New, Sudden **"Arm Drift"**

NCLEX TIP

F

Facial & Smile Droop



A

Arm Drift
"1 sided weakness"
NCLEX TIP



S

Speech Impairment



T

Time to CALL 911!
CT scan Immediately



Hemorrhagic Stroke

"Ruptured cerebral **aneurysm**"

- **Severe headache**



NCLEX Question

Most concerning patient statement with **diplopia** and **new weakness**, & onset vomiting **without nausea:**

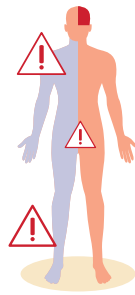
- "I have the **worst headache of my life**"

Stroke "CVA" II

L

Left Brain Language & Logic

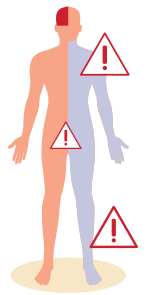
- Dysphasia
- Reading or writing problems
- **RIGHT Hemiparesis** (1 Sided weakness)
- Right Side neglect



R

Right Brain Reckless & Really Creative

- Lack of impulse control
- Behavioral changes
- **LEFT Hemiparesis** (1 Sided weakness)
- Left Side neglect



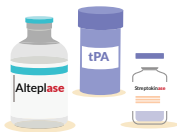
Diagnostics

- CT scan immediately!!!

Treatment: Pharmacology

Strokes cause by Clot - Give clot busters

- Thrombolytics - within **4.5 hours of onset of symptoms**
 - **tPA**
 - "-as" Alteplase, Streptokinase



NCLEX Question

Teaching for families of patients with **right-sided brain injuries?**

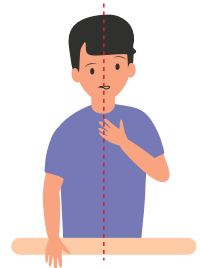
- ✓ Answer: **lack of impulse control and behavioral changes.**



ATI Question

Manifestations of **right -sided hemispheric stroke...**

- Visual & spatial deficits
- Left homonymous hemianopsia
- One-sided neglect



2 Tricky NCLEX Questions:

Question 1:

Interventions for **initial plan of care** for a patient with **suspected embolic stroke?**
Select All that Apply

- ✓ Obtain a **STAT CT of the head**
- ✓ Perform **neuro assessment**
- ✓ Prepare to initiate **alteplase within 4.5 hours of symptoms onset**

Question 2:

Priority nursing action for a patient with **left-sided weakness**, lack of verbal response, and **drooping face?**

- ✓ Maintain patent airway
- Stats CT scan
- Neuro assessment
- Give tPA

Strokes - Hemorrhagic (no clot busters)

- Implement **seizure precautions** - strict bed rest
- No Blood Thinners
 - **NO** Aspirin & Clopidogrel
 - **NO** Heparin & Enoxaparin
 - **NO** Warfarin
 - **NO** Thrombolytics
- Limit any activity that may **increase ICP:**
 - Administer PRN stool softeners daily to prevent straining & bearing down during bowel movements



Stroke "CVA" III

Patient Education

H HEMIANOPSIA Half Vision Loss

- **Risk of Self Neglect**
 - "Dress the **weaker side first**"
 - "Apply clothing on **affected side first**"
- **Safety**
 - "Scan surroundings"
 - "Turn head to affected side"
 - Family - "**approach** patient from **unaffected side**"
- **Right Side - Reckless**
 - Lack of **impulse** control
 - **Behavioral** changes
 - Educate family that behavioral changes are expected



Nursing Interventions

F FEEDING

- **NPO** until **swallow screen** is performed
- **Eating**
 1. "**Flex neck**" while swallowing
 2. **AVOID** sedation meds before meals
 3. **HOB Up** - High Fowler's "Upright"
 4. **Dysphagia** (diff. swallowing)
 - Puree diet - **NOT regular diet**
 - Add thickening agent to fluids
- **Seizure precautions**
- **Frequent neuro assessments**
- **Cluster Care** (prevents sensory overload)



Transferring

- **Use a transfer belt**
- Safe transfer **from Bed to Chair**
(ALWAYS transfer toward the **STRONGER SIDE**)

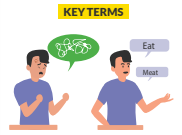
AVOID completing tasks for the client
(to promote independence)

1. **Patiently allow time** to understand each instruction
2. **Simple gestures** (point) & **Show Pictures!**
 - Example: shower, toilet, toothbrush
3. Ask **Yes or No questions**
 - Normal voice - **Not Loud**



C COMMUNICATION

- **Broca Aphasia** - "Expressive"
 - Easily frustrated (attempting to **speak**)
 - **Speech limited** to short phrases
- **Wernicke Aphasia** - "Receptive"
 - **Misunderstanding** to verbal cues
 - **Unable to comprehend** speech



ATI

- **Priority finding** patient recovering from stroke...
Dysphagia with a regular diet ordered

KAPLAN

- **Priority intervention** for a patient with right-sided hemiplegia, and inability to eat without assistance...
Answer: pureed diet for client with dysphagia
- **Prevention of sensory overload** in client with stroke?
Answer: Obtain vitals and assists with morning care in one visit



Big No Nos!

- **DO NOT** - complete tasks for the client! Allow them to learn
- **DO NOT** - speak loud, speak normally - allow time for client to RESPOND
- **DO NOT** - give complex instructions or questions - simple yes or no questions



Seizures

Pathophysiology

Sudden, uncontrolled electrical discharges in the brain. Epilepsy is lifelong episodes of seizures.

Memory Trick

ePILEpsi - like a PILE of seizures that come & go over a lifetime



Causes

Anything that can cause brain swelling or hypoxia

- **Infection:** meningitis
- **Trauma:** TBI, Concussion
- **Brain mass:** BRAIN tumors
- Increased ICP
- Fever in infants = "febrile seizure"
- Withdrawal from drugs & alcohol

Types of Seizures

Generalized

- **Tonic** - Tight & Tense - Tonic
- **Clonic** - convulsions, contraction - clonic clicking
- **Tonic Clonic** - tight & convulsions
- **Atonic**
- Myoclonic
- Absent - "spaced out"



Partial "Focal"

Simple: Fully conscious
Complex: impaired or Loss of Consciousness

- Lip smacking
- Biting
- Picking



HESI Question

Phases of tonic clonic seizure?

- **Loss of consciousness**
- Pt. **Falls** to ground
- Body **stiffens** for 10-20 seconds
- **Extremities jerk** for 30-40 seconds
- Pt. feels **tired** and **sleepy**



Kaplan Question

Care for a child with a history of **absence seizures**...

Monitor for **brief interruptions in consciousness**



Triggers

S



S



S



S



S



- Sugar: **below 70** (Hypoglycemia)
Memory Trick: think hypogly brain will die
- Sodium: **below 135** (Hyponatremia)

Stages or Phases of Seizure

- **Prodromal phase** Warning signs before a seizure leading to Aura Phase
- **Aura phase** **NCLEX TIP** Visual, auditory clue that happens prior to a major seizure
- **Ictal phase = Seizure Phase** THINK ignition phase - the period of the active seizure.
- **Postictal Phase** Hangover phase after the seizure - think POST-ignition phase
 - Confused, disoriented, major headache, & typically feels tired or sleepy

Seizures II

Kaplan

Aura: Unusual sensations prior to the seizure

Kaplan Scenario:

Client with seizure disorder tells the nurse "I smell oranges and there aren't any on my tray"

What is the best response?
"Have you experienced this sensation before?"



NCLEX Questions:

Confusion and headache following a 20 minute long seizure

This is documented as:
Postictal phase

Prodrromal Aura Ictal Postictal

Priority Patient:
Who will the nurse see first?

History of **epilepsy** who reports having an aura



Status Epilepticus

MEDICAL emergency!! NCLEX TIP

Key points

- 5 min. or longer for 1 seizure, or
- 30 min. Repeated seizure activity
- #1 Priority = **STOP** the Seizure (after airway and breathing are secure)

IV or Rectal benzodiazepine

Lorazepam (brand: Ativan)

Diazepam (brand: Valium)



Interventions during SZ

#1 - Airway

- Turn client to side **NCLEX TIP**
- Prepare for suctioning

NEVER insert anything in the mouth!
NEVER restrain or "Hold down arms"

- Call for help & Stay with Client

#1 Drug = **STOP** the Seizure

Lorazepam (brand: Ativan)

Diazepam (brand: Valium)

Rectal or IV

- Loosen restrictive clothing (Neck & chest)

- Safety

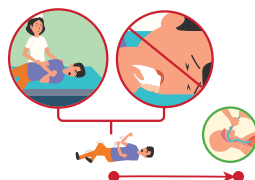
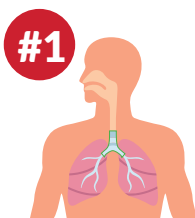
Protect - Clear area for any objects
Pad Side Rails

- **AFTER** seizure activity

Record Time

Assess LOC, Neuro, Vitals

Prepare for suctioning



Diagnostics

- MRI or CT - to look for abnormalities.
- **EEG** - electroencephalogram **NCLEX TIP**
Assesses electrical activity in the brain by placing sticky electrodes on the scalp
 - Wash Hair (before/ after) to make sure it sticks
 - **NO** Caffeine (tea, coffee, soda) or **stimulants: 12 - 24 hours before**
 - **NO** Seizure meds
 - **NO** Sleep - Sleep deprivation is BEST
 - **YES** Eat before test - no need for NPO

Memory trick

- **EEG** think of EEG head - electrical activity of the EEGhead
- **ECG** - C think C - Cardiac rhythms

ATI Question

- **Q1: First priority** for a client having a seizure?
Turn client to the side
- **Q2: Tonic clonic seizure nursing interventions?**
Loosen restrictive clothing
Prepare to suction the client's airway
- **Q3: Client who is at risk for seizures:**
Ensure a patent IV

Pharmacology

Anticonvulsants

- Phenytoin: **Toxic Over 20** hold med
- Levetiracetam: **Driving permissions** from HCP

Alzheimer's

Pathophysiology

Incurable progressive disease, where plaques build up in neuronal-synapses of the brain disrupting brain signaling, which severely impairs memory & personality changes.

Risk Factors & Causes

- **#1 Risk Factor:** Family history of Alzheimer's Disease
- **"Regular exercise** reduces the risks of Alzheimer's"
- Dementia - a general term for brain damage
- **Memory Trick:** DeMentia = DaMAGE to the brain



DeMentia
DaMAGE

Interventions

Fall Safety

- **Remove "Throw rugs & clutter"** from floor
- **Grab bars** - installed in showers & tubs
- **Night Light** "Well-lit halls"



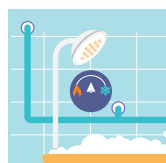
Location & Locked Down

- **"Safe return bracelet"** on wrist
- **Lock** doors:
 - Stairwell Doors - **Fall Risk**
 - Keyed Deadbolt Doors leading to outside
- **Lock** Hazards: toxic chemicals, gas, sharp objects
- Medications **Locked or Out of Reach** - do not put in pill dispenser



Living Areas

- Allow for **free movement**
- Place **frequently used items** within easy reach
- **Pictures or symbols:**
 - Bathrooms
 - Label **Hot vs. Cold** water



Simple Communication

- **NO** open-ended Questions - **Yes or No questions**
 - **NOT** too many options - Limit choices
 - **DO NOT RUSH Client!**
 - Allow plenty of time for ADLs & tasks
- "Decrease Anxiety by
Decreasing number of choices"



ATI scenario:

- Create outfits and allow the client to **choose one** each day.
- Treat client as an **ADULT!** (not like a child)



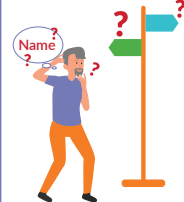


Diet

- **Correct nursing action:** Give **half the sandwich** initially and other half later



Signs & Symptoms

Stage 1	Stage 2	Stage 3
No impairment	Forgetfulness & short term memory loss	Long-Term Memory LOSS
		

Tricky NCLEX Question

Agitated Client with Alzheimer's

- 1. Acknowledge & Discuss feelings
- 2. Redirect with new activities **NCLEX TIP**
- 3. **DO NOT** - Present reality or Rationalize

HESI Question

Q: Stage 3 Alz. client with aggression ...

A: Complete crossword puzzles

NCLEX Question

Best nursing action
Client with Alzheimer's is frustrated, stating they are waiting for their husband to pick them up, but their spouse has been dead for over 10 years now.

- Answer:** Acknowledge their feelings & redirect with new activities

A.L.S.

Amyotrophic Lateral Sclerosis

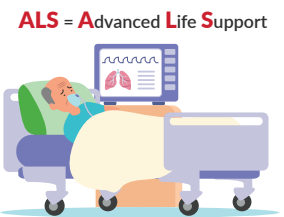
Pathophysiology

ALS also called Lou Gehrig's disease presents as deterioration of motor neurons in the brain & spinal cord, resulting in progressive **TOTAL BODY paralysis**, eventually clients die in 3 - 5 years from Respiratory Failure.



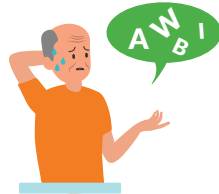
Memory trick:

ALS think ALS like Advanced Life Support, since clients will eventually have to go on a ventilator to keep them alive.



Signs & Symptoms:

- Progressive **muscle weakness**
- Dyspnea - **Difficulty breathing**
- Dysphagia - **Difficulty swallowing** **HESI**
- Dysphasia - Difficulty speaking
- Constipation
- Respiratory failure **#1 Priority**



ATI Question

Priority finding... client with ALS?

- Increased **respiratory** secretions



Nursing Care

Infection - monitor for pneumonia

- Fever - Temp over 100.3°F
- **Lung sounds - Rhonchi**
 - Not Crackles = Pulmonary edema



HESI Question

Expected finding with ALS?

- Limb weakness



Bell's Palsy vs. Trigeminal Neuralgia

Bell's Palsy

Pathophysiology

- Damage or inflammation to the **7th cranial nerve** in the face
- Seen **as sudden weakness** to the muscles on **ONE SIDE OF the FACE**, which typically resolves on its own.

Memory Trick

- **Think Fells** Palsy - since Face Falls to one side



Causes

- Unknown
- Some think it's caused by infections like Herpes, Varicella, or shingles & even some bacteria

Signs & Symptoms

- Drooping of Eyelid & Mouth - inability to completely close eye on affected side
- Inability to smile symmetrically
- Change in lacrimation on affected side (dry eye)
- Flattening of the nasolabial fold

Diagnostics

- Identify the problem is with the FACIAL NERVE
 - Ask patient to close their eyes, lift their eyebrows, show teeth and frown
 - To rule out a Stroke!

Interventions

- Corticosteroids to reduce inflammation
- Patient Education:
 - Apply eye patch at night or tape down the affected eye
- Artificial tears & glasses - prevent dryness
- Oral hygiene after meals
- Chew on unaffected side & give soft diet
- Clients can still drive & balance is NOT affected

HESI

- Warm, moist heat to CN VII

KAPLAN

- Priority action: Assess the patient's pain

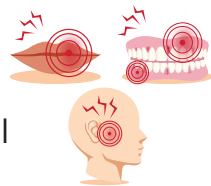
Trigeminal Neuralgia

Pathophysiology

- Irritation of Trigeminal nerve, the **5th Cranial nerve**
- Severe sharp pain described as **ELECTRICAL shocks** to 1 side of the face!

Memory Trick

- Think Trident gum! Like you're Chewing on Gems in Tri**GEM**inal



Causes

- Multiple Sclerosis (MS) = damage to myelin sheath
- Tumor or vascular compression

Signs & Symptoms

- **Electric shock** like pain in lips & gums
- **Severe pain** along cheekbone
- **Dental like pain:**
 - Triggered by hot food or caffeine

Diagnostics

Trigeminal

- MRI to rule out MS/ tumor

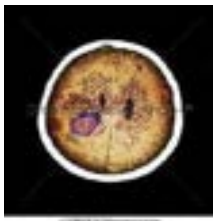
Interventions

- Carbamazepine (Anticonvulsant) slows nerve firing
- Surgeries to decompress or destroy the cause
- MOST tested:
 - **Avoid Triggers:**
 - Caffeine & hot foods

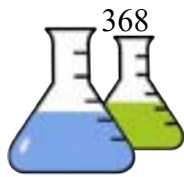
KAPLAN Question

- Patient newly dx trigeminal neuralgia, the nurse should intervene when the patient states:

"I will drink **coffee** with breakfast and after dinner"



BRAIN ABSCESS



WHAT AM I?

A lesion on the brain that is rare in healthy people. They are usually a result of an underlying disease such as otitis media

PATHO

Infectious material that has collected in the brain mostly caused by accumulation of bacteria. The most common cause of brain abscess is otitis media and rhinosinusitis. Abscesses can also be a result of intracranial surgery, penetrating head injury, and tongue piercings. Organisms can spread from the lungs, gums, wound, heart, or tongue.

CAUSES

- ❖ Otitis media
- ❖ Tongue piercings
- ❖ Oral infections
- ❖ Cardiac infections
- ❖ Lung infections
- ❖ Mastoiditis
- ❖ Rhinosinusitis
- ❖ Systemic infections



ASSESSMENT

Frontal lobe

- ❖ Hemiparesis
- ❖ Expressive aphasia
- ❖ Seizures
- ❖ Frontal headache

Temporal lobe

- ❖ Localized headache
- ❖ Changes in vision
- ❖ Facial weakness
- ❖ Receptive aphasia

Cerebellar

- ❖ Occipital headache
- ❖ Ataxia
- ❖ Nystagmus

LABS & DIAGNOSTICS

- ❖ **CT:** Is mostly used to identify location and size of the abscess. Aspiration is also guided by CT or MRI.
- ❖ **Culture & Sensitivity:** To identify the organism and how to treat it.
- ❖ **Chest X-Ray:** Rules out prior lung infections.
- ❖ **EEG:** To Localize the lesion.



TREATMENTS

- ❖ Treatment goal is to control ICP, drain the abscess and treat with antibiotics.
- ❖ Antibiotics are ordered based on culture and sensitivity results.
- ❖ Ceftriaxone: First choice antibiotic.
- ❖ CT guided aspiration: To Drain the abscess.
- ❖ Corticosteroids: To reduce the inflammatory cerebral edema.
- ❖ Antiseizure meds may be given to prevent seizures.

NURSING INTERVENTIONS

- ❖ Continuous neurological monitoring
- ❖ Monitor vital signs
- ❖ Administer antibiotics
- ❖ Monitor for signs of ICP
- ❖ Monitor blood glucose and Potassium when administering corticosteroids.
- ❖ Initiate seizure precautions
- ❖ Keep patient safe and free of falls
- ❖ Assess distress and ability to cope with altered state.



Dementia vs. Delirium



DeLLirium

DeLirium

- Limited, short-term confusion that is easily reversible!
- Correct the causes, correct the Delirium.

Causes

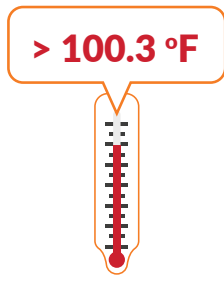
- **Infection** (Sepsis) **Key terms:**
 - Temp over 100.3 F
 - Urine Culture + Positive
- **Hypoxia** "Low SpO2"
 - Agitation

Priority action: **"Assess the client"**

Other causes:

- Opioid Pain Meds
- Low sodium (norm: 135 - 145)
- Low blood glucose (norm: 70 - 110)

Priority action: **"Assess the client"**



Common NCLEX Question

Nurse understands which factors can cause delirium?

Select All That Apply

- Positive urine culture with 101 F temp.
- Serum sodium level of 123
 - Serum blood glucose level of 120
- SpO2 82%
 - Brain damage ... Yo dis too much



DeMMentia



DaMMMage

Dementia

DaMage to the brain that is irreversible

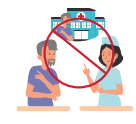
Causes

Alzheimers, Parkinson's & even Traumatic brain injuries

Tricky NCLEX Question

Agitated with Dementia!!

1. Acknowledge & Discuss feelings
2. **DO NOT** - Present reality or Rationalize
3. Redirect with new activities



In end stage deMentia, there is too much brain daMage making it IMPOSSIBLE for clients to understand reality.

This causes more anxiety & aggression, so interventions revolve around distraction



ATI

- Place **personal items** such as **pictures** at client's bedside
- Provide a **manual activity to occupy** the client in order to prevent the need to restrain a client with dementia



Kaplan

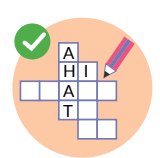
Encourage client to discuss "mixed-up" feelings



HESI

Q: Patient with Stage 3 Alzhiemers with aggression ...

A: **Redirect** by completing a crossword puzzles (distraction)





ENCEPHALITIS



WHAT AM I?

Encephalitis is an acute inflammatory process that affects the brain tissue, the cerebrum, brainstem, and cerebellum.

PATHO

- Encephalitis is an inflammatory process caused by the herpes simplex virus or bites from a tick or mosquito and causes necrotizing hemorrhage of the brain that becomes generalized and is followed by edema. Encephalitis also can cause damage to nerve cell bodies. Encephalitis commonly affects neonates via transmission from an HSV-2 infected mother. Encephalitis caused by insect bites comes from attempts at replication of viral DNA which elicit olfactory tract and CNS problems. The virus jumps from neuron to neuron affect the gray matter of the brainstem and thalamus.
- Fungal Encephalitis happens when fungal spores enter the body of an immunocompromised person upon inhalation causing fungemia. Fungus may spread to the CNS and cause meningitis, granuloma, arterial thrombosis, encephalitis or brain

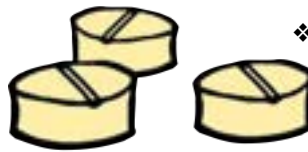


CAUSES

- Viral infection of HSV
- Mosquito bites
- Tick bites
- Bacteria
- Fungi
- parasites

ASSESSMENT

- DERM:** Cold sores, lesions, ulcers of the oral cavity, insect bites
- NEURO:** Nuchal rigidity, changes in Locomotor dysfunction, neurological deficits, seizures, hemiparesis
- Misc:** Nausea, vomiting, travel to areas where there is increase rate of disease. Dysphagia. Flu like symptoms, hydrocephalus with fungal infection, HIV.
- H:** Herpes Virus infection
- E:** Enterovirus infection
- R:** Rigidity (Nuchal)
- P:** Populations with lots of disease
- E:** Extreme changes in LOC
- S:** Sores in the mouth
- V:** Varicella infection
- I:** Insect Bites
- R:** Really high fever
- U:** unilateral paralysis (hemiparesis)
- S:** Seizures



TREATMENTS

- Acyclovir:** Antiviral agent , decreased dose if the patient has a history of renal impairment.
- Ganciclovir:** Antiviral Agent
- Starting antivirals early is well tolerated and the patient should continue treatment for up to 3 weeks.
- IV administration** over 1 hour prevents crystallization of the medication in the urine.
- Interferon :** St. Louis Encephalitis
- Lumbar Puncture and Shunting: Fungal encephalitis.
- Amphotericin B:** Treats progressive fungal infection. May cause renal dysfunction
- Fluconazole:** Treats fungal infection and may cause bone marrow depression



NURSING INTERVENTIONS

- Assess neurological function.
- Assess for signs of ICP
- Assist client to Turn cough and Deep breathe
- Elevate HOB 30-45 degrees
- Comfort measures to reduce headache.
- Administer analgesia.
- Use opioids cautiously because they can mask neurological symptoms.
- Seizure precautions.
- Monitor Blood cultures.
- Monitor intake and output due to possible renal impairment from the antivirals.
- Initiate rehabilitation for motor dysfunction.

LABS & STUDIES

- EEG:** Diffuse slowing or focal changes in the temporal lobe.
- Lumbar Puncture:** High opening pressure, normal glucose range, high protein levels.
- Viral cultures:** Usually negative
- Polymerase Chain reaction:** Standard test for early diagnoses and identifies the DNA of HSV-1, validity is highest on the 3rd and 10th day post symptom onset.

ARTHROPOD INFECTED LAB STUDIES

- MRI:** Inflammation in the basal ganglia (St. Louis) or periventricular area (West Nile)
- EEG:** Abnormal brain waves.
- CSF:** Immunoglobulin M antibodies will be present
- CSF:** Elevated White cells and protein or candida
- Neuroimaging:** Identifies CNS changes
- MRI:** Is the study of choice, identifies hemorrhage, abscess or inflammation.



TRANSMISSION

- Arbovirus:** From human to mosquito.
- West nile virus
- Western equine encephalitis
- Eastern equine encephalitis
- Powassan virus
- Echovirus
- Poliovirus
- Herpes zoster virus
- Varicella
- Herpes simplex-1
- Amebic transmission

EDUCATION

- Encourage fluid intake
- Small frequent meals
- Educate the client on the disease.
- Educate the client on the treat regimens and when to call the HCP.

FOCUSED NEUROLOGICAL ASSESSMENT

ASSESS LEVEL OF CONSCIOUSNESS

- ❖ **Full consciousness:** Awake and Alert
- ❖ **Lethargic:** sleeps frequently but awakens easily.
- ❖ **Obtunded:** extreme drowsiness, requires vigorous stimulation to waken.
- ❖ **Stupor:** minimal movement, responds inappropriately. Is awake briefly with vigorous stimulation or painful stimuli.
- ❖ **Comatose:** does not respond to verbal and tactile stimuli. May respond appropriately to painful stimuli.



ASSESS ORIENTATION

- ❖ **Oriented x3:** understands spoken and written language and responds appropriately.
- ❖ **Oriented x2:** Mild confusion, guesses date, may be able to recognize time of year. May not be able to follow instructions. May have memory deficits.
- ❖ **Oriented x1:** confused, unable to give date or time, unable to verbalize where or who they are. Has memory deficits and can be restless or agitated.
- ❖ **Disoriented:** patient does not answer appropriately or at all. May be hallucinating or agitated. Unable to follow directions.

PEERLA

- ❖ Test pupil response, size, symmetry, shape. They should be equal and reactive to light.
- ❖ Shine the penlight into each pupil. Constriction should be brisk and equal.
- ❖ Bilateral dilation can be caused by cerebral anoxia or anticholinergic medications. Be sure to assess the client's medication list and other symptoms.
- ❖ Bilateral constriction can be caused by: intracranial hemorrhage, opiates, or organophosphates.



CRANIAL NERVES

- ❖ **I: olfactory:** Smell, have the client identify familiar smells.
- ❖ **II: Optic:** Visual acuity, use snellen eye chart, assess peripheral vision.
- ❖ **III: Oculomotor:** Pupillary reaction, assess PERRLA
- ❖ **IV: Trochlear:** Eye movement, patient follows finger without movement.
- ❖ **V: Trigeminal:** Facial sensation, touch patient's face, have them open their mouth.
- ❖ **VI: Abducens:** Motor function, patient follows finger without moving head.
- ❖ **VII: Facial:** Taste and face movement, have patient smile and puff cheeks, have patient differentiate between sweet and salty tastes.
- ❖ **VIII: Acoustic:** Hearing and balance, snap fingers close to patient's ear, have patient stand with feet together, arms at side and eyes closed for 5 seconds.
- ❖ **IX: Glossopharyngeal:** Swallowing and voice, have the patient swallow and say "ah"
- ❖ **X: Vagus:** Gag reflex, use a tongue depressor to swab and elicit a gag reflex.
- ❖ **XI: Spinal accessory:** Neck motion, have patient shrug and turn their head against resistance.
- ❖ **XII: Hypoglossal:** Tongue movement, have patient stick their tongue out and move it around.

- ❖ **Brain trick to remember the order of cranial nerves.**
"OOO to touch and feel a great velvet super hero"



POSTURING

- ❖ **Decorticate:** An abnormal posturing in which a person is stiff with bent arms, clenched fists, and legs held out straight.
- ❖ **Decerebrate:** An abnormal body posture that involves the arms and legs being held straight out, the toes being pointed downward, and the head and neck being arched backwards

ASSESS MUSCLE STRENGTH & FUNCTION

- ❖ Have the patient move all extremities.
- ❖ Have the patient squeeze your fingers.
- ❖ Hold your hands up for the patient to push and pull your hands.
- ❖ Have the patient hold their arms to their eyes. Note any drifts.
- ❖ Have the patient dorsiflex and plantar flex.
- ❖ Have the patient raise their legs without resistance.

Muscle strength scale

0 : No muscle movement.

- 1: Visible muscle movement, no joint movement.
- 2: Movement at the Joint but not against gravity.
- 3: Movement against gravity but not resistance.
- 4: Movement against resistance but less than normal
- 5: Normal strength.

GLASGOW COMA SCALE

Eye response

Spontaneously	4
On command	3
To pain	2
No response	1
Score	____



Verbal response

Alert and oriented	4
Confused	3
Inappropriate	2
Incomprehensible	1
score	____

Motor response

Follows direction	6
Localizes pain	5
Withdrawal from pain	4
Abnormal flexion	3
Abnormal extension	2
No response	1
score	____

G.B.

Guillain-Barré Syndrome

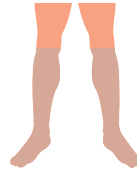
Pathophysiology

RAPID ascending paralysis starting in the legs & eventually reaching the respiratory system, which kills the client within a few hours to a few days.



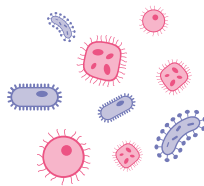
Memory Trick:

Ground up barees - paralysis from the legs up



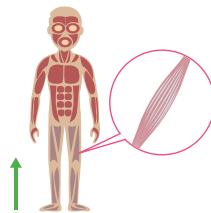
Causes:

Triggered by an **infection**



Signs & Symptoms:

- Ascending Symmetrical muscle weakness
- Lower extremity weakness
- **Absent deep-tendon reflexes**
- Neuromuscular **respiratory failure**



- **Respiratory failure** - early signs :
 - ♦ **Inability to cough** **NCLEX TIP**
 - ♦ **Inability to lift the head or eyebrows** **NCLEX TIP**
 - ♦ Shallow respirations
 - ♦ Dyspnea and hypoxia



NCLEX Question

Priority finding:
Client with Guillain-Barré?

- **Inability** to lift head or cough

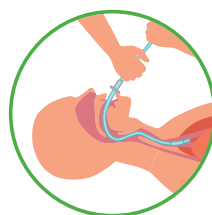
KAPLAN

Priority for patient with G.B.

- Prepare **mechanical ventilator** for client with **worsening Guillain Barre**

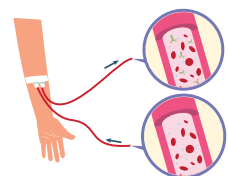
Nursing Intervention:

- Intubation setup bedside &
- Mechanical Ventilator



Treatments:

- IVIG
- Plasmapheresis (Plasma exchange) to remove antibodies that contribute to the destruction of neurons.



Head Injury

Traumatic Brain Injury - TBI

Pathophysiology

Any injury to the head can be open & closed traumatic brain injuries (TBI).



OPEN TBI - Basilar skull fracture

Key Sign

- CSF leakage from **Eyes, Ears, Nose**
- "Clear fluid drainage" **NCLEX TIP**
- Positive Glucose

CLOSED TBI

- Concussion - Minor TBI**
 - Brief loss of **consciousness** **NCLEX TIP**
 - Headache
 - Retrograde amnesia
- Concussion - Major TBI "Coup - Contrecoup"**
 - Coup
 - Coup - Contrecoup
 - Frontal lobe Injury
 - Expressive aphasia "speech"
 - Memory problems
 - Occipital lobe
 - Vision problems

Memory Tricks:

- Frontal lobe** = Front OFFICE controls speech, memory, & movement.
- Occipital lobe** = Ocular Sight controls visual perception
- Temporal lobe** = Think **TEMPO** like hearing a beat.
- Parietal lobe** = sensory, touch - Think purrietal like a cat - soft & fluffy to touch.
- Cerebellum** - think cere-**BaLance** - controls balance
- Brain stem** - controls HR & RR

Causes

- Motor vehicle accident
- Fall greater than 20 ft
- Child abuse (shaken baby)



KAPLAN Questions

- Client with head injury with **clear nasal drainage** noted...
Answer: Check drainage for **glucose**
- Which patient to see first following a multi car accident?
Answer: Patient with **clear fluid** draining from right ear

NCLEX Questions

- What is **MOST** likely affected by **coup-contrecoup** brain injury?
Answer: **Memory, speech and vision.**
- Which assessment is expected with **occipital** lobe injury?
Answer: Deficits in **visual** perception.

(This is a sign of a **BASILAR SKULL FRACTURE!** A priority patient!)

Frontal lobe Occipital lobe



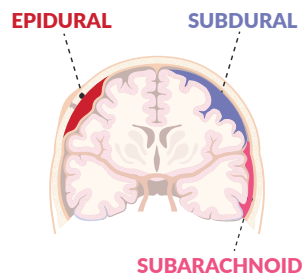
HEMATOMA 3 Types

▪ Epidural- Most Deadly

medical emergency! High bleeding & rapid DEATH from ↑ ICP

- **Classic sign:** Loss of consciousness
- Followed by brief alertness (STAY with & monitor client who passed out and then woke up again.

- Subdural
- Subarachnoid



Monitor for Increased ICP

- Early signs**
 - Agitation **NCLEX TIP**
 - Restlessness/ irritability
 - Change in LOC **NCLEX TIP**
 - Decreased Mental Status
 - Sudden Vomiting "Emesis" **Without Nausea**
- Late signs**
 - Seizures
 - Posturing (decorticate & decerebrate)
 - Cushing triad

Interventions

1ST PRIORITY

- Stabilize cervical spine "C-spine"**
- Keep body perfect alignment
- Assess **GCS**
 - 15** = highest score
 - 8** = intubate
 - 3** = lowest score
- Report Decline in GCS score!**

NCLEX Questions

- Client recovering from head trauma ... GCS of 15 over 2 hours ago, but now GCS score of 14... **First action?**
Answer: Report to provider immediately
- Client in C spine after fall ... priority assessment?
Answer: Obtain Glasgow Coma Scale score.

Imaging

- CT scan or MRI to show evidence of bleeding, bruising, or swelling

Discharge Teaching

- Return** if having **difficulty walking "Ataxia"**
- Adult** should **stay with the patient**
- No alcohol:** vasodilates & makes brain swelling worse
- NOT** necessary for patient to stay awake ALL night

Increased ICP

Intracranial Pressure

Pathophysiology

Increased pressure within the head compresses blood vessels leading to cerebral hypoxia & can put pressure on the brain stem - killing the patient.



Causes

- Aneurysm stroke: burst blood vessels that fill up the brain with blood.
- Head Trauma or Meningitis: Increased swelling & inflammation.
- Tumor: Increased brain tissue

Signs & Symptoms

Early Sign: NCLEX TIP

- Altered LOC: Irritability, Restless
- Decreased Mental Status
- Sleepiness
- Flat affect and drowsiness

Moderate Signs:

- **Headache** - Constant
- Sudden **Vomiting** "Emesis" **Without Nausea** = **Report to HCP!**

Critical LATE signs

Cushing triad NCLEX TIP

- Wide pulse pressure
 - **HIGH BP** "Hypertension"
 - **Low HR** "Bradycardia"
- **Low RR** "Decreased Respirations"

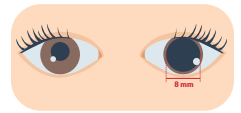
Memory Trick:

- CUSHing triad think CRUSHing triad
- Crushed HR & RR with Wide blood pressure



Late DEADLY Signs:

- **Lungs:**
 - Irregular Respirations
 - "Cheyne Stokes Respirations"
- **Neck:**
 - Nuchal rigidity (stiff neck)
 - "Can not FLEX chin toward chest"
- **Brain Stem Affected:**
 - Eyes**
 - Pupils "Fixed & Dilated"
 - Unequal
 - **8 mm** (Normal 2 - 6 mm)
 - Doll's eyes: this means Brainstem is intact!
 - If the eyes stay fixed & dilated when the head is turned, it means **BRAINSTEM** is affected.
 - Foot**
 - Babinski reflex (Toes fan out when stimulated = **BAD**) means brain stem herniation! Normal in an infant below 1 year old, NOT NORMAL in adult!
- **Seizures & Coma**
- **Abnormal posturing:**
 - Decorticate: arms flex toward core
 - **Decerebrate: arms flexed out to sides** = Far WORSE!



NCLEX Questions

Question:

Which client is priority?

Answer:

Closed head injury waiting for brain imaging who reports a **headache** & **emesis** of 200 mL **without nausea**

Priority assessment findings for a client recovering from a head trauma? **Select all that apply**

1. Eyes that move in the opposite direction when patient is turned.
- ✓ 2. Extremities that contracted to the core of the body.
- ✓ 3. Fixed pupils that remain 8mm when assessed with a pen light.
4. Level of consciousness that has not diminished since admission.
5. Grips 5/5 bilateral
- ✓ 6. Toes that fan out when the sole of the foot is stroked.

Diagnostics

- Imaging - **CT scan**
 - 1st test - quick easy picture of the brain - showing the root cause
 - NOT an MRI - they are too long & slow
- **NO lumbar puncture** (spinal tap)
- ICP monitoring (for long-term patients)
 - Normal ICP: 5 - 15 mmHg
 - **HIGH RISK of infection!**

NCLEX Questions

Client found on the floor, appearing lethargic, bleeding at the back of head, heart rate of 45 BPM & a blood pressure of BP 220/88. **First action?**

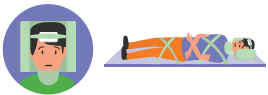
- **Answer:** Immediate C- Spine immobilization & **CT scan to rule out intracranial bleed**

Increased ICP Intracranial Pressure II

Nursing Interventions

I Immobilize Head "C-Spine"

- Head in neutral position
- **Log Roll** "As one unit"



C CO2 LOW

- Lower CO2 means Lower ICP. Carbon dioxide vasodilates the brain resulting in more swelling from more blood flow. Hyperventilation decreases CO2 by blowing it out

P Positioning

- HOB - Semi-Fowler's **30 - 35 Degrees or higher**
- **NO** flexion & bending extremities
- **NO coughing**, sneezing, blowing nose
- **NO valsalva maneuvers** or holding breath

S Suctioning

- **10 Seconds or Less**
- **100% O₂** before/after suction



HESI Question

Client on ventilator... **increased PaCO₂**. The nurse receives an order to **increase the respiratory rate** on the ventilator. This change should have what change on the patient's ICP?

Answer:

- **Decrease the ICP decrease in carbon dioxide.**

KAPLAN Question

Instruct patient to exhale when turning or moving in bed.



NCLEX Question

Immediate intervention when client with ICP states...

- "I will turn cough, & deep breathe"



HESI Question

Interventions for increased ICP? **Select all that apply**

- Position - **Semi-Fowler's**
- Place neck in **neutral position**
- Teach **avoid valsalva** maneuver
- Position **avoid flexion** of hips, waist, and neck
- **Suction** only as necessary but **no longer than 10 seconds**

Interventions.. increased ICP & ineffective breathing pattern? **Select all that apply**

- Suction no longer than **10 seconds**
- **100% O₂** before and after **suctioning**
- Perform neuro checks using **GCS**

GCS Score:

GCS Score

- **15** = Highest Score
- **8** = **intubate**
- **3** = lowest score

REPORT Decreasing GCS score!



HESI Questions

Patient replies.... **correct name & location**, but **incorrect year & date**. How should the nurse document the patient's responses?

- Alert and oriented to **person and place**

NCLEX Questions

Client recovering from head trauma ... **GCS of 14** over 2 hours ago, but **now GCS score is 11...**

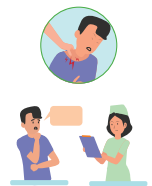
- **Report to HCP immediately**

SCORE: 11



Which assessment best demonstrates the GCS?

- Painful stimuli applied, client pulls away = **responsive to pain**
- Client responds to a nurse's question = **responsive to verbal**



Treatment: Pharmacology

- Phenytoin: prevent seizures
- Steroids: Dexamethasone
- Pheno**barbital**: a barbiturate to decrease brain activity
- **Mannitol**: osmotic diuretic #1 drug to know
Side effect: edema & s/s of heart failure **NCLEX TIP**



Notes

Pathophysiology

MG is an autoimmune disease where body attacks itself, attacking & destroying the **acetylcholine receptors**, resulting in low acetylcholine. Clients present with a weak muscles & a dry body from low acetylcholine.

Memory Trick:

- **MG** - MYasthenia Gravis
- **MG** - DRY-asthenia Gravity

Signs & Symptoms

- **Ptosis** "Droopy eyes" **NCLEX TIP**
Decreased eye & eyelid movements
- **Diplopia** "Double Vision"
- **Dysphagia** - difficulty **swallowing**
- **Dyspnea** - difficulty **breathing**



Low & SLOW:

- Tiredness with slight exertion **KAPLAN**
- Improves with rest

Myasthenic Crisis!

Airway protection (safety with swallowing)

- Intubation set up - **BEDSIDE**
- **BEFORE meals:**
Give pyridostigmine
(anticholinesterase drug) **NCLEX TIP**
- Encourage **semi-solid** foods



AVOID the 4 Ss = Trigger **Flare Ups**

- **S** - Stress (exercise, surgery, pregnancy)
- **S** - Sun
- **S** - Smoking
- **S - Sickness or Sepsis** (infection)
 - **Avoid** crowds during flu season &
 - **Get vaccines** (flu, pneumonia, etc)
 - Fever 100.3
 - **Wear** a medic alert **bracelet**



Diagnostics

Tensilon Test

- Edrophonium (brand: Tensilon) injection helps prevent the breakdown of the acetylcholine
- If the drug **INCREASES** muscle strength, then patient has MG.



Pharmacology

- **IVIg**: the body attacks this substance instead of itself
- **Steroids** - Prednisone to decrease swelling
- **Immunosuppressants** help the body **STOP** attacking itself
- **Neostigmine**: given to treat the dry. Think **Stigmine** adds **Secretions**.



HESI

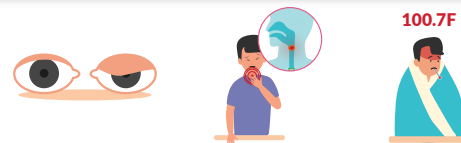
What is myasthenia gravis?

Autoimmune disease of the neuromuscular junction & is characterized by **fluctuating weakness** of certain **muscle groups**.

Common NCLEX Question

Which client should the nurse see first?

- Client with myasthenia gravis difficulty swallowing & temperature of 100.7F



HESI

Myasthenia gravis safety precautions ...

Which instructions should the nurse include in the **patient teaching**?
Select All That Apply

- Use **airway** protective techniques when **swallowing**
- Wear **medic alert bracelets** at all times
- **AVOID** crowds during **cold and flu** season



Neuro Meningitis

Pathophysiology

Meningitis is the inflammation of the **Meninges** (the inner lining of the brain & spinal cord)
 Inflammation → massive brain swelling → deadly ↑ ICP → leading to death



Signs & Symptoms

H - Headache & Photophobia
H - Hard stiff neck "Nuchal rigidity"

H - High Temp. "Fever"

- Pediatrics
 - **High-pitched** cry
 - **Bulging** fontanelle
- Adults
 - **Agitation & altered LOC (1st sign)**
 - Leads to seizures, coma, & DEATH!



Tests:

- **CT scan (done first)**
 - **LP** (Lumbar Puncture "spinal tap")
 - Viral - Very clear
 - Bacterial - Bad cloudy
 - Both types will have elevated WBCs
 - AFTER LP: Monitor insertion site dressing for **clear fluid**

Causes

- Infection, head trauma, & auto-immune diseases (Lupus)

Memory Trick

- Bacterial = Bad news **MOST** contagious
- Viral = Very common - **MOST** tested

Diagnostics

- **+ Kernig Sign:** Laying on the back & straightening the leg = very painful.
- **+ Brudzinski Sign:** when neck flexes, hip & knees also flex.

Memory Trick:

- Kernig "Krinkle"
- Brudzinski "Beach Chair"



Interventions

- First action
 - Place client on droplet precautions - PPE 1st!

Droplet

- P** - Pertussis
- I** - Influenza
- M** - Meningitis
- P** - Pneumonia



1. **Surgical Mask** & Goggles
2. Single room

ATI

Teach unlicensed personnel to **wear a mask**

Airborne

- M** - Measles
- T** - TB (Tuberculosis)
- V** - Varicella (shingles/chicken pox)

1. N95 mask - Staff
2. Neg. Pressure Room
3. Door closed
4. Transport - **Patient wears surgical mask**

KAPLAN Scenario

- **Question:** Client with suspected **meningitis...** when **neck flexes**, the **hip and knee also flex.** Priority action?
- **Answer:** Immediately report this finding to the HCP!!!

NCLEX question

- Client admitted for bacterial meningitis with a BP of 78/56... priority action?
 - Admin. **bolus of IV normal saline**

Interventions

- **LOW** BP will kill!
- **Low** noise - quiet room
- **Low** light - photophobia
- **Low** pressure all over:
 - NO coughing
 - NO sneezing
 - NO bending extremities
 - RAISE HOB at least 30 degrees

Early Sign of ↑ ICP: NCLEX TIP

- **Altered LOC:** Restlessness, Irritability, Agitation
- **Decreased Mental Status**

Put ON "DON"

GMGG

1. Gown
2. Mask
3. Goggles
4. Gloves

Take OFF "DOFF"

GGGM

1. Gloves
2. Goggles
3. Gown
4. Mask

M.S. Multiple Sclerosis

Pathophysiology

MS is an autoimmune disease where the body attacks myelin sheaths, the sheets of fatty tissue around nerve cells which helps the body move.

Memory Trick:

MS - Myelin Sheath destruction

MS - Muscle Spasm & Stiffness

M.S.



M.S.

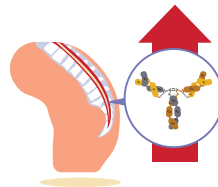


Diagnostics

- MRI & CT scan show plaque on brain & spinal cord
- Lumbar spinal puncture high levels of antibodies

HESI

- 3 - 4 mm sclerotic brain plaques on MRI
- Elevated gamma globulin in cerebrospinal fluid (CSF)



Patient Education

- **Balance** exercise with rest
- **AVOID 4 Ss** = Trigger Flare Ups
 - **S - Stress** (exercise, surgery, injury)
 - **S - Sickness** or Sepsis
 - **S - Smoking**
 - **S - Sun** & Extreme heat (hot tub, bath, sauna)
- **Promote** Independence = All Neuro Patients
 1. **"SELF** Care ADLs"
 - **NEVER** do "All ADLs for the client"
 2. Gait training
 - **Teach 1st** - Gait training
 - **Then offer Cane**
 - Walker
 - Last wheelchair



HESI

- **Q1:** Which action ... requires **immediate intervention** ... patient with MS?
Correct Answer: Preparing to place a client with **MS in a bathtub with hot water**
- **Q2:** Which instructions regarding techniques to **avoid fatigue** ... with multiple sclerosis?
Correct Answer: **Rest in air conditioned** surroundings



Causes

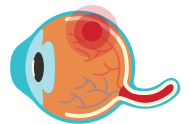
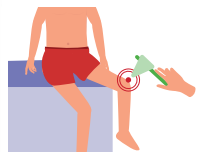
- Female more common
- Infection & Vitamin D deficiency

Signs & Symptoms

- **Muscle Spasticity:** seen with bad flare-ups that come & go from Myelin Sheath destruction
- Other signs:

KAPLAN

Ataxia
Urinary retention
Hyperreflexia of extremities
Decreased concentration
Fatigue & paralysis
Double vision, blurry, or dark



Pharmacology

- **IVIG** - body attacks this substance instead
- **Interferon** - interferes with body attacking itself
- **Steroids** - Prednisone - decreases swelling
- **Muscle Relaxants** - Baclofen - for muscle spasms
- **Cyclosporine** - immunosuppressant (**most important**)
 - Report signs of infection & bleeding
 - **NOT for pregnant** clients

INterferon INterferes



Neuro Diseases Intro & Quick Overview

CNS brain & spinal cord

- M.S. - Multiple Sclerosis
- Parkinsons
- Alzheimers
- Huntington disease



PNS peripheral nervous system

- M.G. - Myasthenia Gravis
- A.L.S
- G.B. - Guillain-Barré Syndrome



Highlighted are the **Most Tested**

TEST TIP

- NO drugs or interventions will CURE these conditions
- We can only **treat to prevent progression**

Promote Independence All Neuro Disease Patients

- Never do All ADLs
- Gait training
 - **1st - Teach** Gait training
 - **Then** offer **Cane**, then Walker, last wheelchair



M.S. - Multiple Sclerosis

(autoimmune disease - body attacks itself)

Memory Trick:

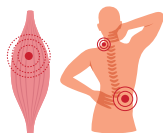
- **MS** - Myelin Sheath destruction
- **MS** - Muscle Spasm & Stiffness
- **MS** - Mellow out & Stay cool (no sun)

Teach:

- **Balance** exercise & rest
- **AVOID 4 Ss** = Trigger **Flare Ups**
 - **S** - Stress (exercise, surgery, injury) - Don't over exercise
 - **S** - Sickness or Sepsis - Stay healthy & free from infections
 - **S** - Smoking - use smoking cessation
 - **S** - Sun & Extreme heat (hot tub, bath, sauna)

Pharmacology

- **IVIG** - acts as bait - the body attacks this substance instead of the nerves.
- **Cyclosporine** - immunosuppressive think "Cyclo**SPARIN**"- spares the body from attacking itself



M.G. - Myasthenia Gravis

(autoimmune disease - body attacks itself)

Memory Trick:

- **MG** - MYasthenia Gravis
- **MG** - DRY-asthenia Gravity Dry body & Weak muscles - like Loads of Gravity weighing down the body.



AVOID the 4 S's = Trigger **Flare Ups** (see above)

Myasthenic crisis: respiratory arrest!

Airway protection (safety with swallowing)

- **Intubation** set up - BEDSIDE
- **BEFORE meals:** Give pyridostigmine (anticholinesterase drug) **NCLEX TIP**
- Encourage semi-solid foods

Pharmacology

Neostigmine: given to treat the dry. Think Stigmine adds Secretions.

Alzheimer's

Patho: Brain damage resulting in Dementia "daMage to the brain"

Signs & symptoms: VERY forgetful & loss of reality

Key Point

- **Safety:** NO rugs, LOCK everything
- **Location:** Lock doors leading outside!
- **Communication:** Distract & REDIRECT from reality Redirect any Dementia clients who get easily frustrated



Parkinson's Disease

Patho: Low dopamine - HIGH acetylcholine

3 Key Signs for NCLEX

1. Shuffling gait & Decreased arm swinging **NCLEX TIP**
2. Pill rolling - looks like rolling a pill between fingers
3. Tremors at rest - lots of jittery movements

Memory Trick: You can't jump ROPE if you got low DOP - improved movement with more dopamine.

Pharmacology

- **LevoDOPA** & **CarbiDOPA** Leaves more DOPamine in the body & Carbidopa helps conserve MORE dopamine
 - **AVOID protein** - can block absorption
- Memory Trick: LEAVE the protein with LEVODopa**

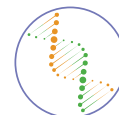


Huntington Disease

Key Point

- Passed on by Genetics
- Only requires 1 parent!
- Recommend Genetic counseling

Memory Trick HuntingTON - One parent needed to pass on the disease



A.L.S. (Amyotrophic Lateral Sclerosis)

- **Dysphagia** - **Difficulty swallowing**
- **Dysphasia** - Difficulty speaking
- **Priority finding** - Increased **respiratory** secretions



G.B. - Guillain-Barré Syndrome

Patho: clients get **RAPID** ascending paralysis from the legs up eventually reaching the respiratory system which ultimately kills the patient!

Memory Trick: Ground up barees - paralysis from the legs up

Respiratory failure (early signs)

- **Inability to cough** **NCLEX TIP**
- **Inability to lift the head** or eyebrows **NCLEX TIP**



Parkinson's Disease

Pathophysiology

A movement disorder with the progressive death of neurons in the brain resulting in Low dopamine & HIGH acetylcholine

Memory Trick

- Think NO dope in the park - low **DOP**amine - in **PARK**-insons
- **HIGH** acetylCCCholine - we get **High** seCCCretions with lots of drooling

Signs & Symptoms

- Resting tremors
- **Bradykinesia**: delay in initiation of movement

3 Key Signs

1. Shuffling gait & Decreased arm swinging
2. Pill rolling
3. Tremors at rest

Other common: Dysphagia (diff swallowing) & Drooling

HESI

Q: Dopamine

A: Neurotransmitter ... primarily affects motor function & gross subconscious movements of the skeletal muscles.

Kaplan

Statement that indicates an understanding of tremors with Parkinson's?

- "Tremors decrease when attention is diverted by activity"

HESI

Signs of Parkinson's

- "propulsive shuffling gait"
- Drooling of saliva
- Decreased arm swing

Diagnostics

HESI

Diagnostic tests for Parkinson's? Select All That Apply

- CT brain - cerebral atrophy wasting away or destruction of brain tissue
- Decreased motility in pt. Upper GI tract
- Positive response to low dose carbidopa levodopa



Patient Education

Kaplan

Realistic goal... Parkinson's disease?

Maintain optimal function within the client's limitations.



Common NCLEX Question

FURTHER teaching needed for a patient statement...

- Answer: This treatment will CURE my disease



Critical Complications

• Airway = #1



- Suction set up at bedside (excess drooling)
- Eating
- Pureed Diet + "Small bitesized pieces"
- Tissues readily available during eating
- "Add thickening agent to fluids"
- Dysphagia - Monitor swallowing
- HOB up - High Fowler's "Sit Upright"

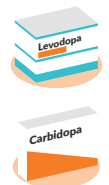
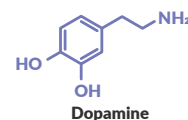
Pharmacology

- Increase DOPamine
- Decrease Acetylcholine
- Levodopa

- Levodopa & Carbidopa (combo drug)
- AVOID protein

Memory Trick LEAVE the protein with LEVOdopa

- Bzotropine - treat resting tremors
- Pramipexole - dopamine agonist - stimulates more dopamine



HESI

Patient taking carbidopa-levodopa, selegiline, and pramipexole. Based on these meds ... patient has which disorder?

- Parkinson's disease



Side note:

- Selegiline - actually an MAOI antidepressant - increases availability of dopamine & other neurotransmitters in the brain

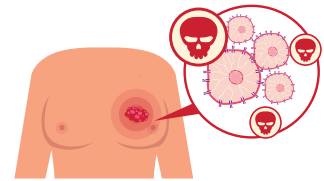
Oncology

Breast Cancer

Med Surg: Oncology (Cancer)

Pathophysiology

Breast cancer is the **uncontrolled growth of cells** in the breast tissue. It is deadly because the breasts are very vascular with lymph tissue & blood vessels acting like highways to the body, where **cancer can easily spread**.



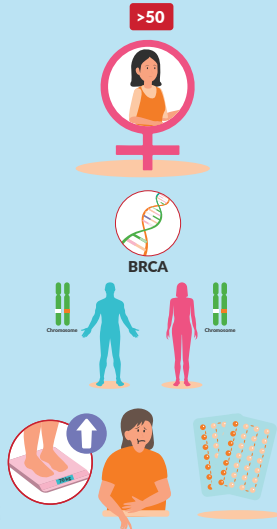
Causes & Risks

NCLEX TIPS

- **Female**
- Age **over 50** (common **postmenopause**)
- **Family History:** sister / mother
- **Personal History:** ovarian / uterine cancer
- **Genetic mutations: BRCA**

Lifestyle Risks

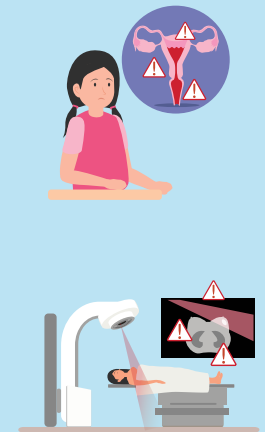
- **Weight gain & Obesity**
- **Oral contraceptives** (birth control)
 - Estrogen & Progesterone
- Diet: High fat, Low fiber
- Alcohol & Smoking



Saunders

Educational session ... discussing the risk factors with breast cancer. **Select all that apply.**

- **Early age menstruation**
- **Family history** of breast cancer
- High-dose **radiation** exposure to chest
- **Previous cancer** of the breast, uterus, or ovaries



Diagnostics

Mammograms are essential for high risk patients, done every year. No powder lotion or perfumes.

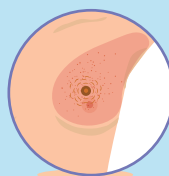


"Just a reminder that mammogramming your breasts is more important than instagramming them."

Signs & Symptoms

Self Breast Exam Report to HCP NCLEX TIP

- **Red & Warm**
- **Orange peel skin**
- Pitting appearance **"small indented areas"**
- Hard **painless** swelling "immobile"
- **No pain** or discomfort (until it spreads)



Fibroadenoma: Benign breast disorder

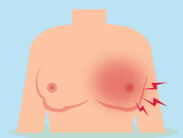
- Round, **Painless, Mobile** lump

Fibrocystic disease: Benign

- **Nodules:** soft, mobile
- Breast changes in size during menstrual cycles

Key point

Malignant Cancer!
REPORT breast changes
NOT RELATED to menstrual cycle



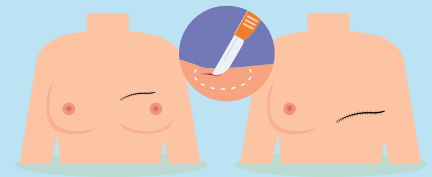
Notes

Breast Cancer & Mastectomy

Med Surg: Oncology (Cancer)

Mastectomy

A mastectomy is surgery to remove the whole breast or partial breast & sometimes lymph nodes are removed, which places the client at higher risk for both infection & swelling.

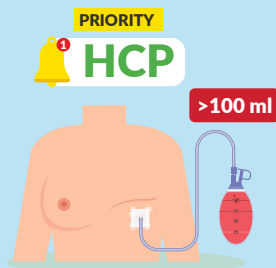


Post-Operative

- Blood drainage: Jackson Pratt bulb

REPORT to HCP:

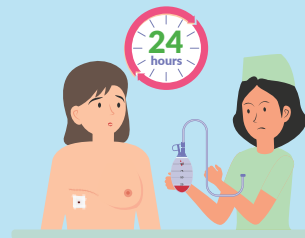
- Over 100 mL "bright red"



KAPLAN

Mastectomy of the right breast ... Which intervention should the nurse include in the plan of care?

- Instruct the client that the drain will be removed when there is 25mL or less of drainage within a 24 hour period



HESI

Q1: 24 hours postoperative after a ... mastectomy ... Which nursing intervention is most appropriate for this patient?

- Monitor the patient for signs of shock or hemorrhage

Q2: Bilateral mastectomy and removal of the axillary lymph nodes. Interventions to prevent which complication will be most important after surgery?

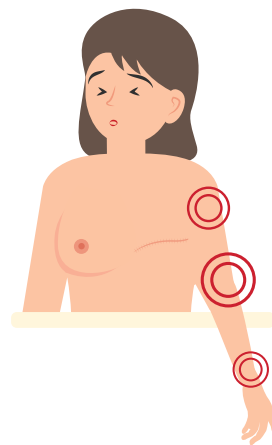
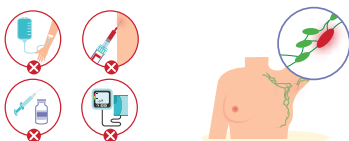
- Infection



Teaching

Key Points NCLEX

- **AVOID** affected arm
 - **NO** IV & Blood Draws
 - **NO** Vaccines
 - **NO** Blood pressure
- **Prevent Swelling**
 - Compression sleeve
 - **Elevate arm** above the heart
 - Perform exercises
- **NORMAL** "Expected"
 - Numbness
 - Lymph Node swelling



KAPLAN

Discharge teaching ... postoperative radical mastectomy. Which of the following instructions should the nurse include?

- Numbness can occur along the inside of the affected arm

Saunders

Q1: Following a mastectomy ... Which nursing intervention would assist in preventing lymphedema of the affected arm?

- Elevating the affected arm on a pillow above heart level

Q2: Mastectomy ... 2 weeks ago... she has numbness in the area of the surgery ... the nurse should provide which information to the client?

- These sensations dissipate over several months and usually resolve after a year

Eye Cancer

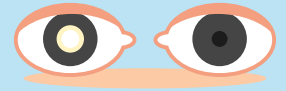
Med Surg: Oncology (Cancer)

Pathophysiology

Retinoblastoma is the **most common eye cancer in childhood**, typically diagnosed in children less than 2 years of age.



≤ 2 year-old



Retinoblastoma

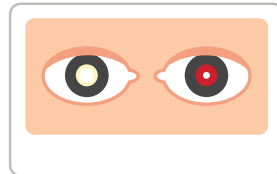
Signs & Symptoms

NCLEX TIPS

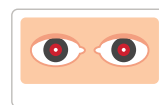
1. **White pupil** (Leukocoria)
2. Absent **red reflex**

MEMORY TRICK

RED-inoblastoma



Normal



Late sign



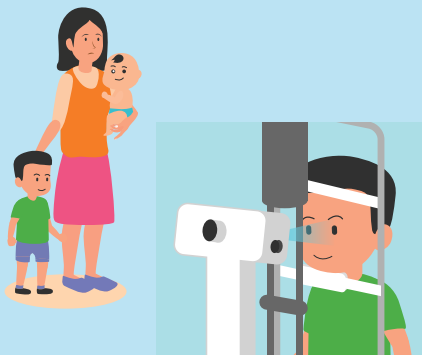
First recognized when parent report a **white pupil**.

This may be first seen while taking a photograph using a flash.

Another sign is a **Strabismus**, or wandering misaligned eye, but that is a late sign.

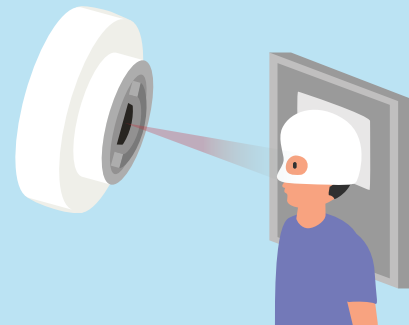
Interventions

Siblings should undergo ocular screening **NCLEX TIP**



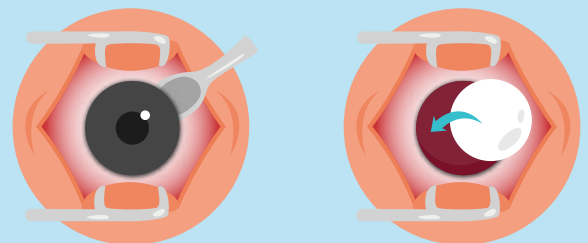
Siblings should undergo ocular screening as some forms of retinoblastoma are hereditary.

Retinoblastoma interventions - Radiation.



Enucleation

(removal of the eye & placing a prosthesis)



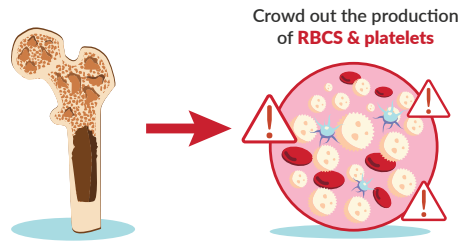
Notes

Leukemia

Med Surg: Oncology (Cancer)

Pathophysiology

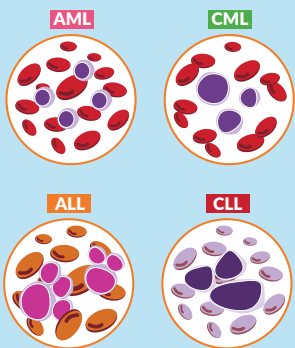
Leukemia is a type of cancer that affects the **blood cells & bone marrow**. Bone marrow is responsible for making blood cells: WBCs, RBCs, platelets. In Leukemia there is an **overproduction of white blood cells (WBCs)** that crowd out the production of normal cells, leading to low RBCs & low platelets.



Leukemia

- Leuk = Leukocyte (WBC)
- emia = blood

Main Types

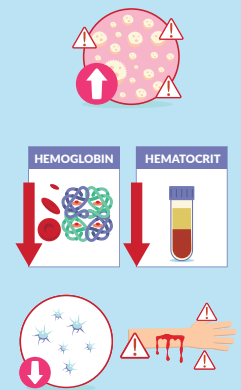


- AML** - Acute myeloid Leukemia
Pediatrics more common
- CML** - Chronic myeloid Leukemia
- ALL** - Acute Lymphocytic Leukemia
- CLL** - Chronic Lymphocytic Leukemia

Labs

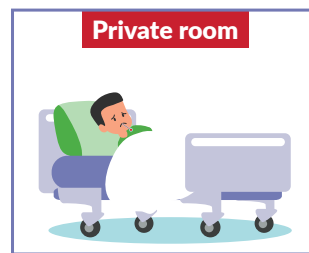
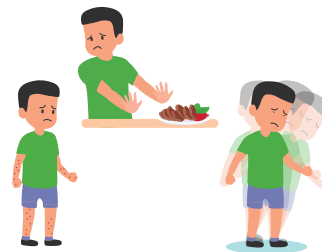
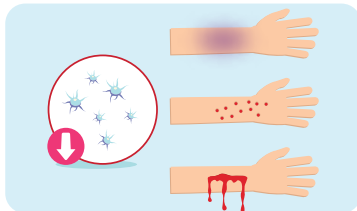
Labs

- High WBCs
- Low H/H
- Low Platelets



Signs & Symptoms

- **Frequent infections**
- **Fatigue**, Unsteady Gait, Pale "Pallor"
- **Bruising**, Petechiae, & easy Bleeding
- Weight Loss & **Anorexia**
- Bone pain



ATI Question

A nurse is assessing a child who has leukemia. Which of the following findings should the nurse expect? Select all that apply.

- Anorexia
- Petechiae on the extremities
- Unsteady gait

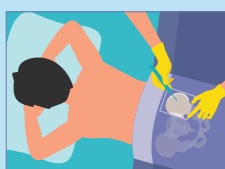
ATI Question

7-year-old with acute lymphoblastic leukemia who is being admitted for evaluation of fever. To which of the following rooms should the nurse assign the client?

- **Private room** in order to prevent transmission of infection from others

Diagnostics

Bone marrow biopsy
Taken from the posterior iliac crest



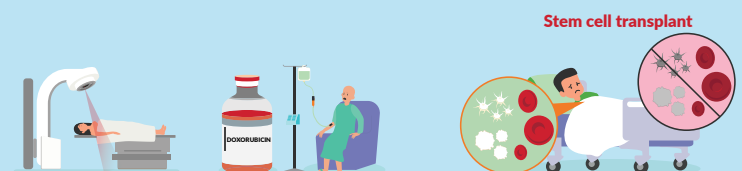
HESI Question

A nurse preparing a patient for a **bone marrow biopsy** knows which site will most likely be used?

- **Posterior iliac crest**

Treatment

Radiation & Chemotherapy to kill the cancer.
Rarely: Stem cell transplant - like hitting the restart button to reboot the bone marrow.



Lymphoma

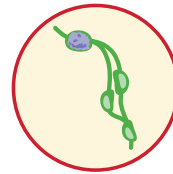
Med Surg: Oncology (Cancer)

Pathophysiology

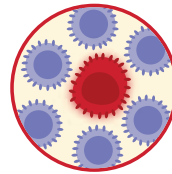
Lymphoma is cancer within the **lymphatic system**, the body's disease fighting network including:

- **Lymph nodes** - the drainage tubes that help to empty the waste
- **Spleen** - houses the white blood cells (WBCs), which help to defend the body against infection
- **Thymus gland** & bone marrow

Hodgkin's



Non-Hodgkin's



Diagnostics

Hodgkin's = Reed-Sternberg

Non-hodgkin = NOT reed sternberg cells

HESI Question

What is the main diagnostic feature of **Hodgkin's** disease?

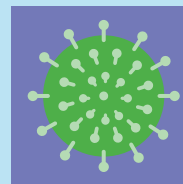
- **Reed-Sternberg** cells



Causes

Epstein Barr virus

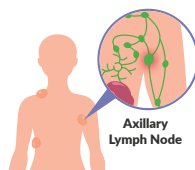
50% of cases



Epstein Barr virus

Signs & Symptoms

- **Painless** Bumps & "Lumps **under arm**"
- Enlarged lymph glands
- Fever (**no chills** or feeling bad)
- **Weight loss**
- **Night sweats** (changing sheets)
- Infections



HESI Question

A nurse caring for a patient with **Hodgkin's lymphoma** knows the patient is at an **increased** risk for which complication?

- **Infection**

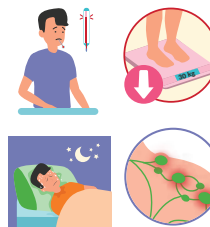


Saunders Question

Hodgkin's disease... Which assessment findings noted in the client's record are **associated** with this diagnosis?

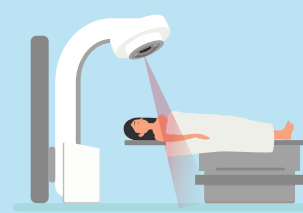
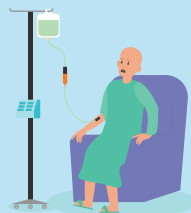
Select all that apply.

- Fever
- Weight loss
- Night sweats
- Enlarged, painless lymph nodes



Treatment

Clients are treated with chemotherapy and/or radiation.

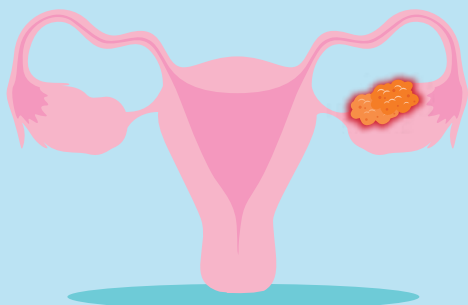


Notes

Ovarian & Cervical Cancer

Med Surg: Oncology (Cancer)

Ovarian Cancer Signs & Symptoms



- **Bloating & pelvic pressure** **NCLEX TIP**
- Increased abdominal girth
- **Urinary** urgency, frequency



Saunders Question

Educational session on cancer of the cervix ... **early** sign of this type of cancer?

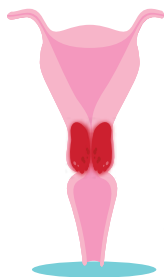
- **Irregular** vaginal bleeding

Educational class on **ovarian cancer** ... Which **signs and symptoms** should the nurse include in the presentation?

Select all that apply.

- Having urinary **urgency or frequency**
- Experiencing **pelvic or abdominal swelling**

Cervical Cancer Causes



HPV **NCLEX TIP**

Human PapillomaVirus

- Spread by **skin-to-skin** contact
 - **Even with condom use**
- Vaccinate **before** sexual activity
- Both boys and girls



Risk factors

- **Multiple** sex partners
- Sexual activity **before 18**
- Oral Contraceptives "birth control"
- HIV



Saunders Question

Which are risk factors for **cervical cancer**?

Select all that apply.

- **Smoking**
- Multiple **sex** partners
- Human papillomavirus (**HPV**) **infection**
- First intercourse before 17 years of age

Cervical Cancer Screening

Pap test "pap smear"

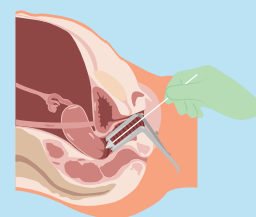
- Women **over 21** years (sex or not)
- **Every 3 years** **NCLEX TIP**



HESI Question

Which **diagnostic test** is useful for diagnosing **cervical cancer**?

- Papanicolaou (**Pap**) test



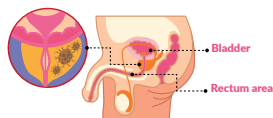
Notes

Prostate & Testicular Cancer

Med Surg: Oncology (Cancer)

Prostate Cancer Pathophysiology

Cancer of the prostate, affecting only males. Tumor grow under the bladder in front of the rectum area.



Signs & Symptoms

- **Anemia** pale skin "pallor"
- General weakness & fatigue
- Difficult & painful urination **NCLEX TIP**

HESI Question

Q1 A male patient comes to the clinic complaining of **general weakness, difficulty urinating, fatigue, and pallor** that began 1 week ago... laboratory results show **anemia**. Which question should the nurse ask next?

- When as your last **prostate examination**

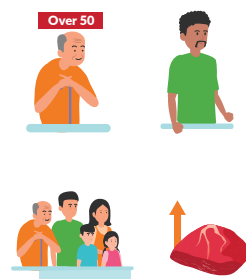
Q2 Diagnosed with stage 4 prostate cancer. The nurse knows which characteristic describes this type of cancer?

- Widespread metastasis



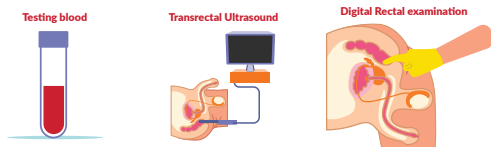
Risk Factors

- Older **Over 50**
- **African-American** men
- **Family** history
- Diet: **HIGH in red meats**



Diagnostics

Detected by testing **blood sample, transrectal Ultrasound** or digital rectal examination - **Prostate exam**



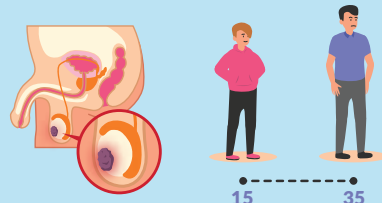
Surgery

Prostatectomy or **Turp** to take out the prostate



Testicular Cancer Risk Factors

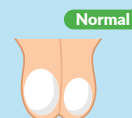
Most common cancer in men between ages 15-35. Undescended testes when young.



Screening

TSE - Testicular Self-Exam

- Each month on the **same day**
- During a **warm shower** or bath
- Palpate:
 - Each test: **Thumb & first 2 fingers** **Kaplan**
 - **Both hands** feel testis **separately** should feel
 - Smooth, soft & round like an egg **HESI**
 - **Normal:** one testis larger than the other



Report to HCP!

- Hardened **lump "mass"** (painless)
- Dull ache
- Swelling & Enlarged **scrotum = Hydrocele**



KAPLAN

A nurse is **teaching** a client how to perform **testicular self-examination**. Which **instructions** should the nurse include?

- Roll each testicle between the **thumb and fingers**



Saunders

While performing **testicular self-examination** ... found a **lump** the size and shape of a **pea**. Which statement is the **most appropriate** response to the client?

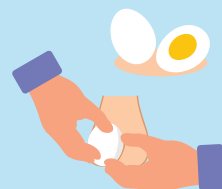
- That's **important to report** even though it might not be serious



HESI

Teaching a patient about **testicular self-examination**. Which statement by the patient indicates the need for **further teaching**?

- The testes should be smooth and **hard to the touch**



Skin Cancer

Med Surg: Oncology (Cancer)

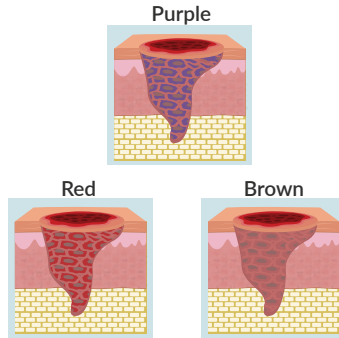
Pathophysiology

Uncontrolled growth of cells within the skin.

TYPES

- Basal cell carcinoma
- Squamous cell carcinoma
- Sarcoma **NCLEX TIP**
- **Melanoma**

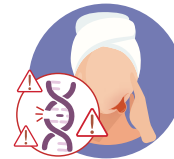
KEY TERMS



Mole = Nevi



Tumor = Neoplasm



MEMORY TRICK

- **BeNign = Be Nice**
- **MALignant = MALicious**

Saunders

Client diagnosed with **melanoma** ... Which statement by a client indicates that **education** was **effective**?

- It is **highly metastatic**

Signs & Symptoms

Screening: Skin Lesions

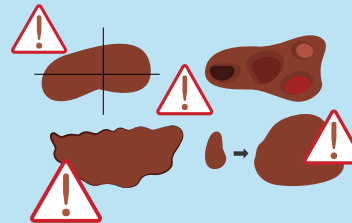
NCLEX TIPS

- A** - Asymmetry: **Irregular is BAD**
 - Half raise & half flat
- B** - Border **irregularity**: Uneven edges
- C** - **Color** Variation and changes:
 - Mixture of brown, tan, black, & red
 - **Black** / dark
- D** - **Diameter Over 6 mm**
 - Lesion is the **size of a coin** or nickel
- E** - **Evolving** - changes in size, shape, and color



NCLEX TIP: Key Terms

- **Irregular** or **Uneven** growth
- Change: **Abrupt, Sudden, Rapid** (color, size, shape)



HESI Question

The nurse notes ... **widespread nevi** across the body. Which characteristic, if demonstrated by **one of the nevi**, would cause the nurse to be **concerned about malignancy**?

- **Irregular border**

Causes & Risk Factors

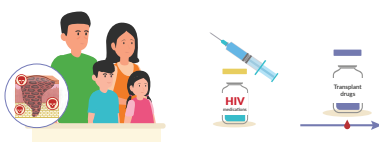
Environmental NCLEX TIPS

- Exposure to UV light
- Tanning beds
- Sun exposure
 - "Frequent sunburns"
 - "Outdoor occupation"

Genetics NCLEX TIPS

- **Family History** of skin cancer "father or mother with melanoma"
- Caucasian (light skin, blonde hair, freckles)
- **High number of moles**

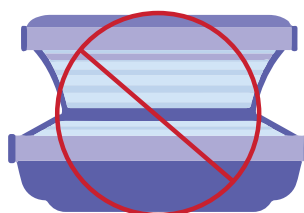
Drug Immunosuppressant medications



HESI Question

What would the **nurse advise** a patient to avoid to minimize the **risk of skin cancer**?

- Tanning beds



Diagnostics

Tissue biopsy is required to make a definitive diagnosis of skin cancer, but again

ONLY the ones with **irregular uneven changes**.

Education

NCLEX TIPS

- Apply **broad spectrum sunscreen**
 - **15 minutes** before
 - SPF over 30
- **Reapply sunscreen**
 - Every 2 hours
 - **After swimming**
- **Sunburns** can happen on **overcast days** & avoid sun **10 am - 4 p.m.**
- **AVOID** tanning beds



Cancer Prevention

Med Surg: Oncology (Cancer)

Education

Diet

- **High Fiber**
- Veggies (**broccoli, beans, cabbage**)
- **Bran**
- Fruit & **whole grains**

AVOID Bad Habits

- Limit alcohol = **less than 2 drinks/day** HESI
- **Tobacco** "Smoking cessation" **NCLEX TIP**
 - Smoking: cigarettes / cigars
 - Chewing tobacco
- **Obesity** = Lose Weight

<2 drinks per day



Saunders

Cancer prevention seminar ... effective if the clients select which food items on the menu?

- **Broccoli**, baked fish, mashed potatoes

HESI

Q1: Increase intake of which foods to aid in cancer prevention?

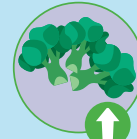
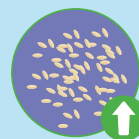
Select all that apply.

- **Beans**
- **Whole grains**
- All types of **cabbage**

Q2: Which dietary modifications ... for preventing cancer development?

Select all that apply.

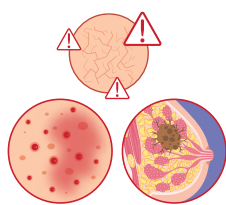
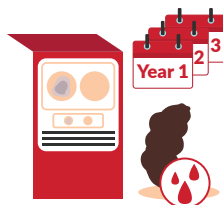
- Increase **broccoli** intake
- Consume more **dietary bran**
- **Restrict alcohol** consumption to less than 2 drinks per day



Screening 8 warning signs of cancer

"Sudden" "Rapid" "Unexplained" **NCLEX TIP**

1. Unusual sudden **Bleeding**
2. Unusual **Weight Loss**
3. Change in Urine And **Bowel Habits** = Colon Cancer
Yearly fecal occult blood test **HESI**
4. A **Non-Healing Sore** & Thickened **Lump**
5. Cough
 - Nagging, Constant, Persistent
 - **Hoarseness for months**
6. Skin Changes = Skin or breast cancer
 - Skin lesions "**Irregular** or **Uneven** growth"
 - "**Orange peel** with "**small indented areas**"
7. Difficulty swallowing and/or Indigestion
8. Fever & fatigue (night sweats)



HESI

A nurse is providing **education ... prevention & detection of cancer**. Which information is most appropriate to include?

Select all that apply.

- "Know the **8 warning signs of cancer**"
- "Eat a balanced diet that includes **vegetables, fruits, whole grains and fiber**"
- "Seek **immediate medical attention** if you notice a **change** from what's normal for you"

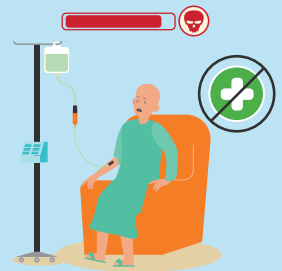


Palliative Care & Neutropenic Precautions

Med Surg: Oncology (Cancer)

Palliative Care & Hospice - Terminal Cancer

Clients who will pass away from untreatable cancer will typically go home on hospice care for comfort. Palliative care is delivered by a team of medical professionals & goals of care must be set up.

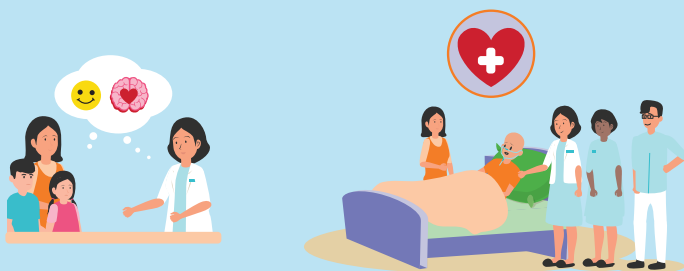


- **Decision making**
 - Family should participate in **decision making**
 - **Patient's ultimate choice**
- Intense psychosocial support
- **Therapeutic communication:** factual, open, and honest

KAPLAN

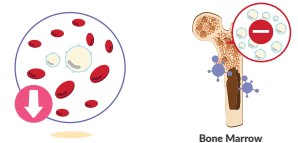
Client who has **terminal cancer**... tells the nurse "I wish I could stop these treatments, I am ready to die." Which of the following **statements** should the nurse make?

- "Discontinuing the treatments is **your choice** if you choose to do so"



Neutropenic Precautions

Neutropenia is the very low white blood cell (WBC) count - normally 5,000 - 10,000. This happens when clients with cancer undergo **chemotherapy & radiation** which kill the cancer cells, but also kill the bone marrow where WBCs are produced. Clients have **HUGE** risk for infection!



Interventions

2 BIG TEST TIPS

1. **NO** Fresh Flowers, or Fresh Fruits
2. **AVOID** crowds & sick people!
3. **FEVER** is a priority **OVER 100.3 F (38 C)!!!**

NCLEX TIP

Neutropenic precautions



SAUNDERS

Client receiving **chemotherapy**... the **white blood cell count** is **extremely low** and places the client on **neutropenic precautions**. Which interventions are components of these types of precautions? **Select all that apply.**

- Removing **fresh-cut flowers** from the clients' room
- Instructing family members on the proper technique for **handwashing**
- Instructing family members to **wear a mask** to enter the client's room



HESI

A patient about to undergo **chemotherapy**... Which expectations will the nurse have when providing care to this patient?

- **Fresh flowers should be discouraged** from the room of a patient with **neutropenia**

KAPLAN

Q1: The nurse is planning care for a client with **neutropenia** due to chemotherapy. Which intervention should be included?

- Monitor the client's **temperature every 4 hours**

Q2: Client who is receiving **chemo**... Which of the following **findings** should the nurse identify as priority?

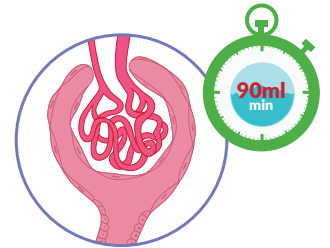
- Report of **sore throat**

Renal & urinary

Renal Anatomy & Physiology

Anatomy

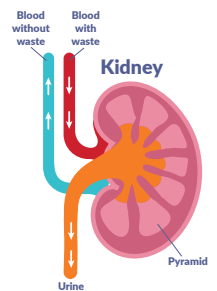
Inside the **nephron** (the functional unit of the kidney) is the **Glomeruli**, a network of small blood vessels that help to filter the blood from waste.



GFR - Glomerular Filtration Rate
Over **90 ml/min** is normal

Physiology

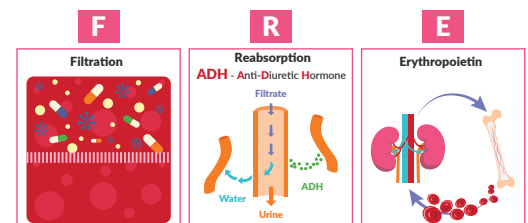
The kidneys function like 2 washing machines helping to wash the blood from waste through **Filtration**, regulating fluid volume by **Reabsorption**, and also stimulate red blood cell production by producing **Erythropoietin**.



Memory Trick

"FRE the PEE"

- **F** - Filtration of medications & waste
 - H - hydrogen ions (too much = High Acidity)
 - U - Urea (BUN - Blood Urea Nitrogen)
 - C - Creatinine (**Over 1.3 = Bad Kidney**)
- **R** - Reabsorption **ADH - Anti-Diuretic Hormone**
ADH - Add Da H₂O **Memory trick**
- **E** - Erythropoietin (stimulates RBC production in bone)



HESI

Three phases of urine formation?

Answer: Filtration, reabsorption, and secretion

HALF-LIFE

The time it takes for half of the medication to be eliminated from the body.



Memory Trick

The kidneys filter out HUC, since the kidneys sort of look like a pirate hook.



H+

Hydrogen Ions = High Acid

Are very acidic & too much can push the body into Acidosis. Renal failure & infection causes a back up of H+ Ions

pH BELOW 7.35



U

Urea BUN (Blood **U**rea Nitrogen)

10 - 20 Max

Byproduct of protein waste. Think of a protein bar wrapper, it is trash that the body tosses out.

This trash comes in the form of ammonia, which the liver converts into **UREA**, then it's pushed into blood & excreted by the kidneys. Hence the name blood **UREA** nitrogen.

C

Creatinine = **Critical Kidney Lab!**

Key Numbers:

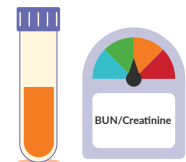
Over 1.3 = Bad Kidney

Urine Output 30 ml/hr or Less = Kidney distress

Higher creatinine levels in the blood = **Higher renal** impairment.

Creatinine is a waste product produced by the muscles coming from the normal everyday wear & tear.

Creatinine > 1.3



Common NCLEX Questions

List of clients **MOST** at risk for **Metabolic Acidosis**? **Select all that apply.**

- 1. Renal failure
- 2. Pyelonephritis
- 3. Patient waiting for hemodialysis
- 4. Hyperventilation related to anxiety attack
- 5. Child with diarrhea x 2 days

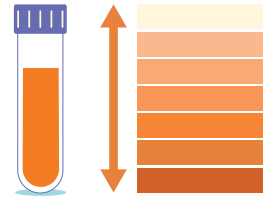
Client with an infected toe due to diabetes is scheduled for cardiac catheterization with contrast, which lab value should the nurse report to

- 1. Blood Urea Nitrogen level of 19
- 2. Blood glucose of 155
- 3. Creatinine level of 1.9
- 4. White blood cell count of 14,500

UA - Urine Analysis

Color

Light = Hydrated
Darker = Dehydrated
* (Unless on diuretics or in SIADH or DI)

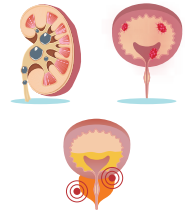


Specific Gravity 1.003 - 1.030

Low Gravity 1.003 = Liquidy body
High Gravity 1.030 = Dry body

RBC "blood" (hematuria)

Cause: Kidney stones, bladder cancer, post-operative TURP.



WBC "Leukocytes"

Cause: infection (UTI)

Nitrites - Kidney infection "pyelonephritis"

Memory trick: Look for the "N"

- N - Nitrites
- N - pyeloNephritis

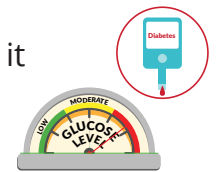
kidney pyeloNephritis

Urine Culture & Sensitivity

Culture: which bacteria is causing the infection

Sensitivity: which antibiotic is the bacteria sensitive to, in order to kill it

Over 10,000 organisms/ml indicates a UTI.



Protein HIGH = Nephrotic Syndrome - Nasty protein loss

Glucose HIGH = Diabetes

Common NCLEX Question

Exhibit ✕

Spec. Gravity: 1.030

Protein: None

Glucose: High

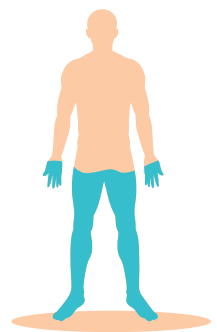
Red blood cells: None

Leukocytes: Medium

✕ Close

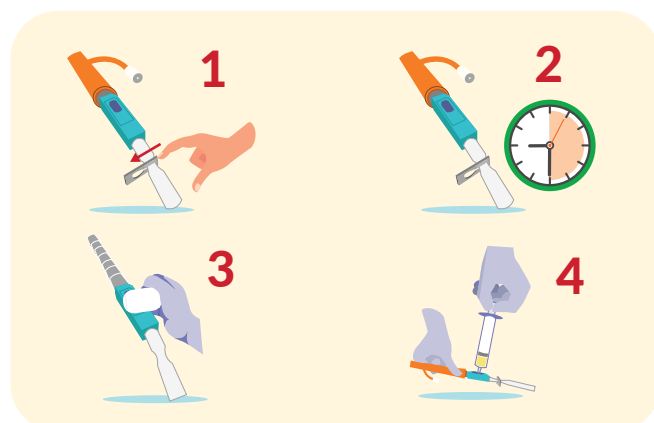
Client with history of diabetes... which does the nurse suspect?

- ✓ Dehydration (low fluid intake) & possible UTI.



KAPLAN Question

- Procedure for **collecting a sterile urine** specimen from a foley bag?
 - Answer:
 1. Clamp drainage tube below port
 2. Wait 15-30 minutes
 3. Scrub the port using an antiseptic swab
 4. Attach a sterile, needleless access device to aspirate a specimen via the port.



Bladder Cancer & Cystoscopy

Causes:

- Tobacco use
- Family history
- Chemical exposure



Signs & Symptoms MOST TESTED

Painless hematuria

KAPLAN Question:

Most common finding of **bladder cancer**?
Painless hematuria

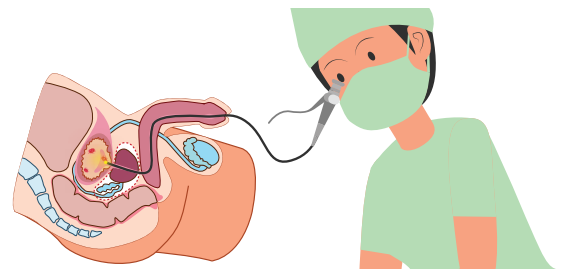


Diagnostic:

Cystoscopy
scope inserted through urethra to view bladder

After Procedure Notify HCP

- Blood clots & bright red blood
- Retention: Over 100ml
- Infection: Fever >100.4 F (38 C)
- Abdominal pain unrelieved by analgesics



HESI:

Cystoscopy teaching...

- "You will feel pressure during insertion of the scope."

KAPLAN:

Client with frequency, urgency, and dysuria after **cystoscopy**
• Highest nursing priority is to obtain vital signs (monitor for fever)



Common NCLEX Question:

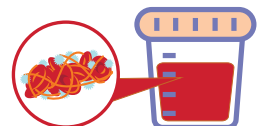
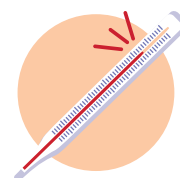
The nurse teaches the client to report which findings after a cystoscopy?

Select all that apply:

- ✓ Inability to urinate
- ✓ Elevated temperature over 100.4 (38 C)
- ✓ Blood clots in urine



100.4°F
(38°C)

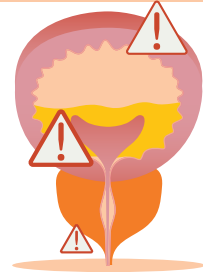


BPH, TURP & Prostatectomy

Benign prostatic hyperplasia: prostate enlargement that compresses the urethra & surrounding bladder causing difficulty urinating!

MEMORY TRICK

Big Prostate Holds



Signs & Symptoms:

KEY WORDS

- Urinary Retention
 - Sensations of Incomplete emptying
 - "Feel the need to urinate again **immediately after urinating**"
- Urinary Frequency & Nocturia
 - Need to awake at night with the "**urge to urinate**"
- Straining to void
 - "**strain** to begin a stream of urine"
- "Stream of urine - **weak or intermittent**"



Complications (NOT Normal)

- **UTI** (infection)
- "**burning sensation** with urination"
- **Cloudy or** smelly urine



Treatments:

- Bladder training & avoid caffeine
- Finasteride (brand Proscar)

HESI

What med will **shrink** the prostate = **Finasteride**



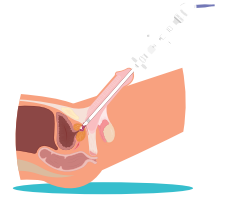
Memory Trick:

Think of a man with a **SWOLLEN** prostate riding around on a horse
 - OUCH - thats a very painful Ride So think - if you want a Fun ride -
 get **FINasteRIDE** lol

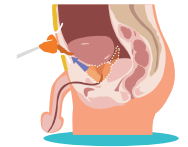
BPH, TURP & Prostatectomy II

Surgery:

- **TURP** - Transurethral resection of the prostate - less invasive as an instrument inserted directly through the urethra to remove the prostate.
- **Prostatectomy** - MORE invasive as a surgical incision is made.

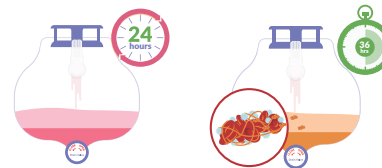


After either procedure - 3 way Foley catheter is used for continuous bladder irrigation. This gives pressure to bleeding tissue & allows urine drainage.



Key Points:

- Normal Immediately After** - Bloody urine
- **24 hours** After - Urine **Light Red** & Pink
 - **36 hours MAX** - **Small blood clots**



HESI

1. Benign prostatic hypertrophy (BPH) that has been refractory to treatment with other medications?
Answer: Anticipate TURP
2. Instructions for a patient who has undergone **prostatectomy**?
SATA
 - Observe for signs of **UTI**
 - Ensure fluid intake of **2-3 L per day**

Common NCLEX Question

- Prostatectomy **5 days ago** ... small **blood clots**. First action?
- Advise client to follow up with **HCP immediately**



REPORT

Kaplan

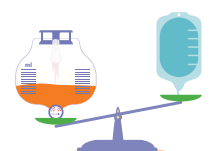
1. Expected assessment **immediately post TURP**?
 - **Bloody** urinary drainage
2. **24 hours after TURP** the nurse notices **bright red urine... First action?**
 - Contact health care provider immediately
3. **Third day post-op TURP**, catheter is removed ... uncontrolled dribbling after urination?
 - **Temporary incontinence** is expected following urinary catheter removal

So when a question says a client is reporting **SEVERE PAIN** with continuous bladder irrigation after a TURP.

First nursing Action: Assess amount & **urine output - light pink color** - BEST

Top test tip:

Output = **MORE** than input
NOT "equal to" or "less than"



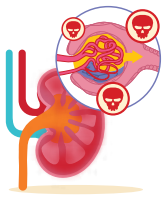
Glomerulonephritis vs. Nephrosis

Glomerulonephritis

- inflammation & scarring of the kidney

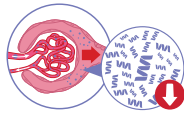
Cause:

Infection - typically Strep infection and usually gone in 14 days



Signs & Symptoms

- LESS protein loss
- UA: lower **Proteinuria**
 - Recent Strep infection (Key assessment)
 - Fever
 - Blood Labs: **WBC HIGH**

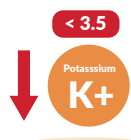


Treatment:

- Treat cause INFECTION
- Educate - finish all antibiotics
- Limit Protein NCLEX TIP
- Meds -Antihypertensives
 - A - Ace & Arbs
 - "-pril" - Lisinopril
 - "-sartan" - Losartan
 - B - Betas
 - C - CCB
 - D - Diuretics - "-ide"
 - Loops "FurosemIDE"
 - Thiazide "HydrochlorothiazIDE"



Both are potassium wasters - so watch out for hypokalemia (potassium less than 3.5)



Nephrosis (Nephrotic syndrome)

- Inflammation & scarring
- Key difference HIGH massive amounts of protein dumped into urine

Cause:

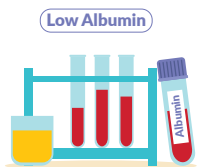
Autoimmune diseases like Lupus where the body attacks itself

Triggers - 4 Ss initiates an immune response

- **S** - stress
- **S** - sickness or sepsis (infection)
- **S** - smoking
- **S** - sun (hot temps)

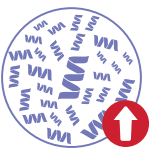
Signs & Symptoms

MORE protein loss
UA: **HIGH Proteinuria**
Blood Labs: Low **Albumin**
"Hypoalbuminemia"



Memory trick

- Nephrotic Syndrome
- Nasty protein loss



Deadly Complication

Renal Failure & HTN Crisis!

Report key signs:

- Headache & Mental Status Changes
- Nausea & Vomiting
- Oliguria - NO or low urine output
- New, Sudden, **Rapid Weight Gain**



Treatment:

- **Increase** Protein **NCLEX TIP**
- Treat cause & remove trigger
- Steroids "-sone" Prednisone



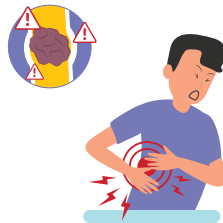
Kidney Stones

Pathophysiology

- **Renal Calculi** - hard stone calcified in renal
 - usually made of calcium
 Or names with Lith - meaning stone
- **Urolithiasis** - stone in urinary system
- **Renal Lithiasis** - stone in the renal
- **Ureterolithiasis** - stone in the ureter - tubes connecting the kidney & bladder

Signs & Symptoms:

- **Extreme PAIN**
- Like knife in the back
- Equivalent to childbirth



Kaplan

Priority intervention ... urinary calculi with right flank pain.

Relieving pain

Urine Analysis:

- Urine analysis:
- Hematuria **NCLEX TIP**
- Strain all the urine



Procedures: Shockwave Lithotripsy

Shock waves to break up LARGE stones into smaller stones that can be easily passed

Educate after procedure

Teach client to **Increase fluid intake**
NORMAL findings:

- Bruising & pain
- **Blood in urine** up to 24 Hours

NOT Normal

- Fever or chills

ATI

Expected findings after lithotripsy?

Answer: stone fragments in urine



Percutaneous Nephrolithotripsy

Also called nephrolithotomy, the HCP sticks a needle & scope into the kidney to suck out stones.

After the procedure - temporary nephrostomy tube & bag to allow any loose stones fragments to pass & in the bottom you expect to see sediment. The bad news is that this drainage tube can get clogged with stones!!

Key Point:

PRIORITY - Maintain tube patency

1. Irrigation of the nephrostomy tube with sterile normal saline

ATI

Teach patient to ... report back pain to provider for client with new nephrostomy tube

Treatment:

1. Administer analgesics
2. Fluid intake - **3 L/day**
3. Strain all urine for stones
4. Ambulation **"Walk & Move"**
5. **NOT** bed rest
6. **NEVER** massage



Diet:

- **Restrict Protein: "animal meats"**
- Limit Purines: red meats, organ meats, beer

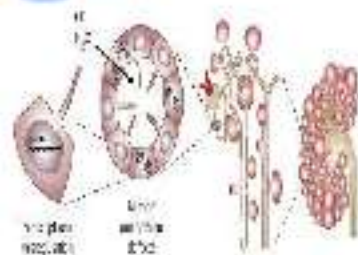
HESI

Urolithiasis teaching
- Restriction of **animal protein**

POLYCYSTIC KIDNEY DISEASE



12-16



WHAT AM I?

Cyst formation and hypertrophy of the kidneys.

PATHO

Cyst formation and hypertrophy of the kidneys.

Which leads to cystic rupture, infection, formation of scar tissue, and damaged nephrons.

TYPES

- ❖ **Infantile:** An inherited autosomal recessive trait that results in the death of the infant within a few months after birth.
- ❖ **Adult:** Autosomal dominant trait that manifests between 30&40 years of age and results in end stage kidney disease.

Polycystic Kidney Disease



ASSESSMENT

- ❖ Pain in the flank or lumbar or abdomen that worsens with activity.
- ❖ Fever & Chills
- ❖ Recurrent UTI
- ❖ Hematuria, proteinuria, pyuria.
- ❖ Calculi
- ❖ Hypertension
- ❖ Palpable abdominal mass
- ❖ Enlarged kidneys
- ❖ Increased abdominal girth.



LABS & DIAGNOSTICS

- ❖ **Urinalysis** may show hematuria, bacteriuria, or proteinuria.
- ❖ **Creatinine clearance** test may show renal insufficiency or failure.
- ❖ **Hematocrit** test may be elevated.
- ❖ Albumin level test may be decreased.
- ❖ **Serum electrolyte levels** may reveal hyponatremia, hyperkalemia, hyperphosphatemia, or hypocalcemia.
- ❖ **Ultrasonography identifies cysts.**
- ❖ **Excretory urography** reveals enlarged kidneys, with pelvic elongation, flattening of the calyces, and indentations caused by cysts.
- ❖ **Magnetic resonance imaging or computed tomography scanning (kidneys)** shows multiple areas of cystic damage.

TREATMENTS



Medications

- ❖ **Analgesics:** opioids, transcutaneous opioid patches, or perinephric injection of local anesthetics, for pain relief
- ❖ **Antibiotics:** ciprofloxacin hydrochloride (Cipro), levofloxacin (Levaquin), sulfamethoxazole-trimethoprim (Bactrim), for urinary tract infection
- ❖ **Antihypertensive agents:** angiotensin-converting enzyme (ACE) inhibitors (captopril [Capoten], enalapril maleate [Vasotec], and lisinopril [Prinivil]) or angiotensin receptor blockers (losartan potassium [Cozaar], irbesartan [Avapro], or candesartan cilexetil [Atacand]), for hypertension
- ❖ **Diuretics:** furosemide (Lasix), to treat hypertension and renal calculi
- ❖ **Electrolyte replacements:** calcium carbonate, and phosphate binders to reduce phosphorus load in renal failure
- ❖ **Tolvaptan (Samsca),** a selective competitive vasopressin receptor-2 antagonist, to slow progression
- ❖ **Kidney transplant**
- ❖ **Surgical cyst drainage.**

INTERVENTIONS

- ❖ Monitor for gross hematuria, this indicates cyst rupture.
- ❖ Increase sodium and water intake
- ❖ Provide bedrest
- ❖ Administer antihypertensives as prescribed.
- ❖ Prepare the client for dialysis
- ❖ Do not give the Patient NSAIDs due to increased risk of nephrotoxicity.

Renal Failure

Acute vs. Chronic

Acute kidney failure -- sudden short-term loss of kidney function. If not stopped & reversed - can lead to Chronic Renal failure (CRD).



VS

Chronic kidney failure -- long-term chronic damage to kidneys - years & years of destruction resulting in permanent damage



Kaplan

Acute Kidney Injury ... correct understanding?

- **Sudden loss of kidney function** due to loss of the renal system circulation or glomerular/ tubular damage



Pathophysiology & Causes

Acute Renal Failure:

1. **Prerenal** -- think decreased tissue "PRE-fusion"

- **Obstruction** - blocks blood flow & oxygen (emboli, clots, tumors)
- **Low Blood Pressure** - low perfusion (shock, hypovolemia, dehydration - from blood or volume loss); low MAP <65
- **Low Cardiac Output**



2. **INtrarenal**

INSide the renal

- **CT Contrast**
 - Contrast kills the kidney!
- **Antibiotics**
 - Vancomycin
 - Gentamicin
- Creatinine **over 1.3** = Bad kidney



2. **Post Renal** -- think Past the Renal

- Kidney stones, tumor, BPH

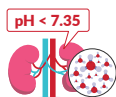
Key Numbers:

- Creatinine **Over 1.3** = bad kidney
- BUN **Over 20**
- Urine output **30 ml/hr Less** = Kidneys in distress
- Metabolic ACIDosis pH **below 7.35**

Kaplan

Best indicator of good renal functions

- 1500 mL urine in 24 hours



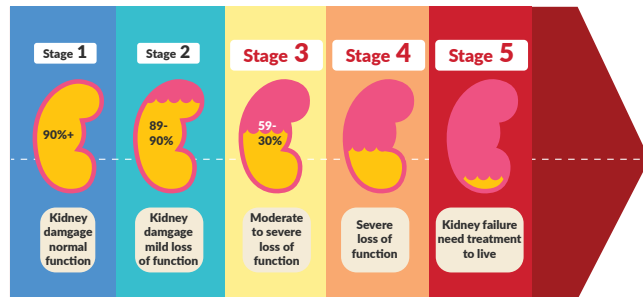
4 Phases

Acute Renal Failure

1. Onset of injury (initiation)
2. **Oliguric phase** - less than 400ml in 24 hours
LOW output = thick sticky urine
3. Diuresis phase - "Polyuric phase" - Diuresis = drain urine 3-6 L per day!
4. Recovery phase - SLOW up to 1 year for recovery



Chronic Kidney Disease



5 stages of CKD

GFR - Glomerular Filtration Rate
Over **90 mL/min** - normal

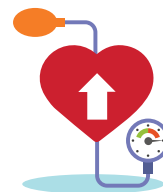
- Stage 1: 90 + GFR
- Stage 2: 89 - 60 GFR
- Stage 3: 59 - 60 GFR
- **Stage 4: 29 - 15 GFR**
- **Stage 5: 15 or Less GFR = End Stage Renal Disease**

HESI

Polycystic kidney disease
• At risk for end stage renal disease

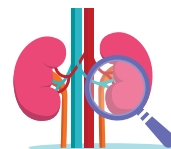
Causes of Chronic Renal failure

- Older age
- MOST commonly tested
 - Uncontrolled Diabetes - uncontrolled HIGH sugar
 - Uncontrolled HTN - uncontrolled HIGH blood pressure
- Unchecked autoimmune disease - body attacks the kidney



Diagnostics

- Creatinine - Over **1.3** = Bad Kidney
- **Creatinine clearance test**
 - 24 hours - collect all urine in a container
 - Discard the **FIRST** urine specimen



Hesi Question

Correct understanding of creatinine clearance test?
Save all urine samples in a container for a designated period after **discarding the first urine**



Renal Failure

Acute vs. Chronic II

Chronic Renal Failure

Signs & Symptoms

Oliguria - LOW urine output

Excess waste & electrolytes in the blood -
Broken Washing machine!

- H⁺ ions (Acid)
Metabolic **ACID**osis pH
below 7.35
- Urea
- Uremic frost
- Pruritus
- **HIGH** Electrolytes
- Sodium Na⁺ **HIGH** (norm: 135 - 145)
- Phosphorus **HIGH** (norm: 3.0 - 4.5)
- Potassium K⁺ **HIGH** (norm: 3.5 - 5.0)
 - Peaked T waves - 6 - 7 mEq/L
 - ST elevation - 7 - 8 mEq/L
 - Wide QRS complex - OVER 8 mEq/L



Kaplan Question:

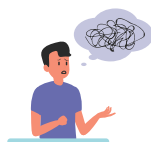
Patient with chronic kidney disease?
• **Oliguria** is **expected**

Critical Complications

Hypertensive Crisis

Priority Key Signs! NCLEX TIPS!!!

1. Headache
2. Nausea & Vomiting
3. Change in mental status



Signs of Fluid Volume Overload (FVO)

- Crackles in the lungs - wet fluid filled lungs
- JVD - jugular vein distention
- Bounding pulses from that fluid excess!

Anemia - Low RBCs, since kidneys release Erythropoietin, the hormone that stimulates bone marrow to produce red blood cells

Memory Trick

- 3 Ps
P - Potassium is
P - Priority - since it
P - Pumps the HEART muscles

High potassium Over 5.0

HIGH PUMPS in the heart resulting in
Peaked T waves & ST Elevation

Kaplan Question:

Client with **kidney disease** is weak/ lethargic and bradycardic

- K⁺ 8.5 mEq/L lab value is suspected

Priority Treatment

1. IV Calcium Gluconate for **Dysrhythmias**
Memory trick: Gluconate GLUES
down heart muscles
2. IV 50% Dextrose + Regular INSulin
3. Kayexalate (**polystyrene sulfonate**)
4. Dialysis

Top 2 Missed NCLEX Questions

Patient with chronic kidney disease missed 3 dialysis sessions... **potassium level of 8.1** ...
wide QRS complexes, heart rate of 58 & lethargy.
Which order should the nurse implement first?

- 1. IV 50% Dextrose & regular insulin
- 2. Sodium polystyrene sulfonate
- 3. Hemodialysis
- ✓ 4. IV calcium gluconate

End stage renal disease... **potassium 7.2**, BUN 35,
creatinine of 3.8, and urine output of 300 ml in 24
hours. Which order is **PRIORITY**?

- ✓ 1. IV Regular insulinR & 50% Dextrose
- 2. IV loop diuretic
- 3. Dialysis
- 4. Put in for vacation time?

Renal Failure

Acute vs. Chronic III

Nursing Interventions

- Daily Weights
 - 1 kg = 1 liter of fluid retained
- **Avoid:** the top drugs that can cause kidney failure
 - NSAIDS
 - Milk of Magnesia (Anti Acid)
 - Antibiotics: Vancomycin + Gentamicin
 - CT Contrast dye! Thick cement in washers!



Procedures

Hemodialysis: the machine version of the kidney, used to wash the blood. It is only used for a number of years until a **kidney transplant** is available.

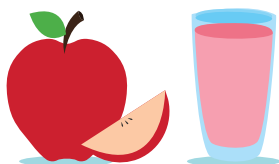
Diet

- **NO Sodium**
 - **No** canned / packaged foods -
 - **No** processed meats -
- **NO Potassium**
 - **Apples = BEST choice! NCLEX TIP**
 - **NO Salt Substitutes NCLEX TIP**
 - **NO** Leafy veggies (spinach)
 - **NO** Avocados, Carrots, Tomatoes
 - **NO** Strawberries, Oranges or Bananas
- **Low** - Phosphorus
 - **NO Dairy:** Yogurt, Pudding, Milk **NCLEX TIP**
- **Low** - Protein



HESI Questions

- Q: Best food choice for potassium of 6.5?
- **A:** Apple slices or apple juice... low K+ levels
- Q: Which statement ... need for further education?
- **A:** "I should reduce my sodium intake by using a salt substitute."



KAPLAN Questions

- Rationale for **low protein diet?**

Answer: preserve renal function

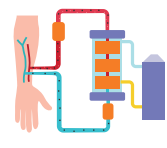
- Teaching about nutrition has been effective when the client states:

Answer: "I will eat red bell peppers and avoid red meats"



Renal Hemodialysis

- Machine version of the kidney
- Helps to clean the blood by filtering waste & flushes out excess fluid and electrolytes



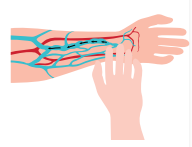
Memory Trick

Any time you see the word "DIAL" think of the soap, it cleans the blood



Before Dialysis

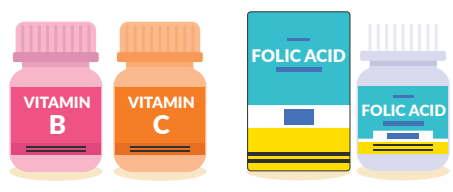
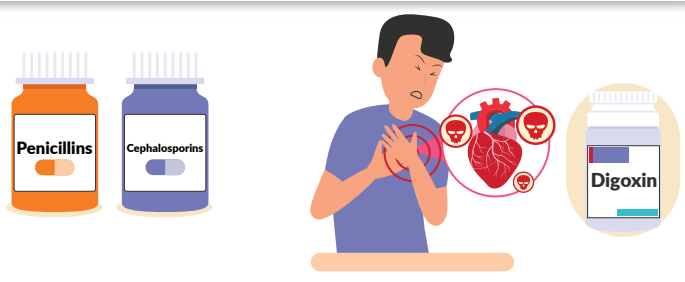
- Assess **Fluid Status**
 - Weight (current & previous)
 - Vital Signs
- Assess **Fistula** (shunt) **NCLEX TIP**
 - Feel a thrill "vibration"
 - Hear a bruit



- **Hold meds:**
 - **Antihypertensives**

A	Ace & Arbs Lisino pril , Los artan
B	Beta Blockers Ateno lol NCLEX TIP
C	Ca Channel Blockers Nife dipine , Verapa mil , Diltiaz em
D	Diuretics Furose mide , Hydrochlorothiaz ide
D	Dilators Nitroglycerine

- **Washed Out:**
 - Antibiotics
 - Digoxin
 - Water-soluble vitamins (B, C, and folic acid)



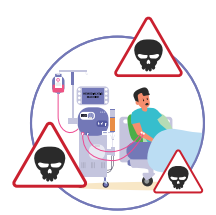
Deadly Complication

Dialysis disequilibrium syndrome (DDS)

a condition where solutes are removed too quickly from blood causing brain cells to swell with fluid resulting in DEADLY increased ICP - leading to coma & death!

Key Signs:

- **Restless & disoriented**
- Vomiting
- Headache



Priority Action

- Stop or slow infusion
- **Report to Provider NCLEX TIP**

Pt Education

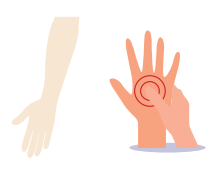
Care for Fistula (AV shunt)

- Squeeze or Grip: "Rubber ball" "sponge"
- Pitting edema = Normal

NOT Normal

Report to HCP **NCLEX TIP**

- P - Pale skin** "pallor"
- P - Paresthesia** "Numbness or tingling"
- P - Pulses diminished
- P - Poor cap refill
- P - Pain (distal to shunt)



Monitor:

- Infection - warm, red, or drainage at shunt site
- Bleeding
- Feel a thrill - feel a vibration - TEACH clients to check this several times a day

No Nos

- **NO** restrictive clothing or jewelry (watch)
- **NO** BP on affected arm
- **NO** sleeping on arm
- **NO** creams or lotions
- **NO** lifting **over 5 lbs (NO purse)**

Renal

Peritoneal Dialysis

- The peritoneal cavity is filled up with hypertonic solution to PULL solutes out

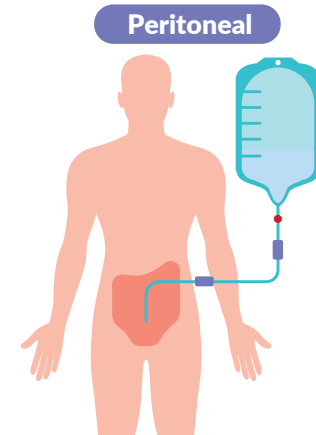
Before:

1. Take Weight
2. Warm solution

Kaplan

Proper preparation for peritoneal dialysis

First action: **Warm the dialysate**



Infection Risk:

Sterile technique **PRIORITY**

Peritonitis: Key Signs to REPORT to HCP

- Fever
- Tachycardia
- Cloudy drainage

Memory trick -

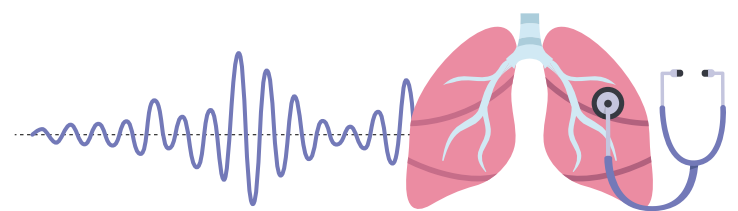
- no one likes cloudy dayyyys
- & nobody likes cloudy drainnnnng



Respiratory distress - due to rapid infusion or overfilling the abdomen:

Key Signs

- **Crackles** in lung bases
- Rapid respirations
- Dyspnea



Priority Intervention:

- First action: Raise HOB
- Remember breathing over circulation

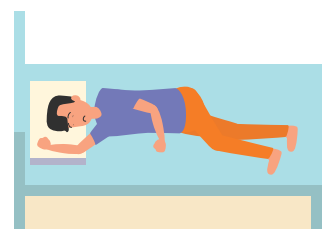
Kaplan Scenario

Patient on **peritoneal dialysis** ... begins to **suddenly breathe more rapidly**.

- First action: **raise HOB**

Insufficient outflow

1. Assess **Patient = abdomen**: distention & **Constipation**
2. Assess Device = catheter **kinks & obstructions**
3. Intervention: **Repositioning to side-lying position**

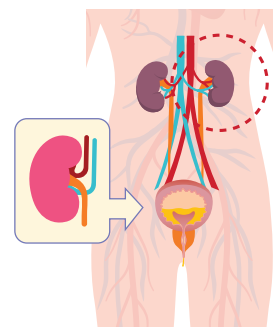


Renal

Kidney Transplant vs. Biopsy

Kidney Transplant

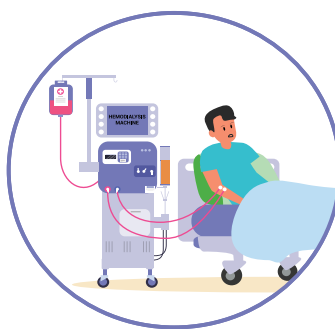
- **Before** - immunosuppressants to help prevent organ rejection
- **After** - Urine output - 30 ml/hr or LESS = kidneys in distress
 - s/s infection - low-grade fever is #1
 - s/s organ rejection - HTN, pain at sight



ATI Question

Teaching for client with end-stage kidney disease **awaiting kidney transplant**

- Hemodialysis sometimes needed after surgery

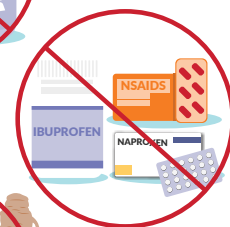
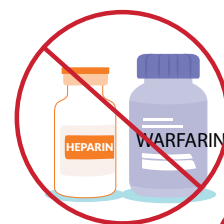


Renal Biopsy

- A tissue sample is taken from the kidney to determine specific diseases

Before

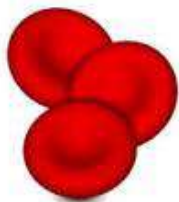
- **Discontinue** blood thinners at least 7 days before
 - **anticoagulants** - heparin, warfarin
 - **antiplatelet agents** - aspirin & clopidogrel (plavix)
 - **NSAIDs** - ibuprofen, Naproxen
 - Supplements:
 - E - Vitamin E
 - G - Gingko, Ginseng, Garlic
 - O - Omega 3
 - S - St john's Wort



After

- Priority: Assess **vital signs** every **15 minutes for 1st hour**
- Positioned on their back on affected side





WHAT AM I?

An accumulation of nitrogenous waste products in the blood caused by the kidneys inability to filter out waste products.



PATHO

Kidneys become damaged from disease process or injury causing inability to filter out nitrogenous waste products. This causes a buildup of waste in the blood stream, electrolyte imbalances, altered mental status and scanty output.

CAUSES

- ❖ CKD
- ❖ AKI
- ❖ Diabetes
- ❖ Kidney trauma



EDUCATION

- ❖ Educate the patient on dialysis procedures.
- ❖ Educate the patient on prescribed treatment regimen.
- ❖ Educate the patient on proper diet to reduce the risk of recurrence.

UREMIC SYNDROME

ASSESSMENT

- ❖ **GI/GU:** Oliguria, Hematuria, magnesium, potassium, uric acid in the urine. Stomatitis, nausea, vomiting, diarrhea, constipation.
- ❖ **CARDIO:** Hypotension or hypertension, dysrhythmias
- ❖ **CNS:** Altered level of consciousness.
- ❖ **HEME:** Anemia with hemoglobin less than 8 mg/dL.

W: Waves of nausea and vomiting.
A: Altered Level of conscious, anemia
S: Some blood in the urine
T: Terrible BP
E: Extra waste in the urine and blood
D: Dysrhythmias



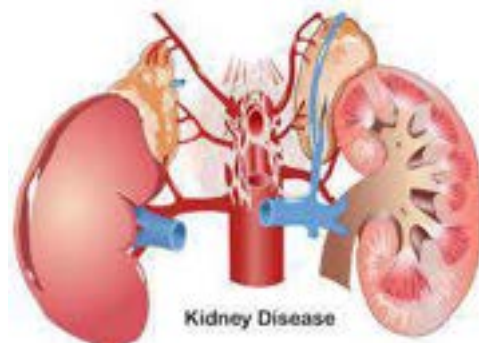
TREATMENTS

- ❖ Hemodialysis, Peritoneal dialysis, Hemofiltration, and Renal replacement therapy.
- ❖ Calcitriol, calcium reducers, erythropoietin.
- ❖ Kidney transplant.



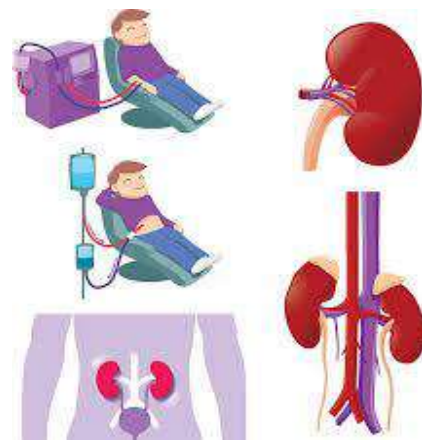
LABS & DIAGNOSTICS

- ❖ **Urinalysis:** Mild proteinuria may be present; red blood cells (RBCs) and RBC casts may be present.
- ❖ **(BUN), serum creatinine, and serum electrolyte levels:** Elevated.
- ❖ **Hematologic determination:** Severe anemia may be present.
- ❖ **Hemolytic workup:** Results may show anemia. Bilirubin levels may be elevated. Lactate dehydrogenase (LDH) levels may be elevated. Haptoglobin levels may be decreased.
- ❖ **Stool culture:** Evaluate especially for *E coli* and *Shigella* bacteria.



INTERVENTIONS

- ❖ Monitor VS for tachycardia, hyper/hypotension and dysrhythmias.
- ❖ Monitor serum electrolyte levels.
- ❖ Monitor intake & Output
- ❖ Provide a high protein diet.
- ❖ Provide a limited sodium, nitrogen, phosphate and potassium diet.



Urinary Incontinence I

Urinary IN-continence: Client can't hold urine IN

U

URGE INCONTINENCE



- Sudden URGE to urinate
- Typically known as Neurogenic bladder (loss of bladder control)

S

STRESS INCONTINENCE



- Pressure STRESS causes urine to spill out
- Coughing, laughing, sneezing, running, jumping

O

OVERFLOW INCONTINENCE

- OVERflow leads to dribbling urine
- Incomplete emptying

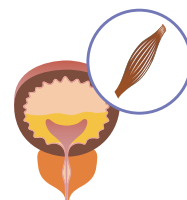
MEMORYTRICK

Big Prostate Holds



Causes:

- Urethra prolapse
- Prostate enlargement (BPH)
- Weak bladder muscles - diabetic neuropathy & spinal cord injury



HESI Question:

Q1: Male reporting **urine incontinence**

- Ensure **prostate** exam performed

Q2: **Stress incontinence** cause?

- Expected result of **aging**

Q3: The leakage of urine occurs in small amounts and is more frequent **when the patient coughs**. Which information does the nurse provide to the patient about the disorder?

Select All That Apply

- "This is called **stress incontinence**"
- "This is caused by weakness of muscles **around the urethra**"
- "This occurs when **intraabdominal pressure** exceeds urethral resistance"

Q4: Elderly female patient experiencing **urinary incontinence**. Which **physiological change** does the nurse **expect to see** in this patient?

- Decreased muscle tone

Urinary Incontinence II

Management:

Incontinence Teaching & Meds:

- **Train Bladder:** Void **regularly** every **2 hours**
- Weight Loss
- **Kegel** Exercises 4 x daily
- **AVOID:** Caffeine, Alcohol, Smoking
- Anticholinergic Meds:
 - **Oxybutynin** - to decrease sudden bladder spasms ...B in Butynin & Bladder
 - **Dry mouth - side effect**

Kaplan Question

1. **First nursing action** ... for urinary habit training?
 - Establish the client's **voiding pattern**
2. 78 yo client, 200 lbs, with 4 live births experiencing **stress incontinence** ... most appropriate statement by nurse?
 - "Let's talk about ways to **reduce your weight**"

ATI Question

1. Teaching for a client with BMI 32 newly diagnosed with **stress incontinence**?
 - Teach to **lose excess weight**

HESI Question

- **Q1:** Patient with stress incontinence after birth of second child:
 - Teach to perform **Kegel exercises 4x daily**
- **Q2:** Considering the care plan information below, which condition is the patient most likely experiencing?

Care Plan info:

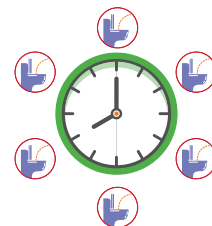
- "Remind patients to perform **Kegel exercises four times per shift**"
- "Assist to the **toilet every 2 hours.**"

- **Answer:** Urinary incontinence

Common NCLEX Questions:

Priority teaching for a patient newly diagnosed with **stress incontinence**?

- ✓ 1. Voiding every **2 hours**
- 2. Kegel exercises 4 x per day
- 3. Avoid alcohol & caffeine
- 4. Take oxybutynin



The client understands self-care of **urge incontinence** with which statements? **Select All That Apply**

- 1. "I am going to void only in the morning & evening to ensure bladder training"
- 2. "It is ok to have moderate amounts of wine at night"
- ✓ 3. "I understand that taking oxybutynin may result in dry mouth"
- 4. "I understand that having excess weight is ok."
- 5. "I will limit my intake of coffee to only 3 cups per day"
- ✓ 6. "I will do Kegel exercises every day"



Nursing interventions ... **overflow** urinary incontinence? **Select All That Apply**

- ✓ 1. Teach to bear down when voiding
- ✓ 2. Teach to wait 30 seconds after voiding to try & void again
- ✓ 3. **Monitor for skin breakdown**
- ✓ 4. **Record output**
- 5. Ask for overtime pay



Urinary Retention

Urinary REtention: Clients REtain urine in the their bladder so that it can't get out

Causes:

- After surgery - Post op
- After Foley Catheter is D/C
- Men: Benign prostatic hyperplasia (BPH)

HESI Question:

Patient at most risk for urine retention?

Answer: 65 yo man with **benign prostatic hyperplasia (BPH)**

Medications that cause retention

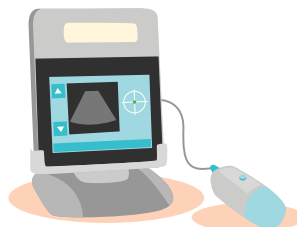
- Opioids (makes body low & slow)
 - Morphine & Hydromorphone - look for O's
- Anticholinergics (can't see, pee, spit, or shh poop)
 - IpraTropium (respiratory drug - you can't Pee with a TroPium)
 - Atropine - (increases HR - its hard to Pee with a TroPINE)
- Tricyclic Antidepressants

Nursing care:

- Assessment 1st!**
 - Palpate the bladder
- Intervention:**

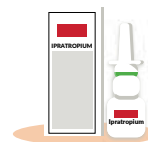
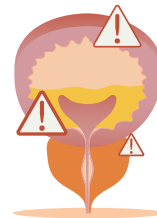
Normal Position - "Help client out of bed"

 - Bladder Scanner
 - **Over 100 mL** = Report to HCP **NCLEX TIP**
 - In & out catheter
 - **Hypotension** (low BP)
 - **Bradycardia** (slow HR)



MEMORY TRICK

Big Prostate Holds



Common NCLEX Questions:

Q1: Patient taking hydromorphone with urinary retention suspected. First action?

- 1. Palpate the client's suprapubic area
- 2. Check chart input & output for fluid intake
- 3. Offer a bedpan
- 4. Clock out for lunch



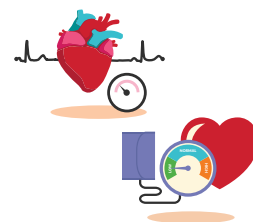
Q2: Intervention for a patient who has not urinated 10 hours post-operation?

- Help the patient out of bed to a normal standing position.



Q3: Urgent catheterization for acute urinary retention... nurse places priority on which sign & symptom?

- 1. Bradycardia
- 2. Hypotension
- 3. Tachycardia
- 4. Risk for infection
- 5. Painful urination



Side note on Foley Catheters
Always BELOW the bladder
NEVER hang on back of wheelchair



UROSEPSIS/URETHRITIS/URETHRITIS



WHAT AM I?

Urosepsis: a gram-negative bacteremia originating in the urinary tract.

Urethritis: inflammation of the urethra, often d/t STI/STD, and may be concurrent with cystitis.

Ureteritis: inflammation of the ureter often associated with bacterial or viral infections and pyelonephritis



PATHO

Urosepsis: most commonly caused by E-coli, and in the immunocompromised patient, from an indwelling urinary catheter or untreated UTI. The greatest problem is the bacteria developing abx resistance.

Urethritis: inflammation of the urethra occurs d/t gonorrhea or chlamydia in men; in women, inflammation occurs d/t feminine hygiene sprays, perfumed feminine products, UTI, spermicidal jelly, UTI, or changes in vaginal mucosal lining.

Ureteritis: pathophys will be dependent upon causative disease process

CAUSES

Urosepsis: Infection from indwelling urinary catheter or untreated UTI

Urethritis: Inflammation results from STI/STD in men or in women: UTI, scented feminine products, changes in vaginal mucosal lining

Ureteritis: bacterial or viral infection, pyelonephritis



ASSESSMENT

Urosepsis: Fever is the most common and earliest manifestation.

Urethritis:

- ❖ Dysuria
- ❖ Urinary frequency, urgency
- ❖ Nocturia
- ❖ Males: clear to mucopurulent penile discharge
- ❖ Female: lower abd pain

Ureteritis:

- ❖ Dysuria
- ❖ Urinary frequency
- ❖ Clear to mucopurulent penile discharge



TREATMENT

Urosepsis: IV, then oral abx once discharged

Urethritis: Antibiotics, urethral dilation

Ureteritis:

- ❖ Metronidazole (Flagyl) or clotrimazole (Mycelex) for Trichomonas infection.
- ❖ Nystatin and Diflucan for yeast infections.
- ❖ Doxycycline or Zithromax for chlamydial infections.



LABS & DIAGNOSTICS

- ❖ **Urosepsis:** UA/UC prior to abx
- ❖ **Urethritis:** UA/UC, STI/STD testing
- ❖ **Ureteritis:** dependent upon causative organism (bacterial/viral infections, pyelonephritis).



EDUCATION

Urosepsis: Finish antibiotics course of treatment, increase fluid intake.

Urethritis: Similar to interventions-instruct pt to complete abx course, safe sex practices.

Ureteritis: Encourage pt to finish abx treatment, safe sex practices.



INTERVENTIONS

Urosepsis: Obtain UA/UC before abx tx is started, administer IV abx as prescribed and provide teaching regarding importance of oral abx once pt is home.

Urethritis:

- ❖ Encourage fluid intake
- ❖ Prepare for STI testing.
- ❖ Instruct pt in how to take a sitz/tub bath
- ❖ Instruct females to avoid perfumed feminine products.
- ❖ Instruct pt to avoid intercourse until UTI tx is complete.
- ❖ If STI is the cause, instruct pt on future prevention (condom use, potential for sterility with repeated infections).

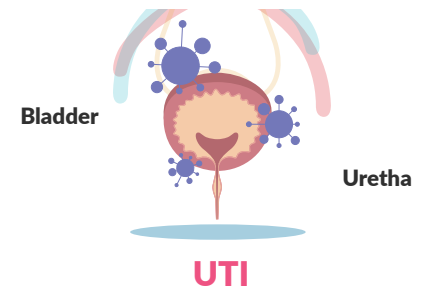
Ureteritis: identifying and treating the underlying cause, providing symptomatic relief.

UTI & Pyelonephritis

Patho

- **UTI:** urinary tract infection - urethra, bladder
- **Cystitis:** Bladder infection
- **Pyelonephritis:** aka kidney infection - more serious infection

If that infection gets bad enough it can migrate & sort of climb up the Ureters to infect the kidneys.



UTI Signs & Symptoms

- Fever
- Dysuria "Burning during urination"
- Urinary Frequency

Diagnostics

- UA:
 - Cloudy & smelly
 - WBC
 - Nitrites - **Kidney infection**
 - Urine Culture & Sensitivity
 - Over **10,000** organisms/ml
 - Cultures **FIRST** then antibiotics

HESI:

Q1: Cloudy urine specimen is an indication of:

- Bacteria in urine

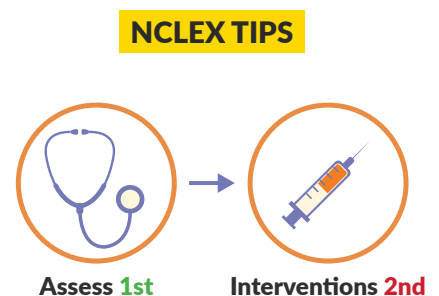
Q2: Pt reporting **dysuria** and **frequency** ... which test does the nurse anticipate to be ordered?

- Urine culture

Kaplan Scenario:

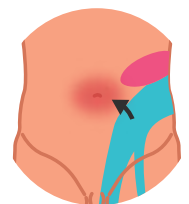
Client with s/s of UTI collected a mid-stream urine specimen 2 hours prior and left it sitting in the bathroom ... what is the nurse's priority action?

- Discard the specimen and obtain a new specimen



Pyelonephritis Signs & Symptoms (kidney infection)

Like UTI but worse! Key difference - pain location: Costovertebral tenderness
Dull **Flank** pain
Extending **toward Umbilicus**



HESI:

Patient with temperature of **102.5°F (39°C)** **grabbing on to her left side** and complaining of **dull pain**. The urine specimen appears concentrated with a **cloudy appearance**. Findings are associated with?

- **Answer: Pyelonephritis**

UTI & Pyelonephritis II

First action:

Obtain blood and urine cultures and then begin ANTI-biotics



Causes:

- Urinary retention

- BPH
- Holding urine too long - nurse bladder
- Kidney stones - renal calculi - can hold back urine

- Foley catheters

- E Coli - MOST COMMON - bacteria in colon gets into urethra
- Wiping back to front - scrapes ecoli into urethra

Hesi Question

Physiologic changes in elderly male admitted with UTI. SATA

- **Prostate enlargement** may lead to urinary retention
- **Urinary retention** increases the risk of UTI
- Ineffective bladder contraction leads to **urinary retention**

Complication:

Confusion, UTI - quickly turns into urosepsis - infection in the blood that infects the brain.

Kaplan

72 y/o patient **suddenly** becomes **disoriented** to person, place, and time ..

- **Assess** for signs & symptoms of UTI

Memory Trick:

L - DeLirium

L - Limited, short term confusion

- fix the cause & fix the patient



L - LLLLimited

Pharmacology

Treatment

Antibiotics: Sulfonamides & Levofloxacin
& Give analgesics for the pain



Education

- Increase **Fluid Intake**

HESI **2000 mL water daily**

- **Void** after sex **ATI HESI**

- Take cranberry supplements **ATI**

- **Avoid:** Caffeine & Alcohol

The big no no's:

- **NO** Douching

- **NO** Spermicidal contraceptive

- **NO** Perineal deodorants

- **NO** Synthetic fabrics "Nylon" "Spandex"

- **NO** Bubble Baths

- Wipe **FRONT** to back

HESI:

Q1: Instructions to maximize UTI recovery?
Drink **cranberry juice** daily to acidify urine

Q2: Urinary frequency caused by **cystitis** ...
most helpful advice? **SATA**

• Recommend **cranberry juice**

• Encourage **increased fluid intake**

• Discourage **coffee**, tea, cola, and alcohol

Reproductive

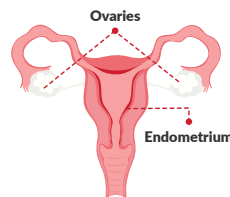
Menstrual Cycle

Med Surg: Reproductive

Anatomy & Physiology

A 28 day cycle of changes that happens every month with female reproductive organs, specifically the **endometrium** & the **ovaries**.

The 1st period is known as **menarche** & continues every month until **menopause** (50 - 55 years old).

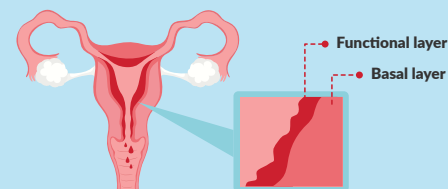


Endometrium:

The layer of tissues lining the uterus (which houses the fetus during pregnancy).

This uterus lining consists of 2 layers:

- **Functional layer** which is shed during monthly menstrual cycles
- **Basal layer** which aids in feeding the top functional layer.

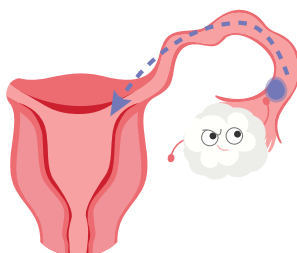
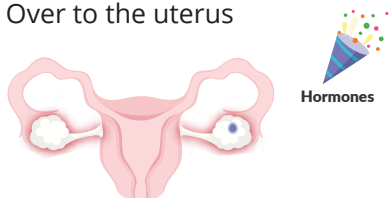


Ovarian cycle

During **ovulation** hormonal changes trigger the ovaries to **release an egg**. Kind of like tossing the ball over to the uterus.

MEMORY TRICK

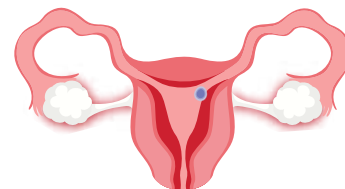
- - Ovulation
- - Ovaries release an
- - Oval shaped egg
- - Over to the uterus



Uterine cycle

Think the “catching phase”.

The endometrium **beefs up really thick** to house a fertilized egg, but if the egg is **not fertilized within 14 days**, then it will shed each month causing menstrual bleeding.



Hormones During Ovulation

2 main phases

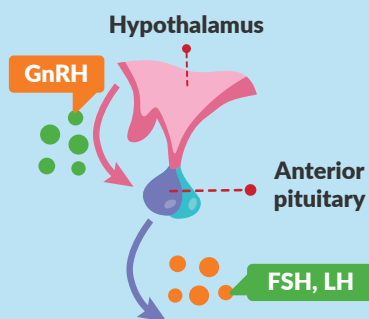
1. Follicular phase
2. Luteal phase

Ovarian Cycle

Follicular phase (Preovulatory Phase)

- **GnRH** (Gonadotropin releasing hormone)
- **FSH** (Follicle Stimulating Hormone)
- **LH** (Hormone)

Ovulation = Luteal Phase begins



Ovarian Cycle

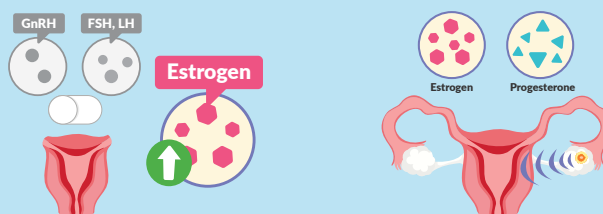
• Follicular Phase:

Be**FO**re an egg is released (before ovulation). A number of hormones pop off like a party popper. The hypothalamus releases **GnRH (Gonadotropin releasing hormone)**, which dominos into the release of **FSH (Follicle Stimulating Hormone) & LH (Hormone)** from the anterior pituitary. Which stimulates the follicles within the ovaries causing ovulation!

• Luteal Phase:

Ovulation begins & the egg floats away from the ovaries toward the uterus. The empty follicle within the ovary (**corpus luteum**) releases both **estrogen & progesterone** (steroid sex hormones) to help to thicken the **endometrium** & to turn off excess FSH & LH hormones in **order to help a fertilized egg** implant & develop into a baby.

But if the egg is **NOT fertilized within 14 days**, then the egg dies & the thick endometrium dissolves, causing menstrual bleeding.



Menstrual Cycle II

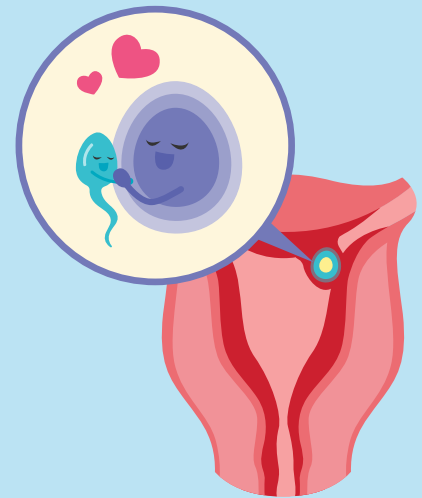
Med Surg: Reproductive

Side Note - Pregnancy

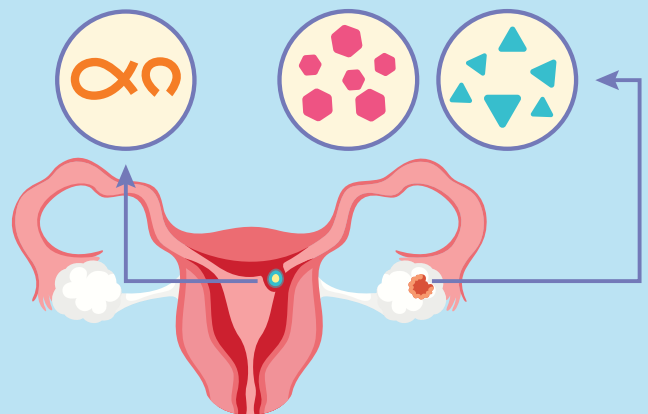
Now if the egg is **fertilized** with sperm, then the menstrual cycles will STOP, as the egg attaches to the wall of the uterus.

This embryo releases **HCG (human chorionic gonadotropin) hormone**, which is the hormone tested during a pregnancy test. A positive test means positive for HCG hormone.

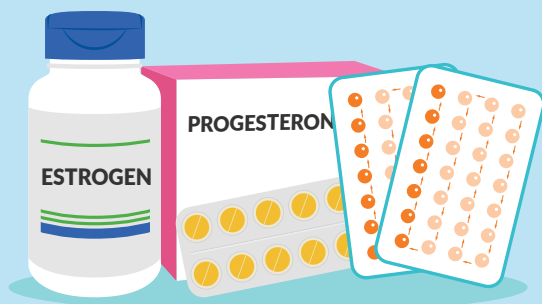
This HCG helps to keep **estrogen & progesterone** levels HIGH by keeping the corpus luteum open inside the ovaries.



HCG
(human chorionic gonadotropin)



Contraceptives

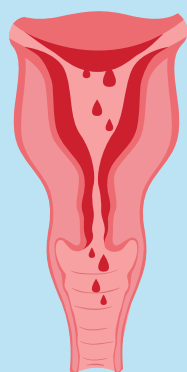


Birth Control:

Oral contraceptives or the ring, works by keeping **estrogen & progesterone HIGH** in order to control ovulation & prevent fertilization.

Plan B pill (morning after pill):

This emergency contraception works by **shedding the uterine lining** (the endometrium) so that a fertilized egg can not attach & become a fetus.

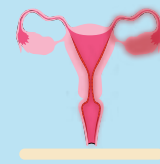
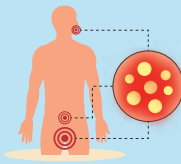


STD/STI

Syphilis & Chlamydia

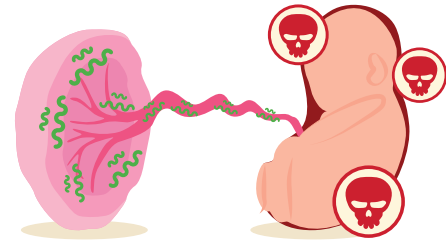
STD - Sexually Transmitted Diseases

STI - Sexually Transmitted Infections



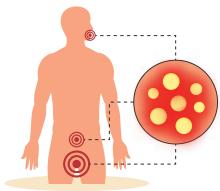
Syphilis

Bacterial infection commonly spread by sexual contact & during pregnancy can cross the placenta which can harm or kill the baby.



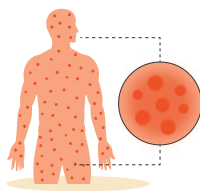
Symptoms

STAGE 1



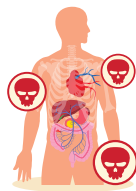
Painless sores on the genitals, rectum, or mouth.

STAGE 2



After the initial sores heal, a rash presents, then the infection hides with no signs/symptoms.

STAGE 3



DEADLY damage to the brain, nerves, eyes, or heart.

Screening During Pregnancy

- First prenatal visit
- 3rd trimester
- Delivery (if high risk)

Treatment

- **Penicillin** (only prenatal treatment)

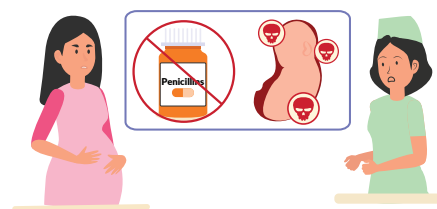
NCLEX TIP

- **Assess:** which type of allergic reaction
- **Intervention:** penicillin desensitization

Education

EDUCATE

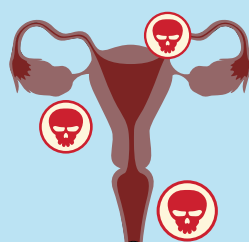
About the **potential death or harm** to the fetus if Penicillin is **NOT** taken



Chlamydia

Chlamydia is the most common STD affecting people of all ages, but it most common in young women & those with multiple sex partners.

LACK OF SYMPTOMS



Signs and Symptoms

- Most clients are **asymptomatic** or may have **minor symptoms**

NCLEX TIPS

Antibiotics: Azithromycin & doxycycline

- **"NO sex for 7 days** after starting"
- Sex partner should get treatment too
- Still spread the infection = **Asymptomatic**

Infertility & PID: Untreated **chlamydia** & **gonorrhea** infections

Screening:

- **Yearly** (annually)
- Sex partner checked too

STD/STI

Gonorrhea, Herpes, & HPV

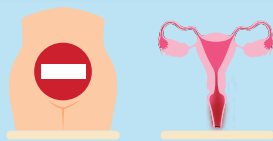
Gonorrhea

Highly tested

Key point:

- **Infertility & PID:** Untreated chlamydia & gonorrhea infections

Annual screening



Education

- Sex partner should be **evaluated & treated!** **NCLEX TIP**
- **Avoid sex** until treatment **completed** (all sex)

HESI Question

Which statement indicates a need for **further education** about gonorrhea?

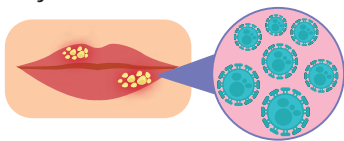
- "If my partner has gonorrhea I should **avoid vaginal sex** but oral sex is safe"



Herpes Simplex Virus (HSV)

Herpes type 1: Cold sore

Typically clear up by itself within 10 to 14 days.



HESI Question

Type 1 herpes simplex virus... Which **instruction** about the **treatment** does the nurse expect the health care provider to give?

- The infection will **clear up by itself in 10 to 14 days**

Herpes type 2: Genital Herpes

Non-curable STI which presents around 14 days after exposure.



HESI Question

Which statement regarding **type 2 herpes simplex**, ... indicates a need for **further education**?

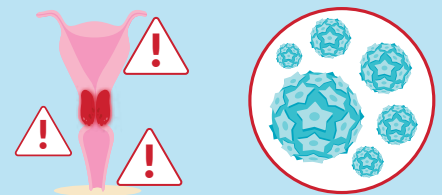
- "With medication, I will be able to cure my herpes virus infection."

How many **days after exposure** to **genital herpes** would an outbreak generally occur?

- **14 days**

HPV (Human Papillomavirus)

The most common STD, associated with **cervical cancer** (highly tested) & genital warts.



Symptoms

Asymptomatic - no symptoms. Clients do not even know they have it.

Education

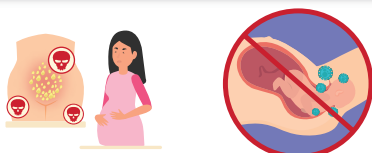
Prevention

1. **Vaccination:** Age 9 - 26
2. **Annual Pap test** (papanicolaou test)
3. Spread:
 - **Skin to skin** contact (Oral sex & others)
 - **Condoms** do NOT protect 100% **NCLEX TIP**
 - Transmits even when **asymptomatic** (no symptoms)

Signs & Symptoms

- **Genital Lesions** "Active lesions" painful, burning, stinging
- **Priority to report** to HCP during **pregnancy** **NCLEX TIP**

- **Acyclovir** (Antiviral drug)
- **Active** Lesions & Birth **NCLEX TIP**
 - **NO** vaginal delivery
 - C-section "cesarean birth"



ACTIVE LESIONS

(actively contagious)

- Do **NOT touch** lesions & **wash hands** regularly
- **AVOID SEX** when **lesions** are present **NCLEX TIP** - **Condoms** will **NOT WORK!**
- **AVOID** scented soaps
- Lesions: clean & dry

Vasectomy & Prostatitis

Med Surg: Reproductive

Vasectomy

Birth control for men & is a form of sterilization. During the surgical procedure, the vas deferens is cut, so sperm can no longer be ejaculated, rather the sperm will now be absorbed by the body.

Sterilization



Vas deferens



Key points

Sexual intercourse:

Use alternative birth control until cleared by HCP = Sperm Free

NCLEX TIP

Cleared by HCP



Don't let the NCLEX trick you!

NOT 3 months, **NOT** 10 ejaculations.

We must be sperm-free here, only cleared by HCP, so take alternative birth control until then.

Don't let

NCLEX TRICK YOU



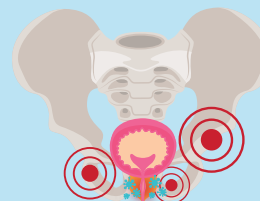
Prostatitis

Bacterial infection causing acute inflammation to the prostate gland.

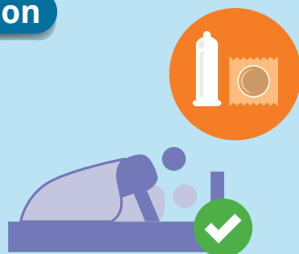


Signs & Symptoms

- Fever & Fatigue
- Pain in the lower pelvis
- Burning during urination
- Urgency, hesitancy, & straining during urination



Education



- **Increase** fluid intake (water & juice)
 - **NO Caffeine** (iced tea, soda, coffee)
- **SEX = GOOD!** **NCLEX TIP**
- Stool softeners: **Docusate**
 - Prevent constipation
- **AVOID straining** **NCLEX TIP**



Pharmacology

- Terazosin & Tamsulosin
- Antibiotics: ciprofloxacin & Levofloxacin

NCLEX TIP

Do **NOT STOP** taking antibiotics when feeling better



HESI Question

Acute prostatitis... Which medication would the nurse anticipate the health provider to prescribe?

- Ciprofloxacin

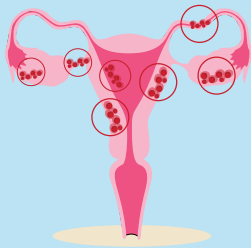


Endometriosis & Hysterectomy

Med Surg: Reproductive

Endometriosis

Disorder in which there is the growth of endometrial tissues outside of the uterus. Cells making up the endometrium migrate to other parts of the body often affects fallopian tubes, ovaries, and uterine ligaments.



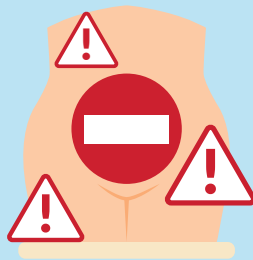
Risk Factors

- **Family history** of endometriosis
- Early menses (period)
- Never having been pregnant



Signs & Symptoms

- **Pelvic** pain
- Pain **during sexual intercourse**
- **Infertility** **NCLEX TIP**
- Menstrual irregularities
- Dysmenorrhea (painful menstruation)

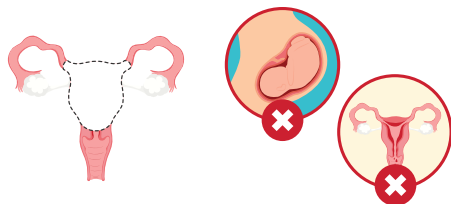


Treatment

- Pain management
- Oral contraception (**estrogen** & prog**esterone**)
- Surgery - Hysterectomy

Hysterectomy

The uterus is removed, where the baby lives during pregnancy. So when the uterus is removed, clients can no longer get pregnant or have periods.

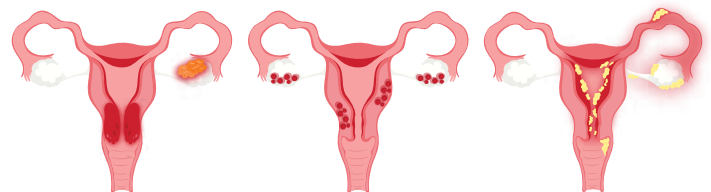


Indication

Uterus cancer

Endometriosis

PID



Complications

After surgery, bleeding is a priority complication!

Vaginal Bleeding

NCLEX TIP

perineal pads: "Saturated" "changed"

More than 1 within **1 hour**



Postoperative Care

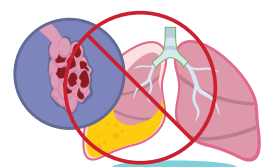
Prevent atelectasis - alveoli collapse

TCDB - turn cough & deep breathe & incentive spirometer every hour.

HESI Question

... plan of care for a patient who has had an **abdominal hysterectomy**?

- Instruct the patient to take **deep breaths after coughing** every hour



Menopause

Med Surg: Reproductive

Pathophysiology

Natural part of the aging process, females over 50 years old have loss of ovarian function with decrease in estrogen production. Clients have **NO periods for more than 12 months** (Amenorrhea).

Memory trick Menopause



12 months

Signs & Symptoms

NCLEX TIPS

- HOT** flashes
- Osteoporosis** (Decreased bone density)
- Loss of **skin elasticity**
- Amenorrhea** (over 12 months)
- Postmenopausal** bleeding & spotting **REPORT to HCP**
 - Weight gain
 - CAD: Coronary Artery Disease
 - Depression & Anxiety



HESI Question

Which **symptoms** is the nurse likely to observe in the patient with **menopause**?
Select all that apply

- **Osteoporosis**
- Loss of **skin elasticity**
- **Hot flashes** and irregular menses

Pharmacology

Hormone Replacement Therapy

NCLEX TIP

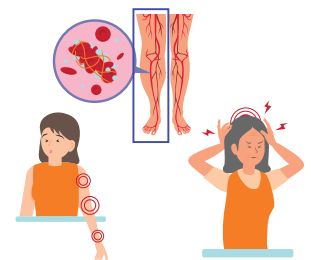
- E** - Estrogen & progEsterone
- E** - Emboli RISK! (DVT, MI, PE, CVA)
- Stop smoking
 - Monitor for **unilateral leg swelling**



Kaplan Question

Hormone replacement therapy ... which of the following **adverse effects** should the nurse instruct the patient about?
Select all that apply

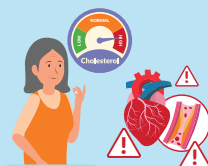
- Calf pain
- Numbness in the arms
- Intense headache



Education

NCLEX TIPS

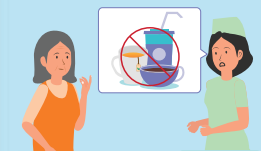
- CAD: **Cholesterol monitoring**
- Weight loss **"weight maintenance"**
- Depression: **seek support**
- Osteoporosis:
 - Daily **weight-bearing** exercise
 - Diet: **green leafy** veggies & dairy products
- Hot flashes
 - **Limit caffeine** (tea, soda, coffee)



HESI Question

Hot flashes caused by **menopause** ... Which instruction should the nurse provide?

- **Decrease caffeine intake** from food and drinks



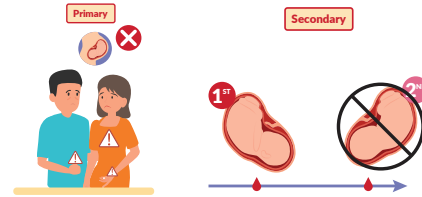
Infertility

Med Surg: Reproductive

Pathophysiology

Inability to achieve a clinical pregnancy after 12 months of regular unprotected sex with no birth control.

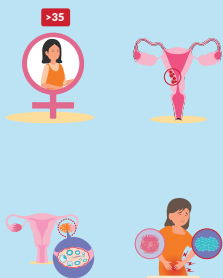
- Primary (failure of a couple to have any children)
- Secondary or Subfertility (inability to add a child after first successful birth)



Causes & Risks

Female NCLEX TIPS

- Age **over 35**
- Cystic fibrosis
- **Endometriosis**
- Ovarian issues:
 - Anovulatory cycles
 - Polycystic **ovarian syndrome**
- Long-term & untreated **STI**
 - **chlamydia & Gonorrhea**
- **PID** - Pelvic Inflammatory Disease



Male Low sperm and Erectile dysfunction

Pharmacology

Drug: **Clomiphen**

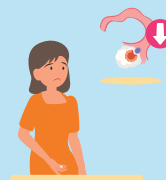
- Encourage sex 5 days **AFTER COMPLETING** med **NCLEX TIPS**



HESI

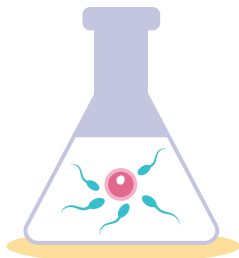
The nurse knows a patient taking **clomiphene** (Clomid) has infertility as a result of which condition?

- Impaired ovulation



Procedures

In vitro fertilization (**IVF**)

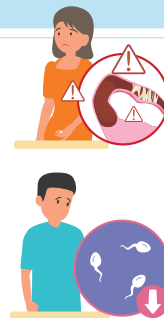


HESI

Which **information** would the nurse include in explaining the **in vitro fertilization (IVF)** procedure?

Select all that apply.

- Done for patients with **tubal obstruction** and **diminished sperm count**
- Embryo develops **outside the body** and is later **transplanted** into the patient's **uterus**

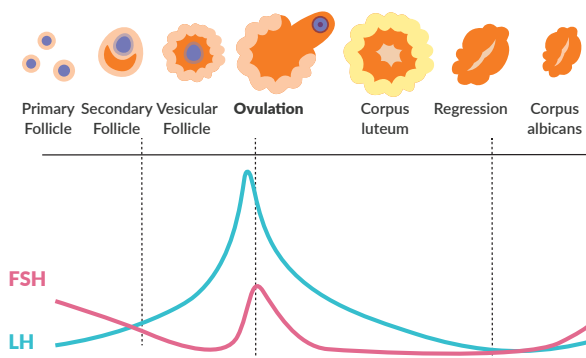


Education

HIGHLY TESTED

NCLEX TIP

Recommend **urine ovulation detector kit** to time sexual intercourse during "fertile window"



Communication

Therapeutic communication NCLEX TIPS

1. **Address** the client alone (ask family to leave)
2. **Assess** with: Active listening & open-ended questions
 "Tell me more about your emotions"
 "Tell me about how your family has been affected"

HESI

Which action by the nurse would **prevent open communication** with a couple undergoing fertility treatment?

- Asking the patient's family member to remain in the room



Pelvic Inflammatory Disease (PID)

Med Surg: Reproductive

Pathophysiology & Causes



NCLEX TIP

STD: gonorrhea or chlamydia



Inflammation in the pelvic area that typically develops from untreated STD like **gonorrhea or chlamydia**. If untreated due to lack of symptoms it can cause massive inflammation!

HESI Question

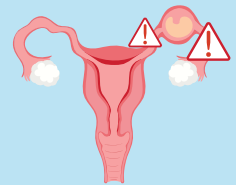
... teaching a group of young women about **pelvic inflammatory disease (PID)**?
Select all that apply.

- PID is associated with a **higher risk of infertility**
- Causative organisms reach the **pelvic organs** through the **cervix** in an ascending manner

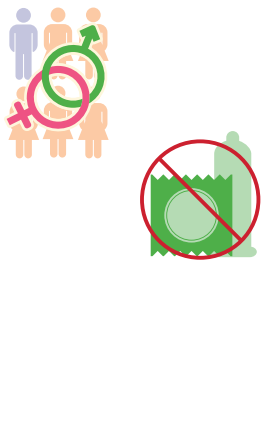
Complications



- Infertility
- Risk for ectopic pregnancies

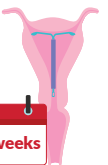
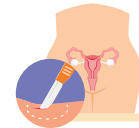


Risk Factors



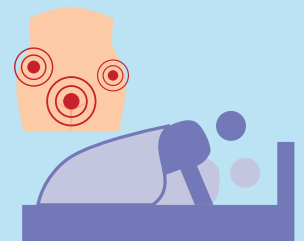
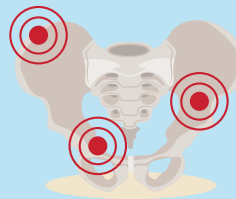
NCLEX TIPS

1. **Sexual** intercourse with **multiple partners**
2. **Unprotected** sex (without condom)
3. History of STI (**chlamydia & gonorrhea**)
4. Recent **pelvic surgery / abortion**
5. **Placement of IUD** within 3 weeks



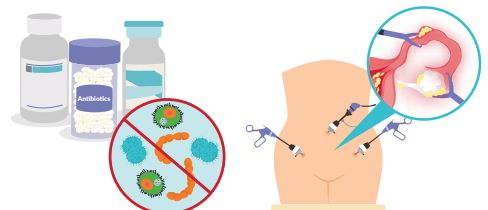
Signs & Symptoms

- Fever
- Pelvic Pain
- Painful intercourse



Treatment

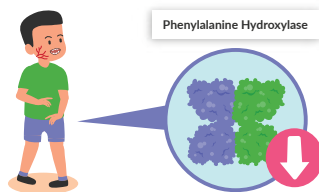
A mix of antibiotics to kill the bacteria
Surgery - remove any scar tissue or adhesions within the reproductive areas



Phenylketonuria (PKU)

Pathophysiology

Rare genetic disorder that causes severe brain damage, & neurological impairment, especially during the developmental years from growing fetus during pregnancy, to the age of 12. With PKU, the body lacks the enzyme Phenylalanine Hydroxylase required to break down an amino acid phenylalanine into tyrosine. Amino acids found in high protein based foods are essential for brain development, especially during pregnancy. But in PKU these unconverted amino acids build in the body, resulting in permanent brain damage occurring in the fetus & newborns.



HESI Question

- Q1** Which pathology pertains to **phenylketonuria (PKU)**?
- Defect in amino acid metabolism
- Q2** Which fetal abnormalities are prevented by monitoring ... a client with **phenylketonuria (PKU)** for high levels of **phenylalanine**?
Select all that apply.
- Cardiac anomalies
 - Intellectual disability
 - Intrauterine growth restoration

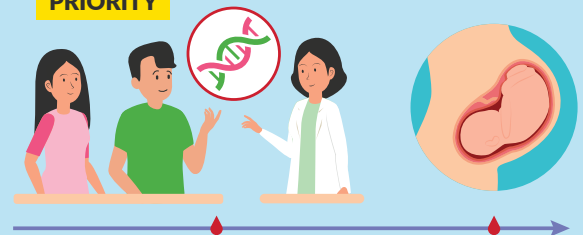


Causes

Genetics is number 1, passed on from both parents, so both parents need to be carriers in order to pass on the disorder. Therefore, genetic counseling is always recommended prior to pregnancy.



PRIORITY



Education

NCLEX TIPS

- Special infant formula
- **Low-phenylalanine** Diet is required
 - Fruits & veggies are best!
 - **AVOID "HIGH protein & iron foods"**
 - **NO meat, eggs, dairy** products
 - Peanut butter & jelly sandwich
- Tyrosine in diet is **GOOD**



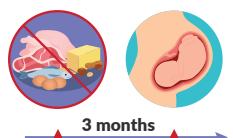
Kaplan Question

- Child client diagnosed at birth with **phenylketonuria (PKU)**... the nurse is **most concerned**... with which statement?
- My child's favorite lunch is **peanut butter and jelly sandwich**.



ATI Question

- Teaching to a client who has **phenylketonuria (PKU)**.... indicates an **understanding** of the teaching?
- **Avoid foods high in protein** for at least **3 months** prior to pregnancy



Notes

Respiratory

Abnormal Lung Sounds

Wheezes *(Whistle)*

Description: High pitched "musical flute"

Location: Entire lung (heard mainly on **exhalation**)

Patho: Narrow airways "bronchoconstriction" (inflamed lung tissue)

Disease: **Asthma attacks** & COPD

Treatment: Asthma attack

AIM

A	Albuterol
I	Ipratropium
M	Methylprednisolone



Stridor *"Serious Squeak!"*

Med. Emergency Airway Obstruction!

Description: High-pitched harsh **inspiratory** whistle

Location: **Throat region** (during **inhalation**)

Patho: **Blockage** in the **larynx** (voice box) or **trachea** (windpipe)

Disease: Choking obstruction, Epiglottitis, Croup (child)

After Thyroid Surgery **NCLEX TIP**

Treatment: Endotracheal intubation, Surgery



Crackles *(rales) "Crazy Fluid"*

Description: liquidy bubbling or crackling

- Fine crackles = **High Pitched** (rubbing hair between fingers)
- Coarse crackles = **Low Pitched** (velcro pulled apart)

Location: Lower lobes (Base of lung, basillary)

Patho: Alveoli "pop" open - inflammation & congestion

Disease: **Pulmonary edema** "fluid in lungs" (with CHF) or Pneumonia (**infection**)

Treatment: **Diuretics** (**furosemide**) Infection (antibiotics)



Rhonchi *"Rumble"*

Description: Low pitched **rattling** or **rumbling** (like snoring)

Location: **Bronchi** (**not alveoli**)

Patho: **Mucous** secretions or obstruction

Disease: **Bronchitis**, COPD, Pneumonia (infection), Cystic Fibrosis (serious mucous)

Treatment: Chest percussion (vibration vest) & fluids to loosen & thin mucus



Cheyne-Stokes *"Death Rattle"*

Description: abnormal pattern of breathing - Increase & decrease in RR - seen as Start & Stop breathing

Patho: apnea (stop breathing) leading to increased CO₂ - Hyperventilation to blow off CO₂

Treatment: intubation & mech. ventilation



Pleural Friction Rub *"Pebbles Friction"*

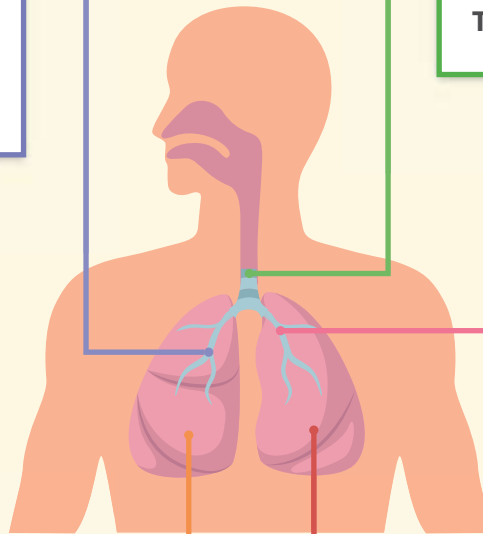
Description: Low pitched - **Dry rubbing** (like 2 rocks grinding)

Location: **Front side of lung** (during **inhalation & exhalation**)

Patho: **Infection** causing inflammation of pleura layer of the lungs rubbing together

Disease: **Worsening pneumonia** (infection)

Treatment: TCDB, Incentive Spirometer, Antibiotics



Respiratory

Airborne vs. Droplet

Droplet

- P** - Pertussis
- I** - Influenza
- M** - Meningitis
- P** - Pneumonia

1. **Surgical Mask** & Goggles
2. Single room

ATI

Teach unlicensed personnel to **wear a mask**

Airborne

- M** - Measles
- T** - TB (Tuberculosis)
- V** - Varicella (shingles/chicken pox)

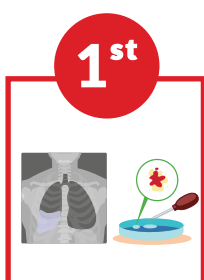
1. N95 mask - Staff
2. Neg. Pressure Room
3. Door closed
4. Transport - **Patient wears surgical mask**

Top 2 Missed Exam Questions

Patient presents to urgent care 48 hours after a tuberculin skin test. The site looks red and raised with a **19 mm induration**. The nurse knows which of the following?

Select all that apply

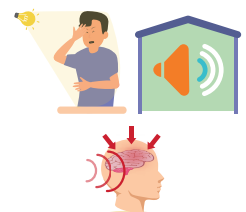
- 1. Anticipate orders for a chest X-ray or sputum samples
- 2. Collect blood for the QuantiFERON-TB test
- 3. The patient has active tuberculosis
- 4. The patient has a tuberculosis infection
- 5. Immediately place the patient on droplet precautions



When caring for a patient with bacterial meningococcal **meningitis**, the nurse implements which of the following?

Select all that apply

- 1. Advise unlicensed personnel to wear surgical mask
- 2. Implement padded side rails
- 3. Keeps light & noise low in room
- 4. Places patient to negative pressure room
- 5. Puts on N-95 mask before entering room



Respiratory Resp. Failure & ARDS

Respiratory Failure

When the capillaries (little blood vessels in the alveoli) can not adequately exchange CO₂ for Oxygen.



Causes

- Infection causes these alveoli to become swollen, inflamed, & filled with mucus or fluid which blocks gas exchange!
- Clients can present with a common FLU which can progress into pneumonia & eventually into DEADLY A.R.D.S. - Acute Respiratory Distress Syndrome



ARDS Pathophysiology

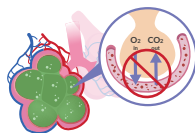
The alveoli become hard due to the capillaries around the Alveoli becoming inflamed & fluid filled, creating a **leaky barrier**, which eventually fills up the little alveoli sac like a sinking ship! THIS makes it impossible to get oxygen in & to get CO₂ OUT! Eventually clients DIE from hypoxia IF they are not on a ventilator early.

Memory Trick:

- ARDS = HARD Alveoli

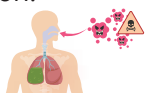
Priority Diagnosis

- Impaired gas exchange



Causes

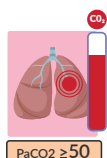
- **Sepsis** - bloodborne infection that inflames the entire body
- **Respiratory inflammation** - pneumonia, inhaled toxin, or even aspiration.
- **Acute pancreatitis** = HIGH risk for developing ARDS **NCLEX TIP** accidental release of active pancreatic enzymes & cytokines into the bloodstream - which get sucked into the lungs causing inflammation.



A.R.F. - ACUTE RESPIRATORY FAILURE

2 types:

- Hyp**O**xemic failure **LOW O₂** (PaO₂ 60 or LESS)
- Hyper**C**apnic failure **HIGH CO₂** (PaCO₂ Over 50)

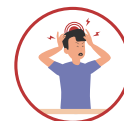


Signs & Symptoms

Hypoxemia LOW O₂

#1 Sign = Altered Mental status **NCLEX TIP**

1. **Agitation**
2. **Restlessness**
3. Confusion



ARDS

Refractory Hypoxemia

Low PaO₂ = **Despite Oxygen delivery**

MEMORY TRICK

REsistant to Oxygen

REfractory Hypoxemia

Lab Values

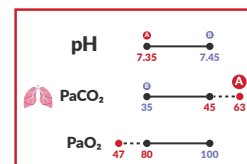
ABG Arterial Blood Gas
Low **PaO₂**
High **CO₂**



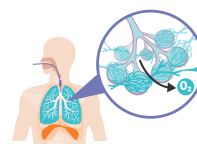
Common EXAM Question

Which arterial blood gas (ABG) values support suspected acute respiratory failure (ARF)?

- 1. PaO₂ 55 mm Hg, PaCO₂ 47 mm Hg
- 2. PaO₂ 62 mm Hg, PaCO₂ 32 mm Hg
- 3. PaO₂ 47 mm Hg, PaCO₂ 63 mm Hg
- 4. PaO₂ 82 mm Hg, PaCO₂ 22 mm Hg



Priority Intervention for ARDS



Mechanical Ventilation

PEEP (positive end-expiratory pressure)

H High Fowler's position (HOB up)

O Oral suctioning & Oxygen

L Listen to lung sounds

Y Yell for help! Notify HCP "provider"

1st

2nd

3rd

4th

Respiratory Asthma

Pathophysiology

- A chronic inflammatory disorder in the major pathways of the lungs: Bronchi & Bronchioles.
- Asthma comes & goes with flare-ups in the form of asthma attacks & these ARE REVERSIBLE!



Memory Trick:

A - Asthma
A - Acute Attacks that come & go

Signs and Symptoms

A	Accessory muscle use Critical Sign: Paradoxical Breathing	
S	SOB & dyspnea Critical Sign: Single word dyspnea	
T	Tight CHEST & Tachypnea	
H	High-pitched wheezing	
M	Minimal "diminished breath sounds"	
A	3 As Absent Breath Sounds (Silent Chest) PRIORITY Acidosis (CO ₂ retention) Air trapping - Prolonged exhalation	

Hypercapnic respiratory failure = **HIGH CO₂**

Hyper **C**apnic = High **C**arbon dioxide

ABG (Arterial Blood Gas)

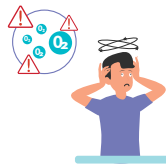
- pH less than **7.35** = **Acidosis**
- PaCO₂ - **Over 45** = **Acidosis**
- PaO₂ - Less than 80! = Hypoxic

* 1st Sign of Hypoxia = **Mental Status Change**

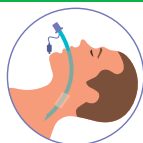
1. Agitation
2. Restlessness **NCLEX TIP**
3. Drowsiness

Status Asthmaticus **NCLEX TIP**

1. Endotracheal Intubation



PRIORITY



Teaching - Peak Expiratory Flow Rate

- Sort of like a weather forecast - we want to anticipate a severe asthma attack - before it happens!

Green zone

- Green means go.
- Asthma is around 80 - 100% under control.

Yellow zone

- Yellow means mellow.
- Asthma is **NOT** under control here! So there is a HUGE need for additional medication
 1. Rescue drug **every 4 hours for 1-2 days**
 2. Call HCP (provider)
NEED additional meds or change in treatment

Red zone

- **Red** means **Really** bad!
- Emergency treatment is needed immediately if the level does not return to yellow **RIGHT** after taking rescue drugs!

Correct Order - Peak Flow Meter

1. Stand or **sit in upright** position
2. Put the flow meter scale to **0 or lowest value**
3. Inhale deeply
4. Put the mouthpiece in mouth & create a seal with the lips
5. **Exhale as quickly & forcibly** as possible & record reading
6. Repeat 2 more times, with a break of 5 -10 seconds between
7. **Record 1 score = the HIGHEST** of the 3 attempts



Teaching Triggers

A	Allergens (dander, dust, pollen) Elevated Eosinophils
S	S - Smoking (second hand cigarette smoke) S - Stress (emotional, physical)

Kaplan Question

Further teaching is needed when which statement is made?

- "Stress does not cause my asthma attacks"



- S - Sickness (Influenza, URI)
- S - Severe weather (cold)
- S - Strenuous activity - **NO need to avoid**
- Take meds before the exercise!

Drugs to AVOID

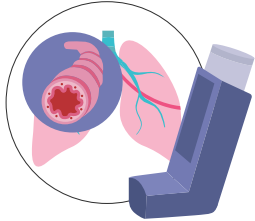
- **N - NSAIDS Naproxen**, Aspirin, **ibuprofen**, indomethacin, & **ketorolac**
- **N - Not good for Asthma**
- **B - Beta blockers**
- **B - Blocked HR & lungs**
 - Propranolol (Inderal) = Non-selective
 - Atenolol = Selective (cardio "Beta 1" selective)

Diagnostics

- PFT - pulm function test (not usually tested)

Respiratory Asthma II

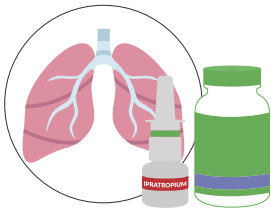
Pharmacology



BRONCHODILATORS

B	Beta 2 Agonist Albuterol
A	Anticholinergics Ipratropium
M	Methylxanthines Theophylline

NCLEX TIP



ANTI-INFLAMMATORY Agents

S	Steroids Beclomethasone
L	Leukotriene Inhibitor Montelukast
M	Mast Cell Stabilizers Cromolyn

Bronchodilator - BAM team

- **B - Beta 2 agonist - albuterol** - think buterols for brutal asthma attacks!
It's considered the 1 & only rescue drug for asthma attacks
- **A - Anticholinergics - Ipratropium** - dries out the body, decreasing secretions & dilating the airways - you cant pee - with a tro-pium
- **M - Methylxanthines - Theophylline** - very toxic & very fast HR!
10 - 20 therapeutic range

Memory Trick: Phyllines have you feeling toxic & tachycardic

Anti-inflammatory Agents - SLM Team

- **S - Steroids** "-sone" like Beclomethasone -
Top side effects - **3 Ss** for **Sone** Steroids
 - **S - Sores** in mouth (oral thrush "candida") so instruct the client to wash out their mouth after every use & inhalers go into the sink, twicer per week.
 - **S - Sepsis & sickness** (increased risk for infection) & increases WBC count in the body
 - **S - Sugars increased** (elevated glucose levels)

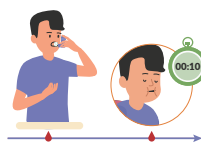
Last 2 - are NOT highly tested here

- **L - Leukotriene inhibitors** ending in Lukast like Montelukast (Singular) - think Luke likes to sing
- **M - Mast cell stabilizers** - Cromolyn

Metered Dose Inhaler Teaching

ATI Question

Client should **hold their breath for 10 seconds** after inhaling so that the medication gets deep into the airways



Kaplan Question

Need for **further teaching** when client states:

- I will be careful **not to shake** the canister before I use it



Most Commonly Missed Question

Patient with severe asthma:

- Tachycardia (>120 BPM)
- Tachypnea (> 30 BPM)
- O2 sat < 90% on RA
- Peak exp. Flow < 40% predicted or best < 150L/min)

Which medication would you give?
Select all that apply

- 1. Inhaled salmeterol
- 2. **Albuterol inhaler**
- 3. **Nebulizer Ipratropium**
- 4. IV methamphetamines
- 5. **IV Methylprednisolone**

Kaplan Question

Aminophylline is a bronchodilator

HESI Question

Therapeutic Range of theophylline (10-20 mg/dL)

MEMORY TRICK

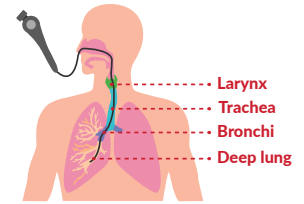
AIM for Acute Asthma Attack

- A** - **Albuterol** 1st
- I** - **Ipratropium** 2nd
- M** - **Methyl-prednisolone**
(brand: Solu Medrol)

Respiratory Bronchoscopy

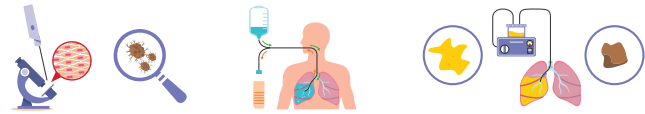
Pathophysiology

A procedure that allows visualization of the larynx, trachea, bronchi & deep lung using a flexible scope. The tube is inserted through the nose, mouth or endotracheal area passing the throat, so naturally a gag reflex & laryngospasm are a big concern!



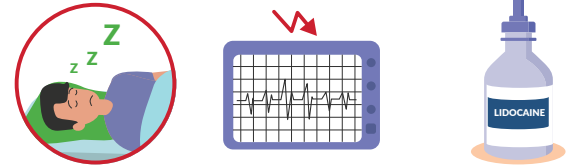
Performed for 3 common reasons:

- **Biopsy** of tissue: like when checking for cancer
- **Lavage** to wash out the lungs
- **Suction** for deep sputum or a foreign object



Before the procedure

- **Mild sedation:** makes the vitals low & slow
- **Topical anesthetic** like lidocaine is applied to the **throat** to prevent the gag reflex

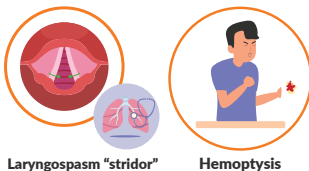


Post-Procedure Care

KEY SIGNS

- Laryngospasm "stridor"
- **Bright red** blood tinged sputum
Hemoptysis

PRIORITY HCP

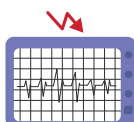


Laryngospasm "stridor"

Hemoptysis

Normal & Expected:

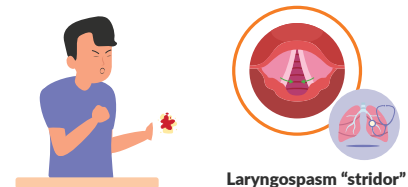
- **Low RR & Low O2 saturation:** the patient has had mild sedation making everything low & slow.
- **Absence of gag reflex:** a numbing agent has been applied to the throat.



Kaplan Question

Post bronchoscopy ...
priority findings to report
to the provider **immediately?**
Select all that apply

- **Blood** tinged sputum ... bright red
- **Stridor** and increased dyspnea

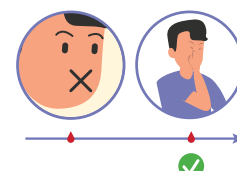


Laryngospasm "stridor"

Nursing Care

NPO

- Until alert with a positive **gag reflex**

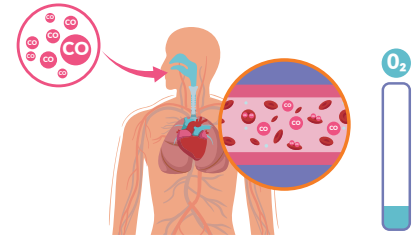


Respiratory

Carbon Monoxide Poisoning

Pathophysiology

The body replaces the oxygen in the red blood cells with carbon monoxide, as it more easily binds to hemoglobin which results in severe hypoxia leading to death.

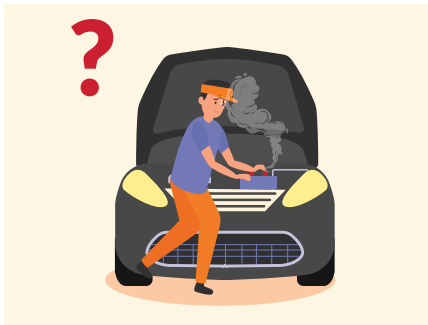


Causes:

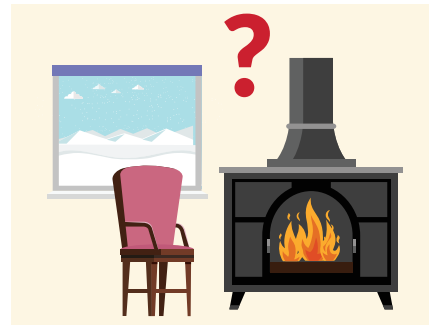
Inhaled toxins released by cars (auto mechanic shops), stoves, or fuel burning like wood (typically in poorly ventilated areas).

Key Assessment Questions **NCLEX TIPS**

Are you a car mechanic or around engine exhaust?



How have you been keeping your house warm?



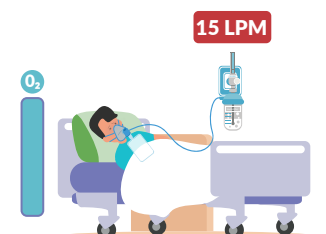
Signs & Symptoms:

- Vague & often unnoticed symptoms
- Slight headache, dizziness, dyspnea & even nausea
- Pulse oximeter readings do not accurately reflect hypoxia with carbon monoxide toxicity.
- False reading of high spO_2 %, but in reality the patient is very hypoxic.



Priority Action

- 100% oxygen via **non-rebreather** mask Flow rate of **15 LPM**
- This will help eliminate carbon monoxide from the body & allow oxygen to attach to red blood cells once again, solving the root cause of the hypoxia.

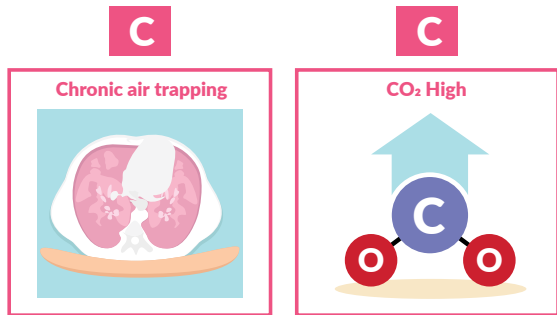


COPD - Chronic Obstructive Pulmonary Disease

Pathophysiology Memory Trick

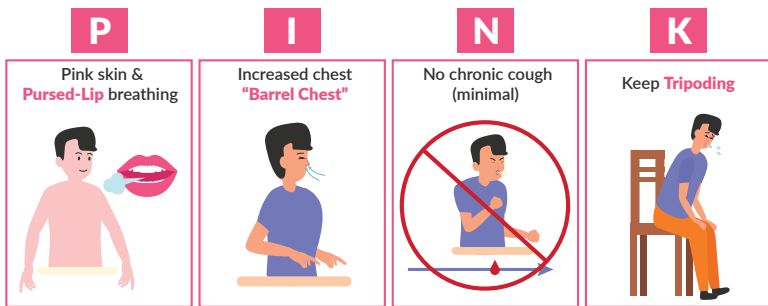
Chronic destruction of the lungs resulting in decreased gas exchange, leading to chronic air trapping & high CO₂ in the body.

Memory trick



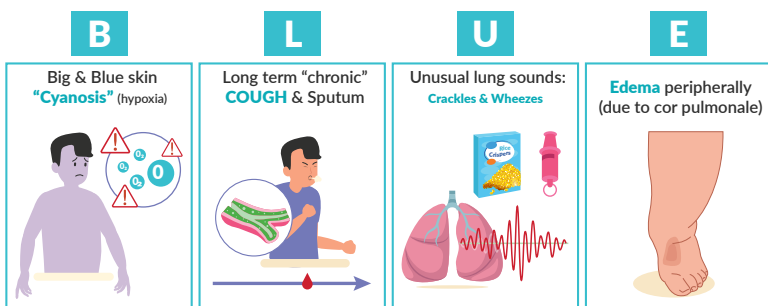
Signs & Symptoms

Emphysema "Pink puffer"



Damage to the Alveoli results in loss of lung elasticity & loss of inflation of lung tissue, resulting in loss of lung tissue recoil & air trapping.

Chronic bronchitis "Blue bloater"



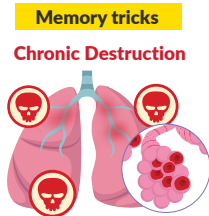
Inflammation of the bronchi & excessive mucus production resulting in a chronic hacking cough, & recurrent infections.

Key sign:
Low O₂ saturation for COPD clients is expected

**88-93%
NORMAL**

Causes & Risk Factors

- **Smoking**
- Car mechanics



Kaplan Question

- Risk factor for COPD = client has **smoked** for more than 30 years



Lab Values

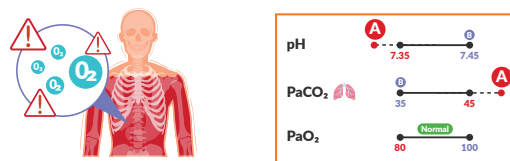
- Don't get tricked: **Anemia** is **NOT common** with these patients, rather increased blood count.
- **ABG** (arterial blood gas) **Key numbers**

Low PaO₂ 32 = **Hypoxemia**
Below 80 (Normal 80 - 100)

High PaCO₂ = **HyperCapnic**

pH less than **7.35** = **Acidosis**

PaCO₂ - **Over 45** = Acidosis

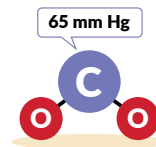


Memory trick

COPD - CO₂ PrisonerD
Carbon Dioxide
Carbon diACID

HESI Question

- Partial pressure of carbon dioxide (PaCO₂) is **65 mm Hg**
- This pt. with bronchitis is experiencing **hypercapnia**



Deadly Complication

Respiratory Failure:

- Hypoxemic respiratory failure = Low O₂
- Hypercapnic** respiratory failure = **HIGH CO₂**
- Priority = BiPap**

Memory Trick

HyperCAP = Give BiPAP

- #1 Monitor: **Mental Status Change** **NCLEX TIP**
- Restless
 - Decreased LOC
 - Confusion

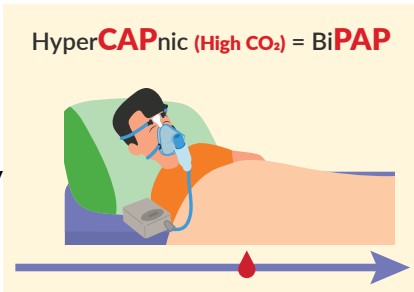


COPD II - Chronic Obstructive Pulmonary Disease

Priority Question

An elderly client with worsening COPD presents to the emergency department with fatigue and altered level of consciousness. Upon assessment the nurse finds O₂ saturation of 87%, and ABG: pH 7.21, PaCO₂ 75, and PaO₂ 55 mm Hg. Which immediate intervention is best?

- 1. Apply oxygen 4 LPM via nasal cannula.
- 2. Call respiratory for STAT albuterol treatment.
- 3. Sit the patient upright and apply Bilevel Positive Airway Pressure BiPAP
- 4. Start looking for other jobs in cosmetic surgery.



Nursing Care

COPD exacerbation

NO Opioids:

- MORphine
- HydrOMorphone
- HydrOCodone
- OxyCOdone

NO Benzos:

- Diazepam (brand: Valium)
- Lorazepam (brand: Ativan)

Look for the Os to know its an opioid:



our crazy pam & lam ending drugs



Teaching

Diet:

- Oral hygiene **BEFORE** meals to wake up the taste buds!
- Eat **small**, frequent meals (decreases stomach distention)
- HIGH **calories & protein**
 - **AVOID** eating high amounts of **carbohydrates** Kaplan
 - **AVOID** exercise 1 hour Before/After meals
 - conserve oxygen for chewing & swallowing
 - **AVOID** Gassy Foods
 - **NO** carbonated drinks
 - **NO** high-fiber foods (broccoli, beans)

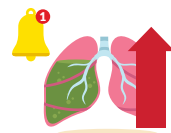
Fluids:

- Increase **fluid** intake **8 glasses (2 - 3L/day)** to thin that mucous
- **AVOID** drinking fluids while eating



Infection:

- **Report increase in sputum**
- Fever, Worsening dyspnea



Vaccines:

- **Pneumococcal every 5 years**
- Flu vaccine **every year**

Meds: Albuterol if short of breath to vasodilate the lungs & allow more air flow

Side Note

for our patients with heavy mucus

Bronchitis

- **Before Bed** - Mobilize Secretions
- Guaifenesin (Brand: Mucinex)
- Cool mist humidifier at night to make breathing easier.

Breathing:

- Pursed lip breathing
 - **Inhale:** 2 seconds via nose (closed mouth)
 - **Exhale:** 4 seconds with pursed lips

Memory trick:

- 2 nostrils = 2 seconds INhale like smelling a rose
- Pursed lips for 4 seconds EXhale like blowing a kiss

Kaplan Question

- Purpose of pursed lip breathing?
- **Prevent air trapping**

ATI Question

- Pursed lip breathing...
- **Prevent** airway collapse during expiration

NCLEX Question

An **82 year old** client with COPD presents with **dyspnea, restlessness, pursed lips & in tripod position** complaining of anxiety, pain and "not being able to breathe". The nurse should **question** which order? **Select all that apply**

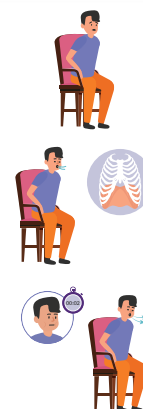
- 1. Ipratropium
- 2. Hydromorphone
- 3. Rescue inhaler
- 4. Oxygen via nasal cannula 3 L/min
- 5. Diazepam



Huff coughing technique

Correct Order:

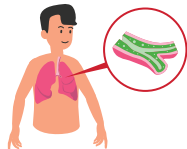
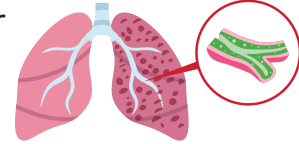
1. **Sit upright in a chair:** feet shoulder width apart & lean forward
2. **Deep slow inhalation** through mouth using diaphragm muscle
3. **Hold breath:** 2-3 seconds & then **forcefully exhale**
4. Repeat **HUFF** once or twice more & avoid from normal coughing
5. Rest for 5-10 normal breaths & repeat as needed until secretions clear



Respiratory Cystic Fibrosis

Pathophysiology

Genetic disorder that causes mucus secretions to be thicker & stickier than normal. This mucus builds up in the lungs leading to recurrent respiratory infections & digestive system leading to poor weight gain & failure to thrive for younger patients.



Serious MuCus
Cystic Fibrosis

Signs & Symptoms:

Resp. Failure Priority

= Oxygen Sat. & Airway

- **Low** pulse oximetry reading (norm: 95 - 100%)
- **Sudden drop** in oxygen saturation



Common "Normal" findings

- **Recurrent** lung infections & **Blood**-tinged sputum
- Weight Loss & **Loss of appetite**
- Constipation & loose, **fatty stool** (steatorrhea) due to mucus build up & lack of enzymes to help breakdown fat.



Diagnostics

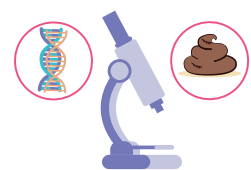
Not commonly tested on exams or boards

- Sweat chloride test
- DNA, Stool test

Sweat chloride test



DNA, Stool test



Pharmacology

Acetylcysteine (brand: mucomyst)



Nursing Care

MOST TESTED

1. Diet:

High calories

Enzymes **WITH** meals

2. Mucus

- **Increase fluid intake**
- Exercise
- Chest Physiotherapy
- Postural drainage

3. Financial counseling



Acetylcysteine

(brand: mucomyst)

Antidote: Acetaminophen (Tylenol) poisoning

Key Point

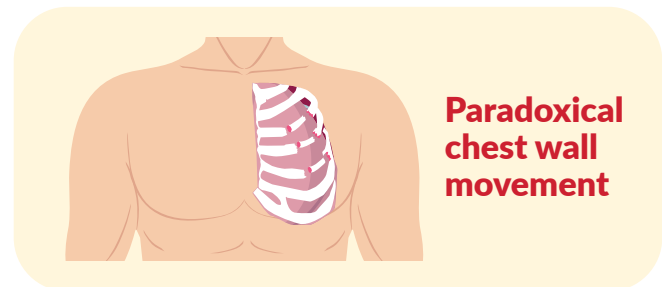
NOT SAFE

Will **Worsen** bronchospasm!

Respiratory Flail Chest & Rib Fx

Pathophysiology

- Broken ribs typically result after any major trauma:
Car accident, falls & the like.

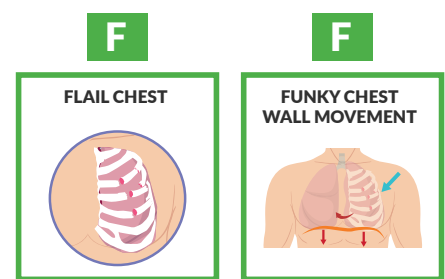


- **Flail chest:** a segment of the rib cage completely breaks & becomes detached from the rest of the chest wall, a **life-threatening medical emergency**.

Signs & Symptoms:

- **Paradoxical chest wall movement** (key sign)
The ribs sort of sucks INward during inspiration & floats out during expiration
 - Extreme chest pain
 - Shallow respirations

Memory Trick:



Deadly Complications

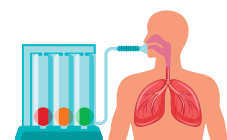
- High risk for infection **Pneumonia** is very common
- Hypercapnic respiratory failure from **High CO2 retention**, putting the body in an acidotic state.



Interventions


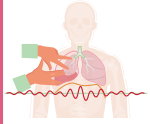
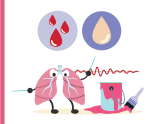
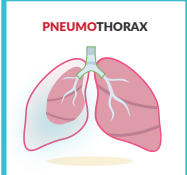
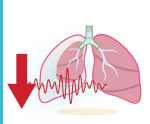

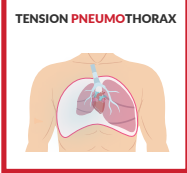
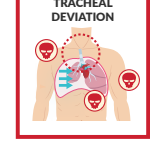
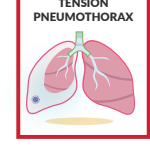
1. Priority = **Pain Control**
YES - Administer prescribed Opioids
 - Morphine
 - Hydromorphone
 - Hydrocodone
2. Pulmonary hygiene only AFTER Pain is controlled
 - TCDB - Turn, cough, deep breathing
 - IS - Incentive Spirometer to re - expand the lungs & preventing atelectasis

1st PRIORITY



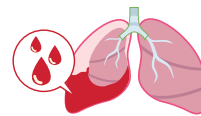
Respiratory Hemothorax vs. Pneumothorax

Key Sign & Memory Trick

<p>Hemothorax</p>		<p>L</p> <p>DULL RESONANCE</p> 	<p>L</p> <p>BLOOD OR FLUID</p> 
<p>Pneumothorax</p>		<p>H</p> <p>HYPERRESONANCE</p> 	<p>H</p> <p>HIGH AIR</p> 
<p>Tension Pneumothorax</p>		<p>T</p> <p>TRACHEAL DEVIATION</p> 	<p>T</p> <p>TENSION PNEUMOTHORAX</p> 

Hemothorax

Blood collects in pleural space (space between lung and chest wall) resulting in lung collapse. Think hemo meaning blood like HEMOGlobin.



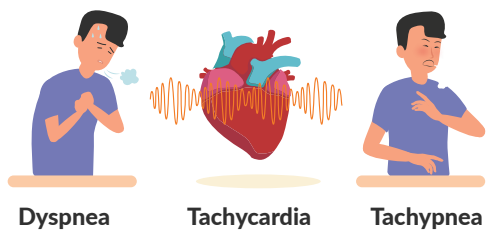
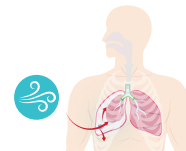
Pneumothorax

Lung collapses due to AIR in pleural space. Key sign: hyperresonance - like tapping on a hollow drum or tree.



Tension Pneumothorax

Can result from an open pneumothorax, where air gets sucked into the pleural space when breathing in & can't get out, known as a sucking chest wound. All this built-up pressure can push organs & **trachea to one side**.



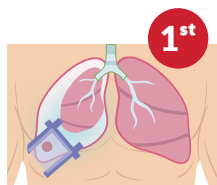
Dyspnea

Tachycardia

Tachypnea

Treatment:

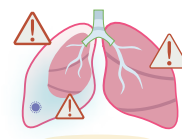
- Chest tube
- **Open pneumothorax** "sucking sound"
 - Cover the wound with **occlusive** (petroleum gauze) dressing
 - Tape on **3 sides**



HESI Question

During central line placement the patient develops **dyspnea** and **tachypnea** and the provider asks for a **chest tube** tray...

- Suspected **pneumothorax**



Respiratory Chest Tubes

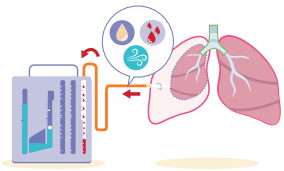
Chest tubes are used to drain fluid, blood, or air from the pleural space within the lung in order to re-expand a collapsed lung & **RESTORE the normal negative pressure** in the pleural space

Examples

- Pleural effusion - Fluid in the pleural lung space
- Hemothorax - Blood in pleural lung space
- Pneumothorax - Air in pleural lung space

Mechanism of action

Inserting the tube into the pleural space it simply **SUCKS** out all the air, fluid, or blood into a closed 1-way drainage system. Always keep the chest tube drainage system **BELOW** the **CHEST** level to help with drainage



HESI

Interventions for client with chest tube for **pneumothorax**

- Keep drainage **below** patient's **chest level**

Chest Tube Chambers:

1 SUCTION CONTROL CHAMBER

"gentle, steady or **continuous bubbling**"



Memory trick
Think of a child sucking down a milkshake, we want gentle bubbling NOT vigorous.

2 WATER SEAL CHAMBER & AIR LEAK MONITOR

- Tidaling (rise & fall) = **Good**
- "**continuous bubbling**" = **BAD**

Air leak monitor **NCLEX TIP**



Memory trick
Just think of a seal in the ocean for a water seal. seals float up & down with the **TIDE** of waves & every time it takes a breath. **THIS** is good Tidaling, rising & falling with the **TIDE**

KAPLAN

Best response from the nurse when a client asks about **tidaling** in the water seal chamber?

- "It shows your lung has **not yet re-expanded**"

ATI

Possible indication of lung **re-expansion?**

- Tidaling in the water seal chamber has **stopped**

3 COLLECTION CHAMBER

- **Notify HCP** **NCLEX TIP**
"**bright red blood**" Over **100 ml/hr +** (after 1st hour of placement)
 - **D - Dark bloody** drainage = Normal
 - **D - Document & monitor (old blood)**



MEMORY TRICK

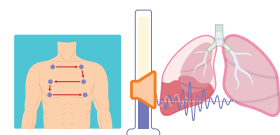
- **Dark Blood = Document**
- **BRIGHT** Blood = well that **ain't RIGHT!**



Stopped or decreased drainage?

1. Auscultate lung sounds
diminished breath sounds = **PRIORITY**
2. **Turn, cough & deep breathe**
3. **Reposition** the patient

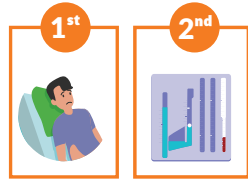
PRIORITY



KAPLAN

Priority for client with three chambered chest drainage system for hemothorax?

- **Assess client's** respiratory status frequently

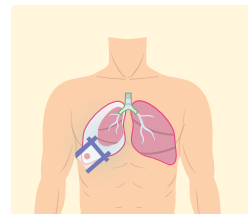


Patient Assessment

- Every 2 hours - listening to breath sounds, dressing around the chest tube to see if blood or pus for infection
- Subcutaneous emphysema (trapped air under the skin) feels like rice krispies under the skin "snap, crackle & pop"

Disconnection & Damage

- **Disconnected from patient**
 1. Cough & Exhale **immediately**
 2. Apply **occlusive** (petroleum gauze) dressing secured on **3 sides**



HESI

Interventions for a client with a chest tube for pneumothorax ...

- If the tube becomes **dislodged**, ask the patient to **cough and exhale as much as possible**

KAPLAN

Essential equipment to have at the bedside of a client with closed chest drainage system?

Sterile connector, sterile petrolatum gauze, padded clamp

If chest tube disconnects from the collection chamber itself - we have 2 options:

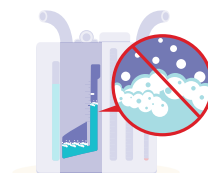
2. Damage:
 - Water Seal Chest Tube Damage
 - Place distal end into 250ml sterile saline

Chest Tube Removal

Take a **deep breath, hold it & bear down** (Valsalva maneuver)

No Nos

1. **NEVER** "milk" "strip"
2. **NEVER** "**continuous bubbling**" in the **Water seal / Air leak chamber**
3. **NEVER** clamp during transport



Respiratory Obstructive Sleep Apnea

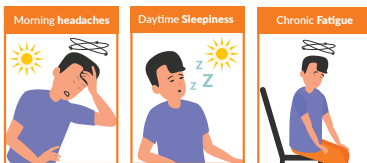
Pathophysiology

When the tongue or muscles in the pharynx block the airway resulting in moments of no breathing & no airflow, called Apnea.

Signs & Symptoms:

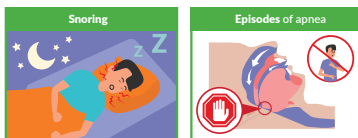
Daytime:

- Morning headaches
- Daytime sleepiness
- Chronic fatigue
- Irritability, mood swings, depression



Night Time:

- Snoring
- Episodes of apnea



Causes:

O



S



A



Pt Education

- Lose weight / Exercise
- **Limit** alcohol intake
- **NO napping** during the day
- **NO sedatives** at bedtime
- **NO eating** bedtime snacks



Memory Trick

O - **O**bstructed
S - **S**norring
A - **A**irway



HESI Question

Findings that support obstructive sleep apnae?

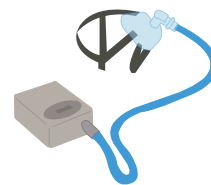
Select All That Apply

- Chronic **fatigue**
- Reports going to bed early, sleeps for 8 hours, and **still does not feel rested on awakening.**
- **Obese man** with hayfever that causes predominantly nasal symptoms.

HESI Question

Patient who is **not compliant** with CPAP?

- Use **BiPap** instead of CPAP



CPAP
 Continuous positive airway pressure

Intervention

CPAP: Continuous positive airway pressure uses a mask & air pump to push air pressure into the nose & mouth which keeps the pharynx and tongue from collapsing backward.

Key point

1st Action:

- Client on **CPAP** with **Low O2 Sat.**
- **Check tightness** of straps and mask.

Side Note

Cpaps give continuous pressure during inhalation & exhalation making it more uncomfortable & BIPAP pressures accommodate for normal breathing

Oxygen Delivery Devices & Hypoxia

Hypoxemia (PaO2 less than 80 mmHg)

Early Signs

NCLEX TIP

■ **Brain: Mental Status Change**

- Restlessness
- Agitation "irritability"
- Confusion



■ **Vitals Signs - HIGH**

- RR - Tachypnea (over 20 RR)
- HR - Tachycardia (over 100 bpm)
- BP - Hypertension (over 140 sys.)

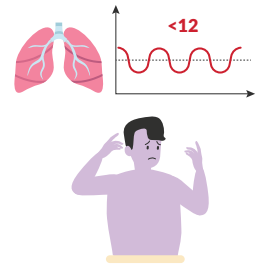


■ **Positioning**

- Accessory muscle use
- Paradoxical breathing
- Tripoding

Late signs

- Low Vitals
 - Bradypnea (below 12)
 - Bradycardia (below 60)
 - Hypotension
- Skin Blue
 - **Cyanosis**
- ECG dysrhythmias



CAUTION: Avoid combustion!
Oxygen is **HIGHLY** flammable

NO	NO	NO
Smoking (open flame)	Static (synthetic / wool fabrics) = ONLY Cotton	Flammable material • Alcohol • Acetone (nail polish)

Device	Description
NC - Nasal Cannula	1 - 6 Liters per minute (LPM) 25 - 45% O ₂
	Short-term use: low oxygenation after surgery Long-term use: can dry out mucous membranes in the nose, so we use humidification for long term use.

Device	Description
NRB non-rebreather	10 - 15 LPM Medical Emergencies 60 - 100% O ₂
	Key Points: • Used during carbon monoxide poisoning • If the reservoir bag is fully deflated on inspiration = Increase oxygen flow. Don't let the EXAMS trick you: • Do not open flutter valves • Do not tighten face mask straps first if the reservoir bag is fully deflated.

Device	Description
Simple Face Mask	6 - 10 LPM 40 - 60% O ₂
	Used in exchange to partial rebreather & non-rebreather.

Device	Description
Venturi Mask	4 - 10 FiO ₂ Most precise oxygen delivery device
	Memory Trick: V - Venturi Mask V - Very Accurate O ₂ Typically used for patients with unstable COPD who can not tolerate changes in oxygen concentration from other devices.

Device	Description
Partial Rebreather	6 - 10 LPM 35 - 60%
	Looks very similar to the non-rebreather Key difference is the flutter valves on the sides

Device	Description
Face Tent	Used facial trauma & burns High humidification
	F Face Tent
	F Face Trauma

Oxygen Delivery Devices & Hypoxia

Common EXAM Question

A patient **recovering from surgery** in the postoperative area suddenly becomes **confused**, pulse ox reading shows a drop from **98% to 90%** on room air. What is the most appropriate intervention?

- 1. Apply non-rebreather
- 2. Apply simple face mask
- 3. **Apply nasal cannula**
- 4. Raise the head of bed



BiPAP (Bilevel Positive Airway Pressure)

Most tested: used for **worsening COPD** who have **High levels of CO₂ retention (Hypercapnic)**. Bipap is a positive pressure machine that forcefully PUSHES air Deep into the lungs giving much needed Oxygen while expelling CO₂!! Typically last line oxygen device before endotracheal intubation.

Respiratory Failure:

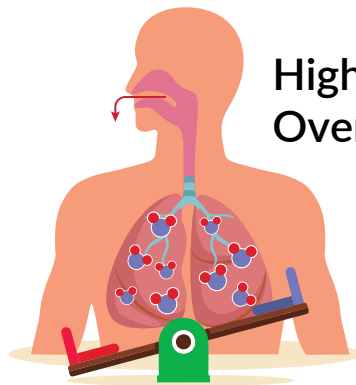
- **Hypoxemic** respiratory failure = Low O₂
- **Hypercapnic** respiratory failure = **HIGH CO₂** (Over 45)

Priority = BiPap

Memory Trick

HyperCAP

Give BiPAP



High CO₂
Over 45

PRIORITY



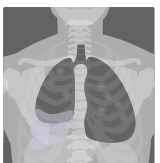
Intubation (Endotracheal intubation)

Ultimate solution to keep the airway open! A tube is inserted directly into the trachea to ventilate the client manually.



Complication:

- VAP - "Ventilator Associated Pneumonia"
 - Reposition side to side **Q 2 hours**
 - Oral Care **Chlorhexidine Q 2 hours**
- **Monitor** Key Signs:
 - **Positive sputum culture**
 - **Fever**
 - Chest X-ray: **new infiltrates**



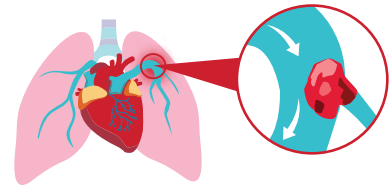
Respiratory Pulmonary Embolism

Pathophysiology

Deadly **PRIORITY** medical emergency! PE is a blood clot that obstructs a pulmonary vessel (blood vessel inside the lung), typically the pulmonary artery. This blockage prevents blood flow to the Alveoli where gas exchange is supposed to happen, eventually leading to DEADLY hypoxemia (deadly low oxygen).

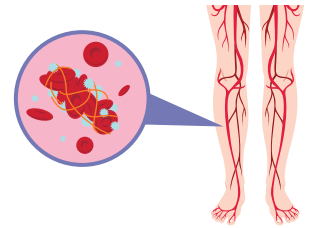
Highest Priority

- Impaired **gas exchange** r/t imbalance of ventilation & perfusion



Causes:

Typically caused from a DVT blood clot that loosens from another part of the body (typically the leg) & gets sucked into lungs - causing a blockage.



Risk Factors

- Smoking, Obesity, Immobility, & even cardiac issues like Atrial Fibrillation or valve disorders.
- Estrogen birth control "oral contraceptives" MOST TESTED leads to increased risk for blood clots

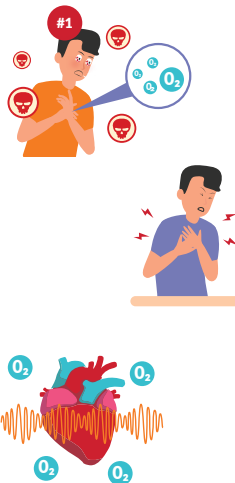


Memory Trick

- E - Estrogen
- E - Emboli (blood clots)

Signs & Symptoms:

- #1 Sign = **Hypoxemia**
 1. Restless
 2. Agitation
 3. Mental status change
- **Chest pain**
- **Dyspnea** & SOB
- **Tachypnea**
- **Tachycardia**
- **Anxiety**



Diagnostics:

- **High D dimer** - High risk for blood clots in the body

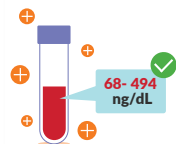
Memory trick:

- **D** - Dimer (Positive)
- **D** - Dime sized clot in body

HESI Question

Indications for pulmonary embolism include...

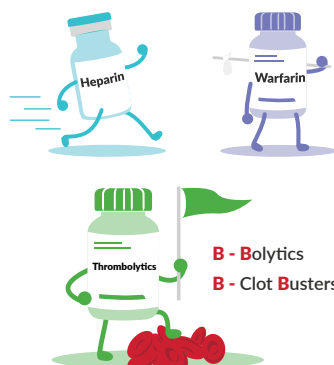
Positive D-Dimer
Normal range 68- 494 ng/dL)



Pharmacology

Pharmacology

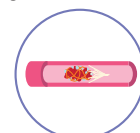
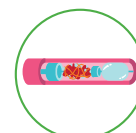
- **Anticoagulants**
 - Heparin
 - Warfarin
- **Thrombolytics**
 - tPA
 - Alteplase
 - Streptokinase



Treatments

Surgery

- **Embolectomy:** surgical removal of the clot
- **Vena Cava filter:** acts like a net to catch any new clots

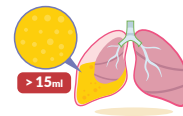


Respiratory

Pleural Effusion & Thoracentesis

Pathophysiology

Pleural Effusion think Plenty of Fluid in the lung space, specifically fluid collection in the pleural space greater than 15 mls of fluid. This fluid prevents full expansion of the lung & results in decreased gas exchange & atelectasis (collapse of the alveoli).



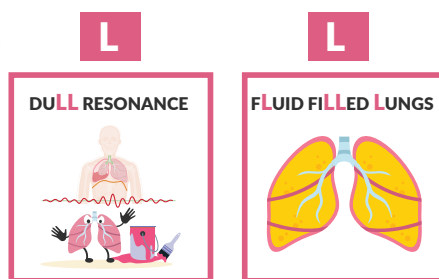
Causes:

- **Pneumonia** (lung infection), which fills the lungs with fluid.
- **Heart failure** causing pulmonary edema, where heavy fluid builds up in the lungs.

Signs & Symptoms:

KEY SIGNS

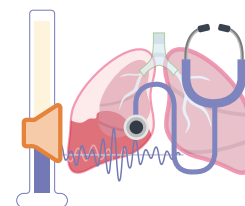
1. Chest pain during **inhalation**
2. Dyspnea
3. **Diminished** breath sounds
4. **Dull** resonance on percussion



KAPLAN

Suspected pleural effusion findings ...

- **"Decreased breath** sounds noted in lower lobe"



Interventions

Thoracentesis

Provider places a needle through an intercostal space (the space between the ribs) to gently puncture the lung & drain the fluid!

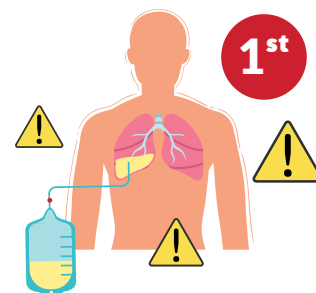
Sign a consent form

Chest X-ray before & AFTER procedure to compare fluid & lung expansion

BEFORE procedure:

STOP all blood thinners:

- **Antiplatelets:** aspirin & clopidogrel
- **Anticoagulants:** Warfarin & heparin (enoxaparin)



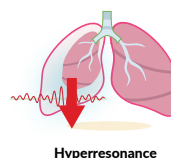
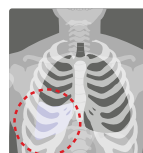
AFTER a thoracentesis:

- Deep breaths to help re-expand the lungs & promote adequate oxygen exchange
- Lie on the unaffected lung to keep BAD LUNG UP!

Complications: REPORT to HCP

Pneumothorax

- **Asymmetrical** chest expansion & **decreased** breath sounds on affected side
- Hyperresonance
 - **H** - Hyperresonance
 - **H** - High Air in the lungs
- Deviated Trachea



ATI

Correct instructions after a thoracentesis?

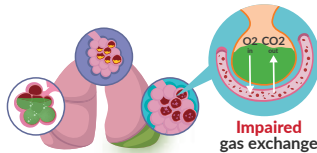
Have the client **take deep breaths** after the procedure



Respiratory Pneumonia

Pathophysiology

Infection that causes severe inflammation in the lungs which makes the alveoli to fill with mucus, fluid, & debris leading to **impaired gas exchange** where CO₂ can't get out & oxygen now can't get IN, resulting in hypoxia (low oxygen).

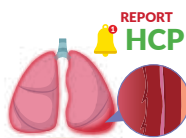


Signs & Symptoms

1. Altered Mental Status
Restlessness, Agitation, Confusion
2. **Fever** (Over 100.4 F/ 38°C)
3. Productive cough **"Yellow Sputum"**
4. Fine or Coarse **Crackles**
5. **Dyspnea** "Shortness of Breath"
6. Pleuritic Chest pain
(Pleural friction rub) Report to HCP
"Sharp chest pain upon inspiration or coughing"



Big Sign



Critical Complications

1. Pleural Effusion **NCLEX TIP**

Fluid that fills the pleural space (space between the lung itself & the chest wall) This prevents full expansion of the lung, resulting in decreased gas exchange.

KEY SIGNS

1. D - During **inhalation** = Chest pain
2. D - Dyspnea
3. **D - Diminished** breath sounds
4. **D - Dull** resonance on percussion

Priority to report

- **Asymmetrical** Chest Expansion
- **Decreased** Breath sounds

2. ARDS (acute respiratory distress syndrome)

- Deadly **STIFF** lungs - ARDS - think **HARDS** hard stuff lungs

KEY SIGNS

Refractory Hypoxemia = Low PaO₂

MEMORY TRICK

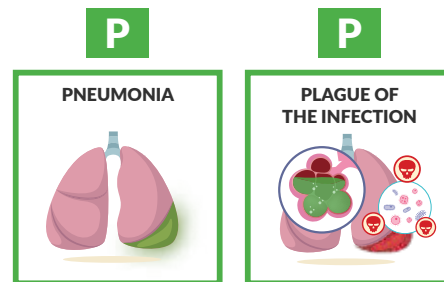
- **RE**sistant to Oxygen
- **RE**fractory Hypoxemia

#1 Sign of **Low O₂** = Altered Mental status

1. Confusion
2. Agitation
3. **Restlessness**



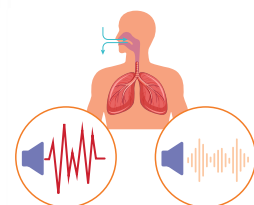
Memory Trick



KAPLAN

Pleural friction rub?

- **Grating** sound or **vibration** heard during **inspiration** and **expiration**



Common NCLEX Question

Priority Patient: who to see first?

- ✓ **Post-operative** patient with suspected **pneumonia** temp. of 98.2F, SpO₂ 94%
... **becoming restless & agitated.**

KEY TERM



3. Septic Shock

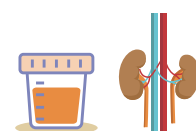
If the infection gets severe, the body releases chemicals into the bloodstream to fight the infection resulting in severe low blood pressure & total body inflammation which can damage multiple organs causing them to fail, known as MODS - multiple organ dysfunction syndrome.

Memory Trick:

- S** - Shock
- S** - Severely Low BP & perfusion

Key signs

- Hypotension **NCLEX TIP**
 - Systolic < **90 mm Hg**
 - MAP < **65 mm Hg**
- Cap refill over 3 - 4 seconds
- Tachycardia
- Early - Fever (Over 100.4)
- **Late - Hypothermia (Under 96.8)**
- Elevated WBC (norm: 10,000 or less)
- Decreased Urine Output
 - **30 ml/hr** or **Less** = Kidney Distress

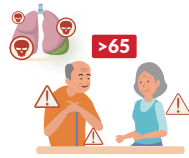


Respiratory Pneumonia II

Risk Factors & Causes

#1 - Advanced AGE

Over 65 years old



VAP - "Ventilator Associated Pneumonia"

1. Reposition side to side **Q 2 hours**
2. Oral Care & Suctioning **Q 2 hours**
3. Chlorhexidine



Best indicators of VAP **NCLEX TIP**

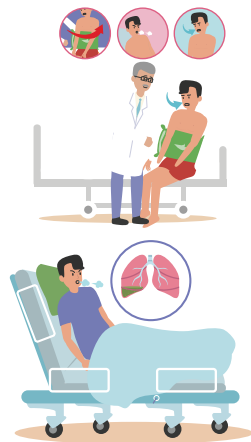
- **positive sputum culture**
- **Fever**
- Chest X-ray: new infiltrates

- Prolonged immobility - secretions are not mobilized & get stuck in body
- Post-Operative - Anesthesia - the body is put to sleep which traps infection in the lungs

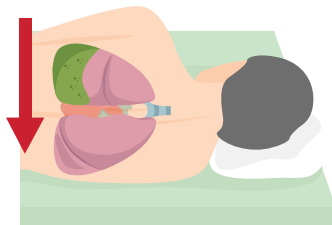
Patient care

Mobilize secretions & Expand Lungs

- Chest physiotherapy
- TCDB - turn **cough** & deep breath!
 - Huff **coughing** technique **NCLEX TIP**
 - **AVOID** cough suppressants
- **Fluid** 2 - 3 L per day
- Positioning
 - HOB UP! **High Fowler's**
 - **Hypoxia** in Unilateral Pneumonia? = Good Lung Down **NCLEX TIP**



Common Exam Questions



Early ambulation

(within **8 hours** after surgery)

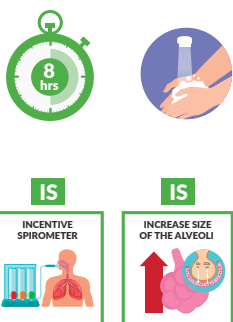
Cough with splinti

Handwashing

Mouth Care Q 12 hour

• Chlorhexidine swab
Incentive Spirometer **Q Hour**

GIVE Pain Meds



Diagnostics

- Elevated WBC - white blood cell count
 - Over 10,000
- **Sputum Culture** = Positive
 - **Test tip** - cultures are always taken first - BEFORE antibiotics
 - Think **A** - Antibiotics **A** - AFTER cultures, in order to identify the causative bacteria.



Common NCLEX Question

Best indicator of ventilator associated pneumonia (VAP) ?

- ✓ Positive sputum culture

Best blood lab value shows effective treatment of pneumonia after IV antibiotics?

- ✓ White blood Cell count



HESI

Encourage **3L of fluid intake** per day to promote expectoration



Discharge Teaching

Mobilize Secretions

- **Avoid** cough suppressants
 - Antitussives: Codeine
- **Cool mist humidifier** at night
- Increase Fluid

Re-expand Alveoli

- **IS - Incentive spirometer** at home

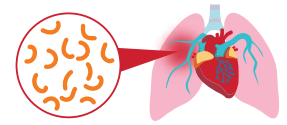
Prevent Reinfection

- **Finish oral antibiotics** at home
- **Pneumonia vaccine** (Every 5 years)
- Smoking cessation
- Handwashing
- **Schedule follow up** & Chest X-ray
- **Report:** increased or Worsening
 - Fever
 - Confusion
 - SOB, cough, sputum

Respiratory Tuberculosis

Pathophysiology

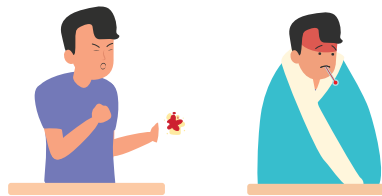
- Bacterial infection in lungs caused by the bacteria M.Tuberculosis
- Spread via the **airborne route**, once inhaled it enters the lungs & spreads to the lymph & bloodstream.



Signs & Symptoms:

KEY POINTS

- **Night Sweats**
- Anorexia: **Weight loss**
- Cough + Hemoptysis
"Blood tinged sputum" **NCLEX TIP**
- Dyspnea & SOB
- **Fever** & chills



Memory Trick

T

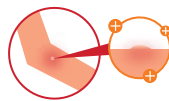
 Terrible cough "**blood tinged**"

B

 Bad infection:
Fever, **night sweats**, **weight loss**

Diagnostics:

- **Intradermal injection** (mantoux test) requires a 2 to 3 day window for reading.

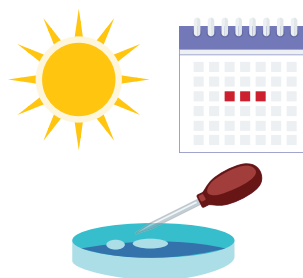
 Over **15 mm** induration
= **positive TST**

 Patient has a
TB infection

- **Chest X-ray & sputum cultures** test for active form.

Key point

Sputum Culture Diagnosis

- **Early morning** sterile sputum specimen
3 consecutive days



Pharmacology (see pharmacology TB study guide)

ATI

 Precautions for a patient with suspected **tuberculosis (TB)?**

- **Airborne** precautions

HESI Question

First action for a patient with **night sweats**, **weight loss**, hemoptysis, **fever** and chills.

- **Airborne** precautions

KAPLAN Question

 Client with **anorexia**, low-grade **fever**, **night sweats** and a productive cough.

- Priority action: Initiate **airborne** precautions.



HESI Question

 Most accurate description of **tuberculosis (TB)?**

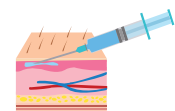
- "Most people who become infected with the TB organism, **do not progress to active disease**"



KAPLAN

 Route of administration for **Mantoux test?**

- **Intradermal**



ATI

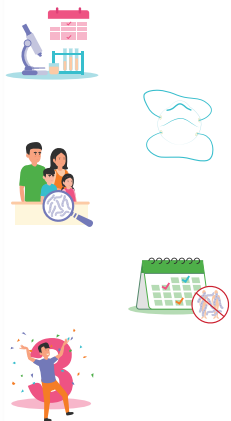
- Sputum cultures are taken until **3 negative** cultures
- Family members should be **tested for TB**

TB DRUGS

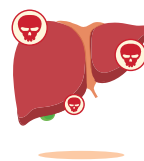
5 TB Tips

5 NCLEX TIPS

1. Meds Last **6 - 12 months**
2. N-95 mask worn all the time
3. Family tested for TB
4. Sputum samples every 2 - 4 Weeks
5. **3 Negative** cultures on **3 different days** = NO Longer infectious



Memory Trick



ALL are **LIVER TOXIC!!!!**
So some instructors just use the acronym:

R I P E

R

**RIFAMPIN
RED-FAMPIN**

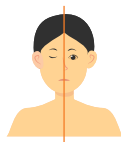
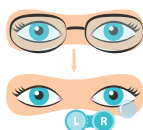


KEY Points:

1. **NORMAL**
 - Red, Orange: Tears, Urine, Sweat

Teach:

 - Wear glasses instead of contacts due to discoloration of tears **NCLEX TIP**
2. Oral contraceptives ineffective
"Use **non-hormonal Back-up birth control**"
3. Monitor for Jaundice



I

**INH
ISONIAZID**

**#1 TESTED
TB DRUG**

- I** - Interferes with absorption of B6 (pyridoxine)
 - Low **Vitamin B6** = Peripheral **Neuropathy**
 - Take **Vitamin B6** 25 - 50mg/day
- N** - Neuropathy
REPORT:
 - New Numbness
 - Tingling extremities
 - Ataxia
- H** - Hepatotoxicity
REPORT Immediately!!!
 - Jaundice (yellow) **Skin / Sclera**
 - Dark urine **NCLEX TIP**
 - Fatigue
 - Elevated liver enzymes (AST/ALT)
 - HOLD the Med**
 - Teach: NO ETOH!!

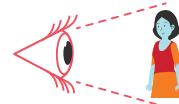
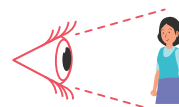


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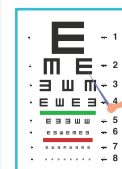
ETHAMBUTOL - Eye

**KEY POINT:
REPORT!**

- Blurred vision
- Color changes



This information has come up in multiple sections!
TEACH to have baseline eye exams and routine **EYE** appointments! For **EEEEthambutol**



P

PYRAZINAMIDE

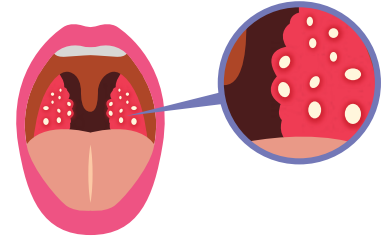
Did not come up once in 10,000 questions.
it's a nice to know but **NOT A NEED TO KNOW**

Respiratory

Tonsillitis & Abscess

Pathophysiology

Tonsillitis is the inflammation of tonsils, the little soft tissue masses located near the rear of the throat. When these guys get inflamed it can lead to a life-threatening airway obstruction!

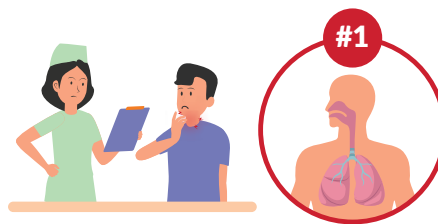


Key Sign

KEY SIGN

Sore throat with **difficulty opening mouth and swallowing**

PRIORITY



Treatments to avoid bleeding after surgery:

Tonsillectomy: simple surgery to remove the tonsils, HUGE RISK for bleeding.



Patient Teaching

- **AVOID** coughing, blowing nose
- **AVOID** sharp foods: chips, nuts
- **NO** milk products
- **NO** hard brushing or gargling



Key Signs

Priority Findings
Post-Op tonsillectomy

1. Frequent swallowing
2. Restlessness
3. Persistent Coughing



Ventilator (Mechanical Ventilation)

Mechanical ventilation means that a machine is mechanically giving breaths or ventilations to a patient. This machine is like an air pump that pumps air into tires on a bicycle. In the same way we are pumping air into the lungs, this is called PPV - positive pressure ventilation

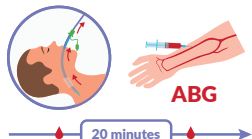


Suction

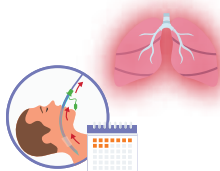
5 Key Points

- Suction OUT** - never IN
"Never apply suction when inserting catheter into airway"
- 10 Seconds** or LESS
- 100% Oxygen **30 seconds Before**
- AVOID** suctioning before an **ABG** draw **NCLEX**
- AVOID** suctioning "routinely"
- **Acute Lung Injury ONLY** when needed

NCLEX TIP



AVOID



ONLY when needed

Kaplan

Adjust **FiO2** when preparing to **suction endotracheal tube**

HESI

Pt with **increased ICP**... when should **suctioning** be performed?

- When **O2 sat. drops** bc of increased **respiratory secretions**

Oral Care

VAP "Ventilator Associated Pneumonia"

- Reposition side to side **Q 2 hours**
- Oral Care **Chlorhexidine Q 2 hours**



Common EXAM Question

Best indicator(s) of **ventilator associated pneumonia (VAP)**?
Select all that apply

- 1. **Positive sputum culture**
- 2. **Fever (Over 100.3 F) 38°C**
- 3. **Chest X-ray: new infiltrates**

Common EXAM Question

Appropriate interventions for a patient intubated on **continuous sedation** to prevent **ventilator associated pneumonia**?
Select All That Apply

- 1. **Daily sedation & weaning protocols "sedation vacations"**
- 2. **Elevate HOB 30-45 degrees**
- 3. **Oral care with chlorhexidine**
- 4. **Hand hygiene**
- 5. **Clock out for lunch.**



NGT Feeding & GI Ulcers

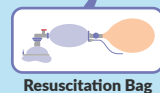
- NGT - **NO** bolus feedings
- GI "Stress Ulcers"



Complications

1. Dropping O2 Saturation

- Auscultate** lung sounds
- Secretions = Suction
- Manual ventilation w/ **resuscitation bag** Bedside Essentials
- Extra intubation set up & bag valve mask (Ambu bag)
- Kaplan** Essential to have **resuscitation bag at bedside**



Resuscitation Bag

NCLEX TIP



Over 60% of students miss this!

2. Pneumothorax - Barotrauma from High PEEP **NCLEX TIP**

3. Hypotension (Low BP)

Extubation:

- Use warm **humidified** oxygen via facemask
- Oral care** (oral sponges)
- NPO** (nothing per oral)
- High Fowler's** position



2 DEADLY risks:

- Atelectasis & Pneumonia:**
 - Incentive Spirometer Q hour**
 - Turn, Cough, Deep Breathe (TCDB) to mobilize secretions
- Stridor** "Squeaky"



Atelectasis



Pneumonia

ATI

Stridor following extubation = **Report** to provider **immediately**

HCP



Kaplan

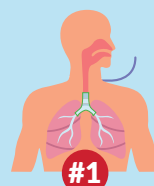
Extubated from endotracheal **intubation** 10 minutes prior. **Priority assessment finding to report to HCP?**

- Stridor

Tracheostomy Care

#1 Priority "New tracheostomy"

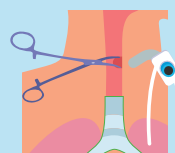
- Checking tightness of ties
- 1 finger to fit** under ties



#1

Mature tracheostomy (7 days or more) **NCLEX TIP**

- Insert **new** tracheostomy tube using curved hemostat
- Cover stoma with **sterile occlusive dressing** & ventilate lungs with bag valve mask **over nose/mouth**



Ventilator Settings

Alarms

Low pressure (Low Tidal Volume Alarm)

- L - Loss of connection**
- L - Leak**

- Cuff leak
- ET Tube displacement
- Disconnection

High pressure (High Peak Pressure Alarm)

H - High Blockage

- **Biting** tube
- **Kinks** in the tube
- **Excessive airway secretions**
- Mucus plug
- Coughing
- **Pulmonary edema**
- Pneumothorax



Kaplan

A client with **emphysema** receiving mechanical ventilation appears **restless and agitated**.

Priority action when a **high pressure alarm sounds?**

- Instruct client to **allow machine** to breathe for the client



Common NCLEX Question

The nurse responding to a **high-pressure alarm** on the ventilator would assess for which condition? Select all that apply.

- 1. Auscultate the lungs for pulmonary edema
- 2. Biting the ET tube
- 3. Tube displacement
- 4. Disconnection of tubest
- 5. Excessive airway secretions
- 6. Kinked ventilator tubing

Which complication is associated with excessively **high levels of PEEP?**

- Barotrauma (pneumothorax)**



Mode

	Name	Description	Memory Trick
AC	A ssist C ontrol Full machine control	100% Machine control	A - Actively C - Controls breathing
SIMV	“Weaning Mode” S Synchronized I Intermittent M Mandatory V Ventilation	Patient controls breathing mainly, but machine assists	S - SIMV S - Step down

Settings

	Name	Description	Memory Trick
VT (V4)	Tidal Volume (V4)	Volume of air set to be delivered with each breath 500 - 800 ml of air	T idal Volume T idal Wave of air
f RR	Freq. RR	# of breaths / min. 12 - 20 RR	f RR f reakin RR
FiO₂	Oxygen Concentration	35% - 100% Higher = More Severe	Fi O ₂ Fi-eed me O₂
PEEP	Positive End Expiratory Pressure	Keeps alveoli open with positive pressure at the end of respiration. Caution = Barotrauma	P - PEEP P - Pushes open alveoli
PS	Pressure Support	Push of air to help with spontaneous breath	PS - SP ontaneous breath support

Monitoring

	Name	Description	Memory Trick
Ve	Minute V entilation	Amt. of air delivered per minute	V - Ventilations e - every minute
PIP	P eak I nspiratory P ressure	Max pressure during inspiration	PIP is the TIP of max pressure
Pplat	P lateau P ressure	Pressure applied to HOLD OPEN small airways & alveoli before expiration. Indicates Lung compliance	P lateau P ause lung



INFLUENZA (RHINOVIRUS)



WHAT AM I?

Known as the "FLU", a highly contagious acute viral respiratory infection.

Types :

- ❖ A
- ❖ B
- ❖ C



PATHO

Virus invades the epithelium of the respiratory tract, causing inflammation and desquamation.

After attaching to the host cell, viral ribonucleic acid enters the cell and uses host components to replicate its genetic material and protein, which are then assembled into new virus particles.

Newly produced viruses burst out to invade other healthy cells. Viral invasion destroys host cells, impairing respiratory defenses (especially the mucociliary transport system) and predisposing the patient to secondary bacterial infection.

CAUSES

Infection by the orthomyxovirus, which is transmitted by inhaling a respiratory droplet from an infected person or by indirect contact (such as drinking from a contaminated glass)



SUBTYPES

- ❖ **Avian flu:** Does not usually affect humans, mainly affects birds.
- ❖ **Swine flu:** A strain of flu that contains genetics from swine, avian, and human influenza viruses.



ASSESSMENT

Usually, recent exposure (typically within 48 hours) to a person with influenza, No influenza vaccine received during the past season

CNS: Headache

MISC: Malaise, Fatigue, listlessness, weakness, Fever, Warm, hot skin, Red, watery eyes; clear nasal discharge, Erythema of the nose and throat without exudate

MS: Myalgia, Pain with eye movement
Fatigue, listlessness, weakness

RESP: Sore throat, Nonproductive cough, Tachypnea, dyspnea, cyanosis

Cardio: Tachycardia

Germ Farm



COMPLICATIONS

- ❖ Pneumonia
- ❖ Croup
- ❖ Ear infections
- ❖ Myositis
- ❖ Exacerbation of chronic obstructive pulmonary disease
- ❖ Reye syndrome
- ❖ Rhabdomyolysis
- ❖ Myocarditis
- ❖ Pericarditis
- ❖ Transverse myelitis
- ❖ Encephalitis
- ❖ Toxic shock syndrome
- ❖ Acute respiratory distress syndrome
- ❖ Death

LABS & DIAGNOSTICS

Throat swabs, nasopharyngeal washes or swabs, or sputum culture isolate the influenza virus.

- ❖ Immunodiagnostic techniques show viral antigens in tissue culture or in exfoliated nasopharyngeal cells obtained by washings.
- ❖ White blood cell (WBC) count is elevated in secondary bacterial infection.
- ❖ White blood cell count and differential are decreased in overwhelming viral or bacterial infection.
- ❖ Rapid influenza antigen tests are positive for the type of influenza (A or B).
- ❖ Chest radiography rules out pneumonia.



TREATMENTS

- ❖ **Antipyretics:** acetaminophen (Tylenol), or nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (Advil)
- ❖ **Guaifenesin** (Robitussin) or expectorant
- ❖ **Antivirals:** oseltamivir phosphate (Tamiflu) or zanamivir (Relenza Diskhaler) as precautionary medications to family members and others not vaccinated and who have been exposed by the infected even if they are not showing signs or symptoms
- ❖ **Influenza virus vaccine** (for prevention)
- ❖ **Antibiotics** for secondary bacterial infections such as bacterial pneumonia, otitis media, or sinusitis



RISK FACTORS

- ❖ Weakened immune system
- ❖ Age (very young or elderly)
- ❖ Occupation: Health care or day-care worker
- ❖ Chronic illness
- ❖ Pregnancy
- ❖ Living in close quarters with many people
- ❖ Caring for or living with a person with influenza

INTERVENTIONS

- ❖ Encourage rest
- ❖ Encourage fluid intake
- ❖ Monitor lung sounds
- ❖ Administer medications as prescribed
- ❖ Institute droplet precautions



LUNG CANCER



13-11

WHAT AM I ?

Malignant tumors arising from the respiratory epithelium

- Typically divided into two major groups:

Small-cell (less common)

Non-small-cell, which is further divided histologically into adenocarcinoma, squamous cell carcinoma, and large cell carcinoma.

Most common site is wall or epithelium of bronchial tree. Poor prognosis for most patients, depending on the extent of the cancer, when it was diagnosed, and the cell growth rate (5-year survival after diagnosis in only about 13% of patients)



PATHO

Patients with lung cancer demonstrate bronchial epithelial changes progressing from squamous cell alteration or metaplasia to carcinoma in situ. Tumors originating in the bronchi are thought to be more mucus producing. Partial or complete obstruction of the airway occurs with tumor growth, resulting in lobar collapse distal to the tumor. Early metastasis is present in other thoracic structures, such as hilar lymph nodes, the bronchi, carinal lymph nodes, and the mediastinum. Distant metastasis to the brain, liver, bone, and adrenal glands occurs.

CAUSES

- Tobacco smoking is major cause (90%)

Risk Factors

- Smoking (16-fold increase in risk)
- Exposure to secondhand smoke or radon gas
- Exposure to carcinogenic and industrial air pollutants (asbestos, arsenic, chromium, coal dust, iron oxides, nickel, radioactive dust, and uranium)
- Genetic predisposition
- Pulmonary fibrosis
- Radiation therapy

ASSESSMENT

- Possibly no symptoms. Exposure to carcinogens, chronic cough or a change in the cough, hemoptysis, dyspnea, dysphagia chest or abdominal pain, hoarseness, fatigue, anorexia
- Dyspnea on exertion, use of accessory muscle for breathing; nasal flaring, digital clubbing, edema of the face, neck, and upper torso, dilated chest and abdominal veins (superior vena cava syndrome), weight loss, enlarged lymph nodes, enlarged liver (with liver metastasis), absent breath sounds, wheezing, pleural friction rub.

TREATMENTS

- Chemotherapy drug combinations: Non-small cell: carboplatin (Paraplatin) or cisplatin (Platinol),
- Targeted drug therapy (in combination with chemotherapy) such as afatinib (Gilotrif), bevacizumab (Avastin)
- Immunotherapy, such as gefitinib (Iressa), erlotinib (Tarceva), crizotinib (Xalkori), PD-1/PD-L1 inhibitors: nivolumab (Opdivo) and pembrolizumab (Keytruda)
- Antiemetics, such as ondansetron hydrochloride (Zofran),
- Corticosteroids for brain metastasis and spinal cord compression (small-cell lung cancer)
- Analgesics
- Anti-anxiety medications
- Supplemental oxygen therapy
- Partial removal of lung (wedge resection, segmental resection, lobectomy, radical lobectomy)
- Total removal of lung (pneumonectomy, radical pneumonectomy)



INTERVENTIONS

- Monitor vitals & respiratory Status
- Maintain patent airway
- Daily weights
- Meticulous skin care
- Provide support
- Turn patient frequently
- Offer a high calorie foods with small frequent meals.

LABS & DIAGNOSTICS

- Cytologic sputum analysis** shows diagnostic evidence of pulmonary malignancy.
- Complete blood cell count** may reveal anemia, leukocytosis, or hypercoagulable disorders.
- Liver function test** results are abnormal, especially with metastasis.
- Serum calcium level test** may be elevated with bone metastasis.
- Arterial blood gas analysis** may reveal evidence of hypercarbia, hypoxia, and acidosis.
- Chest radiography** may show advanced lesions and can show a lesion up to 2 years before signs and symptoms appear; findings may indicate tumor size and location. It may reveal mediastinal widening, atelectasis, hilar enlargement, or pleural effusion.
- Contrast studies of the bronchial tree** (chest computed tomography [CT], bronchography) demonstrate size and location as well as spread of the lesion.
- Bone scan** is used to detect metastasis.
- Computed tomography scanning (thorax)** of the chest is performed to detect malignant pleural effusion and of the brain to detect metastasis.
- Positron emission tomography** aids in the diagnosis of primary and metastatic sites.
- Magnetic resonance imaging** may reveal tumor invasion.
- Gallium scanning** of the liver and spleen help detect metastasis.
- Peak expiratory flow monitoring** may reveal airflow obstruction.
- Bronchoscopy** can help identify the tumor site. Bronchoscopic washings provide material for cytologic and histologic study.
- Needle biopsy of the lungs** (relies on biplanar fluoroscopic visual control to locate peripheral tumors before withdrawing a tissue specimen for analysis) confirms the diagnosis in 80% of patients.
- Tissue biopsy** of metastatic sites (including supraclavicular and mediastinal lymph nodes and pleura) is used to assess disease extent. Based on histologic findings, staging describes the disease extent and prognosis and is used to direct treatment.
- Mediastinoscopy** is used to evaluate enlarged lymph nodes identified on CT scans.
- Thoracentesis** allows chemical and cytologic examination of pleural fluid.
- Exploratory thoracotomy** is performed to obtain biopsy specimen.

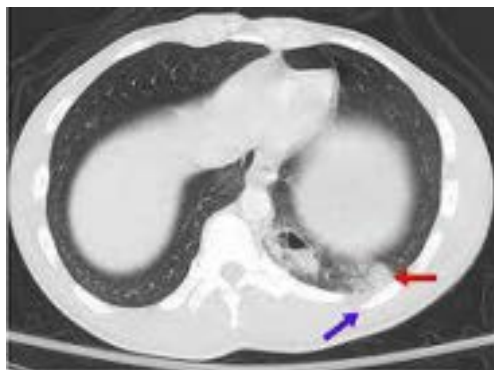


CHEST INJURIES : PULMONARY CONTUSION

13-17

WHAT AM I?

A bruise of the lung, caused by chest trauma. As a result of damage to capillaries, blood and other fluids accumulate in the lung tissue. The excess fluid interferes with gas exchange, potentially leading to inadequate oxygen levels (hypoxia).

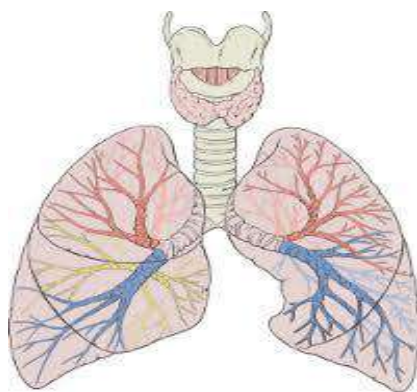


ASSESSMENT

- ❖ Dyspnea
- ❖ Hypoxemia
- ❖ Increased bronchial secretions
- ❖ Hemoptysis
- ❖ Restlessness
- ❖ Decreased breath sounds
- ❖ Crackles and wheezes

PATHO

Blood and other fluids accumulate in the lung tissue. The excess fluid interferes with gas exchange, potentially leading to inadequate oxygen levels (hypoxia). Resulting in decreased pulmonary compliance, this poses an increased risk for Acute respiratory syndrome.

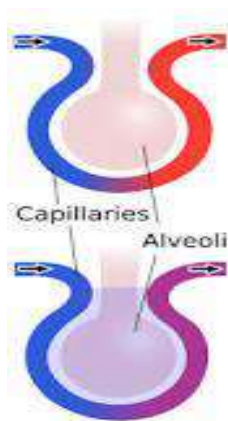


INTERVENTIONS

- ❖ Maintain patent airway and adequate ventilation.
- ❖ Place the client in the Fowler's position.
- ❖ Administer oxygen as prescribed.
- ❖ Monitor for respiratory distress
- ❖ Maintain bedrest and limit activity.
- ❖ Prepare for mechanical ventilation.

CAUSES

- ❖ Car accidents
- ❖ Contact sports
- ❖ Intimate partner violence
- ❖ Parathyroid disorders
- ❖ Endocrine disorders
- ❖ Bone disorders



SEVERE ACUTE RESPIRATORY DISTRESS SYNDROME

WHAT AM I ?

Mild, moderate, or severe viral respiratory infection caused by a distinct coronavirus. It is believed to be less infectious than the influenza virus. Incubation period estimated to range from 2 to 10 days .
Not highly contagious when protective measures are taken Currently no known transmission worldwide.

PATHO



Coronaviruses cause diseases in pigs, birds, and other animals. A theory suggests that a coronavirus may have mutated, allowing transmission to and infection of humans-(SARS-associated coronavirus [SARS-CoV]). Mucous membranes come in direct or indirect contact with infectious respiratory droplets or fomites. The virus attaches itself to human receptor cells, initiating a nonspecific acute lung injury. The result is diffuse, severe, alveolar damage.

CAUSES

- ❖ Coronavirus known as *SARS-associated coronavirus (SARS-CoV)*

TWO STAGES

- ❖ **Stage 1** : involving flu like symptoms that begin 2 to 7 days after incubation and last 3 to 7 days
- ❖ **Stage 2**: involving the lower respiratory tract

ASSESSMENT

Contact with a person known to have SARS.
Travel to an endemic area. Flu like signs and symptoms; initially no respiratory signs or symptoms during the first 3 to 7 days, then a nonproductive cough.

RESP: Dry cough, Dyspnea, Tachypnea, Rhinorrhea, Crackles, Respiratory distress in later stages

GI/GU: Diarrhea, Nausea and vomiting, Sore throat,

MS: Myalgias

DERM: Rash

MISC: Fever and chills, Headache, Fatigue, Malaise, Anorexia

O: Out of country

U: Undeveloped countries

T: Travel to endemic areas

O: Out of breath

F: Fever, fatigue

B: Bad muscle aches (myalgias)

R: Rhinorrhea Respiratory distress

E: Excess vomiting

A: A sore throat/

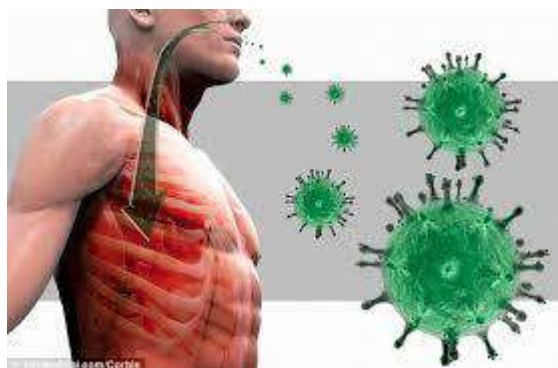
T: Tachypnea

H: Headache



TREATMENTS

- **Antivirals:** ribavirin (Virazole) or oseltamivir phosphate (Tamiflu) (not proven consistently effective)
- **Combination of steroids and antimicrobials** (not proven consistently effective)
- **Interferon alfacon-1** (not proven consistently effective)
- **Oxygen therapy**
- **IV fluid supplementation**



LABS & DIAGNOSTICS



- ❖ **Antibody testing with enzyme-linked immunosorbent assay** and the immunofluorescent antibody test confirm diagnosis.
- ❖ **Sputum culture** isolates coronavirus.
- ❖ **Complete blood count** may show leucopenia and thrombocytopenia.
- ❖ **Liver transaminase level and lactate dehydrogenase test** results may be elevated as may creatine kinase levels.
- ❖ **SARS-specific polymerase chain reaction test** detects SARS-CoV ribonucleic acid.
- ❖ **Blood culture** identifies the infection.
- ❖ **Chest radiography** may be normal or may reveal diffuse interstitial infiltrates or bilateral peripheral infiltrates.
- ❖ **Computed tomography scanning (thorax)** may reveal infiltrates that resemble ground glass or may reveal obvious consolidation.

INTERVENTIONS

- ❖ Symptomatic treatment
- ❖ Airborne and contact precautions
- ❖ Negative-pressure single room for hospitalized patients
- ❖ Strict respiratory and mucosal barrier precautions, including an N95 respirator
- ❖ Quarantine of exposed people to prevent the spread of the virus
- ❖ Global surveillance and reporting of suspected cases to national health authorities
- ❖ Intubation and mechanical ventilation, if indicated
- ❖ Venous thromboembolism (VTE) prophylaxis

EDUCATION

- ❖ Educate on disease process
- ❖ Measures to prevent spread of infection
- ❖ Hand hygiene
- ❖ Not sharing utensils
- ❖ Educate on treatment regimen.
- ❖ Educate on the importance of follow up care.

Visual & Audio

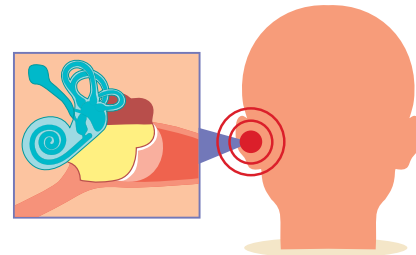
Meniere's Disease

Med Surg: Sensory (Visual & Auditory)

Pathophysiology

Fluid collection within the inner ear, typically affecting only 1 side coming & going with sudden attacks. It can eventually lead to permanent deafness.

My Ears - Meniere's Disease

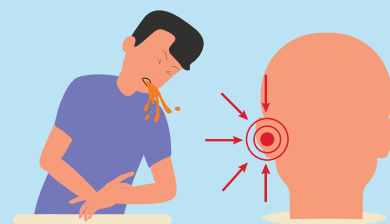


Signs & Symptoms

3 Key Signs:

- **Tinnitus** (ringing in the ear)
- Unilateral **hearing loss**
- **Vertigo** (dizzy & balance loss)

NCLEX TIP - Full Risk



Education

- **Fall precautions** **NCLEX TIP**
 - **SLOW** position changes
- **Sodium Restriction**
(Sodium Swells)
- **AVOID:** smoking, caffeine, & alcohol



Notes

Eye Injury

Med Surg: Sensory (Visual & Auditory)

Types

Chemical splash: from a household cleaner or another chemical

Penetrating Object: something gets stuck in the eye, for example pencil penetrates the eye.

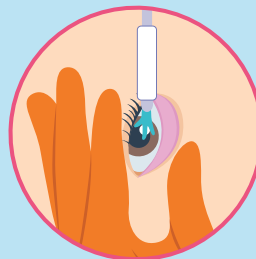


KEY POINTS

- Chemical: Continuous **eye irrigation**
- Penetrating Object:
 - **Cover BOTH** eyes = **eye shield** (2 cups)

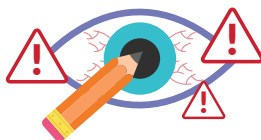
Penetrating object **keep both eyes covered** since both eyes work in sync with each other, we cover both to prevent any eye movement.

Chemical - Continuous



Don't let

NCLEX TRICK YOU



DO NOT flush the eye that has a penetrating object!

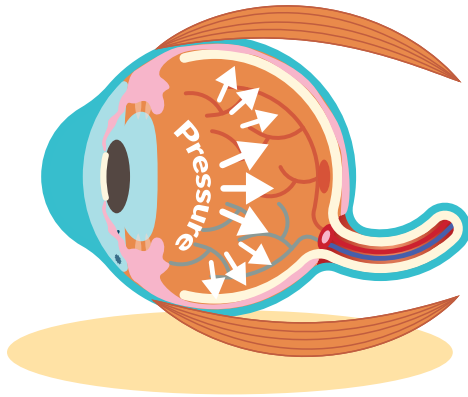
Never remove any object that has penetrated the body, since this can cause **MAJOR bleeding** as arteries can rupture when you pull the object out. So stabilize the **object & allow only the surgeon** or HCP to remove the impaled object, as they can provide immediate surgery if needed.

Notes

Glaucoma

Med Surg: Sensory (Visual & Auditory)

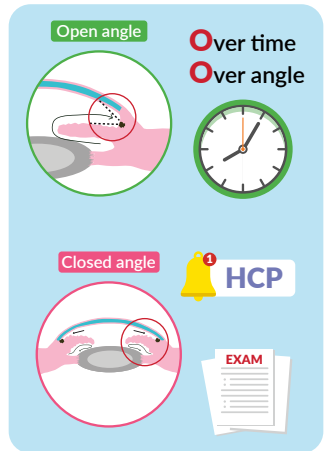
Pathophysiology



Leading cause of blindness, where **increased pressure within the eye** results from an issue in the optic nerve (cranial nerve 2)

2 forms

- Open angle
- Closed angle



Signs & Symptoms

Open angle:

mild pain & gradual loss of peripheral vision (**tunnel vision**)

Closed angle:

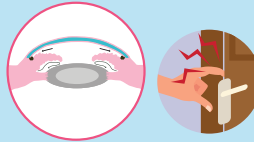
sudden **EXTREME pain** **NCLEX TIPS**

Key words

EXTREME, "severe", "sudden"
eye pain

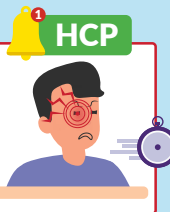
Memory trick

Closed angle
Close a door



PRIORITY

LIFE & LIMB



Common NCLEX Question

Identify which image shows the effects of glaucoma?

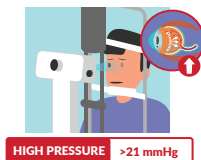
- 1. Option 1
- 2. Option 2
- 3. **Option 3**
- 4. Option 4



Diagnostics

Tonometry test

(normal IOP: 10 - 21 mmHg)



Pharmacology

- Beta blockers - **Timolol**
- **Mannitol** (osmotic diuretic)



Surgical

* NOT Usually Tested

- **Laser treatments:** to kill the aqueous humor producing cells to decrease fluid.
- **Trabeculoplasty:** helps closed angle by punching a small hole in the iris.
- **Implants:** bypass the collecting systems & shunt fluid out.

Education

AVOID **NCLEX TIPS**

Added pressure **AFTER surgery**

- **NO** Coughing, sneezing
- **NO** Bending at the waist
- **NO** Lifting heavy objects
- **NO** Nausea & vomiting
- **NO Valsalva maneuver** (bearing down)
 - **Constipation Priority**
- **NO** Anticholinergics (**Atropine**, **Ipratropium**)
- **NO** Diphenhydramine (brand: **Benadryl**)

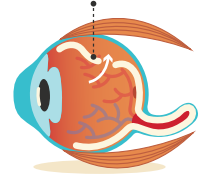
Retinal Detachment

Med Surg: Sensory (Visual & Auditory)

Pathophysiology

Detachment or **separation of the retina** from the back of the eye, resulting in **loss of vision**.

Separation of the retina



Causes

Any type of trauma to the head, like being hit in the head with a baseball bat or even being in a car accident



Signs & Symptoms

The most tested

- **Hairnet like vision** **PRIORITY**
 - “curtain-like half vision loss”
 - **Floater**s & cobweb looking vision
 - **Flashes** of light



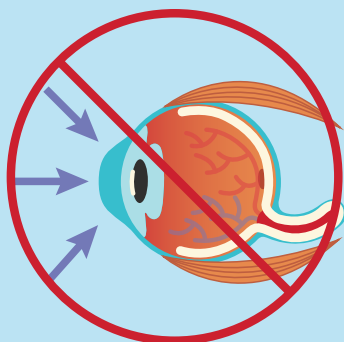
Kaplan Question

Assessing a client with a **detached retina**. Which of the following should the nurse **expect** the client to report?

- It's like a **curtain** closed over my eye

Surgical Repair

Avoid pressure here!



Key points Education **NCLEX TIPS**

- **AVOID**
 - Straining on the toilet (**NO** constipation)
 - Rubbing / scratching
 - Eye **straining activities** (reading, TV, computer etc.)
- **REPORT**
 - “**Sudden**” “**New**” Vision loss, Pain, flashing light



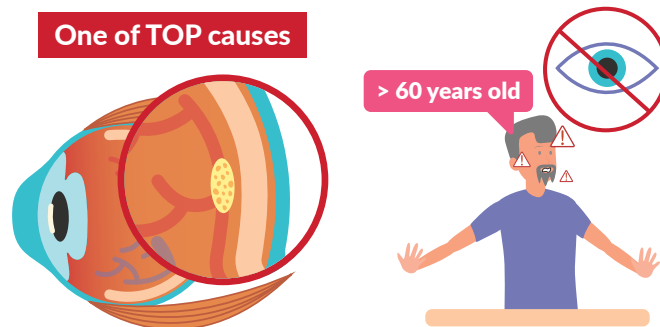
Notes

Macular Degeneration

Med Surg: Sensory (Visual & Auditory)

Pathophysiology

Central loss of vision & blindness. One of the top causes of blindness over the age of 60. Currently no cure & **NOT a common part of aging.**

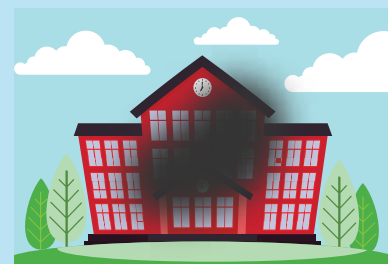


Signs & Symptoms

NCLEX TIP

KEY POINT

- **Blurry spot** in the **middle** of vision



When you get an **exam question** about a client stating they have a **blurry spot in the middle of vision** while reading or while watching something, then **report this to the HCP immediately.**

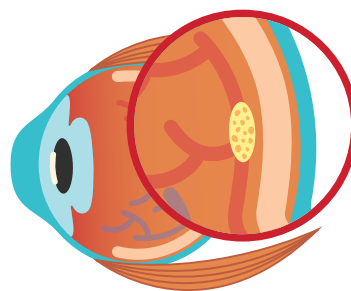
MEMORY TRICK

M - MIDDLE of vision

M - Macular degeneration

Macular degeneration

MIDDLE vision loss



Notes

TPN & Internal Feeding

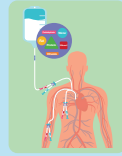
TPN

Med Surg: GI - Gastrointestinal

Pathophysiology

It's basically the client's entire nutrition in a IV bag (right into the blood) bypassing the normal process of digestion in the GI tract. Since it's very thick, **only give TPN through a central line.**

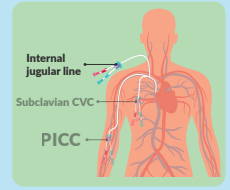
Total Parenteral Nutrition



Central line

CVC (Central Venous Catheter)

- **PICC line**
- Subclavian CVC
- Internal jugular line



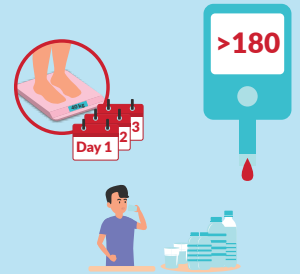
Indication

- **Pancreatitis** / Crohn's Disease (NPO)
- **Severe burns**, Trauma (hypercatabolic state)
- Oncology
- Chronic malabsorption issues



Nursing Care

- **Daily weights** (maintain muscle)
- **Glucose levels**
Hyperglycemia **NCLEX TIP**
 - Increased **Urination** (Polyuria)
 - Excessive **THIRST** (Polydipsia)
 - Nausea, Headache, Abdominal pain



Administration

- TPN line
NO IV meds (push or piggyback)
- Start & stop slowly
Never **abruptly** stop TPN
- Change bag & tubing **every 24 hours**

NCLEX TIP

Priority action:
Hang **10% dextrose in water**



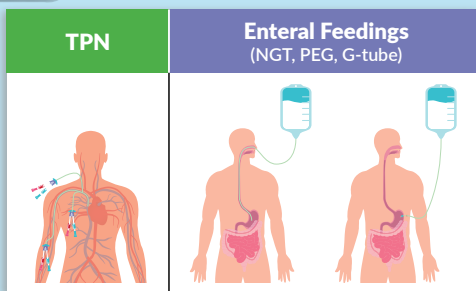
KAPLAN

Priority action when a client's **TPN bag is empty** and a new one is not readily available:

- Administer **dextrose 10%** in water until the new bag arrives

Complications

NCLEX TIP



- #### TPN
- Infection (CVC)
 - Stress Ulcers

- #### Enteral Feedings (NGT, PEG, G-tube)
- Tube displacement
 - Abdominal distention
 - Clogged Tubes
 - **Aspiration** **NCLEX TIP**
(**NO bolus** feeding via nasogastric tube on mechanical ventilator)

A - Aspiration
A - Airway Obstruction



REQUEST continuous feedings to prevent **aspiration**



KEY POINT

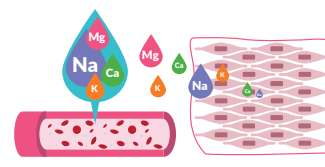
Displaced PEG tube less than **7 days old**

- **Notify** the HCP who inserted it



Refeeding Syndrome

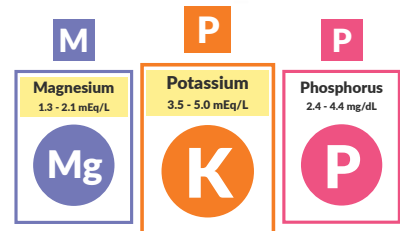
Deadly complication with severely malnourished clients! Giving **too MUCH nutrition too QUICKLY** - pulls electrolytes from the blood & into the tissues, resulting in **deadly low electrolytes.**



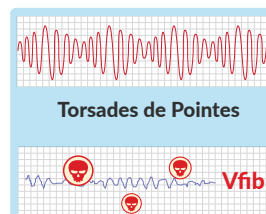
NCLEX TIP

- Anorexia nervosa
- Chronic Alcoholism

24 - 48 hours starting Enteral or Parenteral Nutrition



NCLEX TIP



Torsades de Pointes

- **Causes:**
Post MI, Hypoxia, **Low magnesium**
- **Treatment:**
Magnesium Sulfate **NCLEX TIP**

V Fib & Cardiac Arrest

- Low potassium in this case **Below 3.5**

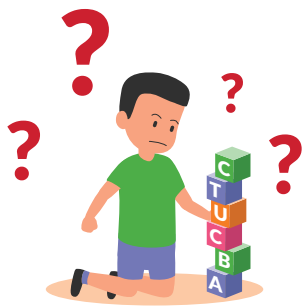
Mental health

Autism Spectrum Disorder

Mental Health "Psychiatric Care"

Pathophysiology

ASD is a developmental disorder that impairs a child's ability to communicate and interact. The cause of autism is unknown.



HESI

Delayed developmental milestones

ATI

Autism can usually be diagnosed when the child is approximately:

2 years of age

Risk Factors

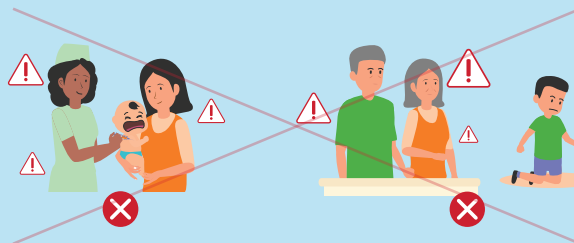
Highest risk factor = **sibling with autism**



For example - while performing a developmental screening on 2 siblings. If the older sibling has autism then the younger sibling is at highest risk for having it too.

Don't let **NCLEX** trick you

Highest risk factors are **NOT** having early vaccinations & **NOT** having parents of older age - this is according to the NCLEX.



Signs & Symptoms

Does NOT

- Maintain **eye contact** **NCLEX TIP**
- Interact with gestures
- Like being cuddled & plays alone



Does NOT

- **Respond to questions** **NCLEX TIP**
- **Display** nonverbal behavior
- Delay in language development



Repetitive

- Actions "Ritualistic behavior"
- Words (**echolalia**)

Education

Routines & Consistency

Give a **schedule** of daily activities **NCLEX TIP**

Maintain **daily routines** when possible **HESI**

Avoid making acute changes in their environment



ASD - Autism Spectrum Disorder



HESI

Child who **plays alone**, does **not maintain eye contact**, **repeatedly** twists fingers, has **inadequate speech**, and does **not interact with gestures**?

- Autism spectrum disorder (ASD)

Kaplan

Child with **autism** is admitted to the pediatric unit ... Which response by the nurse is best?

- "The **inability to maintain eye contact** is a characteristic of autism."

HESI

Q1: Child with autism spectrum disorder (ASD). The parents say, "We are going to move our child to a **different bedroom** in our home." Select the nurse's therapeutic response.

- "Children with autism spectrum disorder usually **prefer for things to stay the same.**"

HESI

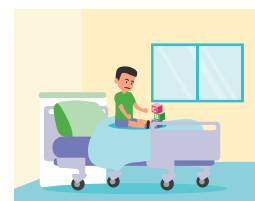
Q2: Child with autism spectrum disorder. Which statements by the parents indicate ... that they **understand the teaching**?

- Select all that apply.
- **Repetitive movements** are common
 - **Non-verbal communication is limited**
 - Maintain a **daily routine** whenever possible



Prevent Overstimulation

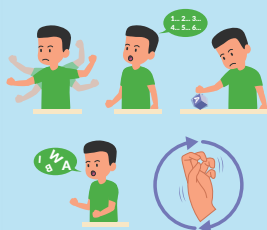
- **Limit number** of visitors & choices
- **Private room** away from the nurse's station **NCLEX TIP**



ATI

Which of the following **manifestations** ... are indications of **autism spectrum disorder**? Select all that apply.

- **Nonverbal** behavior
- **Repetitive** counting
- Spins a toy **repetitively**
- Delayed **language** development
- Exhibits **ritualistic** behavior



ATI

What is the **most important** intervention when admitting a child with **autism** spectrum disorder?

- Placement in a **private room** down the corridor from the nurses' station

ADD/ADHD

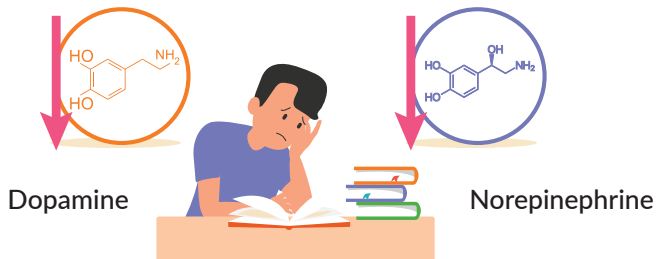
Mental Health "Psychiatric Care"

Pathophysiology

ADD - Attention Deficit Disorder

ADHD - Attention Deficit Hyperactivity Disorder

The brain has low levels of the neurotransmitters dopamine & norepinephrine which help the brain focus on reward vs. risk and control impulsivity & mood, making clients with ADHD more likely to have anxiety & substance abuse problems.



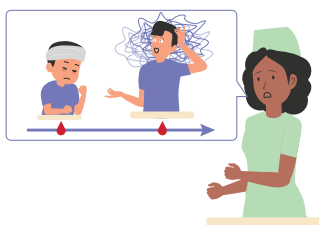
Signs & Symptoms

1. **Hyperactivity** "restless"
2. **Inattention** "reduced ability to focus"
3. **Impulsiveness** "excessive talking"
4. **Low self-esteem & impaired social skills** **NCLEX TIP**



Causes & Risk Factors

- **Head trauma: TBI (traumatic brain injury)**
Children who have had a serious head injury are more likely to develop ADHD later on in age.



ATI Question

Risk factors of ADHD... Which of the following should the nurse include in the teaching?

- History of head trauma

Management

- Give a **written schedule** of daily **activities** **NCLEX TIP**
- **Aggressive behavior:** distract the child & ask them to **blow up a balloon**
- Increased **risk for injury**



Always think **calm with ADHD**



ATI Question

9 year old hospitalized client on bedrest who has **attention deficit disorder...** Which of the following should the nurse **prioritize**?

- Provide the child with a **daily schedule that is typed or written**

HESI Question

A **nursing diagnosis** that should be considered for a child with **attention deficit hyperactivity disorder** is

- Risk for injury



ATI Question

... new diagnosis of **ADHD...** which of the following statements should the nurse include in the **teaching**?

- Your child is at an **increased risk for injury**

Communication

1. **Eye contact first** (before speaking)
2. **Simple language**
3. Child **repeats back** what was said
4. **Offer praise** upon task completion

ATI Question

6 year old client with ... ADHD. What techniques should the nurse use to **communicate most effectively** with the client when asking the client to **complete a task**? **Select all that apply.**

- Obtain **eye contact** before speaking
- Use **simple language**
- Have them **repeat** what was said
- **Praise them** if they complete a task

Kaplan Question

... child with **attention deficit disorder.** Which statement by the nurse is most appropriate?

- "Hug your child after a task is **completely performed.**"

Classroom Strategies

ATI Question

... **classroom strategies** for children who have **ADHD.** Which of the following information should the nurse plan to discuss with the teachers? **Select all that apply.**

- Allow for **regular breaks**
- **Combine verbal** instruction with **visual cues**
- Establish **consistent classroom rules**
- **Decrease** the amount of **homework** assigned



Abuse & Neglect

Mental Health "Psychiatric Care"

Elder

Elder neglect is a form of abuse that happens when the caregiver fails to provide for the needs of the elderly client either **emotionally, physically, or socially**.

Key signs

Poor eye contact

NCLEX TIP

- Client **breaks eye contact** when talking with a caregiver

Broken assistive devices

- Glasses, hearing aids

Expired medication

Physical

- Weight loss**, dehydration & malnutrition
- Pressure ulcers
- Poor Hygiene: orally, soiled clothing



Caregiver Role Strain (CRS)

- Assess stressors & Unmet needs **NCLEX TIP**
- Ask about the nature & requirements of providing daily care

KEY WORD

What is the nature & requirements of providing daily care?



HESI Question

A 79-year old ... weighs **93 lbs**, and is **wearing old, dirty clothes** ... diagnosed with **pneumonia**. Which comment by this patient suggests a significant **risk for abuse**?

- Our family is poor, so my daughter gets my monthly retirement and Social Security checks

Intimate Partner Violence

Intimate partner violence is domestic violence or abusive behavior inflicted by one partner against the other - be it **physically, emotionally, verbally, sexually, or financially**.

- Abusive partner: **extreme jealousy & possessiveness** **NCLEX TIP**
- Abuse gets **more intense** during **pregnancy**
- Victim stays: **Financial, Fear of harm, Child custody, Religion, etc.,**

Interventions

- Priority Action:** Have partner leave the room to speak with & examine client in private

HESI Question

... expect the abuse to worsen?

- When the victim moves toward independence from the abuser



HESI Question

The clinic nurse notes **bruises in various stages of healing**... What questions must the nurse include?

Select all that apply.

- Is anyone **hurting you**?
- When you and your spouse disagree, **what happens to you**?
- Has your spouse ever **threatened you verbally or with violence**?

ATI Question

Which of the following ... should the nurse implement ... client in a **domestic violence situation**?

Select all that apply.

- Assure the victim that they are **not alone**
- Preserve any **physical evidence**, if applicable
- Convey an **attitude of concern and respect** for the client

Treatment

Victim

- Affirm that the patient did not deserve or cause the abuse **HESI**
- Developing a plan to assure safety: Local shelter

Psychotherapy (Talk Therapy)

- Identity triggers
- Recognize destructive patterns of behavior & learn alternative responses

HESI Question

... injuries associated with **intimate partner violence**. The patient plans to return home. Which of the nurse's actions should be **prioritized**?

- Provide the patient with **contact information for the local shelter**.

ATI Question

... **coping strategies** ... clients who are experiencing **intimate partner violence**...understanding of the teaching?

- "I should try to **identify issues that increased my partner's stress level**."



Alcohol & Drug Abuse

Mental Health "Psychiatric Care"

6 Key Definitions

1. **Tolerance:** decreased response to a drug / alcohol
2. **Withdrawal:** symptoms that develop after abruptly stopping drugs / alcohol
3. **Dependance:** the body's physical addiction to a drug / alcohol
4. **Relapse:** the recurrence of drug/ alcohol use after remission
5. Denial & projection
6. Enabling & codependence

Enabling & Codependence

3 NCLEX TIPS

"It is **my fault** that my spouse drinks so much"

"**I will take care of the children** so that my spouse can drink"

"**I have lied to my spouse's boss** about why he missed work"

ATI

...client who abuses alcohol & illicit drugs... spouse tells the nurse: "**have lied to his boss, his children, and his friends** and I just don't think I can do this anymore." Which of the following best describes this behavior?

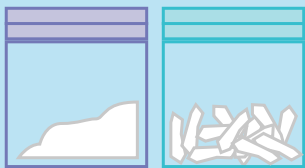
- Enabling

HESI

Patient with chronic pain... A regular dose of analgesic medication is ineffective in reducing the patient's pain?

- The patient is showing signs of tolerance

Cocaine Methamphetamines



Cocaine & Meth. Or Methamphetamines are both stimulants that act on the brain to increase the heart rate & blood pressure.



Symptoms

- Meth = dental problems
- Cocaine = nasal damage

HESI

Q1: ... significant **dental problems**. The nurse expects that this patient abuses which substance?

- Methamphetamines

Q2: The nurse finds that a patient who is a drug addict has nasal damage. Which substance does the nurse suspect? Cocaine

HESI

A nurse is learning how to manage patients with substance **abuse disorders**. Which step should the nurse apply as a **first-line intervention** in such cases?

- Providing safety and sleep

KAPLAN

The client is agitated and fights against the nurse ... **positive for cocaine**... priority intervention?

- Provide a calm **atmosphere** and **monitor** respiratory and cardiac status

Nursing Interventions



Opioids

Signs & Symptoms

- Slurred incoherent speech
- **Decreased respiratory rate** (norm: 12 - 20)
- Narrowed "constricted" pupils
- Sedation & coma



HESI

Which vital sign would be **most concerning** to the nurse?

- **Respirations 10 breaths/min**

KAPLAN

A client uses heroin several times a day. Which **signs and symptoms** does the nurse expect to observe? **Select all that apply.**

- **Constricted pupils**
- **Depressed respirations**
- **Drowsiness or sedation**
- **Slurred incoherent speech**



Opioid Withdrawal

Signs & Symptoms

- Runny nose
- Diaphoresis (sweating)
- Insomnia
- Dilated pupils



Treatment

- Naltrexone = Prevents relapse by **reducing cravings**
- Clonidine = Lowers BP
- **Methadone** = Low dose opioid (wean off addiction) **NCLEX TIP**

ATI

Treatment for opioid dependence... which of the following medications is used for treatment of opiate withdrawal?

Select all that apply

- Clonidine
- Methadone

HESI

... teaching a patient with a new prescription for **naltrexone**?

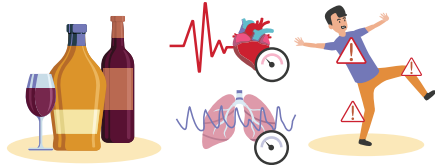
- It helps **prevent relapse** by **reducing your drug cravings**

Alcohol & Drug Abuse II

Mental Health "Psychiatric Care"

Alcohol Abuse

Alcohol is a toxin that causes central nervous system depression, making the vital signs low & slow, causing coordination & balance problems.



Big Key Point

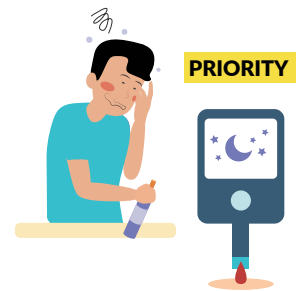
Hypoglycemia



Alcohol intoxication & **Diabetic**

- Monitor **blood glucose levels** at night **NCLEX TIP**

PRIORITY



Psychosocial Assessments

- **Escape** from problems
- **Cover up** depression & anxiety
- Primary goal of counseling: **identify triggers**



KAPLAN

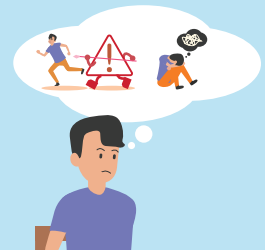
Q1: The nurse prepares to lead a group session for ... dependence on alcohol. The nurse knows that a client with a **diagnosis of alcoholism** drinks because of which reason?

Select all that apply

- **Escape** from problems
- **Cover up** depression or anxiety

Q2: The nurse provides care for a client diagnosed with alcohol abuse ... Which is the **primary goal of counseling?**

- Assist the client to **identify factors that trigger alcohol use**



Recovery Teaching

After detox the primary goal of recovery is total abstinence - meaning NO alcohol forever!

3 NCLEX TIPS

1. **Expressed accountability:** taking responsibility & acknowledging
2. Coping skills
3. Setting Goals: **develop motivation & self help skills**



HESI

... patient with **alcohol misuse**. What intervention does the nurse plan for the **rehabilitation** of this patient?

- Develop motivation and self-help skills



Alcohol Withdrawal & DT

Alcohol, Benzodiazepines, Barbiturates

- **24 hours:** **anxiety**, insomnia, palpitations
- **48 hours:** **seizures** & unstable vitals
- **48 - 72 hours:**

Delirium Tremens **NCLEX TIP**

1. **HYPERreflexia** "Hand Tremors"
2. **Diaphoresis** (sweating)
3. **Hallucinations**
 - Increased Vitals:
 - Tachycardia** (HR over 100 BPM)
 - Hypertension
 - Fever
 - **Mood:** Agitation & Anxiety
 - Mental: Confused & restless
 - **Seizures!**

HESI

Signs of alcohol withdrawal. What assessments will the nurse include when providing care to this client?

Select all that apply

- Anxiety
- Tachycardia
- Irritability
- Tremors

ATI

... result of **sudden withdrawal from barbiturate** use?

- Seizures

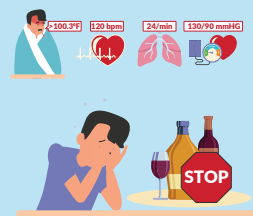
KAPLAN

Q1: The client reports drinking socially ... states, "I am **anxious and shaking** inside." ... vital signs are **Temp. 100 F (38 C), HR 120 bpm, RR 24/min, BP 130/90 mm Hg**. Which conclusion does the nurse make?

- The client has **early signs of alcohol withdrawal**

Q2: The nurse admits a client for possible appendicitis... client states, "Most days I drink about **one pint of vodka**..." alcohol withdrawal delirium time frame?

- **48-72 hours** after last consumption



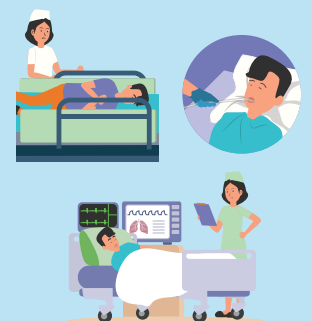
Nursing Care

- Implement seizure precautions

Kaplan

The nurse admits a client who has a **diagnosis of alcoholism** and admits to drinking a **pint of vodka a day**... which intervention is appropriate?

Ensure **seizure precautions** are in place

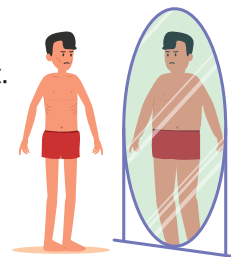


Anorexia Nervosa

Mental Health "Psychiatric Care"

Pathophysiology

Anorexia nervosa is an eating disorder causing clients to obsess about their weight & what they eat.



Distorted body image & **fear** of being overweight

Risk Factors:

- Adolescent females are the most affected
- Anorexia also has the highest death rate of all mental disorders due to suicide

ATI

Anorexia nervosa: The client has an unrealistic fear of obesity



KAPLAN

Which statements are true regarding **anorexia nervosa**? Select all that apply.

- ▣ Clients see themselves as **overweight**
- ▣ **Adolescent females** are most affected
- ▣ Anorexia nervosa has the **highest mortality rate of all mental disorders**

Signs & Symptoms

Starvation → **Malnutrition**
Vigorous **Exercise**

SEVERE

6 NCLEX TIPS

1. Extreme weight loss
Less than 75% of expected weight
"25% below normal weight" **NCLEX TIP**
2. Fluid & **electrolyte imbalance**
Hypokalemia: potassium below 3.5 (cardiac dysrhythmias)
3. Lanugo (thin hair)
4. **Amenorrhea** (no menstruation)
5. Cold intolerance
6. Low Vitals: Low temp., Low BP, **Low HR (below 60)**

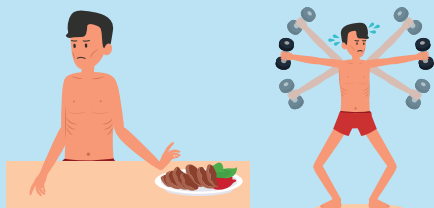
HESI

Q1: adolescent female with **anorexia nervosa**. Which physical findings support the diagnosis? Select all that apply

- ▣ **Lanugo**
- ▣ **Irregular** heart rate
- ▣ Pulse rate **48 bpm**

Q2: ... which assessment finding meets the **criteria for hospitalization**?

- ▣ Serum **potassium level 2.6 mEq/L**



Treatment

Typically done in an outpatient clinic (outside the hospital), but hospitalization may be needed if the client's **body weight is below 75% ideal**.

Priority short-term goal

2 NCLEX TIPS

1. **Increase caloric** intake for **gradual** weight gain
2. **One-on-one supervision** during feedings

HESI

Q1: What is the focus for the acute phase of treatment for anorexia nervosa?

- ▣ **Weight restoration**

Q2: ... anorexia nervosa presents with severe dehydration and rapid weight loss in the last week:

- ▣ **Suggest hospital admission**

Admitted for Malnutrition 5 NCLEX TIPS

1. **Strict record:** protein & **calorie intake**
2. Stay with the client **during each meal** & 1 hour after
3. **Morning weights** prior to oral intake
4. Help the client **identify triggers**
5. **NO** exercise!

Communication

- ▣ **Encourage & reinforce:** **NCLEX TIP** "Progress toward healthy weight"

HESI

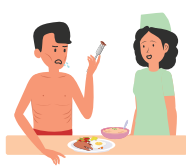
What is a subjective symptom ... with anorexia nervosa?

- ▣ **Fear of gaining weight**

Saunders

... cognitive behavioral approach

- ▣ Help the client to **examine dysfunctional thoughts and beliefs**



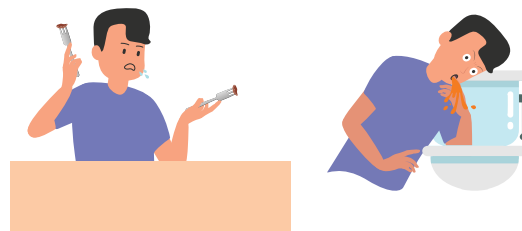
Bulimia

Mental Health "Psychiatric Care"

Pathophysiology

Bulimia is an **eating disorder** that involves 2 cycles:

1. Episodes of **uncontrolled binge eating** in secret (eating a lot of food at once)
2. Followed by **self-induced vomiting** or purging. Also the use of laxatives, diuretics, and fasting to prevent weight gain, along with even excessive exercise.



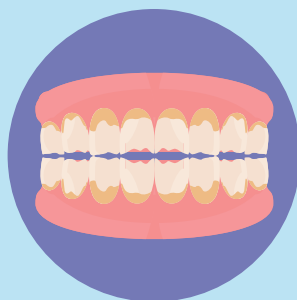
Clients have a distorted view of body image & an obsessive desire to lose weight.

Signs & Symptoms

Binge eating

then **compensatory behavior**:
purging, exercise, fasting, **laxatives**

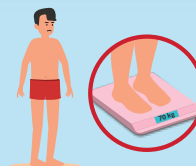
- **Tooth & gum** deterioration
- Scaly skin
- Normal body weight



HESI

... assessment finding with bulimia nervosa?

- Dental **erosion**
- Patients with bulimia often appear to have a **normal weight**



Interventions

- **1 - 2 hours after each meal** NCLEX TIP
- One-on-one supervision **during meals**
- Monitor for fluid & **electrolyte imbalances**
hypokalemia: potassium below 3.5 (cardiac dysrhythmias)
- NCLEX TIP
- Check for hidden binging or purging
 - "Hidden or trashed **food wrappers**"
 - "**Laxative boxes** in the trash"
- **Food diary** during hospitalization



HESI

Q1: A nurse is teaching a patient with bulimia nervosa about **scheduling healthy, balanced meals**:

- To **avoid binge-purge cycles**

Q2: A patient with **bulimia nervosa** uses **ememas and laxatives to purge** ... **which imbalance** should the nurse assess?

- Disrupted fluid and electrolyte balance



ATI

... a client with **bulimia nervosa**... states that at times she **feels helpless**... The most appropriate short-term goal:

- Verbalizing the desire to **increase control over stressful situations**



Pharmacology



• Bupropion

NOT recommended for **purge bulimia**



HESI

The nurse is caring for a patient with **bulimia nervosa** who overuses laxatives **but does not purge**. Which drug is known to be effective to treat the patient?

- Bupropion

Notes

CBT – Cognitive Behavior Therapy

Mental Health “Psychiatric Care”

Pathophysiology

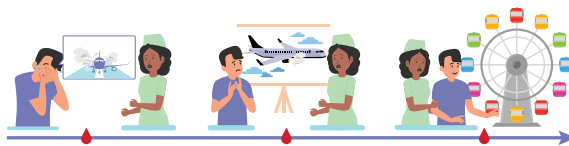
CBT is a common type of **psychotherapy** (talk therapy). It helps clients reframe their thought processes in order to **slowly cope with stress & anxiety**, helping to treat many disorders from PTSD & OCD, to eating disorders like anorexia & bulimia, and even depressive disorders.

5 CBT Strategies NCLEX TIP

1. **Learn** about the disorder
2. **Exposure: Desensitization** to situations & events (behavioral strategies)
3. **Self-observation** & monitor
4. **Relaxation** techniques
5. Teaching **new coping skills** & Techniques to **reframe thinking** (Cognitive restructuring)

Systematic desensitization

Systematic desensitization



Gradual exposure to a phobia or traumatic event which helps to **desensitize** the client to the major stress & anxiety & at the same time administer relaxation techniques.

Kaplan Question

A client states ... “I travel only by train because **I am terrified of flying.**” ... the phobic client is most likely to respond to which **intervention**?

- Systematic desensitization

HESI Question

Q1: A nurse teaches ... **examining negative thoughts** and restating them in **positive ways**. The technique is call:

- Cognitive reframing

Q2: The nurse is teaching **cognitive reframing** ... to counteract **depression**. Which response by the patient indicates effective teaching by the nurse?

- “I have many **friends who love me and care for me.**”

Guided Imagery

Guided imagery is a mind-body intervention where clients concentrate on mental images to help reduce stress, anxiety, & improve concentration.



ATI Question

- Q1:** Which of the following have been shown to be advantages of using **guided imagery**? **Select all that apply.**
- Finding **relaxation** and inner **peace**
 - Solving **complicated** problems
 - Improving **concentration**
- Q2:** Which of the following information should the nurse include about **guided imagery**?
- It **concentrates** on descriptive mental pictures to treat pathological conditions

Biofeedback

Biofeedback is just like guided imagery, but the key difference is that machines are used to help the mind focus, sort of like virtual reality



ATI Question

A nurse is providing education to student nurses about non-pharmacological modalities of pain control. Which best describes **biofeedback**?

- **Teaching the body to respond differently** to stress of other stimuli

Therapeutic Milieu

This provides a safe & secure environment for clients that are in therapy. It's basically the goal of every behavioral health or psych unit in the clinical setting. Clients are encouraged to freely roam around in the social environment.

Kaplan Question

Psychiatric inpatient setting: which description is the best for **milieu therapy**?

- Providing a **therapeutic physical and social environment**

HESI Question

Primary goal of **milieu therapy** for patients diagnosed with personality disorders?

- **Managing the effect of the behavior** on the entire group

ATI Question

... how to establish a **therapeutic milieu** on the unit?

- Orient **new clients** to their environments, rights, and responsibilities



Group Therapy

Goal

Reduce **isolation** & Communicate **acceptance**

Problem?

- Allow the group to handle it
- **Silent member:** encourage interaction, then divide groups into pairs
- **Aggressive member:** address the anger & separate in another room



KAPLAN Question

Q1: The nurse understands which is the **primary benefit of group therapy**?

- Groups **reduce isolation** in structured, controlled environments

Q2: The client with depression joins an ongoing therapy group. Which is the **goal of group therapy**?

- To communicate **acceptance** to the client

HESI Question

... one participant ... interrupts others when they are talking. What is the **best action** ... to take in this situation?

- Allow the **group to handle the problem**

ATI Question

Q1: Group therapy: Which of the following is the **primary focus** of group therapy?

- **Personal feelings** that affect behavior

Q2: Group therapy: Which response should the nurse make to a client's **aggressive statement**?

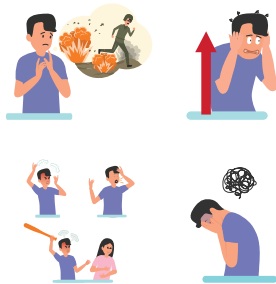
- “You seem very upset.”

Crisis Management

Mental Health "Psychiatric Care"

4 Phases

- 1. Trigger event:** anxiety in response to threat
- 2. Escalation:** increasing anxiety & agitation
- 3. CRISIS:** outburst, violence, or shouting
- 4. Post Crisis Disorganization & Depression**



ATI Question

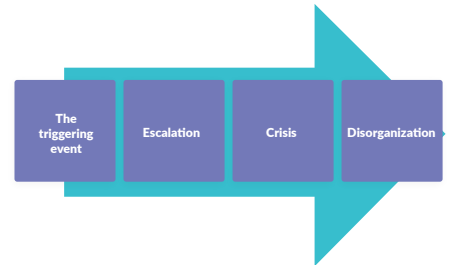
... which of the following best describes what should be in the first box?

- The triggering event

Kaplan Question

The client states, "I feel like I can barely get out of bed in the morning." The nurse recognizes the client is in which stage of crisis?

- Disorganization & depression



Interventions

1st



2nd



3rd



Communication

1. Explain all activities of care clearly & calmly **NCLEX TIP**
2. Eliminate the **trigger**
3. **Low-stimulation environment** - NOT near nurses' station
4. **Determine** the source of anger
5. **Acknowledge** the client's emotions

HESI Question

The patient becomes agitated and threatens to harm a member of staff. Which nursing intervention is appropriate?

- Address the patient with simple directions and a calming voice

Kaplan Question

When intervening with a violent client, the nurse takes which action?

- Identifies the nurse to the client and remains calm



ATI Question

- Q1:** A client becomes agitated and threatens to punch the other client. What is the priority action by the nurse?
- Eliminate the trigger using nursing measures and interventions
- Q2:** ... yelling and screaming at the staff... which actions should the nurse take?
- Determine the true source of the client's anger
- Q3:** angry and throws a chair in the dayroom. Which of the following interventions should the nurse perform first?
- Acknowledge the client's emotions



HESI Question

- Q1:** A client ... bursts out in a verbal tirade in the dayroom. The client has a history of poor impulse control. What is the nurse's priority action?
- Remove any other clients from the day room
- Q2:** When approaching an angry patient, which safety considerations should be taken?
- Have other staff as backup, and stand far enough away to avoid injury



Pharmacology

Anxiolytics

Benzos: "**-pam**" "**-lam**"
Lorazepam (brand: Ativan)

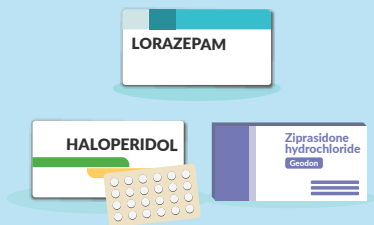
Antipsychotics:

Haloperidol (brand: Haldol)
Ziprasidone (brand: Geodon)

HESI Question

A client who is displaying violent behavior. Which of the following medications should the nurse expect the provider to prescribe? **Select all that apply.**

- Lorazepam
- Haloperidol
- Ziprasidone



Physical Restraints

1. Get an order for restraints (Renewed every **4 hours** for adults)
2. Must be assessed by HCP **within 1 hour of order**
3. Document every **15 minutes**
4. Monitor & meet physical needs

HESI Question

Physical restraints are placed on the client, and then the client is put into a seclusion room. Which actions must the nurse take in the next hour?

- Meet the physical needs of the client
- Obtain a prescription for the restraints
- Objectively document the client's behavior



Death & Dying

Mental Health "Psychiatric Care"

5 Stages of Grief

1. Denial

2. Anger

3. Bargaining

4. Depression

5. Acceptance

KAPLAN

Q1: The client appears **angry** and **demanding** following a below-the-knee amputation.

The client is having **difficulty accepting** the new body image

Q2: After being told **the feet will need to be amputated**, the client states, "I'm sure if I start taking my medication **my feet will heal!**"... example of which behavior?

Denial

ATI

... **acute grief process**. Which of the following statements made by the client indicates understanding of feelings?

Select all that apply

- I might experience feelings of resentment
- I might have some guilt over how my partner died
- I might have angry feelings that I should express

Bowlby's 4 Stages of Grief

Numbness or protest

Disequilibrium

Disorganization and despair

Reorganization

Defense Mechanisms

1. Displacement **NCLEX TIP**

shifting of anger or impulses from an outside situation **toward another person**.

2. Repression

Choosing to hide or ignore painful memories instead of facing them in hopes of forgetting.

3. Compensation

Overachieving in one area to compensate for failures in another.

4. Undoing

A person tries to cancel out an unhealthy memory, by doing good acts.

5. Sublimation

A person channels unacceptable desires into an activity that is appropriate & safe.

6. Projection

Taking unacceptable qualities or feelings & pinning them on other people.

7. Rationalization

Justify illogical or irrational ideas & feelings

8. Identification

A person adopts the behavior of a person who is perceived to be more powerful

Type of Loss

• Perceived loss

The type of loss that is felt by the person, but is intangible to others. For example loss of financial independence or a valued personal item.

• Situational Loss

Unexpected loss caused by an external event, like cancer in a family member.

• Maturational Loss

Loss that is expected with normal life transitions, like graduating from high school & leaving your friends behind.

ATI

... best describes an instance when **displacement** is used as a defense mechanism?

- A man who **loses his job** goes home and **yells at his wife**

HESI

A 20 year old was **sexually molested** at age 10, but can no longer remember the incident... **defense mechanism** used:

- Repression

KAPLAN

... a client with **alcoholism**... states, "I need a drink or two to relax after a busy day at work. I have an incredibly **high stress job**." ...which defense mechanism?

- Rationalization

HESI

A client on the psychiatric unit seeks out a particular nurse and **imitates her mannerisms**. Which defense mechanism?

- Identification

HESI

... an adolescent with a history of violence ... **sublimation**?

- Joined a competitive boxing team

KAPLAN

The client is told ... she **cannot have children**.... **forms a close attachment** to the niece and nephew ... example of which **defense mechanism**?

- Sublimation

ATI

... a client who was bullied about his **interest in chemistry** now **tutors** students having difficulty with science. Which of the following defense mechanisms?

- Sublimation

IDENTIFICATION



Interventions - Pediatric

1. **Play therapy**

2. **Honestly answer questions**

3. **Therapeutic touch**



KAPLAN

The parent of the younger child asks the nurse why the child is involved in **play therapy**. Which statement is **best**?

- "Young children have **difficulty verbalizing emotions**."

Young children have difficulty verbalizing emotions



HESI

A **6 year old** learns about the **death of a grandparent**... What will the nurse include in the parent's **teaching plan**?

Select all that apply.

- **Promote activities** that the child enjoys
- **Encourage the child to express feeling** through coloring
- **Answer the child's questions honestly**
- **Hold and cuddle** the child to reinforce closeness

Interventions - Adult

- Therapeutic communication
- Sit with the client
- Support Groups
- Focus on good memories



ATI

A nurse is caring for a client who just delivered a **stillborn fetus at 36 weeks** of gestation. Which of the following **statements** should the nurse make?

- **You may hold your baby** as long as you want **NCLEX TIP**

NCLEX

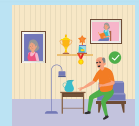
You may hold your baby as long as you want



Saunders

... an older client whose **spouse died 6 months ago**. Which behaviors by the client indicate **effective coping**? Select all that apply.

- Looking at **old snapshots** of the family
- Participating in a **senior citizens program**
- **Visiting the spouse's grave** once a month
- Decorating a wall with the **spouse's pictures and awards**



Bipolar Disorder

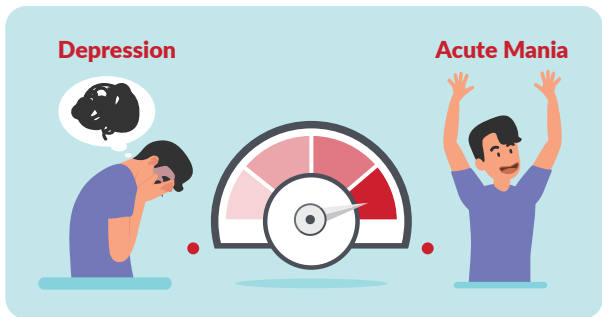
Mental Health "Psychiatric Care"

Pathophysiology

Bipolar is a mood disorder with cycling periods of lows with **Depression** followed by highs with **Acute Mania**.

During depression: clients have low mood, low energy, & motivation & high risk for suicide.

During acute mania: high energy, hyperactivity, elevated mood, & even aggression with violence.



HESI Question

Four or more mood episodes in a 12-month period, the patient is said to be

- Rapid cycling

ATI Question

Five acute manic episodes in one year

- Rapid cycling

MEMORY TRICK

<p>Depression Declined mood</p>	<p>Mania More energy + Maniac</p>
--	--

Types of Bipolar Disorders

Bipolar 1 - 1 episode of mania that lasts over 1 week or need for hospitalization

Bipolar 2 - 2 episodes of milder high hypomania, which can last longer

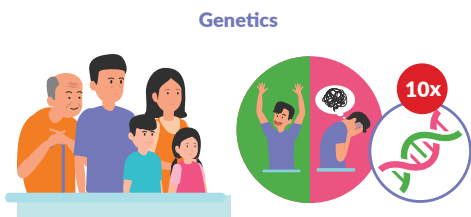
Cyclothymia - milder lows & milder highs cycling over a period of 2 years

Rapid Cycling - 4 episodes of depression & mania within a 12 month period

Causes & Risk Factors

The cause is unknown but what does play a big part is:

- **Genetics** - having a family member with bipolar, clients are 10x more likely to have it.
- **SSRIs** (antidepressants) can trigger a manic episode



Signs & Symptoms

- M** **More energy & Mood Swings**
Euphoric energy, impulsive, grandiosity
Hallucinations & delusions of grandeur
- A** **Agitation**
Set limits & structured environment
- N** **Non-stop talking & Flight of ideas**
Colorful bizarre clothing choices
- I** **Insomnia**
Cannot sleep for days
- A** **Attention span POOR**
Easily distracted = reduce stimuli

ATI Question

symptoms with **manic behavior?**

- **More talkative** than usual
- Easily **distracted**
- Intense need for **activity**

HESI Question

manic phase?
Select all that apply.

- The client is **quickly angered**
- **Flight of ideas**
- Going rapidly from **one activity to another**
- **Colorful & outlandish clothing**

Kaplan Question

Q1: Acute manic phase: Which symptom does the nurse expect?
• **Hyperactivity & irritable**

Q2: "I just bought myself a home computer and a large screen TV for the family." Which interpretation is **most accurate?**
• **Mood disturbance and judgement that is poor** at this time

Saunders

Assessment finding that requires **immediate intervention?**

- **Nonstop physical activity and poor nutritional intake**
- **Constant delusions**

Bipolar Disorder II

Mental Health "Psychiatric Care"

Interventions

Acute Manic Episode

- Reduce Stimulation:**
 - Quiet, calm environment
 - "Private Room** near the nurses station" **NCLEX TIP**
 - Manic episode? A single room near the nurses' station **HESI**
 - **Manic phase** of bipolar disorder? A private room **across from the nurses' station** **ATI**
 - Take the client to a **quiet area** with **low stimulation** **ATI**
 - **Limit group contact:**
 - NO** dining room
 - NO** group activities (1-on-1 activity)

Acute Manic Episode

- Physical exercise
 - Alternating **aerobic exercise** with scheduled periods of rest **ATI**
 - Assist the client with **sweeping the floor** of the unit **HESI**
- Set structure & limits on aggression
 - **"Choose clothes** for the client" **NCLEX TIP**
 - Set limits & be consistent with consequences
 - "If you throw that lamp, you will need to **stay in your room for 1 hour**" **HESI**
 - "Swearing & profanity are **unacceptable here**" **ATI**

Acute Manic Episode

- Diet:
 - **HIGH calories & protein**
 - **HIGH FLUID** intake
 - **Foods "on the go":** **NCLEX TIP**
Hamburgers, Sandwiches, Burritos
Milkshake, protein shake
Hand held: fruits & veggies

Provide the client with a **chicken leg** and **carrot sticks** **HESI**

NO caffeine (coffee, tea, soda)

Top Missed NCLEX Questions

Interventions for a client with bipolar disorder who is admitted to the hospital for an acute manic episode? Select all the apply

- ✓ 1. Encourage **physical exercise** with staff
- ✓ 2. **Private room** near the nurses station
- ✓ 3. **Pick out clothing** for the client
- ✓ 4. **Avoid group** activities
- 5. Eat meals in the dining area with other patients



Pharmacology

Mania

Anxiolytics:

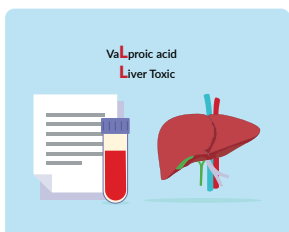
- Clonazepam
- Alprazolam

Depression

Antidepressants

Mood Stabilizers:

- Carbamazepine
- Valproic acid
- **Lithium**



Valproic Acid

ATI Question

Valproic acid... monitor:

- **Liver function**

HESI Question

Valproic acid.... Which laboratory finding is most important?

- **Liver function test results**

Lithium

HESI Question

Q1: What action should the nurse take ... **lithium level is 1.8 mEq/L**

- **Withhold medication** and **notify** the healthcare provider (HCP)

Q2: Taken lithium for 1 year ... nurse's priority attention?

- "I've had very **bad diarrhea** for 3 days."

L	Levels OVER 1.5 mEq/L = TOXIC!
I	Increase FLUID & Sodium (Na+) HIGH RISK Toxicity • Dehydration & Hyponatremia < 135 mEq/L Do NOT limit sodium or water intake
T	TOXIC Signs to REPORT: Excessive urination and extreme thirst! Vomiting & diarrhea
H	HOLD NSAIDS - (Ibuprofen, Naproxen) NSAIDS decrease renal blood flow = toxicity risk

Kaplan Question

Lithium carbonate ... The nurse understands **which other kind of medication is contraindicated?**

- **Diuretic**

ATI Question

Q1: Scheduled to **begin lithium therapy**... **priority to report** to the provider?

- I am currently taking **furosemide** for congestive heart failure

Q2: Manifestations of **lithium toxicity?**

- Nausea & vomiting
- Diarrhea
- Polyuria
- Muscle weakness

Q3: **Lithium** for treatment of bipolar disorder... **teaching:**

- **Aspirin** is better to use than ibuprofen
- Report **excessive thirst** & **increased urination**
- **Avoid exercising outdoors** on hot days
- **Regular laboratory tests** to monitor lithium level

Dissociative Identity Disorder

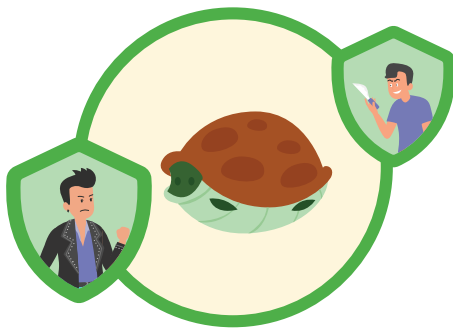
Mental Health "Psychiatric Care"

Pathophysiology

Dissociative identity disorder occurs when 2 or more identities rotate control over the client's behavior. Clients will typically have amnesia or lack of memory, not aware that the alternate identities exist, & often confused by the big gaps in their memory.

How does this happen? Usually caused by a traumatic event like abuse or rape, the various identities & memory gaps serve as protective mechanisms helping to shield the client from the traumatic memories.

Naturally, stress & anxiety that remind the client can trigger the identities into play.

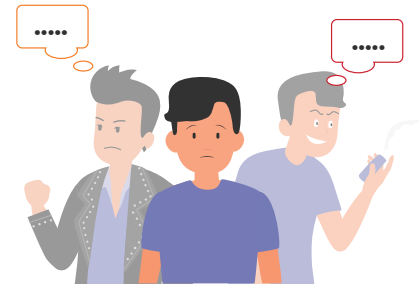


HESI Question

Dissociative episode:

Select all that apply.

- Dissociation is a method for **cop**ing with severe stress
- Dissociative symptoms are **not under the person's conscious control**
- The existence of **two or more subpersonalities**, each with its own patterns of thinking



Treatment

The goal of care is to help the client merge the various identities into 1 personality by integrating past events.

5 NCLEX TIPS

1. **Grounding techniques:** Deep breathing, counting coins, holding an ice cube
2. **Journal** about **feelings & triggers**
3. **Trust:** Develop a **trusting relationship** with each identity
4. **Self-harm:** Monitor & listen for **expressions of self-harm**
5. **NEVER** ask the client to **recall memories**

HESI Question

grounding techniques...
to alleviate symptoms?

- Hold an ice cube in your hand



HESI Question

Which factor would indicate **successful treatment**?

- The patient has **integrated past events**



Notes

Mental Health "Psychiatric Care"

Pathophysiology

- **Obsessions** = Excessive thoughts & impulses
- **Compulsions** = Repetitive "ritualistic behaviors"



ATI Question

Client with **OCD** ... **constantly reorganizing books** ... the client uses this behavior to do which of the following?

- **Decrease anxiety** to a tolerable level

Kaplan Question

.. client with **OCD** must wash, rinse, and dry door handles before entering or leaving a room. **Which action by the nurse is best?**

- **Provide time for the client to complete** the ritual

Key term

- **Give a reminder** that it's time to **take a break**, since the client has been cleaning for hours.

Treatment

Initial Plan of Care 5 NCLEX TIPS

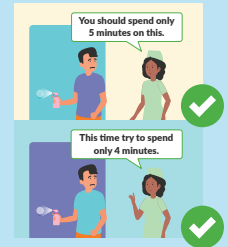
1. Decrease ritual time slowly
 - **NEVER "suddenly" deny** ritualistic activity (initially)
 - Gradually **limit the time** of the activity
2. **Identify triggers** that increase anxiety
3. CBT: **thought stopping techniques**
4. Relaxation / Redirection
 - **Deep-breathing**
 - Exercise (take a short walk)
5. Communication
 - **NEVER say** judgemental comments about OCD habits
 - Give **positive feedback** during **group activities** & non ritualistic behavior



HESI Question

... priority nursing action **3 days after the admission** of a client diagnosed with **OCD**?

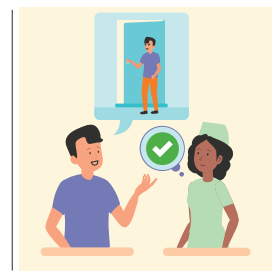
- **gradually decrease** the compulsive behaviors



TOP Missed NCLEX QUESTION

While evaluating a client with **obsessive-compulsive disorder**, the nurse knows which of the following indicates an **improvement in effective coping**?

- ✓ **In the morning when I feel anxiety building, I have been able to attend an exercise class to decompress.**
- Completing rituals of handwashing effectively helps me cope with my anxiety and ensures that I am clean.
- My mom helps disinfect my house everyday when I am at work, so I can have peace of mind everything is clean.
- ✓ **My boss gave me a large project which has increased my stress, but I will use deep-breathing to decrease my anxiety.**
- ✓ **I used to wash door handles 10 times before opening, but for 2 weeks now I can open doors without washing them.**



OCPD - Obsessive Compulsive Personality Disorder

Clients will have their **whole day planned out** **NCLEX TIP**

MEMORY TRICK

OCPD
Punctual **NCLEX TIP**
Perfectionism



I have to do this way.

I don't want change!



ATI Question

... client with **obsessive-compulsive personality disorder (OCPD)**... information about the diagnosis. **Select all that apply.**

- **Perfectionism** and overemphasis on tasks
- This disorder typically involves **inflexibility** and a **need to be in control**

Pharmacology

Antidepressants

SSRI: Sertraline & Paroxetine

SNRI: Duloxetine

Anxiolytics

- Benzodiazepines
- Barbiturates
- Buspirone

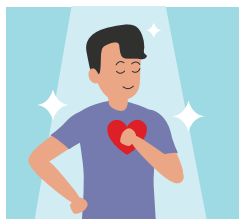


Personality Disorders

Mental Health "Psychiatric Care"

Narcissistic Personality Disorder

- Believes they are **perfect**
- **Acts entitled**, arrogant, & **grandiose**
- Relies on **constant reinforcement** & need for **admiration**
= attempt to maintain self-esteem **NCLEX TIP**



HESI

Which behaviors are demonstrated characteristically by a patient diagnosed with narcissism?

- **Grandiose, exploitive, and rage-filled behavior**
- **Exploitation of others**

ATI

Narcissistic personality disorder: Which of the following manifestations should the nurse expect?

- **Lack of empathy**
- **Feelings of entitlement**

Paranoid Personality Disorder

- Distrust & suspicion of others
- Intense need to **control the environment** **NCLEX TIP**



HESI

Which behavior indicates... that a client with paranoid ideas is improving?

- **Discusses his feelings of anxiety with the nurse**

ATI

A client with a **paranoid personality disorder** sees some clients laughing ... asks the nurse, "Why are they laughing at me? I bet they are making fun of me." Which of the following responses... is **most appropriate**?

- "They are laughing at a joke another client told. They are **not laughing at you.**"

Histrionic Personality Disorder

4 NCLEX TIPS

1. Center of **attention**
2. **Exaggerated** or shallow **emotional expression**
3. **Little tolerance** for frustration & demands gratification
4. Overly friendly & flirtatious



HESI

... a patient behaves in a **melodramatic way** and acts **flirtatiously**. What possible **personality disorder** does the patient have?

- **Histrionic personality disorder**

ATI

Histrionic personality disorder: Which of the following findings should the nurse expect?

- **Lack of insight**

Dependent Personality Disorder

- Extreme dependency in a relationship & fear separation.

PROGRESS

2 NCLEX TIPS

1. "My sister could not drive me here, so I **took the bus.**"
2. "**I am planning** which plants I wish to cultivate this spring"



ATI

Dependent personality disorder: Which of the following actions should the nurse **plan to take**?

- **Give positive feedback** when the client is **assertive** with staff or clients

Borderline Personality Disorder

- Fear of being **abandoned** & uses **manipulative** behavior

1. **Cling to 1 favorite** staff member
2. Self-harm to draw attention = **HIGH risk for suicide**

Priority action: 2 NCLEX TIPS

1. **Assign different staff members** to the client each day
2. Assess **immediately**: any self-harm behavior "**superficial cuts**"



HESI

Q1: Priority nursing intervention... borderline personality disorder:

- Assess for **suicidal and self-mutilating** behaviors
- Q2: Primary coping style** of persons with **borderline personality disorder**?
- "Last night the nurse let me go outside and smoke. I can't believe you aren't letting me. I used to think you were the **best nurse here**"

ATI

Q1: Client with borderline personality disorder ... makes numerous minor requests & spends a lot of time near the nurses station. How should the nurse interpret these behaviors?

- Fear of **abandonment** and attention-seeking

Q2: Client at greatest risk for suicide?

- **Personality disorder**

Antisocial Personality Disorder

Impulsive, manipulates others for personal gain & lacks empathy

HESI

... antisocial personality may present with which characteristic?
Lack of remorse



KAPLAN

Q1: The client shoves another client out of the way ... Which action should the nurse take?

- **Calmly confront** the behavior and remind the client of consequences for negative behavior

Q2: Which statement best indicates improvement in the client's condition?
"I get into trouble because I **don't think before I act.**"

ATI

... demonstrating **manipulative behavior**. Which of the following actions should the nurse take?

- **Institute consequences** for manipulative behavior

Schizotypal Personality Disorder

- **Withdrawn & alone**
- "Special powers" & **Magical thinking**



HESI

A patient is **withdrawn and suspicious** ... prefers to be **alone**... patient describes themselves as having "**special powers**" and states, "**I believe we can all read each other's thoughts at times.**" ... which personality disorder?

- **Schizotypal (STPD)**

Phobias

Mental Health "Psychiatric Care"

Pathophysiology

Phobias are excessive **fear of an object or situation**.

Phobias disorder

- **Arachnophobia**: fear of spiders
- **Zoophobia**: fear of animals
- **Claustrophobia**: fear of being closed in
- **Agoraphobia**: **NCLEX TIP**
Fear of leaving a safe place
"riding on trains or buses"



HESI Question

The inability to leave one's home because of severe anxiety

- Panic attacks with **agoraphobia**

ATI Question

Q1: "I am terrified of **being outside alone.**" The nurse should identify that the client is experiencing which of the following **phobias**?

- **Agoraphobia**

Q2: Phobias can be manifestations of PTSD

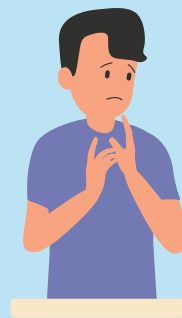
Therapeutic Communication

You always want to assess first, & reinforce the facts, simply state what the client has just stated, for example:

KAPLAN Question

Q1: Phobic disorder: "I am so terrified of heights that the thought of going up my stairs makes me feel like I am going to hyperventilate. **I know it sounds ridiculous.**" Which response is best?

- "You feel like your **fear does not make sense**, but it is very **real to you.**"

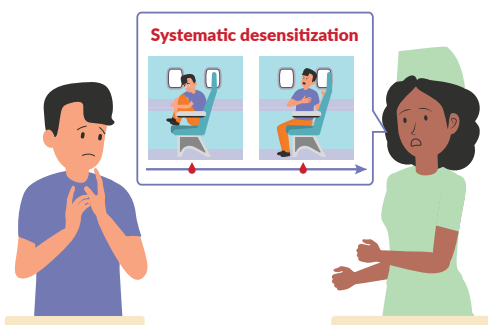


You feel like your fear does not make sense, but it is very real to you



Effective Coping

This is demonstrated as clients increase their comfort levels little by little when exposed to their phobias. This is done via **systematic desensitization**: meaning the clients gradually get exposed to their phobia little by little - to decrease the anxiety over all.



KAPLAN Question

"I travel only by train because I am terrified of flying." ... **phobic** client is most likely to **respond to which intervention**?

- Systematic desensitization

3 NCLEX TIPS

1. **Increased comfort** while exposed to the phobia
2. **Verbalizing** feelings & **insight** about anxiety (self-observation)
3. **Self-distraction**: focusing on something other than the phobia

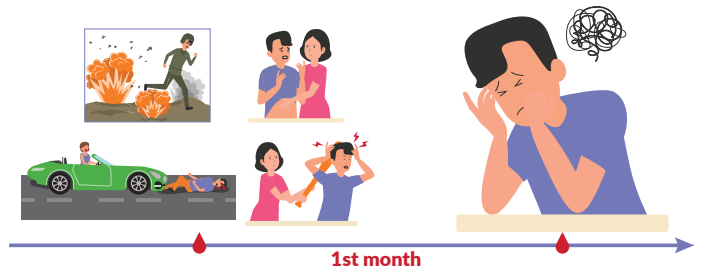
PTSD & Acute Stress Disorder

Mental Health "Psychiatric Care"

Pathophysiology

Acute stress disorder ASD is a mental disorder that can occur within the first month following a traumatic event - typically a near-death experience like war, sexual assault, a car accident, physical abuse, & others, it becomes **PTSD - Post Traumatic Stress Disorder** if symptoms persist for over 1 month.

PTSD - Post Traumatic Stress Disorder



Signs & Symptoms



NCLEX TIPS

- **Increased anxiety**
 - Sweating, pounding heart
 - **Persistent anger**
 - Hypervigilance & restless
- **Flashbacks & Reliving the event**
- **Feeling detached from others**
- Sleep disturbance:
 - **Insomnia**
 - Recurring nightmares
- **AVOIDing** reminders of trauma



Assessments

1. **Self-harm:** thoughts or plans
2. Substance abuse (drugs & alcohol)
3. **Relationships** with family & friends
4. Explain that **difficult symptoms after the trauma** are normal
5. Rape Victim: Assess for **guilt & shame** **NCLEX TIP**
 - Reinforce the client **could not have anticipated rape & did NOT deserve it**



HESI Question

- Q1:** ... "The war was years ago, but I still remember my friends who were killed. I don't know why I lived and they died." What is the nurse's **priority response**?
- Are you having any **thoughts of harming yourself**?
- Q2:** PTSD ... first stage of the treatment?
- **Stopping self-destructive behavior** of the patient

Kaplan Question

- victim of bank robbery reports **daily flashbacks** ... Which **action is best**?
- Offer assurance of safety, & tell the client **these feelings are normal**

Interventions

1. **Priority Action: NCLEX TIP**
Encourage the client to talk about the traumatic experience at their own pace
2. Exposure therapy
3. Group therapy
4. CBT: **thought stopping techniques**

HESI Question

- Q1:** war veteran ... says, "Sometimes I still hear explosions but I know I am safe in my home." What is the nurse's **best response**?
- You are experiencing flashbacks. I'd like to arrange for you to **talk more about your feelings and reactions**
- Q2:** Which actions will the nurse include in the war veteran's plan of care?
- With each session, **explore each traumatic experience more deeply**



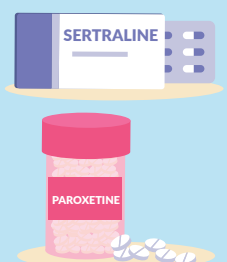
Pharmacology

Antidepressants

SSRI: Sertraline & Paroxetine
TCA: Amitriptyline & Imipramine

Anxiolytics

- Benzodiazepines
- Barbiturates
- Buspirone



Therapeutic Communication

Mental Health "Psychiatric Care"

Open-ended questions

These are **NOT** simply "Yes" or "No" questions, rather it requires an in-depth response.

I don't hear any voices, but I know this is frightening for you.



Closed-ended comments

Stating facts used portray empathy, builds trust & assess further.

HESI

Open-ended questions?
Select all that apply.

- "How do you cope with anxiety?"
- "What event in your life has been the most stressful?"
- "Can you please tell me more about what was happening to you that led you to be hospitalized here?"

Build TRUST 2 NCLEX TIPS

1. Ask & Assess Emotions

- "Tell me when you started noticing ..."
- "Tell me what concerns you have ..."
- "What are you feeling right now?"
- "How are you feeling about your baby?"

2. State Facts

- "We have the vital signs under control"
- "You must be very upset after experiencing this"
- "I understand you are worried"
- "You sound very discouraged & scared."
- "You sound angry. Anger is a normal feeling associated with loss."

Combo:

- "This experience has been overwhelming for you. What are you feeling right now?"
- "Clients with cancer experience fear of dying, tell me about your concerns."

AVOID

"Non-Therapeutic" Communication

- **NEVER:** Offer opinions, advice, or personal experiences
- **NEVER:** Minimize client's feelings
- **NEVER:** Leave the room!
- **NEVER:** Give false reassurance **NCLEX TIP**
 - "Everything is going to be alright"
 - "I'm sure you will do the correct thing"
- **NEVER:** Ask "WHY?!" **NCLEX TIP**
 - "WHY do you feel angry when..."
 - "WHY do you act this way?"
 - "WHY did you leave your child alone?"

Top Missed NCLEX Question

Elderly client losing their spouse to pancreatic cancer. Choose the most therapeutic response. Select All That Apply

- 1. Leave the room to allow the client to grieve in private.
- 2. "I recently lost my grandfather to cancer, so I understand what you are going through."
- 3. "I know this is a difficult time for you. Tell me how you have been coping with this loss."
- 4. "What are your feelings & thoughts about attending a support group."
- 5. "It takes time to deal with & come to terms with a lost spouse, but it will be ok"
- 6. "Why do you feel sad when you are alone?"



Ask Questions

- **Exploring emotions:** gather more information
- **Restating:** repeating patient words to confirm what you understand
- **Reflecting:** return focus on client

Stating Facts

- **Voicing doubt & presenting reality:** refutes misconceptions or delusions
- Suggesting **resources or strategies:** helps offer guidance



Practice Questions

HESI

Q1: What is the most helpful nursing response to a patient who reports thinking of dropping out of college because it is too stressful?

- "School is stressful. What do you find most stressful?"

Q2: Which statements will the nurse indicate as therapeutic? Select all that apply.

- "Am I correct in restating that you are feeling less anxious today?"
- "In looking back at what you said, you stated you are feeling better."
- "Help me understand what you are feeling today?"

Q3: A man was killed during a robbery 10 days ago. His widow... cries spontaneously when talking to the nurse. What is the nurse's most therapeutic response?

- "The sudden death of your husband is hard to accept. Tell me about how you are feeling?"

KAPLAN

Q1: Client with ... end stage heart failure, says "Why can't this just end? I'm no good to anyone anymore." Which response is best?

- "This must be difficult. Please tell me about your feelings?"

Q2: The nurse finds the client crying ... & says, "What do you want? Go away, you can't help me. I hate you and I hate myself." Which response by the nurse is best?

- "You seem to be in pain; I'll stay with you for a while."

Q3: Client's spouse has been unemployed for more than six months, and is afraid of not being able to pay the rent. Which response is most appropriate?

- "You're worried that you won't be able to pay the rent?"

ATI

Q1: "I am really concerned about my mom." Which of the following responses should the nurse make? Select all that apply.

- "Tell me what is troubling you."
- "Tell me about what you are feeling right now. What is upsetting you?"
- "It seems that you feel responsible for what happened to your mother."

Q2: Client who has cancer is scheduled to receive chemotherapy ... she wants to try homeopathic treatments first. Which of the following responses should the nurse make?

- "Tell me more about your concerns about taking chemotherapy."

Q3: A parent who recently lost her child ... states she cries frequently and can't bear the loss ... which therapeutic statements should the nurse make?

- "You are feeling great pain at the loss of your child."

SAUNDERS

Q1: ... "I can't believe that my wife died yesterday. I keep expecting to see her everywhere I go in this house." ... therapeutic nurse response?

- "It must be hard to accept that she has passed away"

Q2: ... "This condition is just another nail in my coffin." Which response by the nurse is therapeutic?

- "You seem very distressed over learning you have asthma."

Q3: A client diagnosed with terminal cancer says to the nurse, "I wish my family would stop hoping for a cure! I get so angry when they carry on like this." Which response by the nurse is most therapeutic?

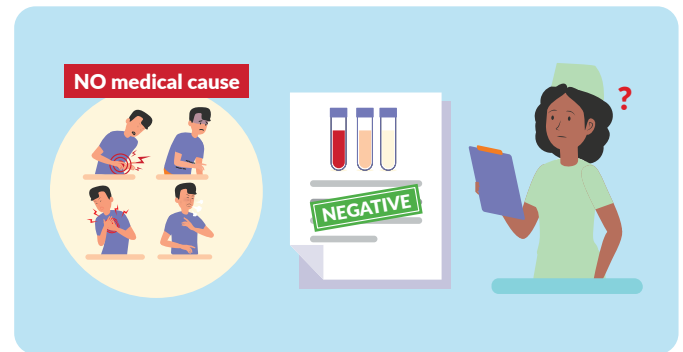
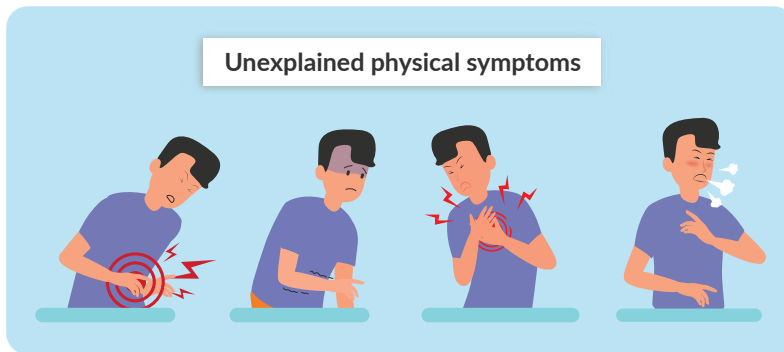
- "You're feeling angry that your family continues to hope for you to be cured?"

Somatic System Disorders

Mental Health "Psychiatric Care"

Pathophysiology

SDD is a psychological disorder where clients have unexplained physical symptoms like abdominal pain, weakness, chest pain, shortness of breath, & others. The key point is that there is **NO medical cause of the physical symptoms!** All diagnostic tests come back negative. These physical symptoms are real & clients are not making them up or faking it.



Causes

Clients will often **obsessively focus their time & energy on the symptoms**, often going to many different doctors & practitioners in order to get a medical diagnosis that does not exist. All the pain in the body is typically **caused by stress**.



Interventions

Limiting focus on being sick

- **Limit time discussing physical symptoms** **NCLEX TIP**

Promote insight

- **Identify stressors** that intensify symptoms

Coping mechanisms

(Stress-reducing techniques)

- Deep-breathing
- Meditation
- Exercise



Don't let

THE EXAMS TRICK YOU

- **DO NOT** reinforce negative exam results when the client wants pain meds.
- **NEVER** debunk or dispute the clients' symptoms saying they are not real!
- **DO NOT** advocate for more diagnostic tests or a new diet plan, since it is a psychological disorder.

Anxiety Disorders

Mental Health "Psychiatric Care"

TYPES

- **GAD:** General Anxiety Disorder
- **SAD:** Social Anxiety Disorder
- Panic disorder
- Separation Anxiety
- Phobias
- **OCD:** Obsessive Compulsive Disorder
- **PTSD:** Post-traumatic Stress Disorder



HESI Question

Client states... "every time I need to leave the house for work ... Mom becomes extremely anxious and cries that something terrible is going to happen to me." ... supports which psychiatric diagnosis?

- Separation anxiety disorder



Pathophysiology

During severe anxiety the mind goes into a state of panic & so the body goes into fight or flight mode turning on the SNS - sympathetic nervous system. The SNS tells the body to shunt blood flow away from the extremities & **toward the core of the body** for the vital organs & to increase the vital signs.

MEMORY TRICK

SNS - Sssspeeds Up the Vital Signs

Increasing the HR, BP, RR, sugar levels, & dilating the pupils!

ATI Question

Which of the following are **physiological signs of anxiety?**
Select all that apply

- Increased pulse rate
- Hyperglycemia
- Dilated pupils
- Dilated bronchioles
- Peripheral vasoconstriction



Classifications


Small
Mild Anxiety




Medium
Moderate Anxiety




Large
Severe Anxiety




EXTRA Large
Panic Attacks!



Signs & Symptoms

Mild Anxiety

- Restless, irritability

Moderate Anxiety

- **Increased** RR & HR
- Pacing back & forth
- **Slightly** reduced perception

Severe Anxiety

- **Increased** RR & HR "hyperventilation"
- **Pacing** back & forth
- Feeling of "**Impending Doom**"
- Perception is **GREATLY reduced**: Can **NOT** respond to directions

ATI Question

...clinical manifestations ... expected in a client with **severe anxiety?**

- The client is **pacing the hallway** and tells the nurse he has a **feeling of impending doom**



HESI Question

Q1: ... a patient tells the nurse, "**I feel like I am going to die.**" Based on the statement the patient made, **what level of anxiety** is the patient experiencing?

- **Severe**

Q2: A male patient is running ... and keeps repeating, "They are coming!" ... **neither follows staff directions nor responds** to verbal efforts to calm him. The **level of anxiety** can be assessed as:

- **Severe**

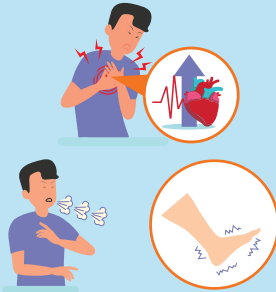
Anxiety Disorders II

Mental Health "Psychiatric Care"

Signs & Symptoms

Panic Attack

- Fear of death **"Impending doom"**
- Feeling detachment **"Hallucinations"**
- Physical s/s:
 - **Chest Pain** & heart palpitations
 - **Trembling** & Numbness
 - Hyperventilation
 - **Sweating** & Hot flashes
 - Nausea & choking sensations



HESI Questions

- Q1:** A symptom associated with **panic attacks** is:
- Fear of **impending doom**
- Q2:** A patient who has to undergo surgery ... complains of **chest pain, feelings of choking, and hot flashes**. What appropriate diagnosis does the nurse make from the patient's symptoms?
- The patient has **panic disorder**



Interventions

Severe Anxiety & Panic Attacks

1. **REMAIN** with the client
#1 Priority NCLEX TIP
2. Place client in a **quiet room**
"Sit with client" "remain at bedside"
3. Speaking **calmly** with **simple** clear words

HESI Questions

- Q1:** Client ... becoming **increasingly anxious**. What **initial actions** should the nurse take for this client?
Select all that apply.
- **Stay by the client's side**
 - **Escort the client to a quiet place**
 - Use a **comforting tone of voice** when speaking to the client
- Q2:** ... new client ... spontaneous onset of **hyperventilation, trembling, and an inability to concentrate**. What is the nurse's **priority action**?
- **Stay with the new client**

ATI Questions

- Q1:** ... a client with a **severe level of anxiety** is **rocking back and forth** ... stating, **"Something bad is going to happen."** Which action should the nurse take?
- Sit in a chair **next the client's bed**
- Q2:** ... client who has **generalized anxiety disorder** and is **trembling and pacing** during a group activity... Which of the following **statements** should the nurse make to the client?
- Come with me to an area where we can **talk without interruption**

Kaplan Questions

- Q1:** Client with **anxiety disorder**... begins to **sweat profusely** and **breathe rapidly**.. & states "I feel like I am having a **panic attack**." Which response by the nurse is **best**?
- "I'm going to **help you back to your room**."
- Q2:** ... client reporting **dizziness** and a **"racing heart"**.... **extremely anxious**. Which response by the nurse is **best**?
- "When did you **first notice** that you were **feeling anxious**?"

Pharmacology

Beta blockers "-lol"

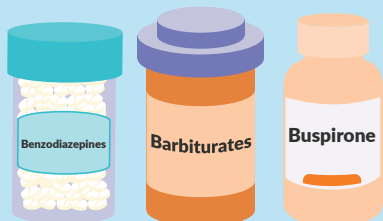
- **Atenolol**

Antidepressants

- **SSRI:** Sertraline & Paroxetine
- **TCA:** Amitriptyline & Imipramine
- **MAOI:** Phenelzine & Isocarboxazid

Anxiolytics **MOST TESTED**

- Benzodiazepines
- Barbiturates
- Buspirone



Effective Coping

3 NCLEX TIPS

1. **Increased comfort** while exposed to the phobia
2. **Verbalizing** feelings & **insight** about anxiety (self-observation)
3. **Self-distraction:** focusing on something other than the phobia



NCLEX TIP

Resilience:
Practicing **stress reduction techniques** daily

Top Missed NCLEX Questions

A client with **social anxiety disorder** has been struggling with his new job when coworkers invite him to lunch. Which of the following statements indicates the client is **improving in coping mechanisms**?
Select all that apply

- 1. I went to a restaurant with a few coworkers & focused on our conversation rather than my phobia.
- 2. I planned to go out of town rather than attend our company's Christmas party.
- 3. I must admit that I am still very nervous about eating in front of my coworkers, but I am working through it.
- 4. I went to a coffee shop by myself and sat to watch people.
- 5. I will make excuses to avoid going to eat with my boss.



Cognitive Behavior Therapy (CBT)

CBT is a type of talk therapy that helps clients **reframe their thought processes to prevent negative thought patterns** in order to adapt to stress & anxiety.

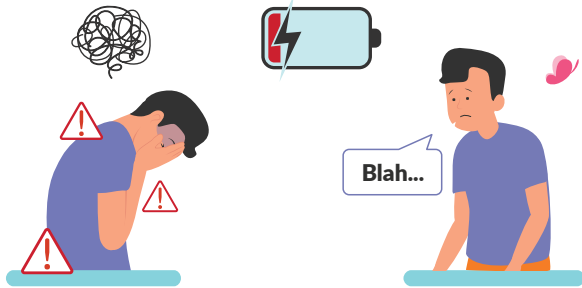


Depression

Mental Health "Psychiatric Care"

Pathophysiology

Major Depressive Disorder (MDD) also called clinical depression is when a client experiences a severe depressed mood, loss of enjoyment in life, low energy & few other critical signs and symptoms. Everything is low & slow, it is thought to be from low levels of neurotransmitters within the brain.



Neurotransmitters

- **Low** Serotonin
- **Low** Dopamine
- **Low** Norepinephrine

Serotonin

C1=CC=C2C(=C1)N(C)C(=O)N2C

↓

Dopamine

C1=CC=C2C(=C1)N(C)C(=O)N2C

↓

Norepinephrine

C1=CC=C2C(=C1)N(C)C(=O)N2C

↓

Risk Factors

- Stressful life event
- Chronic illness
- **Genetics:** Family history
- **Female**
- Substance abuse disorders



ATI Question

a **risk factor** for depression?

- **Stressful life events**

KAPLAN Question

recently become **unemployed** and the client reports **feeling depressed**. The nurse understands which statement to be true?

- unemployment is a **significant potential stressor**

Signs & Symptoms

- Diagnosis: 5 or more symptoms**
1. Depressed mood (hopeless, empty)
 2. **Anhedonia** **HESI** & **ATI** (loss of joy/ interest in life)
 3. **Weight loss (anorexia)** or Wt. Gain
 4. **Psychomotor retardation** **NCLEX TIP**
 - **Slower** speech, response time, & Decreased movement
 5. **Insomnia** or hypersomnia (sleeping too much)
 6. **Fatigue** (Anergia)
 7. Feelings of worthlessness or Guilt
 8. Difficulty concentration
 9. Suicidal thoughts (Recurrent)

Diagnosis

5/9 symptoms



HESI Question

- Q1:** "Life just **doesn't have any joy** in it anymore. Things I once did for pleasure aren't fun."
- **Anhedonia**
- Q2:** Which **complaint regarding sleep** would the nurse expect from a patient diagnosed with **major depression**?
- I wake up about **4 am and cannot go back to sleep. I feel tired all the time**

ATI Question

A nurse is assessing an **adolescent** who has depression. Which of the following findings should the nurse expect?
Select all that apply.

- Irritability
- Anhedonia
- Anergia
- Appetite changes

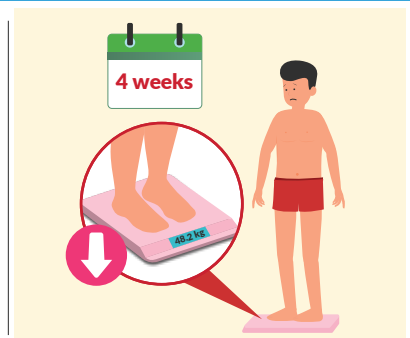
Side Note Pediatrics:

- Adolescents 10 - 19 years** **NCLEX TIP**
- **Angry, aggressive outbursts & vandalism / skipping class**
 - **Weight loss** or gain "suddenly" "rapidly"
 - **Napping** during day
 - Low self-esteem (**withdrawal**)

TOP Missed NCLEX QUESTION

Which of the following pediatric clients should the nurse **screen for depression**?
Select all that apply.

- ✓ 10 year old **taking frequent naps during class time**
- ✓ 16 year old **quit the chess team** despite being the team captain
- ✓ 14 year old sent home from school due to **angry outbursts & skipping class**
- ✓ 17 year old **suddenly lost 15 lbs (6.8 kg)** in 4 weeks



Depression II

Mental Health "Psychiatric Care"

Treatment

3 Phases

1. Acute Phase
2. Continuation Phase
3. Maintenance phase



Types

Dysthymia

- Mild symptoms

Seasonal affective disorder

- Use of light therapy

Pre & Postpartum baby blues

HESI Question

... seasonal affective disorder. What appropriate action...?

- Instruct the patient to be exposed to a light source for **30 to 45 minutes daily**

Nursing Care

Priority: Suicide Risk

Assessment:

- **Calmer or MORE Energetic** = **INCREASED** suicide risk
- Sudden, abrupt, rapid change in energy
- Giving away **possessions** (cherished / valued)
- **Statements:** "I can't go on" "I do not want to live"
 - "I won't be a problem much longer" **HESI**
 - "This will all be over soon" **Kaplan**

Questions: Suicide risk assessment

"Have you had any **thoughts of hurting yourself?**" **NCLEX TIP**

"Do you have a plan to **kill yourself?**"

"Do you want to die?"

ATI Question

... major depression and suicidal ideation who is suddenly calmer and more energetic. Which of the following should the nurse consider?

- The client is **suicidal**

HESI Question

A man tells the nurse ... **he has no reason to continue living**. What should the nurse ask him **first**?

- Do you have **any plans to end your life** right now?

Saunders's Question

Q1: ... a depressed client ... suddenly begins smiling and reporting that the crisis is over. The client says to the nurse, "I'm finally cured." Intervention?

- **Increasing the level of suicide precautions**

Q2: Which behavior ... indicates an adolescent client may be **suicidal**?

- Gives away a DVD and a **cherished autographed picture** of their favorite performer

NCLEX TIPS

1. Continuous **one-to-one observation**
2. **Semi-private** room (near nurses' station)
 - **Remove** harmful objects from room
 - Supervise during meals
 - **Reassess:** changes in **suicidal thoughts**

Clear **plans of the future** involving **personal goals**, family, & friends **NCLEX TIP**

Kaplan Question

... client states, "**I don't want to live anymore**. I'll find something else to kill myself with." Which nursing intervention is **important to perform next**?

- Provide direct **one-to-one observation** to the client at all times

HESI Question

Q1: A client .. admits to a plan for **suicide** .. What is the nurse's **priority action**?

- Provide **one-on-one supervision**

Q2: One week ago, a patient **attempted suicide**.... which comment by the nurse is **most therapeutic**?

- "I'd like to hear about how you are feeling now"

Interventions

Encourage & Invite client to participate

Assist with ADLs

- Help the client get ready **NCLEX TIP**

Spend time with client

- "**Sit with** the client"
- Communication with **simple & direct** language

Reevaluation

ATI Question

Q1: ... newly admitted client who has **severe depression**.

- **Sit with the client** and offer simple, direct information

Q2: ... client seems **more withdrawn and depressed** than usual.

- Say to the client, "I would like to **spend some time with you.**"

HESI Question

Which comment ... shows **improvement in depression**?

- "I talked with my family about ways we can **celebrate holidays together.**"

Kaplan Question

Q1: Client diagnosed with **depression** ... Which approach by the nurse is best?

- **Invite** the client to **join in** group activities

Q2: ... **crying alone in the room**. The client has refused to eat breakfast or have morning care. Which **intervention by the nurse** is best?

- Offer to **sit with the client** and help the client get dressed

Saunders's Question

...diagnosis of **depression** ... plan of care that includes which **intervention**?

- A **structured program of activities** in which the client can **participate**

Depression III

Mental Health "Psychiatric Care"

Diet

Remember a big symptom of depression is rapid weight loss or weight gain, typically weight loss is the most tested, since it is more common. Clients lose appetite & refuse to eat.

Poor nutritional intake

1. Small **"frequent"** meals
2. **High** calorie foods & fluids
3. **Stay** with client during meals
4. Weekly weighing

HESI Question

... imbalanced nutrition, **less than body requirements** ... with **severe depression**. The most reliable evaluation of outcomes?

- Weekly weighing



Saunders's Question

Client with **depression** ... **poor nutritional intake**. ... which **interventions** in the plan of care?

Select all that apply.

- Assist the client in selecting foods from the food menu
- Offer **high-calorie fluids** throughout the day and evening
- Offer **small high-calorie**, high-protein snacks during the day and evening

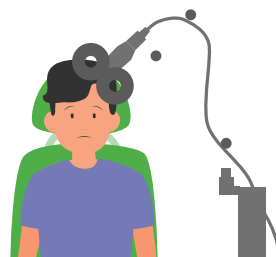
Procedures

MOST TESTED

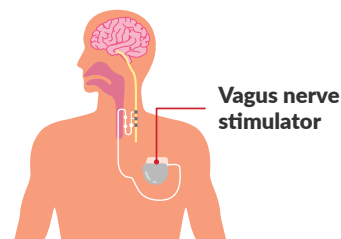
1. **ECT - Electroconvulsive therapy**
2. TMS - Transcranial magnetic stimulation
3. Vagus nerve stimulation



ECT



TMS



Vagus nerve stimulator

ECT - Electroconvulsive Therapy

BEFORE

1. **Screen** for Medical History & **Report to HCP**
 - Recent **myocardial infarction** **Saunders's**
 - Cerebral neoplasm **ATI**
2. **Assess** Concerns:
 - What are your concerns about ECT? **NCLEX TIP**
3. **NPO** x 6 - 8 hours **NCLEX TIP**
4. **NO** anticonvulsant meds **NCLEX TIP**
 - **Valproic Acid**, Carbamazepine
5. **Remove:** dentures & contacts
6. **Side Effect:**
 - Memory loss **ATI** & **Kaplan**
- **Equipment:**
 - Cardiac monitor
 - Oxygen
 - Crash cart
 - Suction
- **Informed Consent** signed

AFTER

- **NO** driving (during course of ECT treatment) **NCLEX TIP**
- Temporary **confusion & memory** loss common after

ECT induces electrical activity on the scalp **to create a generalized seizure**. Think of this as jumpstarting the brain **like jumpstarting a car** or doing a **hard reset on your iphone**. Each seizure lasts around 15 - 20 seconds, done 2-3 times a week for 6-12 treatments total.

ATI Question

Which of the following is a **side effect** of ECT?

- Memory loss

Kaplan Question

after ECT... It is most important for the nurse to take **which action**?

- Remind the client that **memory loss is temporary**

HESI Question

... **electroconvulsive therapy (ECT)**, which equipment should the nurse make sure is available?

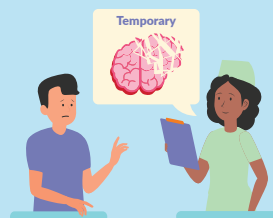
Select all that apply.

- Oxygen
- Suction equipment
- Crash cart

Saunders's Question

ECT ... interventions before procedure? Select all that apply.

- Have the client void
- Obtain an **informed consent**
- **Remove** dentures and contact lenses
- **Withhold food and fluids** for 6 hours



REMOVE



Schizophrenia

Mental Health "Psychiatric Care"

Pathophysiology

Abnormal scattered pattern of thinking for about 6 months or more. It often starts to affect relationships as well as school & work flow as clients cannot concentrate.

Memory trick

- **S** - Schizophrenia
- **S** - Scattered pattern of thinking
- **S** - Suicide Risk **HIGH**

Causes & Risk Factors

- **Genetics**



Children are more likely to have schizophrenia when parents have the condition. It is thought to be caused by a decrease in dopamine within the brain.

Signs & Symptoms



- **Positive Symptoms = Psychotic**
 - Hallucinations
 - Delusions
 - Thought Disturbance
- **Negative Symptoms = Negative State**
- **Cognitive Symptoms = Capacity of Memory**



Positive Symptoms

P

Positive Symptom



P

Psychotic Symptoms



Memory trick

- **P** - Positive Symptoms
- **P** - Psychotic Symptoms

Hallucinations

- **Tactile** Hallucination: sensation of being touched
 - **Auditory** Hallucination: hearing voices & sounds not there
- Best action:** Provide earphones & music **NCLEX TIP**

HESI

Hearing voices that tell them to stay home:
 ▪ **Positive symptoms** of schizophrenia

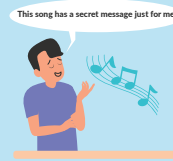


Delusions

- Delusions of **Reference**: **NCLEX TIP**
 "This song has a **secret message** just for me"
- Delusions of **Control**:
 "I do not go online, that's how the FBI **controls you**"
- Delusions of **Grandeur**:
 "I have a very important meeting with the **Queen** today"
- **Persecutory** (paranoid) delusions:
 "The hospital food is trying to **poison me**"

HESI

Schizophrenia: **positive symptom?**
 ▪ **Delusions**

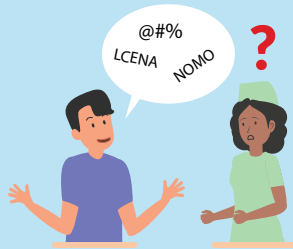


Disorganized Speech & Thought

1. **Loose associations** "flight of ideas": rapid shift of thought with no logical connection
NCLEX TIP
 - "The universe is like a **raisin**, but the the moon is a home & I rode my **bike**"
 - "Glass breaks if you **throw stones** .. My cousin shoots guns. I live in glass houses **Saunders**"
2. **Neologisms**: making up imaginary words
 • "I have to get away. The **vomers** are coming to execute me." **HESI**



3. **Clang associations**: listing rhyming words together that make no sense
 • "Let's go to the **bay**, hit the **hay**, what do you **say**, we can go **today**"
4. **Word Salad**: mixing words together that have no meaning except to the client
 • "Here is the **chair, moon, orange, drank too much**"



5. **Concrete thinking**: taking a statement literally.
 - "Grass is **greener** on the other side" or "don't put all your **eggs** in one basket"
 - Thinking there is **actual grass & eggs**.
6. **Tangentiality**: speaking of unrelated topics that do not correlate to the main discussion.
 - Nurse asks, "how was your sleep?" Client says "When I was **five**, my cat was **killed**, I love **dogs**"



7. **Echolalia**: repetition of words they hear from someone else **NCLEX TIP**
 - Nurse says, "We will take your vitals"
 Client **repeats this phrase over & over**
8. **Perseveration**: repeating the same words / phrases when answering different questions
 - Nurse says, "How do you feel today?" Client says, "**Absolutely splendid**"
 - Nurse says, "Do you know today's date?" Client says, "**Absolutely splendid**"



Schizophrenia II

Mental Health "Psychiatric Care"

Negative Symptoms

The 5 As

- **A**- Affect Flat (expressionless, blank look) **Saunders**
- **A**- Anhedonia (inability to experience pleasure) client mood turned off like a light switch
- **A**- Apathy & Avolition (lack of interest or motivation)
- **A**- Alogia (poor speech)
- **A**- Anxiety & Avoids social interaction **NCLEX TIP**



Saunders

negative symptoms associated with schizophrenia? Select all that apply.

- Verbal communication is almost nonexistent
- The client needs frequent redirection because of short attention span

ATI

negative symptoms?

- Anhedonia
- Blunt affect

HESI

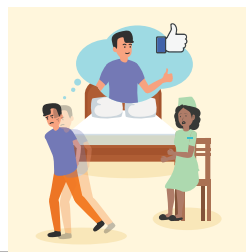
NOT a positive symptom of schizophrenia?

- Affective flattening

Top Missed NCLEX Question

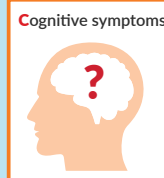
Client with schizophrenia leaves the room as soon as the nurse enters & asks about the client's day. Best action?

- ✔ Let the client leave & sit quietly



Cognitive Symptoms

C



C

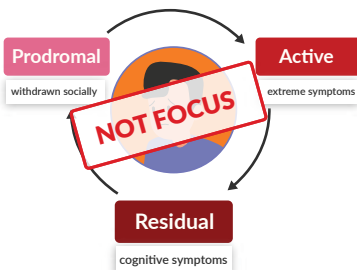


- Affects memory, learning, & understanding

Memory trick

- C - Cognitive symptoms
- C - Capacity to remember

NCLEX Key Points



Catatonic Schizophrenia

- + 2 more features:
- Immobility
 - Bizarre postures "muscle rigidity"
 - Mute (no speech)
 - Severe Negativism
 - Staring

Priority:

- Fluid & nutritional intake **NCLEX TIP**

Paranoid schizophrenia

- "Persecutory Delusions"
- Plan of care: **NCLEX TIP**
 1. Focus on reality & reinforce it verbally
 2. Acknowledge client's feelings



NCLEX TIPS

1. Focus on reality & reinforce it verbally
2. Acknowledge client's feelings

ATI

... catatonia with catalepsy. Which of the following findings should the nurse expect?

- Muscle rigidity

HESI

- "I understand that the voices are very real to you, but I do not hear them."

KAPLAN

- "That must be an unpleasant experience for you. Have you had these feelings before?"

Saunders

- Facilitate awareness that hallucination is not the reality of the world.

Therapeutic Communication

Assessment: (open-ended questions)

- What are the voices saying? What do you see? **NCLEX**
- Tell me what you are feeling at this moment **HESI**
- Describe what you are seeing now **HESI**
- How does it feel to think you are being watched? **Kaplan**
- What activities did you enjoy in the past? **ATI**

KAPLAN

"Do you see those cameras in the ceiling? I am being watched all the time." Which response by the nurse is most appropriate?

- "Those are sprinklers in the ceiling that come on if there is a fire. How does it feel to think you are being watched?"



State the Facts:

- I see you are frightened, let's go to your room & talk about this **NCLEX**
- It might be frightening to think that others want to hurt you **Saunders**
- I don't hear any voices, but I know they are scary for you **Kaplan**
- I understand the voices are real to you, but I do not hear them **HESI**
- You see yourself as the savior I see you as my client **HESI**

HESI

... paranoid schizophrenia refuses food, stating the voices are saying the food is contaminated and deadly. A therapeutic response for the nurse would be:

- "I understand that the voices are very real to you, but I do not hear them."

KAPLAN

"There are really strange people in the corner of my room laughing at me and saying horrible things." Which response by the nurse is best?

- "I don't hear any voices, but I know this is frightening for you."



Schizophrenia III

Mental Health "Psychiatric Care"

Interventions

- Provide safe & structured environment and promote trust
- Decrease environmental stimuli
- Always MONITOR for suicide risk

Delusions & hallucinations

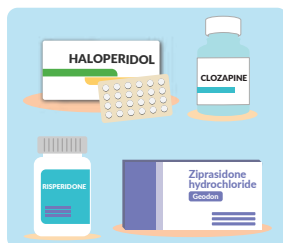
- **Never label** voices or argue
- Always present reality



Pharmacology

Antipsychotics:

- **Haloperidol** (brand: Haldol)
- Clozapine
- Risperidone
- **Ziprasidone** (brand: Geodon)



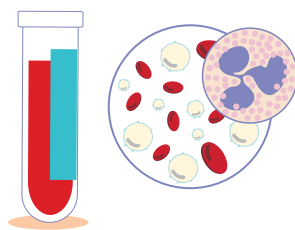
Clozapine Adverse Reactions

NCLEX Question

Clozapine: Priority to monitor?

- ✓ Complete blood count & absolute neutrophil count

PRIORITY



HESI

Prescribed **clozapine**. Which ... should the nurse monitor?

- Total **white blood cell**

Saunders

Clozapine for ... **schizophrenic disorder** ... **adverse reaction** to the medication if abnormalities are noted on which laboratory study?

- **White blood cell** count

ATI

A nurse is reviewing the **laboratory findings** of four clients who have **schizophrenia** and take **clozapine**... **priority for the nurse to report?**

- A client who has a **WBC count** of **2,900/mm3**

Top TESTED questions

• NMS

Neuroleptic malignant syndrome - Life-threatening reaction to antipsychotic drugs characterized by fever, altered mental status, muscle rigidity, and dizziness.

KAPLAN

Haloperidol 5 mg twice a day. The nurse **observes** the client for which **symptoms**?

- **Dizziness** and **lightheadedness**
- **Muscle spasms** and **stiffness**

HESI

antipsychotic medications for the past 3 days with ... **increase in blood pressure** and **temperature** & demonstrates **muscular rigidity**. Which action?

- Take the client's **vital signs** and **notify** the health care provider **HCP** immediately

ATI

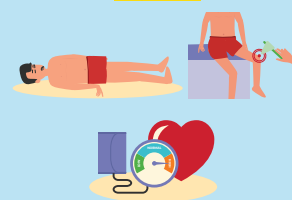
Q1: ... a client prescribed **multiple antipsychotic medications**... has **rigid extremities**, **hypertension**, **hyperpyrexia**, and **diaphoresis**.

- Neuroleptic malignant syndrome **NMS**

Q2: Antipsychotic meds **further teaching** is necessary?

- "I should not be concerned about **fever** and **muscle stiffness**."

Key terms



Maternity

Anatomy & prenatal care



MALE

External genitalia

- ❖ **Penis:** reproductive and urinary elimination.
- ❖ **Scrotum:** External sac that houses testes. Protects the testes from trauma & testicular temperature regulation.



Internal reproductive organs

- ❖ **Testes:** produce male sex hormone and from spermatozoa
- ❖ **Ductal system:** " vas deferens" the tube in which sperm begin the journey out of the body.
- ❖ **Accessory glands:** The seminal vesicles are paired glands that empty an alkaline, fructose-rich fluid into the ejaculatory ducts during ejaculation.

Prostate: muscular gland that surrounds the first part of the urethra as it exits the urinary bladder. The alkaline fluids secreted by these glands are nutrient plasmas with several key functions, including the following:

- ❖ Enhancement of sperm motility (i.e., ability to move)
- ❖ Nourishment of sperm (i.e., provides a ready source of energy with the simple sugar fructose)
- ❖ Protection of sperm (i.e., sperm are maintained in an alkaline environment to protect them from the acidic environment of the vagina) (Hatfield 51)



MENSTRUAL CYCLE

Two main components : Ovarian cycle and Uterine cycle

Ovarian cycle : Cyclical changes in the ovaries occur in response to two anterior pituitary hormones: follicle-stimulating hormone (FSH) and luteinizing hormone (LH). There are two phases of the ovarian cycle, each named for the hormone that has the most control over that particular phase. The follicular phase, controlled by FSH, encompasses days 1 to 14 of a 28-day cycle. LH controls the luteal phase, which includes days 15 to 28

- ❖ Follicular phase
- ❖ Luteal phase

Uterine cycle: changes that occur in the inner lining of the uterus. These changes happen in response to the ovarian hormones estrogen and progesterone.

There are four phases to this cycle:

- ❖ Menstrual
- ❖ Proliferative
- ❖ Secretory
- ❖ ischemic.



SIGNS OF PREGNANCY

- ❖ **Presumptive:** subjective data the woman reports to the HCP for example, " My breasts hurt"
- ❖ **Probable :** objective data such as cervical changes
- ❖ **Positive :** diagnostic confirmation such as, fetal heartbeat & ultrasound

REPRODUCTIVE SYSTEM

FEMALE



External genitalia

- ❖ mons pubis
- ❖ labia majora and minora
- ❖ Clitoris
- ❖ Vestibule
- ❖ perineum

Internal reproductive organs

- ❖ **Vagina:** muscular tube that leads from the vulva to the uterus
- ❖ **Cervix:** dips into the vagina and forms fornices, which are arch-like structures or pockets.
- ❖ **Ovaries :**two sex glands homologous to the male testes, are located on either side of the uterus. (Hatfield 55)

Fallopian tubes: The paired fallopian tubes (also known as oviducts) are tiny, muscular corridors that arise from the superior surface of the uterus near the fundus and extend laterally on either side toward the ovaries. The fallopian tubes have three sections

- ❖ Isthmus
- ❖ Ampulla
- ❖ infundibulum

Uterus: uterus, or womb, is a hollow, pear-shaped, muscular structure located within the pelvic cavity between the bladder and the rectum.

The uterus is divided into four sections.

- ❖ cervix
- ❖ uterine isthmus
- ❖ corpus
- ❖ fundus (Hatfield 53)

CELLULAR DEVELOPMENT

Soma cells:

- ❖ Makeup organs and bodily tissue of the human body.
- ❖ Gametes: germ cells/ sex cells found only in the reproductive glands
- ❖ Nucleus: contains 23 pairs of chromosomes
- ❖ Each parent donates 1 par of chromosomes (46 Chromosomes equals little Mikey)
- ❖ Each parent donates 22 pairs of autosomes: genetic traits such as eye color, hair color, ear wax consistency.
- ❖ One pair of sex chromosomes

FETAL DEVELOPMENT

Pre-embryonic stage : 3-4 weeks gestation

Embryonic: 5-10 weeks gestation

Fetal: 11-40 weeks gestation

Fetal Growth



HEMATOLOGIC CHANGES

- ❖ Blood volume increases by 45-50%
- ❖ Red blood cell count increases up to 30%
- ❖ Plasma increases up to 50%
- ❖ Hemoglobin decreases
- ❖ Hematocrit decreases

CARDIAC CHANGES

- ❖ Blood pressure slightly decreases
- ❖ Heart rate increases by 10-15 BPM
- ❖ Cardiac output increases



INTEGUMENTARY CHANGES

- ❖ **Chloasma** : "pregnancy mask" brown blotchy areas on the skin of the face, cheeks, nose and forehead.
- ❖ **Linea nigra**: a dark line down the middle of the skin on the abdomen
- ❖ **Striae**: develop in response to increased glucocorticoid levels. Also known as stretch marks



MUSCULOSKELETAL CHANGES

- ❖ **Lordosis**: Excessive inward curvature of the spine
- ❖ **Diastasis rectus abdominis**: tearing of the rectus abdominis muscles

RESPIRATORY CHANGES

- ❖ Nasal mucosa edematous due to vasocongestion
- ❖ Nasal congestion and voice changes possible
- ❖ Accommodations to maintain lung capacity
- ❖ May feel short of breath when eupneic
- ❖ Third trimester diaphragm pressure



GI CHANGES

- ❖ Intestines are displaced upwards & to the side.
- ❖ Pressure changes in the esophagus & stomach which leads to heartburn.
- ❖ constipation



PREGNANCY

SIGNS OF PREGNANCY

- ❖ **Presumptive**: subjective data the woman reports to the HCP for example, " My breasts hurt"
- ❖ **Probable** : objective data such as cervical changes
- ❖ **Positive** : diagnostic confirmation such as, fetal heartbeat & ultrasound

WEIGHT GAIN

- ❖ A woman should increase her caloric intake by 300 kcal/day during 2nd & 3rd trimesters.
- ❖ Recommended weight gain depends on pre pregnancy BMI.
- ❖ **FIRST TRIMESTER** : 3-4 lb total
- ❖ **REMAINDER OF PREGNANCY**: 1 lb per week.
- ❖ **Total weight gain**: 25-35 lb for a woman with a normal BMI



NUTRITION

- ❖ When a woman isn't getting the proper nutrients this can cause Amenorrhea which can inhibit the ability to become pregnant.
- ❖ Lack of folic acid can cause neural tube defects (spina bifida) and cause damage to the growing fetus.
- ❖ Deficits in Vit C have been shown to also cause birth defects and cancer.
- ❖ Pica:
- ❖ *persistent ingestion of nonfood substances such as clay, laundry starch, freezer frost, or dirt. It results from a craving for these substances that some women develop during pregnancy.*
- ❖ *These cravings disappear when the woman is no longer pregnant.*
- ❖ *Pica is associated with iron-deficiency anemia, but it is unknown whether iron deficiency is the cause or the result*

NUTRITIONAL REQUIREMENTS

- ❖ **Proteins**: Growth and repair of fetal tissue, placenta, uterus, breasts, and maternal blood volume
- ❖ **Minerals**: Prevent deficiencies in the growing fetus and maternal stores
- ❖ **Iron** : Formation of hemoglobin; essential to the oxygen-carrying capacity of the blood
- ❖ **Calcium**: Nerve cell transmission, muscle contraction, bone building, and blood clotting
- ❖ **Phosphorus**: Promotes strong bone growth
- ❖ **Zinc**: Fetal growth and maternal milk production
- ❖ **Iodine** : Promotes normal thyroid activity, preventing defects



VITAMIN REQUIREMENTS

Folic acid (Vitamin B9)

- ❖ Necessary for formation of the nervous system
- ❖ Prevents up to 70% neural tube defects
- ❖ Diet should include at least 400 mcg of folic acid per day

Vitamin A

- ❖ Recommended intake via beta-carotene
- ❖ Too much can be toxic to the fetus
- ❖ Too little can stunt fetal growth and cause impaired dark adaptation and night blindness

Vitamin C

- ❖ Essential in the formation of collagen, a necessary ingredient to wound healing

Vitamin B6

- ❖ Necessary for the healthy development of the fetus's nervous system

Vitamin B12

- ❖ Needed to maintain healthy nerve cells. P



Labor and delivery

Stages Of Labor I

Maternity

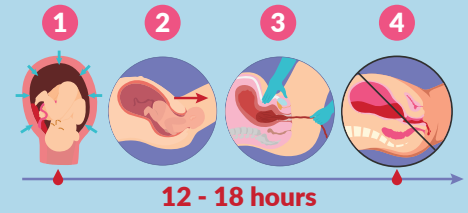
Labor is the **delivery of the baby** - from the mother & into the world.

- **Full Term:** 37 - 42 weeks
- **Preterm Labor:** before 37 weeks

4 Stages of Labor

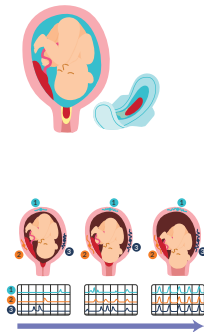
- **Stage 1:** Get to 10 cm
- **Stage 2:** Delivery of the baby
- **Stage 3:** Placenta delivery
- **Stage 4:** Don't let your client bleed to death!

The whole process typically takes around **12 - 18 hours**, but time can vary greatly.



4 Signs of TRUE Labor

1. **"Bloody show":** mucus & blood
2. **Water breaking:** Amniotic sac rupture
3. **True Labor Contractions**
 - **Increased Frequency** (regular & rhythmic)
 - **Increased Intensity & Duration**



4 Signs of TRUE Labor

4. Cervix

1. Dilatation: how wide is the cervix (goal = 10cm)

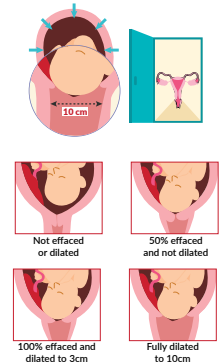
Memory Trick

- **D - Dilatation**
- **D - Door OPENING**
- Measured in cm 0 - 10 cm
- **10 cm is the GOAL!**

2. Effacement: cervix gets **thinner & shorter**

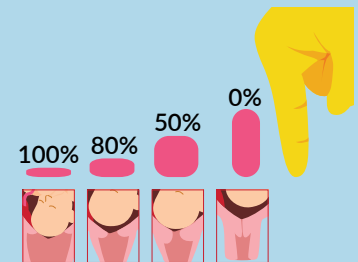
Memory Trick

- **E - Effacement**
- **E - Elastic** cervix gets thinner & shorter
- Measured in percentages from 0 to 100%



When you do a vaginal exam, you literally stick a sterile-gloved finger through the cervix. How thick is it?

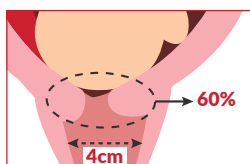
- As thick as your finger is 0%
- To your middle knuckle is 50%
- Half way between the tip and your first knuckle is 80%
- Paper thin: 100%



Kaplan Question

... **4 cm dilated and 60% effaced**... explain the meaning of this information?

- The opening of the cervix is **4 cm wide** and the **cervical canal is 60% shorter** than normal



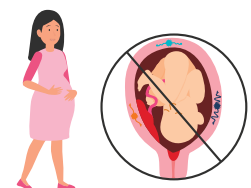
Braxton Hicks Contractions

- **False labor contractions**
- **Disappear with walking** or position change
- No dilatation of cervix

HESI question

false labor contractions?

- **Decrease in intensity** with ambulation



Stages Of Labor II

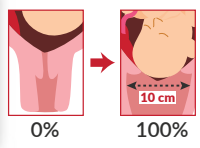
Maternity

	TRUE Labor	FALSE Labor
CONTRACTIONS	<ul style="list-style-type: none"> Regular (increasing frequency, duration, & intensity) 	<ul style="list-style-type: none"> Irregular
PAIN	<ul style="list-style-type: none"> Does NOT decrease with rest 	<ul style="list-style-type: none"> Alleviated with rest or changing position
CERVIX	<ul style="list-style-type: none"> *progressive change Dilation & effacement 	<ul style="list-style-type: none"> NO change

Top Missed NCLEX Questions

Q1: Which signs are most indicative of true labor? Select all that apply.

- ✓ Pain in lower back that moves to lower abdomen
- ✓ Progressive cervical effacement & dilation
- ✓ Regular & rhythmic contractions that increase in frequency
- ✓ Contractions become more intense with walking



Top Missed NCLEX Questions

Q2: Which questions would help determine if the client is in true labor? Select all that apply.

- ✓ "Do you feel like the contractions are getting stronger?"
- ✓ "Does anything you do make the pain better?"
- ✓ "Do the contractions feel the same when lying down?"
- ✓ "How frequent are the contractions?"
- ✓ "Where do you feel the contraction pain most?"



SIDE NOTE

- Back pain "back labor" **NCLEX TIP**
- Occiput Posterior position (OP)
- Memory Trick:**
- OP - OhPoop** not good!

SLOW progression, LONG labor BACK PAIN

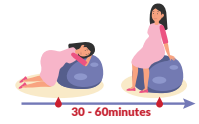


2 Interventions

1. Apply counterpressure to the sacrum during contractions **NCLEX TIP**
2. Reposition the mother on her hands & knees with birth ball & encourage to change position every 30 - 60 minutes

NO position changes & remaining in bed during EARLY labor increases risk for persistent fetal malposition & will SLOW labor progression! Left lateral position will NOT alleviate the client's back pain - this position is good for fetal oxygenation & blood flow.

The **MOST** tested



HESI Question

Which supportive care measure ... back labor pain?

- Lean over a birth ball with her knees on the floor



Top Missed NCLEX Questions

Q1: Client reports intense back pain ... fetal position is right occiput posterior. Which intervention would help alleviate the back pain during early labor?

- ✓ "Applying counterpressure to the sacrum during contractions"

Top Missed NCLEX Questions

Q2: Appropriate task to delegate to the unlicensed assistive personnel (UAP)?

- ✓ Reposition an unmedicated client who is in active labor onto a birthing ball



1st Stage of Labor

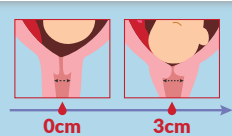
Early/ Latent Phase - the client is relaxed & contractions are mild.
Active Phase - things are getting serious, breathing techniques are in full swing & irritable!
Transition Phase - is when the cervix dilates to that perfect 10!
 Stage 1 begins with the onset of labor & ends with FULL cervical dilation at 10 cm - the perfect 10

3 phases



Phase 1: Early/Latent Phase

- Early Education & Encouragement
- 0 - 3 cm cervix dilation
- 0 - 30% Effaced (thinner cervix)
- Oxytocin stimulates uterine contractions! **Key Point**
- Irregular Contractions (Short & far apart)
 - Frequency 5 - 30 min
 - Duration 30 seconds
- Monitor fetal heart rate! **Priority**
- Assess for late decelerations (not enough oxygen getting to the baby)



Stages Of Labor III

Maternity

1st Stage of Labor

ATI Question

- latent phases of labor?
- Contractions every 5 to 10

HESI Question

- ... what do you closely monitor during the latent phase of the first stage of labor?
- Fetal heart rate

Kaplan Question

- ... purpose of the fetal monitor?
- "To determine if the fetus is receiving an adequate amount of oxygen."

Phase 2: Active Phase

GO to the HOSPITAL!

- Breathing techniques & pain management
- 4 - 7 cm cervix dilation (Goal = Perfect 10 cm)
- 100% effaced (fully thinned cervix)
- Contractions (stronger & longer)
- Pain Medications:
 - Epidural
 - IV narcotics - give slowly during the peak of the contractions **NCLEX TIP**

Remember narcotics make the vitals low & slow leading to newborn sedation & respiratory depression at birth! IV narcotics given at the peak of contractions reduce the amount of narcotic that crosses the placental barrier & will help to decrease the sedation of the fetus.

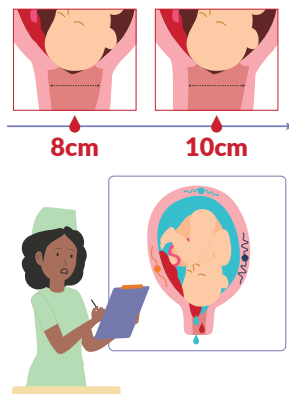
Top Missed NCLEX Question

- A client in latent labor receiving an oxytocin infusion for labor augmentation is requesting IV pain medication. Which nursing action is appropriate?
- ✓ Give the medication slowly during the peak of the next contraction



Phase 3: Transitional Phase

- Focus & staying in control
 - 8 - 10 cm cervix dilation (Goal = Perfect 10 cm)
 - 100% effaced (fully thinned cervix)
 - Contractions (strongest & closer)
- 5 Key Points:**
1. Anxiety & Vomiting
 2. Urge to have a bowel movement
 3. Strong urge to push with each contraction
 4. **DO NOT push until 10cm** (fully dilated)
Risk for cervical swelling & lacerations
 5. Amniotic sac ruptures "bloody show"
- Priority** Assess color of amniotic fluid (water break)
- Meconium-stained fluid (dark fluid)
Sign of fetal distress or hypoxia
Aspiration risk!



HESI Question

- ... expected during the transition phase of the first stage of labor?
- Vomits
 - Bloody mucus
 - Urge to have a bowel movement



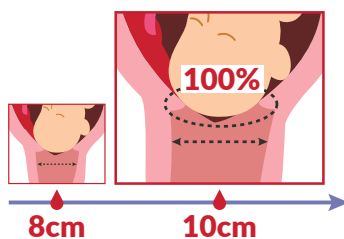
Interventions

- 4 NCLEX TIPS**
1. Emotional support & encouragement
 2. Breathing techniques
 3. 10 cm dilated - document fetal HR every 15 minutes **Saunders**
 4. **AVOID pushing until 10cm** (fully dilated)
Risk for cervical swelling & lacerations



Top Missed NCLEX Question

- A laboring client reports anxiety, vomiting, & the need to have a bowel movement. What is the expected cervical examination finding?
- A. 7 cm dilated, 100% effaced
 - ✓ B. 8 cm dilated, 100% effaced
 - C. 6 cm dilated, 70% effaced
 - D. Go to the break room



ATI Questions

- Q1:** ... 30 weeks of gestation. Which medication... to accelerate fetal lung maturity?
- Betamethasone
- Q2:** ... terbutaline. Which of the following client statements indicates an understanding of the teaching?
- This medication is used to stop my contractions



Stages Of Labor IV

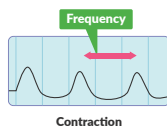
Maternity

2nd Stage of Labor

2nd Stage of Labor (Delivery of baby) is also called the descent phase or the pushing stage, because the baby is pushed out of the birth canal.

4 Key Points

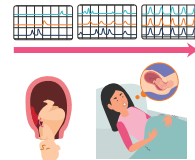
1. Cervix **MUST** be 100% effaced & **10 cm dilated**
Memory Trick Think perfect 10!
2. **Signs:**
 - Increase in contractions & urge to push/ poop
 - **Ferguson reflex:** Spontaneous urge to push during labor. It occurs when the presenting part of the **fetus reaches the pelvic floor.**
3. Interventions
 - Positioning of the mother is **Priority:**
 - High Fowlers, Lithotomy, Side lying
 - Push properly
 1. **AVOID** holding breath or tightening the abdomen
 2. Push when **feeling the urge**
 3. Breath IN deep
 4. **Breathe OUT slowly** through the **mouth** & **keep mouth open while pushing down** **HESI**
4. Assessments
 - **Fetal heart rate** before, during, & after the contraction
 - **Frequency** of contractions
 - **Duration** of contractions
 - **Uterine tone** between contractions



HESI Question

... second stage of labor?

- significant **increase in contractions**
- **Ferguson reflex** activated
- The client experiences a **strong urge to bear down**



Top Missed NCLEX Question

A client presents to the emergency department **after her water broke**. She appears anxious and in pain, **bearing down with each contraction**. What **assessment questions** should the nurse ask immediately to prepare for birth & **potential newborn resuscitation**? **Select all that apply.**

- When your water broke, what was the **color of the fluid**?
- What is your **expected due date (EDD)**?
- How many babies** are you expecting?
- Do you have any **active sexually transmitted disease**?
- Recently have you taken any **medications, opioids, or illicit drugs**?

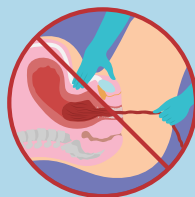
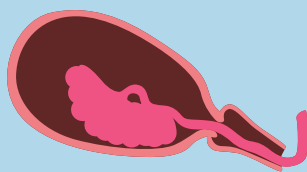


3rd Stage of Labor

In the **3rd Stage of Labor (Placenta Delivery)** - the Uterus contracts & the placenta spontaneously detaches from uterine wall. Placenta **MUST BE** delivered carefully.

NEVER pull on the cord to deliver the placenta!

There is a **HIGH risk** for tearing the placenta & leaving behind placenta parts & possible uterine inversion - this is when the uterus flips inside out, both of which put the client at risk for hemorrhage and infection.



High Risk for

- **Infection** - if placenta parts are not fully removed
 - **Uterine inversion** (pulling on the cord)
 - **Severe hemorrhaging** (bleeding)
 - Decreasing blood pressure
 - Increasing heart rate
 - Pharmacology **AFTER placental delivery**
 - **P** - Placenta delivery
 - **P** - Pitocin (oxytocin): to prevent hemorrhage
- Key point** Oxytocin stimulates uterine contractions

ATI Question

... third stage of labor?

- The baby has been delivered & the mother is now **delivering the placenta**

4th Stage of Labor

4th Stage of Labor (Recovery) -

The Recovery Stage lasts around 2 - 4 hours after birth. At this point we encourage skin to skin & breastfeeding for multiple reasons.

Breastfeeding stimulates maternal oxytocin release (to help the uterus contract). It provides nourishment and supports blood sugar of the newborn.

Maternal Assessment

- **Infection:** temperature over 100.4
- **Hemorrhage**

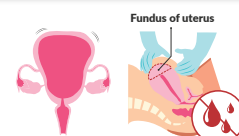
Priority Assessments:

- Peri pads
 - Fully saturated in **less than 1 hour!**
- **Decreasing** blood pressure
- **Increasing** heart rate



Interventions

- **Fundus check First**
 - **Soft & boggy** → massage until firm (contract & stop bleeding)
- Void or use catheter (in & out)
- Pitocin (oxytocin): IV or IM control bleeding after childbirth
- Breastfeeding: stimulate release of natural oxytocin
- **Fundus Assessment**
 - Assess **3 times, every 5 minutes**
 - Then, every 15 minutes for an hour



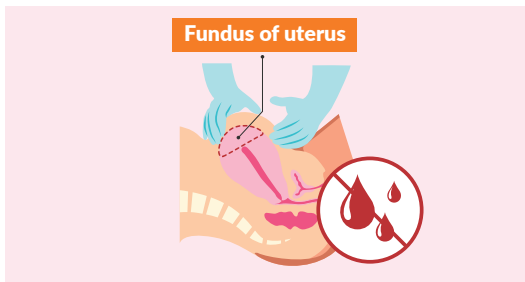
Stages Of Labor V

Maternity

4th Stage of Labor

NORMAL Fundus

- Firm
- Midline
- Level with the umbilicus (belly button)



NOT Normal

- **Displaced fundus** above umbilicus or to one side = **bladder distension**
 - Intervention**
 - **VOID** every 2-3 hours (bed pan preferred)
 - In & out catheter **NCLEX TIP**
- **Soft or boggy (uterine atony)** = increase risk for **hemorrhaging**
 - Intervention**
 - Oxytocin infusion
 - **Fundal massage** **NCLEX TIP**

Top Missed NCLEX Questions

Q1: A client who gave birth vaginally with epidural anesthesia reports **no urge to urinate 3 hours after birth**. The client's fundus is **above the umbilicus, but 3 cm to the right**. What should the nurse do next?

- Perform **in and out catheterization**



Top Missed NCLEX Questions

Q2: A client who had a vaginal birth 1 hour ago has a **boggy fundus that is deviated to the left and above the umbilicus**. Which intervention should the nurse perform first?

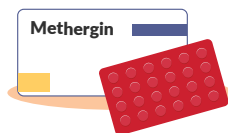
- Assist client to use the **bedpan to void**



ATI Question

... the client delivered a baby **8 hours ago**... the fundus is **boggy and soft**. Which interventions are **most appropriate**? **Select all that apply.**

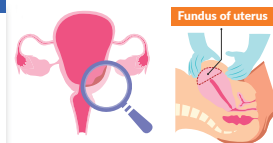
- **Firmly massage** the fundus
- Encourage the client to **void**
- Administer **Methergine** per orders



Kaplan Questions

Q1: ... **six hours after a vaginal delivery** ... the nurse notes the **perineal pad is soaked** and there is **blood underneath the client's buttocks**. Which action does the nurse take first?

- Assess the **fundus**



Kaplan Questions

Q2: ... **after delivery** the nurse administers **oxytocin**... this medication is used for which purpose?

- Simulate **firm contractions of the uterus**



HESI Questions

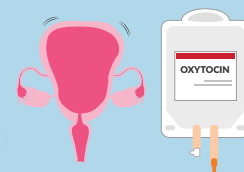
Q1: ... **profuse bleeding in a postpartum client**... **priority intervention**?

- Palpate the uterus and **massage it if it is boggy**

HESI Questions

Q2: Which drug is used for treating a client with **severe postpartum bleeding**?

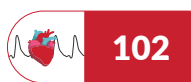
- Oxytocin



Saunders's Questions

Q1: **Fourth stage of labor** ... Early sign of **excessive blood loss**?

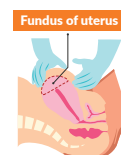
- An **increased pulse rate** of 88 to 102 bpm



Saunders's Questions

Q2: **Fourth stage of labor**... client's **perineal pad saturated with blood & blood soaked into the bed linen**. Which is the nurse's **initial action**?

- Gently massage the **uterine fundus**



Stages Of Labor VI

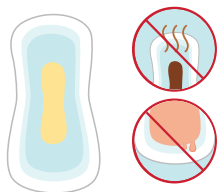
Maternity

Lochia Assessment

Lochia is the discharge after birth from the sloughing off of the inner lining of the uterus.

Lochia should become LIGHTER in COLOR and AMOUNT with each passing postpartum day, It's going to start out **heavy and red (rubra)**, then go **pink/brown (serosa)**, & finally return to **white/clear (alba)**.

	Color	It lasts...
RUBRA	Dark red	3 - 4 days
SEROSA	Pinkish brown	4 - 10 days
ALBA	Whitish yellow	10 - 28 days



Normal 3 Stages of Lochia	NOT Normal Notify the provider
<ul style="list-style-type: none"> Lochia Rubra: Bright red flow (3 - 4 days) * Small clots are expected 	<ul style="list-style-type: none"> Large clots! Malodorous "Foul odor" Excessive bleeding: 1 pad in 15 minutes Check under the client for pooled lochia
<ul style="list-style-type: none"> Lochia Serosa: Pink-brown (4-10 days) 	
<ul style="list-style-type: none"> Lochia Alba: White-yellow (10-28 days) 	

Kaplan Question

... client gave birth three hours ago... a **sudden gush of blood from the vagina while ambulating**. Which is the most likely cause of the bleeding?

- Lochia has pooled in the client's vagina



ATI Questions

Q1: The nurse is assessing a ... client who delivered a baby **3 days ago**. When **assessing for lochia**, the nurse notes **pink discharge with a serosanguinous consistency**. This is best described as:

- Lochia serosa

Q2: a client ... **6 weeks** postpartum. Which of the following findings is **normal** for this client?

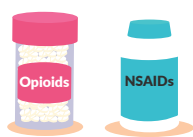
- Creamy colored discharge with a fleshy odor

Lochia serosa



Peri-care

- Cleaning** ATI
 - Squeeze bottle with warm water
 - Wipe front to back
 - Blot perineum dry
- Pain**
 - Sitz baths
 - Ice packs
 - Pharm: Opioids & NSAIDS
 - Topical witch hazel
 - Laxatives & stool softeners (prevent constipation)



ATI Question

... a client who has an **episiotomy** ... proper **perineal care**?

- Use a **squeeze bottle with warm water** to keep the site clean



HESI Question

Which **medication** is appropriate for a postpartum client with **perineal lacerations** ... now experiencing **constipation**?

- Laxatives



5 P's of Labor Maternity

The 5 P's of labor occur in the first AND second stages of labor (when the baby is being delivered).

P PASSENGER (baby)

- Baby delivery: fetal head & body size

Fetal Attitude (Flexed = good & Extended = bad)

Best	Bad
Fully flexed 1. Chin to chest 2. Rounded back 3. Flexed arms & legs	Flaccid is indicative of a CNS problem

Fetal Lie: position of baby's back in relation to mom's back

BEST for Vaginal Delivery	High Risk for Breech - C-section Delivery
Longitudinal lie: both baby & mother's body are parallel	- Transverse: "sideways" baby - Oblique: baby is at an angle

P PASSENGER (baby)

- Baby delivery: fetal head & body size
- Presentation** "Presenting Part"
 - Cephalic Presentation: Head first **NCLEX TIP**
 - Diamond-shaped & soft in the middle

P PASSENGER (baby)

- Baby delivery: fetal head & body size
- Fetal Station** degree of fetal descent into the pelvis

P PASSENGER (baby)

- Baby delivery: fetal head & body size
- Position** of the baby

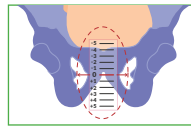
BEST Position	<ul style="list-style-type: none"> ROA: Right Occiput Anterior LOA: Left Occiput Anterior Memory Trick - OA think AOkey :)
Bad Position	"sunny side up" <ul style="list-style-type: none"> OP: Occiput Posterior (left or right) OT: Occiput Transverse (left or right) Memory Trick - OP - OhPoop not good! - OT - Oh Trouble!

Complication:
BACK labor → possible C-section

P PASSENGER (baby)

- Baby delivery: fetal head & body size
- Position** of the baby

Breech Presentation	- Complete Breech - Frank Breech - Footling Breech
Interventions	- External cephalic version (ECV) - C-section



Fetal Station

P PASSENGER (baby)

- Placenta: placenta previa (blocks the cervix)

Station -1 to -5	Pelvic Inlet ■ Baby's head is ABOVE mom's ischial spine (baby is deeper inside the pelvis)
Station 0	Ischial Spine & Engagement ■ Baby's head is level with mom's ischial spine *Head is engaged & ready for labor!
Station +1 to +5	Crowning & emerging from vagina ■ Baby's head is coming out! "Crowning" Start pushing!

P PASSAGEWAY

- Birth canal: maternal pelvis & soft tissues



HESI Question

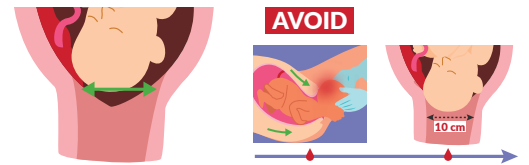
Which are factors that accelerate dilation of the cervix? Select all that apply.

- Strong uterine contractions
- Pressure by amniotic fluid
- Force by fetal presenting part

P POWER

- C - Contractions** to OPEN the cervix
- D - Dilation:** 10 cm (fully open)
AVOID pushing until 10cm dilated
- E - Effacement:** 100% thin

3 Contraction Assessments:	Indications of Progressing Labor
1. Frequency (how often - minutes)	2 - 3 minutes apart
2. Duration (how long - seconds)	Lasting 60 seconds 60 seconds between contractions
3. Intensity (how strong)	Contractions increase closer to delivery



P POSITION

Mother: squat position makes labor easy - Promotes fetal descent



P PSYCHOLOGICAL RESPONSE OF MOTHER

- Cultural considerations
- Coping mechanisms

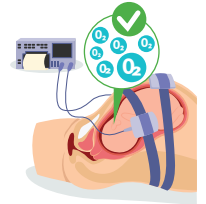


Fetal Heart Monitoring

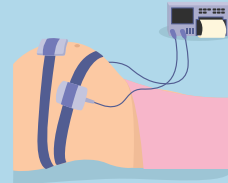
Fetal Heart Monitoring I

Maternity

Fetal heart rate monitoring is a way to identify fetal **well being & oxygenation** during labor. During labor it is vital to monitor both uterine contractions & the baby's heart rate. Abnormal reading may indicate the baby is not getting enough oxygen or other problems.



There are **2 types of devices** used for **External Fetal Monitor** - The **sono or ultrasound** (used for the baby's HR) & the **toco or tocometer** (for mom's uterine activity).



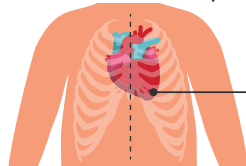
External Fetal Monitor

Find **Point of Maximal Impulse (PMI)**
this is point where the baby's heart rate can be heard the loudest



THE POINT OF MAXIMAL IMPULSE!!!!

Point of Maximal Impulse (PMI)



That is the best place to put the fetal heart rate sensor. The **PMI** is found between the shoulders.

If the baby is cephalic or head down, it will be placed on the mother's lower abdomen & if the baby is breech, the monitor will find the PMI in the upper abdomen.

Finally a 2nd sensor is the contraction monitor. The sensor is placed high on the mothers abdomen to monitor contractions.

A more accurate but more invasive method of monitoring the baby is an **Internal fetal monitor (Fetal Scalp Electrode - FSE)**. These monitors are typically only used for high risk pregnancies.

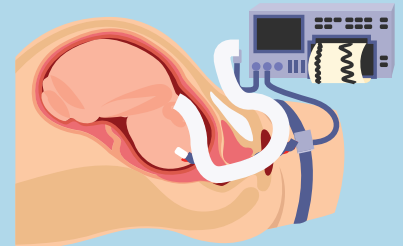
This method uses a thin wire electrode that is placed directly on the baby's scalp through the cervix.

This method gives better readings as it's not affected by movement. **It can ONLY be used after the amniotic sac has ruptured & the cervix is open to at least 2 cm in dilation.**

The **FSE** comes with a **HIGH risk of infection** since we are placing a foreign object into the mother's vagina & onto the baby's head.

Internal fetal monitor

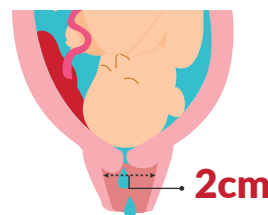
Fetal Scalp Electrode - FSE



ATI question

Which of the following **must be present** before the nurse initiates **internal fetal monitoring**?

- **Cervical dilation** of at least **2 cm**



Notes

Fetal Heart Monitoring II

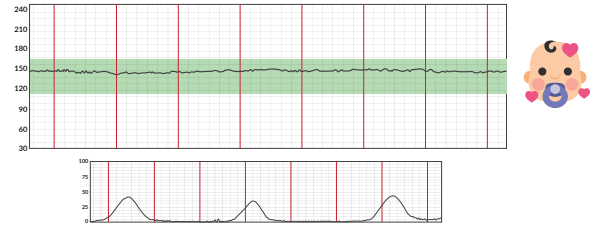
Maternity

Top 8 Strips to Know

As you can see, there are 2 strips here showing squiggly lines - similar to an EKG. **Fetal heart rate is on top** - which we always assess **FIRST!**

Mothers contractions are on bottom. The double red lines represent 1 minute in time.

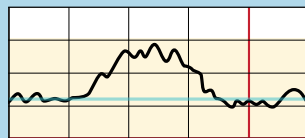
Always assess **FIRST!**



Key Terms for FHR

- **Baseline:** Normal FHR **110-160 bpm**
- **Variability:** how **jiggly or wiggly** is the line?
More wiggly = More happy baby

Variability



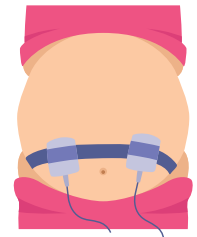
Variability: how jiggly or wiggly is the line? As labor progresses, we expect the fetal heart rate to have wiggly lines - this is called variability.

It means that the baby's neuro system is intact & the baby is happy!
In general we say **the more wiggly=more happy baby.**

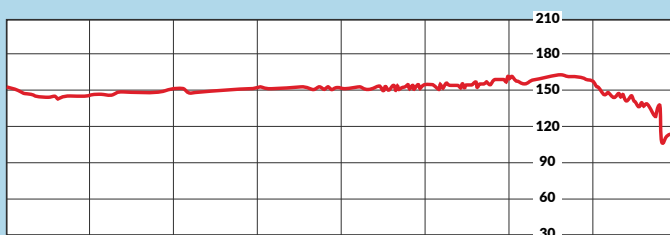
We have different types of variability, kind of like a traffic light. The **RED** light where we STOP what we're doing & run to get the baby out is **Absent variability: NOT jiggly = NOT good!**

Types of Variability

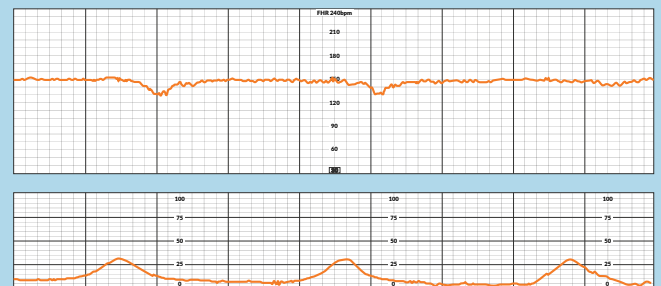
- **Absent** variability: **NOT** jiggly = **NOT** good!
- **Minimal** variability: Flatter line that looks "sleepy & sad"
- **Moderate** variability: Normal & desired finding!
- **Marked** variability: Jagged jiggles = stressed baby!



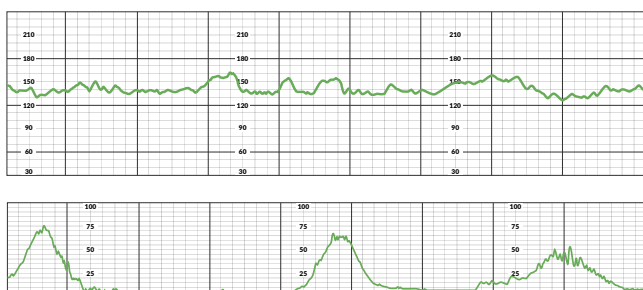
Absent variability: **NOT** jiggly = **NOT** good!



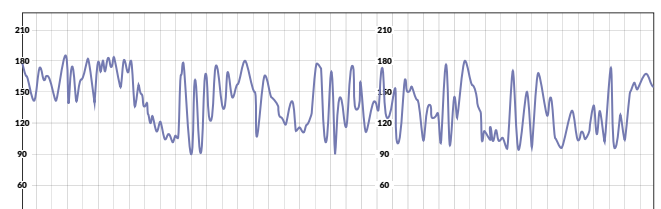
Minimal variability: Flatter line that looks "sleepy & sad"



Moderate variability: Normal & desired finding!



Marked variability: Jagged jiggles = stressed baby!



Fetal Heart Monitoring III

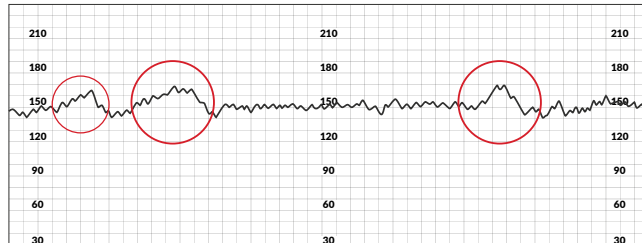
Maternity

Accelerations

These are temporary increases in FHR. It indicates great oxygenation for the baby!
We call these **“happy little mountains”**. They are little bonus points that show the baby is doing well!

Accelerations

- Temporary increases in FHR.
- Indicates great oxygenation for the baby!
- “Happy little mountains”



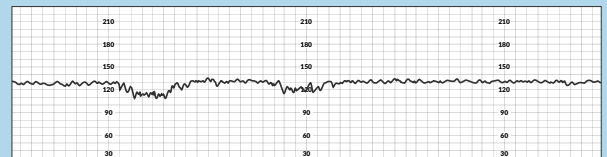
Decelerations

These are dips from baseline & there are 3 different types. Always look at the **shape & timing** with each contraction.

Decelerations: Dips from baseline

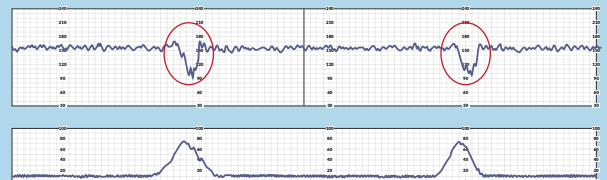
- Early Decels: are GOOD!**
Shallow, bowl shaped dips that mirror mother's contractions
 - Indicates head compression
 - Memory Trick**
Good to be **Early** with **Early** Decels

GOOD!



- Variable Decels: is Very concerning** with Very deep “sharp V dips”
 - Indicates cord compression

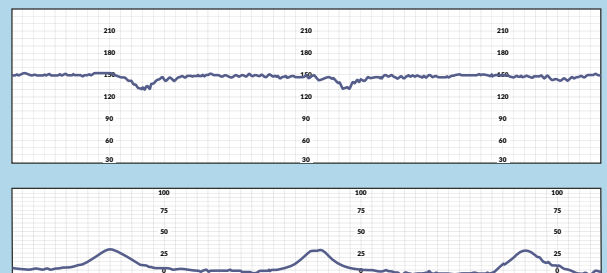
VERY CONCERNING!



These are the **WORST!**

- Late Decels: BAD!!!**
 - Indicates decreased oxygen (hypoxia)
 - Memory Trick: Bad** to be **late** to the party (don't be late with the dip!)

BAD!



FETAL ACCELERATIONS & DECLERATIONS

V Variable Decelerations
W or V shaped dips

V

C Cord Compression
CHANGE mom's position

C

E Early Decelerations
Mirror the contractions

E

H Head Compression
HAPPY baby baby is ready for delivery

H

A Accelerations
Temporary increase in HR

A

O Okay
Oxygen for baby

O

L Late decelerations
Lower HR after contractions

L

P Placental Insufficiency
PROBLEM

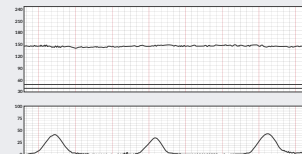
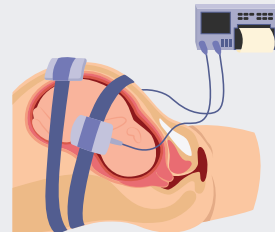
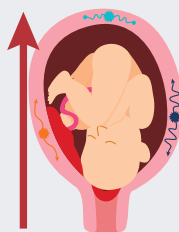
P

Fetal Heart Monitoring IV

Maternity

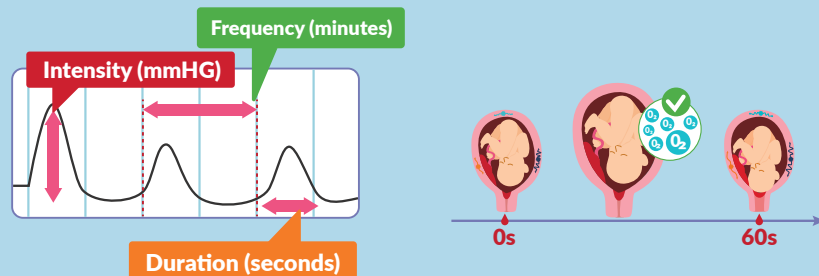
HESI questions

- Q1: What happens when **oxytocin levels are elevated...**?
- Uterine **contractions will increase**
- Q2: The nurse assesses **fetal well-being during labor** by monitoring which factor?
- Response of the **fetal heart rate to uterine contractions**



Key Terms for Uterine Contractions

During contractions, babies will hold their breath & fetal oxygenation is impaired - so knowing this is **VITAL** to **keep the baby well oxygenated** in between. There are 4 components to know.

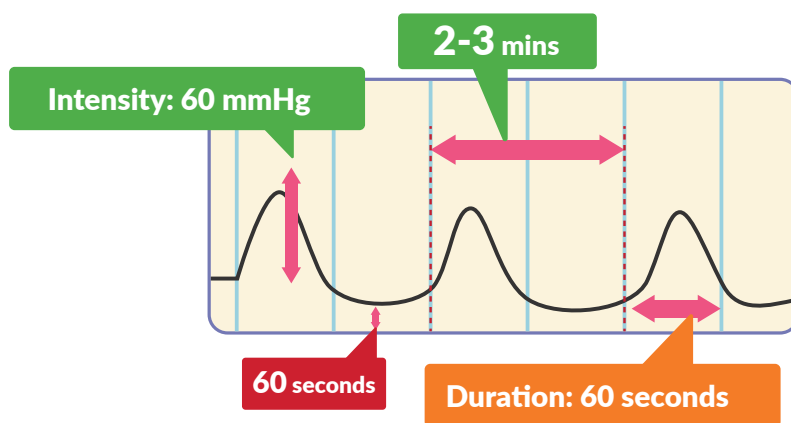


Key Terms for Uterine Contractions

1. **Frequency:** measures how **FAR APART** the contractions are
2. **Duration:** measures how **LONG** the contractions last
3. **Intensity:** rates how **STRONG** the contractions are
4. **Rest (Tone & Time):** the uterus should be **SOFT** to palpation between contractions for at least **60 seconds**.

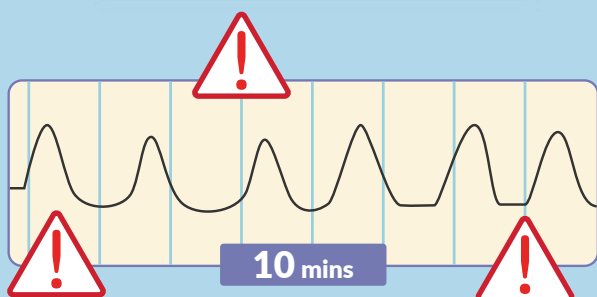
Normal Contractions (Rule of 60)

- **Frequency:** contractions that are 2 - 3 mins apart in active labor.
- **Duration:** 60 seconds
- **Intensity:** 60 mmHg
- **Rest:** 60 seconds or rest in between contractions

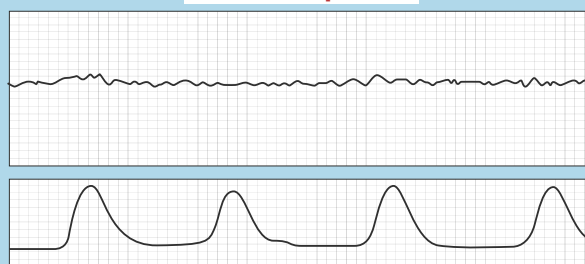


Tachysystole Complication!

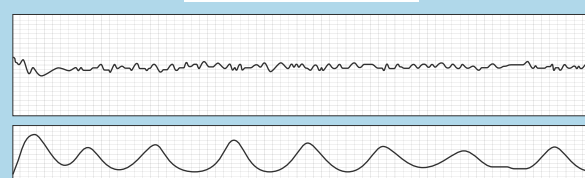
- Over 5 contractions in 10 minutes
- **Too many contractions** → Fetal Distress! Including Hypoxia & reduced placental blood flow



Normal UC pattern



Tachysystole pattern



Fetal Heart Monitoring V

Maternity

Normal Expected Findings	NOT Normal Fetal Distress
1. Normal FHR 110 - 160 bpm 2. Accelerations 3. Early decelerations Memory Trick: • Good to be Early With early decels	4. Tachy/bradycardia 5. Late decelerations 6. Variable decelerations 7. Sinusoidal Tracing Memory Trick: • BAD to be LATE Late or variable

8 Strips on the Nclex

Normal FHR Strips

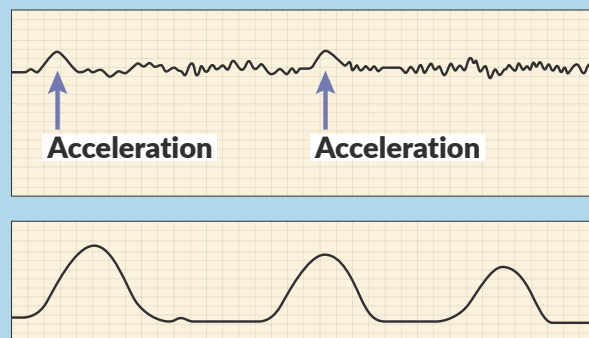
- Normal FHR: 110 - 160 bpm**
Baseline is between contractions
 - Accelerations:**
Temporary increase in FHR (this is ok!)
 - Early decelerations**
Mirror contractions with decreased FHR during contractions = ok!
 - Cause:** Head compression during the contractions
 - Intervention:** Prepare for delivery of the baby
- Memory Trick:**
Good to be Early
With early decels

Normal 110 - 160bpm

GOOD!

HESI question

- Which fetal heart rate tracing characteristics are considered reassuring or normal?
- **Early decelerations**, either present or absent

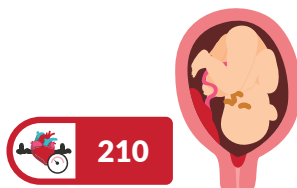


Not Reassuring (Risky!)

- 4. Fetal Tachycardia**
increase in FHR over 160/min for over 10 minutes
Early sign of fetal distress! HESI
- Causes**
- Trauma to mother (broken bone)
 - Maternal infection or fever
 - Fetal anemia
 - Dehydration
 - Stimulants (Cocaine)
- Interventions**
- Oxygen
 - IV fluids
 - Antipyretic

ATI Question

- ... client with a fractured wrist who is 36 weeks pregnant. Which of the following assessment items should the nurse prioritize?
- The fetal heart rate is 210/min



HESI Questions

- Q1:** While monitoring the FHR ... the nurse notes tachycardia. Which is a probable cause for this condition?
- Early signs of fetal distress

HESI Questions

- Q2:** ... a FHR baseline of 175 bpm. The nurse knows that this can be caused by which factor?
- Fetal tachycardia

Not Reassuring (Risky!)

- 5. Fetal bradycardia**
decrease in FHR over 110/min for over 10 minutes
- Causes**
- **Uteroplacental insufficiency**
 - Umbilical cord prolapse
 - Maternal hypotension
 - Analgesic medication
- Interventions**
- Memory Trick:**
- R** Reposition mom: side lying position
 - O** Oxygen via Facemask
 - A** Alert the HCP (provider)
 - D** Discontinue oxytocin
 - I** Increase IV fluids

Saunders's Question

- ... slowing of the fetal heart rate and a loss of variability... nursing action?
- Turn the client onto her side & give oxygen by facemask at 8-10 L/min

Kaplan Question

- ... Abrupt and rapid fluctuations in the fetal heart rate (FHR) from baseline to 90 beats per minute and back to baseline ... The fluctuations in fetal heart rate occur with no relationship to the contraction pattern. Which response by the nurse is best?
- "This is a potential problem that requires a position change."

HESI Questions

- Q1:** ... maternal cardiac output can be increased by which factor?
- Change in position

HESI Questions

- Q2:** ... sudden drop in fetal heart rate (FHR) from its baseline of 125 down to 80. The nurse repositions the client, provides oxygen, increases intravenous (IV) ... Five minutes have passed and the FHR remains in the 80s. Which additional measure would the nurse take?
- Immediately notify the primary health care provider

Fetal Heart Monitoring VI

Maternity

8 Strips on the Nclex

CRITICAL Findings!

6 . Variable decelerations

Abrupt decreases in FHR

Less than 30 seconds from onset to baseline
& **15 bpm below baseline** for 15 sec - 2 min

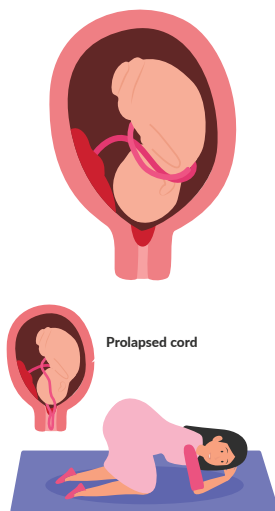
Causes

- Umbilical **Cord Compression!** **NCLEX TIP**
- **Critical: Oxygen tube is compressed!**
- Decreased amniotic

Interventions

Memory Trick

- R** Reposition mom: side lying position
- O** Oxygen via facemask
- A** Alert the HCP (provider)
- D** Discontinue oxytocin
- I** Increase IV fluids



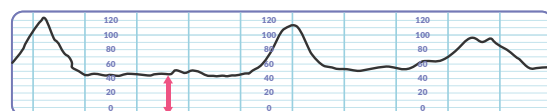
Amnioinfusion

The installation of sterile saline into the amniotic cavity to refill the lost fluid.

Report Immediately

Indications of Overfilling **NCLEX TIPS**

- Uterine resting tone that **increases to 45 mm Hg**
- **Dry** perineal pads



Resting tone:
45mmHg



CRITICAL Findings! TOP TESTED

7 . Late decelerations

Decreased FHR **after contractions** with **prolonged time before returning to baseline**

Indicates that **oxygenation** is compromised! **NCLEX TIP**

Causes

- **Placental insufficiency** (Uteroplacental insufficiency) **HESI**
- Uterine tachysystole **NCLEX TIP**

Side effects of oxytocin causing **severe contractions** → Reduced placental blood flow & impaired fetal oxygenation

STOP Oxytocin

Over 5 contractions in 10 minutes
Late decels

- Hypotension

Memory Trick

BAD to be LATE With late, absent or variable decels

Interventions

- **Memory Trick**

- R** Reposition mom: side lying position
- O** Oxygen via facemask
- A** Alert the HCP (provider)
- D** Discontinue oxytocin
- I** IV fluids (0.9% NS bolus or LR)

- **Prep for C-Section** if late decels persist

Top Missed NCLEX Question

A new nurse is evaluating the fetal monitoring strip of a client in labor who is receiving an oxytocin infusion. Which of the following actions should the nurse take next?

Click the exhibit Select all that apply.

- Slow the oxytocin infusion
- Reposition the client to left/right side**
- Amnioinfusion
- Oxygen by face mask**
- Initiate an IV bolus of 0.9% saline**
- Notify the provider & prepare terbutaline**

HESI Question

Oxytocin induction ... the last five contractions, the fetal heart rate has fallen below the baseline ... and returns to baseline in 20 to 30 seconds after the end of the contraction. What actions must the nurse take?

Select all that apply.

- **Contact the health care provider**
- **Stop the infusion of oxytocin**
- **Increase the infusion of the mainline IV fluid**
- Apply oxygen by facemask



Kaplan Question

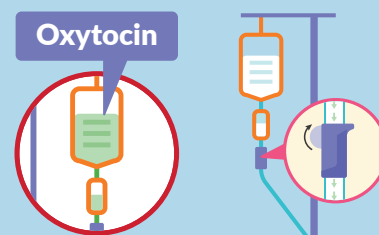
... fetus is experiencing distress if which heart rate pattern is observed?

- Late decelerations

ATI Question

Which of the following interventions ... after examining this fetal monitoring strip?

- **Discontinue oxytocin**
- **Run the IV fluids wide open**



CRITICAL Findings!

8 . Sinusoidal FHR

Repetitive, wave-like fluctuations (hills) with **NO variability & NO response to contractions**

Causes

- Mother **abdominal trauma** (fall, motor accident)
→ leading to fetal blood loss or anemia

Interventions

- Emergency Cesarean Section "Crash C-section"

Critical finding!

Intervention required

Sinusoidal FHR

Top Missed NCLEX Question

The nurse is observing the fetal heart rate (FHR) tracings of 4 clients. Which pattern would be most concerning?

- 1.
- 2.
- 3.
- 4.

- 1. **Early decelerations**
- 2. **Variable Decelerations**
- 3. **Sinusoidal FHR**
- 4. **Fetal tachycardia**

Epidural & Pain control

Epidural & Pain Control I

Maternity

Non Pharmacological

This means **no medications** are used for pain control during labor.

- Breathing techniques
- Imagery
- Massage: effleurage
- Back labor pain: **Sacral counter pressure**



HESI Question

Which is an effective nursing intervention for a client experiencing **pain related to back labor**?

- **Counter pressure** against the sacrum

NCLEX

Monitor for **nonverbal signs** of ineffective coping with labor

- Panic
- Anxiety
- Squirming movements



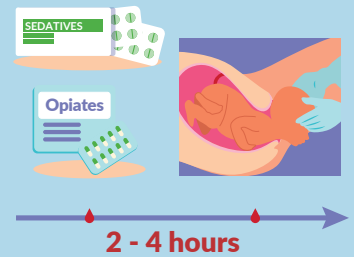
Pain medication



Medication

Pain control during labor with **pain medications**, like **sedatives & opioids**, are best given during the early stages of labor, as they can cause **serious side effects** like respiratory depression when given closer to birth!

These medications can be **VERY DEADLY** - we like babies with strong cries, **NOT FLOPPY BABIES**. It's best to give these **2-4 hours BEFORE birth** so that the drug has time to wear off **BEFORE** birth.

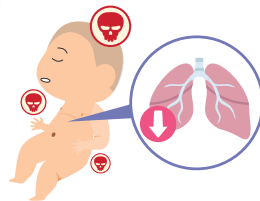


Sedatives

Barbiturates

- Phenobarbital (brand: *Tedral*)

Caution: Respiratory depression



Opioids

1. Meperidine hydrochloride (brand: *Demerol*)
2. **Butorphanol** tartrate (brand: *Stadol*)
3. **Nalbuphine** hydrochloride (brand: *Nubain*)

Caution! 3 Key points for NCLEX

1. **ONLY** give opioids:
 - During contractions
 - After the **cervix** is **4 cm dilated** or it will **slow labor**
2. Assess **fetal heart rate (FHR)** 10 minutes prior
3. Have **Naloxone** (opioid antidote) ready



Memory trick

Opioids make labor **slOw**



HESI Questions

Q1: ... **IV pain medication** for a client in labor? Select all that apply

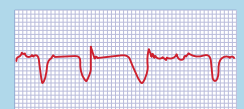
- Administer the medication **only when** the client is having a contraction
- Assess the **fetal heart rate (FHR)** for **10 minutes prior** to administering the pain medication
- **Naloxone** will reverse the pain relief provided by the opioid



HESI Questions

Q2: Which **action** would the nurse take **before administering meperidine hydrochloride** to a client to relieve labor pain?

- Monitor **maternal vital signs and fetal heart rate**



Fetal Heart Rate

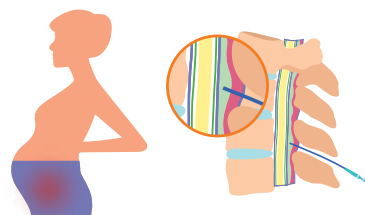
Epidural & Pain Control II

Maternity

Epidural Anesthesia

Epidural anesthesia also called an **epidural block**, is an injection into the lower back that temporarily blocks pain from the waist down. For the procedure, clients will lie on their side with knees tucked in or sit up right & lean forward. To help visualize the position, nurses tell clients to **curl over like a cooked shrimp**. When in the correct position, **the provider will insert a needle into the client's epidural space between the dura mater & the vertebral wall just outside of the spinal cord.**

A catheter is threaded through and secured as the epidural needle is removed. The catheter is used by the provider to administer pain relief when needed.



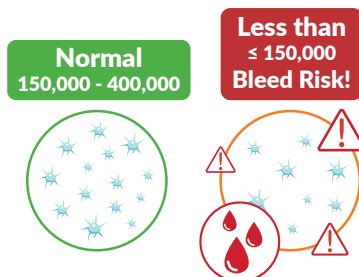
Epidural Anesthesia

Epidural Block

- Blocks sensation from **waist down: umbilicus** (belly button) to legs
- After the **cervix is 4 cm dilated**

Caution

- Maternal hypotension (low BP)
- Fetal bradycardia (low HR)
- Low **platelet** count in the mother
Normal 150k - 400k
Less than 150k = risky! BLEED RISK



NCLEX Questions

Q1: Which laboratory value is the **priority to report to the provider** prior to **epidural anesthesia**?

- Platelet count of 95,000

NCLEX Questions

Q2: An **epidural was administered 20 minutes ago** and now the client reports feeling dizzy and nauseated. Which action should be **performed first**?

- Obtain **blood pressure**

Kaplan Question

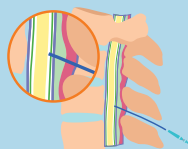
A client is **6 cm dilated** and ready for **epidural anesthesia**. Which **position** will the nurse assist the client?

- On the **left side**, shoulders parallel, legs flexed, and back arched

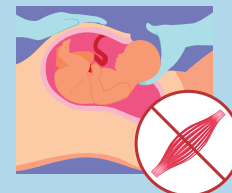
Spinal Anesthesia

Spinal Block

- C-section
- 100% loss of motor movement & sensation



Spinal Anesthesia



Interventions: Epidural & Spinal block

IV fluids to help counteract side effects of maternal hypotension

Exam Question:

Nursing action for hypotension

- Turn the mother to the **left lateral position** & **increase IV fluid rate**

HESI Question

... **spinal block in place for pain...** the client's **blood pressure is 20% lower** than the baseline level. Which **nursing action** is appropriate?

- Turn the client to the **left lateral position** or **place a pillow under her hip**



ATI Questions

Q1: Which of the following can result in **fetal bradycardia**?

- The mother has received **spinal anesthesia**

Q2: After the epidural, the nurse notes **decreased beat to beat variability** and **late decelerations on the fetal heart monitor**. Which of the interventions should the nurse implement? Select all that apply.

- Turn client on the **left side**
- Increase **IV fluid rate**

Pudendal Nerve Block

- Perineum
- Vulva
- Rectum

Good:

- Given quickly when birth is imminent

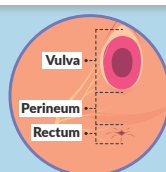
Bad:

- DOES NOT** relieve contraction pain

ATI Question

Which of the following is correct regarding a **pudendal block**?

- A pudendal block anesthetizes the **perineum, vulva, and rectum**



Top Missed NCLEX Question

A laboring client in the **later part of 2nd stage of labor** is urgently requesting **pain relief for the perineal area...** cervix is **10 cm dilated** and **100% effaced**, with the fetal head at **-1 station**. What is the **most appropriate** pain management technique for this client?

- Breathing techniques
- Epidural anesthesia
- Spinal anesthesia
- Pudendal nerve block**

Preterm Labor

Preterm Labor I

Maternity

Preterm Labor refers to labor that begins too early **between 20 - 37 weeks of pregnancy** characterized by CERVICAL change (that can be dilation or effacement), where as labor after 37 weeks is considered full term and labor before 20 weeks is categorized as spontaneous abortion - as the newborn will not survive.

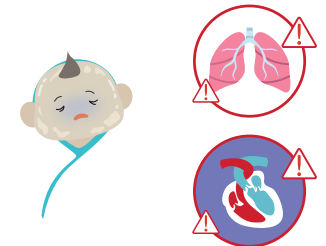
Preterm Labor

20 - 37 weeks of pregnancy

Preterm labor is the number 1 cause of neonatal mortality, as babies born prematurely do not have fully developed organs.

For example, the lungs do not have maturity to breathe on their own & the chambers in the heart have not fully closed yet, just to name a few. Sort of like a cake coming out of the oven too soon - it is not fully cooked.

In the same way, the baby is like a bun in the oven that comes out too soon & does not have enough time to fully cook or develop. Naturally, we will see less complications the longer the baby stays in the womb.



Causes & Risk Factors

D - Distended Uterus

- Fetal macrosomia
- Polyhydramnios (too much amniotic fluid)
- Multiple gestation (twins, triplets etc.)

Diseases

- **Diabetes Mellitus**
- Eclampsia (High BP)
- Heart disease
- Anemia (Hgb less than 10)

I - Infection

- UTI - Urinary tract infections
- STI - Sexually transmitted infections
- **Periodontal disease (gum infection)** **NCLEX TIP**

P - Placental Abruption

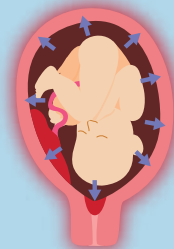
Placenta separates from the wall of the uterus during pregnancy

S - Stress: Emotional or Physical

- **Short cervical length** or too thin (cervical insufficiency)
- **Smoking & Stimulants (cocaine)**

Other risk factors:

- **History of preterm births**
- **Lifting heavy object (if at risk)** **ATI**

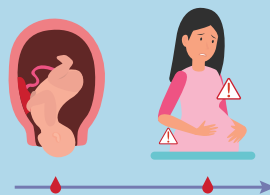


NCLEX TIP



Periodontal disease

No 1 risk



ATI Questions

Q1: A 42- year-old pregnant client ... at **risk of preterm labor**. Which information from the nurse is correct regarding **prevention of preterm labor**?

- **Do not lift heavy bags** of groceries or **young children** which requires use of abdominal muscles

ATI Questions

Q2: Which of the following **factors increases the client's risk of preterm labor**? **Select all that apply.**

- **Urinary tract infection**
- **Multifetal pregnancy**
- **Diabetes mellitus**

HESI Question

Which intervention would ...help **prevent preterm delivery**?

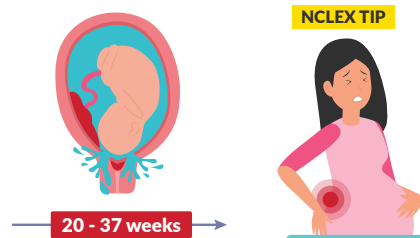
- Suggest that the client **avoid smoking**

Signs & Symptoms

Notify the HCP

Key Signs of Preterm Labor

1. Rupture of membranes **20 - 37 weeks**
Report **watery discharge** from vagina **ATI**
2. **Low back pain** **NCLEX TIP**
3. Contractions every **10 minutes** or less
4. Pelvic pressure
5. Diarrhea



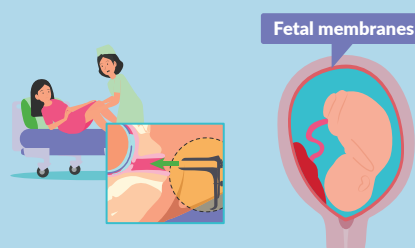
HESI Question

... signs of **preterm labor** with a client at **28 weeks** gestation. Which client statement indicates a **need for further teaching**? **Select all that apply.**

- I expect the discharge from my vagina will change from **thick to brown** over the next two weeks
- The baby's **movement will decrease** and be almost still from here on out
- I should expect **low back pain and diarrhea** as the baby grows

Diagnostics

- Speculum exam: to **visualize the cervix**
 - **Effacement** - thinned out cervix
 - **Dilation** - opening of the cervix
 - **Fetal membranes** intact or ruptured
 - Fetal Fibronectin Test (FFN)
- Transvaginal Ultrasound (less than **34 weeks**)
 - Shortened cervix length



HESI Question

A client at **26 weeks of gestation**... Which finding indicates that **preterm labor is occurring**?

- The **cervix is effacing and dilated to 2 cm**

Preterm Labor II

Maternity

Preventative Measures

Prophylactic Cervical Cerclage

To prevent preterm delivery

- **Cervical insufficiency**
 - 12 to 28 weeks gestation
 - Stitches are removed at 36 - 37 weeks

Interventions

- Education (after cerclage)
 - Activity restriction & bed rest
 - **No sexual** intercourse
 - Mild abdominal cramping is expected
 - Assess **fetal movement** daily **HESI**

12 - 28 weeks



Signs of Preterm Labor

Notify the HCP

1. Rupture of membranes
Report **watery discharge** from vagina **ATI**
2. Low back pain **NCLEX TIP**
3. Contractions & pelvic pressure



NCLEX TIP



Interventions

- Continuous **fetal monitoring**
- **Amniotomy** (AROM) is the manual induction of labor by rupturing the amniotic membranes & is **contraindicated!**

SIDE NOTE

Clients who have had a history of preterm labor are commonly prescribed **progesterone** throughout the pregnancy, as it will reduce the risk for future preterm labor.



Pharmacology

4 NCLEX TIPS

1. Antibiotics

- **Penicillin IV piggyback**
Prevent **group B strep** infections

2. Steroids: antenatal glucocorticoids

Stimulate surfactant for fetal lung maturity

- **Betamethasone**

3. Tocolytic agent

To relax the uterus

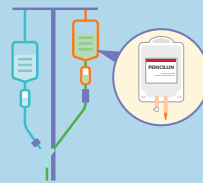
- **Terbutaline**
- **Nifedipine**
- **Indomethacin**

4. Magnesium Sulfate

- Protects the **baby's brain** (neuroprotection)
Reducing the risk for **cerebral palsy**
- Continuous **fetal monitoring** is required for **Mag Sulf** infusion

Mag Toxicity

- Monitor mother's **respiratory rate**, blood pressure, & DTRs
- **Discontinue:** low RR, BP, & depressed DTRs
- Antidote: Calcium gluconate



Top Missed NCLEX Question

A pregnant client is admitted for preterm labor at **30 weeks gestation**. Which **treatment** options should the nurse **anticipate**?

Select all that apply.

- ✓ Intramuscular **betamethasone**
- ✓ **Penicillin** via IV piggyback
- ✓ IV **magnesium sulfate**
- ✓ **Calcium gluconate** ready

HESI Question

...**magnesium sulfate** to prevent preterm labor. Which would the nurse assess in the client to **determine drug toxicity**?

- **Respiratory** status
- Level of consciousness (**LOC**)
- Deep **tendon reflexes**

Kaplan Question

Magnesium sulfate IV ... the client's **deep tendon reflexes** are decreased. Which action does the nurse **take first**?

- **Discontinues** the IV infusion

ATI Questions

Q1: ... 30 weeks of gestation. Which medication... to **accelerate fetal lung maturity**?

- **Betamethasone**

Q2: ... **terbutaline**. Which of the following client statements indicates an **understanding of the teaching**?

- This medication is used to **stop my contractions**

Notes

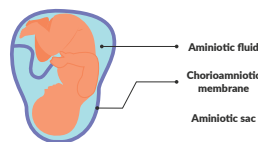
PROM & AROM

Maternity

PROM Pathophysiology

As you know, the baby is floating in amniotic fluid within the chorioamniotic membrane, making up the amniotic sac. This is held inside the uterus, which we call the baby apartment since it is where the baby lives during fetal development.

The cervix is the door to the apartment that holds it all in. **In PROM, the mother's water breaks too early & this amniotic fluid leaks out!**

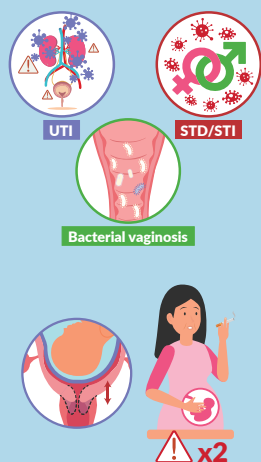


PPROM	PROM
P Preterm	P Premature
P Premature	R Rupture
R Rupture	O Of
O Of	M Membranes
M Membranes	
*Before 37 weeks	*After 37 weeks

Risk factors

Anything that weakens the strength of the chorioamniotic membrane

- Infections
 - UTI
 - STI (STD)
 - Bacterial vaginosis
- Short cervical length
- Smoking
- Abdominal trauma
- Prior distention
 - Polyhydramnios - increased amniotic fluid
 - Multiple gestations (twins, triplets +)



Treatment

Prevent infection

- **Over 37 weeks** gestation
90% of clients will go into spontaneous labor within 24 hours

Nurse care

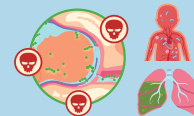
- Give **prophylactic antibiotics** to prevent **GBS infection** - Group B Beta Streptococcus **NCLEX TIP**
 1. Membranes ruptured **at/over 18 hours**
 2. Temperature **over 100.4**
 3. Gestation **less than 37 weeks**



NCLEX TIP



NCLEX TIP



Diagnostics

- Nitrazine Test
- Speculum exam ("Pooling")
 - A speculum is placed inside the vagina & the client is **asked to cough or bear down**. **If amniotic fluid is seen coming out of the cervix** when this pressure is applied, the client has ROM.
- Ultrasound
- Screening for STIs



Saunders Question

- A pregnant 39 week-gestation ... has had a **positive group B streptococcus (GBS)** ... the cervix is dilated 6 cm and 90% effaced. Which should be the nurse's first action?
- Call the health care provider (HCP) to obtain a prescription for intravenous antibiotic prophylaxis



AROM

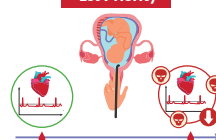
Amniotomy - this is a procedure performed by the health care provider to manually induce labor by rupturing the amniotic membrane or in other words breaking the client's water.

Amniotomy

Manual induction of labor by rupturing the amniotic membrane

- **Risk for Umbilical Cord Prolapse** causing **fetal bradycardia** due to cord compression
- **4 NCLEX TIPS:** Interventions
 1. Assess **fetal heart rate** **BEFORE & AFTER**
 2. Assist to **upright position** after
 3. **Temperature** every 2 hours
 4. Characteristics of **amniotic fluid** **Color, amount & odor**

1st Priority



Normal	NOT Normal
<ul style="list-style-type: none"> ■ Clear ■ Colorless ■ No foul odor 	<ul style="list-style-type: none"> ■ Yellow-green fluid ■ Meconium ■ Strong foul odor ■ Infection

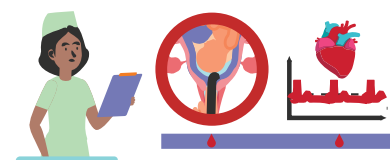


HESI Question

- Amniotomy ... Immediately after the procedure what is most important information for the nurse to obtain?
- Fetal heart rate

ATI Question

- Amniotomy ... Which of the following is the priority for assessment by the nurse?
- Fetal heart rate



AROM

- A** Artificial
- R** Rupture
- O** Of
- M** Membranes

Procedures to Assist Labor & Delivery Maternity

Administering Oxytocin

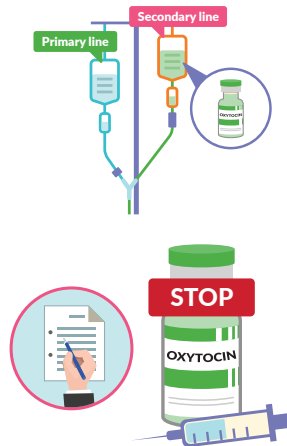
- Use an **IV infusion pump** on a **secondary IV line**

Monitor 2 NCLEX TIPS

- Mother's uterine contraction pattern, blood pressure & heart rate
- The fetal heart rate (continuously)

STOP Oxytocin 3 NCLEX Key Points

- Contractions:
 - Duration **OVER 90 seconds**
 - Frequency **less than 2 minutes** apart
 - Intensity **over 90 mmHg**
 - Resting tone **greater than 20 mmHg**
- Late decelerations in FHR
- Over **5 contractions** in **10 minutes**



ATI Question

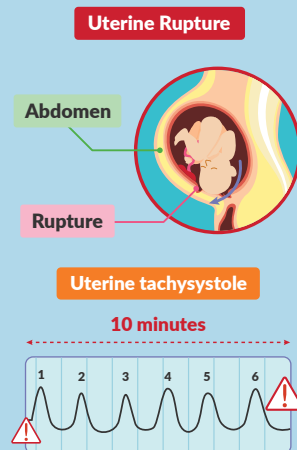
- Q1:** ... receiving oxytocin after prolonged labor. Intervention is necessary when which assessment item is noted?
- 6 contractions in 10 minutes
- Q2:** Which of the following findings ... requires intervention by the nurse?
- Duration of contraction of 100 seconds

Kaplan Question

- ... oxytocin infusion to induce labor. The nurse stops the infusion if it occurs?
- Contractions last 90 to 120 seconds & are 2 minute intervals

Complications

- Uterine Rupture **ATI**
- Late declarations
- Water intoxication (dilutional hyponatremia)
- Increased risk for
 - Placental abruption
 - Uterine atony** Soft or boggy fundus increased risk for postpartum hemorrhaging
- Uterine tachysystole **NCLEX TIP**
 - Side effects of oxytocin causing severe contractions → reduced placental blood flow & impaired fetal oxygenation.
 - STOP Oxytocin**
 - Over 5 contractions in 10 minutes
 - Late decels

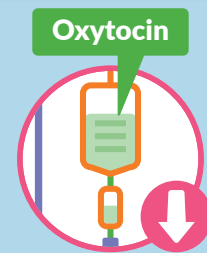


Top Missed NCLEX Questions

A client is receiving oxytocin infusion for labor augmentation. The provider asks the nurse to increase the oxytocin infusion rate. Which of the following actions should the nurse take?

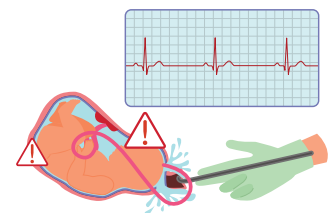
Click the exhibit

- Recommend that the infusion rate be decreased



Amniotomy

- Manual induction of labor by rupturing the amniotic membrane
- ### Risk for Umbilical Cord Prolapse
- Causing fetal bradycardia due to cord compression



Forceps **NCLEX TIP** spoon like devices used to assist delivery

- Caution!** Never apply fundal pressure during forcep use
- Uses:** fetal distress or abnormal fetal presentation
- Complication**
 - Uterine rupture
 - Bladder injury
 - Vaginal Lacerations

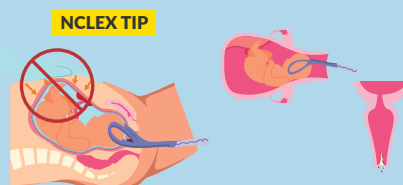
Vacuum **NCLEX TIP** traction applied to the fetal head

- Caution!** Never apply fundal pressure **NCLEX TIP**
- Uses:**
 - Mother not pushing effectively or unable to push
 - Fetal distress, rotation, or abnormal FHR
- Complication**
 - Uterine rupture
 - Lacerations
 - Infant subdural hematoma

HESI Question

Complication... forceps-assisted delivery?

- Presence of vaginal lacerations



Bishop Score

- System for assessing cervical readiness for induction of labor.
- OVER 6 - 8 score** indicates induction will be successful

Cervix	Bishop score			
	0	1	2	3
Consistency	Firm	Medium	Soft	—
Position	Posterior	Mid-position	Anterior	—
Dilation	0 cm	1-2 cm	3-4 cm	≥ 5 cm
Effacement	0% - 30%	40 - 50%	60 - 70%	≥ 80%
Station	-3	-2	-1, 0	+1, +2

Labor Complications

Labor Complications I

Maternity

Amniotic Fluid Embolism

This is a **deadly condition** that occurs when amniotic fluid inside the uterus leaks out & enters the mother's blood stream, leading to very high risk for mortality in both the mother & baby! Most do not survive. It occurs most often during delivery or in the immediate recovery period.

Pathophysiology

Amniotic fluid inside the uterus leaks out & **enters the mother's blood stream**

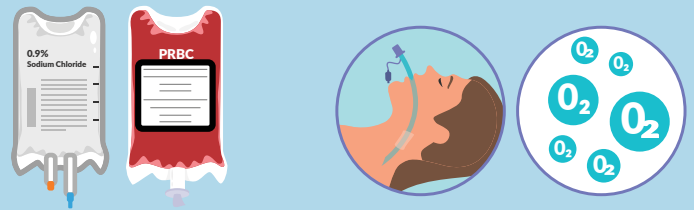
Symptoms

- Sudden **chest pain**
- **Hypotension** (low BP)
- **Tachycardia** (fast HR)
- Dyspnea (difficulty breathing)
- Cyanosis (blue, pale skin)



Interventions

- Notify the provider!
- IV fluids & blood transfusion
- Assist with intubation
- Oxygen



Dystocia

Pathophysiology

Slow or difficult labor or delivery

Memory trick

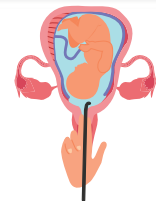
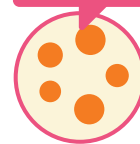
- **D** - Dystocia
- **D** - Difficult Labor



Interventions

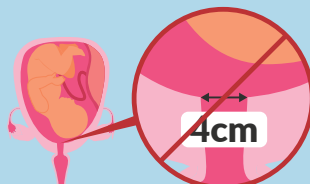
- Reposition or ambulate the mother
- Oxytocin: induce labor
- **Amniotomy**: the provider manually breaks the water

Oxytocin



Causes & Risk Factors

- **Macrosomia** (big baby over 8lbs 13oz)
- Overweight (**BMI over 25**)
- **Older** age
- Previous **difficulty with fertility**
- **Failure** of the uterus and cervix to contract
- **Insufficient** cervix dilation, effacement, & descent of the baby



Saunders Question

... **labor dystocia**... which **risk factors** in the client's history placed her at risk for this complication? Select all that apply.

- Age 54
- Body mass index of 29
- Previous **difficulty with fertility**

Age 54

BMI = 29



Labor Complications II

Maternity

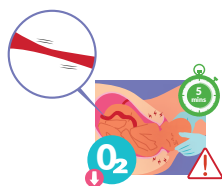
Shoulder Dystocia

Pathophysiology

- **Fetal head delivers**, but the top of the **shoulder becomes wedged** behind or under the mother's symphysis pubis.
- Longer than 5 minutes → **HIGH RISK** for **fetal asphyxia** (hypoxia)



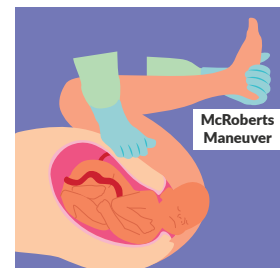
Shoulder Dystocia



Nursing Interventions

NCLEX TIPS

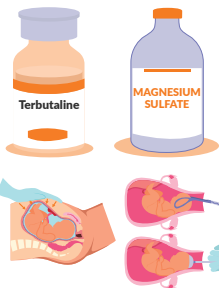
1. Document the **time** of events & position for example Fetal head position, shoulder maneuvers
2. **Verbalize passing time** to guide provider for example "1 minute has passed"
3. Maneuvers to relieve shoulder impaction
 - **McRoberts maneuver:** Flex the client's legs back against the abdomen
 - **Suprapubic pressure:** Press downward on the symphysis pubis
4. Request **additional assistance** from other nurses & staff



McRoberts Maneuver

AVOID NCLEX Traps

- Administering tocolytic agents (Terbutaline, Mag Sulfate)
- **Fundal pressure**
- Use of **forceps or vacuum**



Precipitous Labor

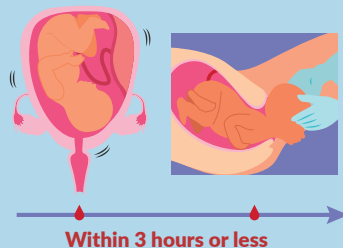
This is quick labor - some professors call these "cannonball" babies, because they shoot out with impressive force and everything can get damaged - baby & mom included!

Pathophysiology

- Labor within **3 hours or less!**
- After the onset of contractions

Memory trick:

- P** - Precipitous Labor
- P** - Pretty Quick labor



Risks

- Hypertonic uterine contractions
- Use of Oxytocin
- Multiparous mother (multiple previous births)

Complications

1. Mom:

- **Postpartum hemorrhage**
- Uterine rupture
- Amniotic fluid embolism

2. Baby

- Intracranial hemorrhage
- Hypoxia



APGAR SCORE
2 points

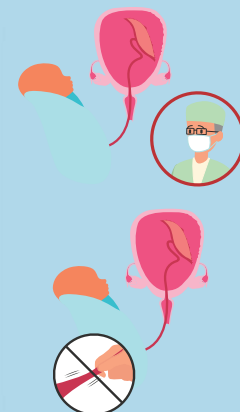


Interventions

- Prepare to assist with birth
- **Keep the infant warm!** **NCLEX TIP**
- **Dried** & placed **skin-to-skin** on the mother's abdomen

AVOID NCLEX Traps

- Do **NOT** pull on the cord!
→ Uterine inversion or cord avulsion
- Fundal massage **ONLY after placenta** is delivered



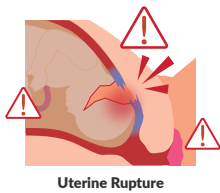
Labor Complications III

Maternity

Uterine Rupture

Pathophysiology

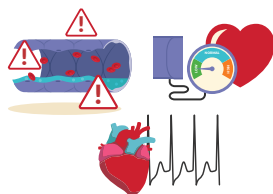
Spontaneous **tearing of the uterus** that may result in the **fetus being expelled into the peritoneal cavity**



Uterine Rupture

Symptoms

- **Severe sudden** abdominal pain! "Tearing or ripping"
- Fetal heart rate that is **non assuring** for example
 - Bradycardia
 - Variable or late decels
 - Decreased variability
- Fetal distress
- Mother s/s of bleeding
 - **Hypovolemic shock**
 - **Hypotension** (low BP)
 - **Tachycardia** (fast HR)



Causes

- **Previous C-section** attempting a vaginal delivery (weak spots in the uterus that can rupture)
- **Forceps delivery**
- Traumatic events (car accident or fall)
- **Overdistension** of uterus: Twins, triplets, or more
- Too much oxytocin



Saunders Question

... risk of **uterine rupture** if which occurred?

- **Forceps delivery**



Interventions

- Immediate Cesarean delivery (C-section)
- Hysterectomy
- IV fluids & blood products



ATI Question

... 38 weeks gestation who reports **severe sudden abdominal "ripping"** pain when receiving an **oxytocin infusion during labor**. The client's heart rate is **130/min** and she is **tachypneic**. The fetal heart rate monitor reveals **minimal variability and bradycardia**. Which of the following tasks does the nurse anticipate?

- Prepare for immediate **cesarean delivery**



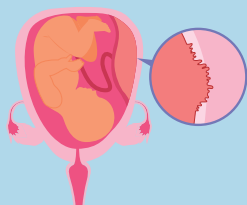
Uterine Inversion

Pathophysiology

Placenta **fails to detach** from the uterine wall and **pulls the uterus inside-out**

Causes

- **Excess cord traction** (pulling the umbilical cord)
- **Excess fundal massage**
- **Placenta accreta**: the **placenta** is too **firmly attached to the uterus**



Symptoms

- **Severe** abdominal pain
- **Mother s/s of bleeding**
 - **Hypovolemic shock**
 - **Hypotension** (low BP)
 - **Tachycardia** (fast HR)

Saunders

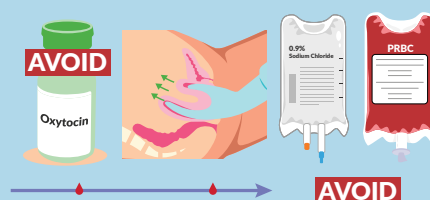
... immediately **after delivery of the placenta**. Which ... could indicate **uterine inversion**?

- Complaints of **severe abdominal pain**



Interventions

1. Relax the uterus: (Tocolytic)
 - Terbutaline
 - Magnesium sulfate
 2. Provider repositions the uterus
 3. **AFTER** the uterus is **repositioned**
 - Oxytocin
- AVOID**
- IV oxytocin **before** the inverted uterus is corrected **NCLEX TIP**
4. IV fluids & blood products



Labor Complications IV

Maternity

Umbilical Cord Prolapse & Compression

This is a **potentially deadly emergency for the fetus!**

Pathophysiology

Umbilical cord protrudes out of the mother's cervix or vagina **BEFORE the baby** → **cuts off oxygen rich blood** to the baby



So if the oxygen tube is compressed, it leads to **DEADLY** low oxygenation! This results in lifelong brain damage or death for the baby! Very serious!

HESI Question

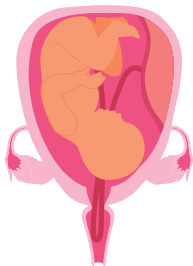
... cause of **variable fetal heart rate (FHR) deceleration** is which factor?

- **Umbilical cord compression**

Saunders Question

... **umbilical cord compression** if which is noted on the external monitor tracing during a contraction?

- **Variable decelerations**

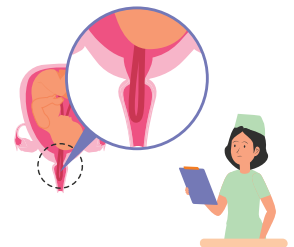
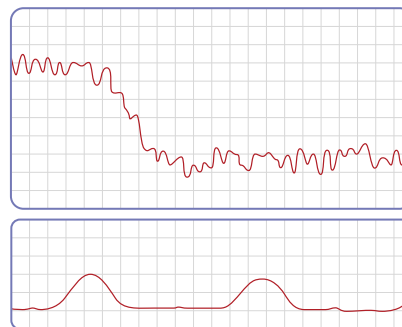


Signs

- Common after **spontaneous rupture of membrane** (water breaks) or amniotomy
- FHR - Fetal Heart Rate
 - Fetal bradycardia
 - **Abrupt fetal heart rate decelerations**

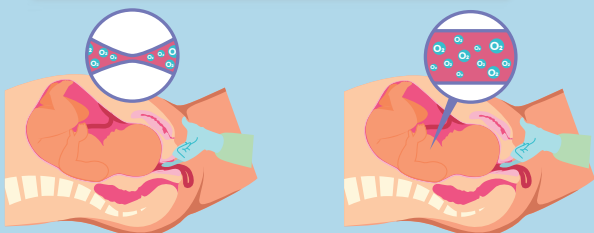
NCLEX TIP

Abrupt fetal heart rate decelerations



Nursing Interventions

1. Call for **assistance**
2. Insert **sterile gloved** hand: **1 or 2 fingers** into mother's **vagina** to **relieve compression**
3. **Reposition mother:**
 - Knee-chest position
 - **Trendelenburg** position
4. Wrap cord loosely with a **sterile towel** or gauze soaked with **sterile normal saline**
5. Prepare for **emergency C-section** (cesarean delivery)



Saunders Question

... **umbilical cord protruding from the vagina...** **nursing action?**

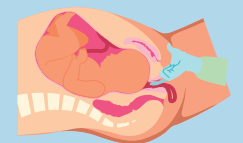
- Wrap the cord **loosely** in a **sterile towel** soaked with **warm sterile normal saline**



ATI Question

... extrusion of the umbilical cord ... **priority nursing intervention** after calling for assistance?

- Use a **sterile gloved hand** and **apply finger pressure** to elevate the presenting part of the fetus



HESI Questions

Q1: ... **umbilical cord protruding** from the client's vagina. The nurse immediately positions the client in the **Trendelenburg** position and inserts a finger into the client's vagina. Which additional care?

- Prepare for an **emergency cesarean delivery**

Q2: ... **amniotic membrane rupture**, and a **prolapsed cord** is suspected... **priority intervention?**

- **Knee-chest** position



Notes

Labor Complications V

Maternity

DIC

Pathophysiology

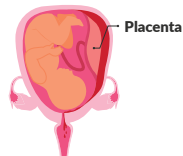
DIC = disseminated intravascular coagulation

Causes & Risks

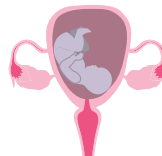
- **Placental abruption:** placenta separates from uterine wall
- Intrauterine **fetal demise** (stillbirth)

This is **severe bleeding inside & outside the mother's body.**

As the body uses up all clotting factors & platelets, it makes little clots all over the body & uses up all means to stop bleeding elsewhere in the body, leaving the mother with no means to stop bleeding anywhere!



Placental Abruption



Fetal demise

HESI Question

... **high risk** for disseminated intravascular coagulation (DIC)?

- Placental abruption

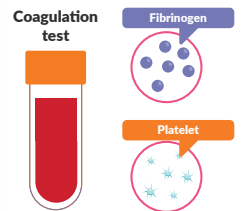
Signs & Symptoms

- External bleeding: venipuncture site
- Internal bleeding: petechiae & ecchymosis
- Organ damage:
 - Respiratory distress
 - Renal failure



Interventions

- **Priority! NCLEX TIP**
Draw **coagulation tests, fibrinogen, & platelet count**
- Administer **blood products**, volume **expanders** & oxygen
- Monitor for bleeding which is sudden & deadly



Meconium Stained Amniotic Fluid

Pathophysiology

Fetus has defecated in the amniotic fluid.

When the mother's water breaks, we expect it to be clear, but with meconium stained, the fluid changes color to various shades of **green, yellow** or **brownish** & it often even smells foul.

Signs

- Amniotic fluid color: green, yellow, or brown
- Foul smelling odor

Key Points

- **Common in:**
 - **Breech** position
 - After events of fetal distress
 - Term/ post term infants
- Indicates fetal **hypoxia**
- Prep for neonatal **resuscitation**
 - Endotracheal tube & ventilation

HESI Question

... **amniotic fluid** was **meconium stained during labor**. Which further assistance would the nurse provide to the newborn?

- Provide **endotracheal tube suction assistance** with ventilation

ATI Question

... **warning signs** of potential complications? Select all that apply.

- **Meconium stained** amniotic fluid
- **Foul-smelling** vaginal discharge



Meconium Aspiration Syndrome

Pathophysiology

Newborn breathes a mixture of meconium & amniotic fluid into the lungs

Newborn breathes a mixture of meconium & amniotic fluid into the lungs around the time of delivery. It's like coating the inside of the lungs with tar!
Gas exchange is nearly impossible, making it the leading cause of **severe illness & death in newborns.**

Risk Factors

- **Over 40 weeks** gestation
- Diabetes
- High blood pressure
- Long or difficult labor

Complications

- **Fetal distress**
- Pneumothorax
- Perinatal **asphyxia**

HESI Question

... **41 weeks** of gestation. Which complication?

- **Meconium aspiration syndrome**

ATI Question

... **meconium aspiration syndrome**. Which of the following is true?

- Pneumothorax may occur

KAPLAN Question

Meconium-stained amniotic fluid alerts the nurse to the possibility of which problem?

- **Fetal distress** and perinatal **asphyxia**

Cesarean Birth

Cesarean Birth

Maternity

Performed after 28 weeks of gestation. C-sections can either be planned or an unplanned emergency.

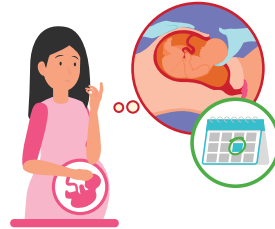
Top reasons

1. Planned C section

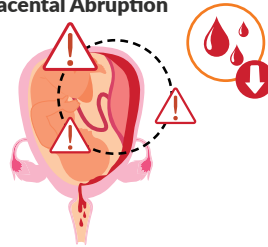
- Previous C-sections
- Large baby or a lot of babies (triplets or twins)
- Genital herpes or other infections (mom)
- Placenta previa (placenta blocks the cervix)

2. Emergency C-section

- Fetal distress: if the baby's life is in danger
 - Placental **abruption**: placenta separates from the wall of the uterus
 - Prolapsed **cord**: umbilical cord is compressed, limiting oxygen to the baby
 - Long labor or contractions not strong enough
- **Breech birth**: baby is in an odd position. Transverse lie or oblique lie



Placental Abruption

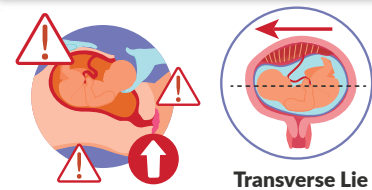


Common NCLEX Question

Which client statement should prompt the nurse to request a **primary cesarean birth** from the provider?
 ✓ "I lost my acyclovir prescription and I've noticed lesions on my labia that are stinging and burning."

HESI Question

Which condition places the pregnant client at a **higher risk for a cesarean delivery**?
 ■ A client with the fetus in a transverse lie



Transverse Lie

Surgical Procedure

- The client is put to sleep with anesthesia or awake with local anesthesia.
- Then Incisions are made on the abdomen through the uterus and the health care provider will rupture the amniotic sac to deliver the baby.
- The entire process typically takes only a few minutes to get the baby out. But can take longer in certain cases.



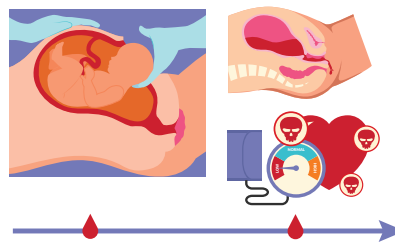
Complications

After a c-section, the highest priority is to monitor the client for hemorrhage & shock. This severe bleeding will lead to low blood pressure that will kill the client!

Complications

- Hemorrhage & shock **KAPLAN**
 - **Placenta Previa**: placenta attaches in the **wrong location**, over the cervical opening
 - **Placenta Accreta**: where the placenta attaches to the **uterus too firmly**
 - **Uterine rupture**: if this uterus is scarred from a previous C-section it has **weak spots that can rupture**.

Hemorrhage & Shock



Kaplan Question

Cesarean delivery... The nurse places the **highest priority** on monitoring the client for which **potential complication**?
 ■ Hemorrhage and shock

Post-Operative Care

Obviously the client will be in pain with a big incision that is healing. The key point is focused on removal of the surgical wound dressing. The initial (first) dressing is **ONLY removed by the surgeon** ...

Not the nurse, not the aid, not the student, NOBODY but the surgeon!

If the surgical site is bleeding, do you remove the surgical dressing then?

No, only the surgeon removes the initial dressing.

If it's bleeding, just keep adding pads to the site & call the surgeon. **DO NOT REMOVE!**

Once the surgeon removes the initial dressing, then you can assess the wound like normal.

Always assess for infection with any surgical site:

- Warm
- Red
- Draining

Surgical Wound Dressing

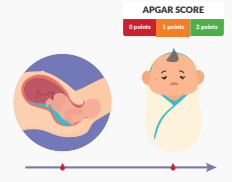
ONLY the surgeon removes the initial (first) dressing!



Newborn

Apgar Score I Maternity

The **APGAR** is a simple quick assessment tool used to rapidly describe a newborn's well-being immediately after birth & how they're adjusting to life outside the womb.

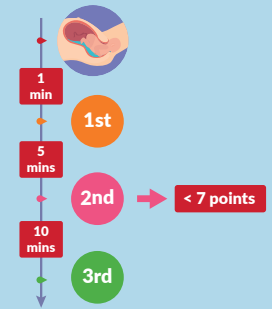


Infants are rated on a scoring system from 0 to 10. The higher the score the healthier the baby

It's important to note it is done twice - at 1 minute & at 5 minutes after delivery. & It may be reassessed for a 3rd time at 10 minutes if the score is less than 7.

NCLEX

7 or Less = Reassess



	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Blue/ Pale Core	Blue arms & legs Pink Body	Completely Pink
P	Pulse (heart rate)	Absent	Less than 100/ min.	OVER 100/ min.
G	Grimace (reaction & reflex)	Absent	Grimace	Cry & Pull away
A	Activity (muscle tone)	Limp	Minor flexion	Active flexion & extension
R	Respiratory effort	Absent	Weak cry	Strong cry

Interventions Based on Score

- 0-3** Severe Distress = Resuscitate Fully!
- 4-6:** Moderate distress = Some resuscitation
- 7-10:** Adequate = Provide post delivery (Oxygen, Suction, Stimulate baby by rubbing back & feet)

Always remember to start with 10 points & then focus on what's BAD! Start subtracting bad signs so:
REALLY BAD - subtract 2 points
KINDA BAD - subtract 1 point.

TEST TIP Be sure to write out this chart at least 10 - 15 times, every day the week of your exam.

It's vital to know these numbers & how to rate it. You need to spot lower ratings - as this means the newborn is in severe distress!

	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Blue/ Pale Core	Blue arms & legs Pink Body	Completely Pink
P	Pulse (heart rate)	Absent	Less than 100/ min.	OVER 100/ min.
G	Grimace (reaction & reflex)	Absent	Grimace	Cry & Pull away
A	Activity (muscle tone)	Limp	Minor flexion	Active flexion & extension
R	Respiratory effort	Absent	Weak cry	Strong cry

Notes

Apgar Score II Maternity

	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Blue/ Pale Core	Blue arms & legs Pink Body	Completely Pink
P				
G				
A				
R				

	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Absent	Less than 100/ min.	OVER 100/ min.
P	Pulse (heart rate)			
G				
A				
R				

	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Absent	Grimace	Cry & Pull away
P	Pulse (heart rate)			
G	Grimace (reaction & reflex)			
A				
R				

	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Limp	Minor flexion	Active flexion & extension
P	Pulse (heart rate)			
G	Grimace (reaction & reflex)			
A	Activity (muscle tone)			
R				

	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Absent	Weak cry	Strong cry
P	Pulse (heart rate)			
G	Grimace (reaction & reflex)			
A	Activity (muscle tone)			
R	Respiratory effort			

Top Missed NCLEX Questions

While conducting an Apgar assessment, the nurse discovers the newborn is completely blue, has a heart rate of 115/min, weak cry, active movements, flexes extremities, and shows facial grimaces when nose is suctioned. The nurse should assign which Apgar score to the newborn?

- Apgar score of 6

	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Blue/ Pale Core	Blue arms & legs Pink Body	Completely Pink
P	Pulse (heart rate)	Absent	Less than 100/ min.	OVER 100/ min.
G	Grimace (reaction & reflex)	Absent	Grimace	Cry & Pull away
A	Activity (muscle tone)	Limp	Minor flexion	Active flexion & extension
R	Respiratory effort	Absent	Weak cry	Strong cry

Saunders Question

... Apgar score. The nurse notes a heart rate of 92, a weak cry, some flexion of extremities, grimacing with stimulation, and a pink body with blue extremities. On the basis of this score, what should the nurse determine?

- The newborn requires some resuscitative interventions

	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Blue/ Pale Core	Blue arms & legs Pink Body	Completely Pink
P	Pulse (heart rate)	Absent	Less than 100/ min.	OVER 100/ min.
G	Grimace (reaction & reflex)	Absent	Grimace	Cry & Pull away
A	Activity (muscle tone)	Limp	Minor flexion	Active flexion & extension
R	Respiratory effort	Absent	Weak cry	Strong cry



ATI Question

... Apgar score. The infant is crying lustily and has a heart rate of 130 bpm; he has some muscle tone and his body is pink but his hands and feet are blue. Which of the following is the most appropriate Apgar score?

- 8

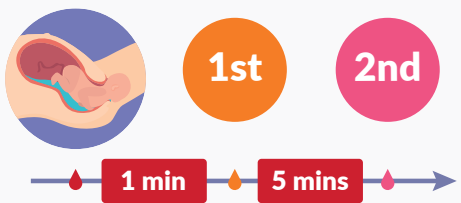
	Sign	0 points	1 points	2 points
A	Appearance (skin color)	Blue/ Pale Core	Blue arms & legs Pink Body	Completely Pink
P	Pulse (heart rate)	Absent	Less than 100/ min.	OVER 100/ min.
G	Grimace (reaction & reflex)	Absent	Grimace	Cry & Pull away
A	Activity (muscle tone)	Limp	Minor flexion	Active flexion & extension
R	Respiratory effort	Absent	Weak cry	Strong cry



Saunders Question

When should the nurse plan to determine the Apgar score?

- At 1 minute after birth and 5 minutes afterbirth



HESI Question

... Apgar score of 10 at 1 minute after birth?

- An infant having no difficulty adjusting to extrauterine life but who should be assessed again 5 minutes after birth

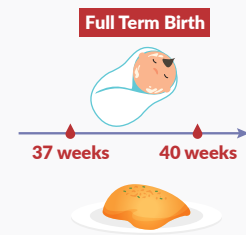
Newborn Assessment I

Maternity

After the baby is stabilized & the APGAR score is assessed, a newborn head to toe assessment is completed. We mainly look for signs & symptoms of maturity and prematurity - in order to guide the care that will be delivered.

Think of the baby as a bun in the oven or in this case a chicken that just came out of the oven. A **Full Term infant** - born **37 weeks to 40 weeks** is like a perfectly baked chicken breast.

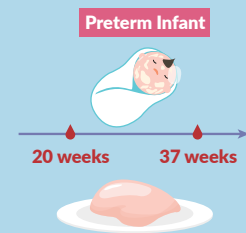
The skin is opaque, & presence of vernix - that white cheesy substance, predominantly located in the skins folds but the baby looks well balanced - not over or under - perfectly "done"!



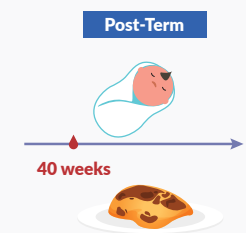
A **Preterm infant** - born between **20 to 37 weeks** - is like an undercooked raw chicken breast.

The baby's skin is smooth, shiny, goeey (lots of vernix), translucent, and extremely flexible - like undercooked dough!

This bun came out of the oven too soon! & is not done baking!

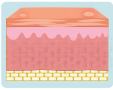





Post Term infant over 40 weeks gestation is like an over cooked, burned chicken breast. The baby will be larger, more chunky and not so flexible. The skin literally appears burned (dried, cracked & peeling). There are also deep creases on the hands/feet.







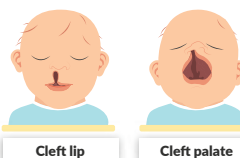
According to ATI - newborn assessment & care is broken down into 3 phases:

- Phase 1** - Stabilization
- Phase 2** - Infant physical exam
- Phase 3** - Routine care

Assessment	Normal	NOT normal
Skin 	<ul style="list-style-type: none"> Vernix caseosa: white cheesy substance, predominantly located in the skins folds Lanugo: fine hair all over the body to hold the vernix in place Mongolian spots: purple, brown, gray flat discolorations typically found on the back, buttocks & lower extremities Acrocyanosis: Bluish discoloration on the hands & feet with a pink trunk → Place the newborn skin-to-skin with mother NCLEX TIP Peeling around the 3rd day 	<ul style="list-style-type: none"> Preterm: 20 - 37 weeks NCLEX TIPS <ol style="list-style-type: none"> Shiny, wrinkly skin "Translucent", very fragile, Smooth, red/pink skin with visible veins Flat areolas without palpable breast buds Abundant lanugo on shoulders & back & goeey (lots of vernix) Postterm: Over 40 weeks Cracked, dried, peeling skin (desquamation) Cyanosis: blue, pale core REPORT TO HCP Jaundice "yellowing of the skin" REPORT Nevus vasculosus (strawberry hemangioma): raised, red nodule. Nevus flammeus (port wine stain): pink, red, purple patch of skin, often on the face.




Assessment	Normal	NOT normal
Fontanelles & Head Shape 	<ul style="list-style-type: none"> Anterior: Diamond shaped Posterior: Triangular Molding: mis-shapen head resulting from pressure in the birth canal; disappears in 3 - 7 days. 	<ul style="list-style-type: none"> Caput succedaneum: localized edema of the scalp (like a cap) Cephalhematoma: localized hematoma beneath the periosteum caused by trauma 


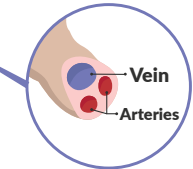


Assessment	Normal	NOT normal
Eyes, Ears & Nose 	<ul style="list-style-type: none"> Eyes open Ear stiff but pliable (more stiff is more mature) Milia: white papules "white heads" on the nose <p>HCP</p> 	<ul style="list-style-type: none"> Low-set ears & flat nose bridge REPORT TO HCP Eyes: <ul style="list-style-type: none"> Ptosis of an eyelid REPORT Cataract seen as red reflex REPORT Jaundice Sclera within the first 24 hours Coloboma - defect in the pupil <p>ATI Question</p> <p>neonate after delivery... Which of the following assessment is most concerning?</p> <ul style="list-style-type: none"> Ptosis of the left eyelid



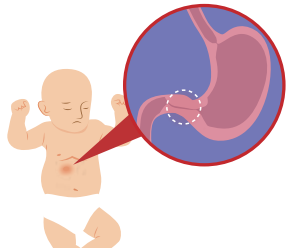
Assessment	Normal	NOT normal
Mouth 	<ul style="list-style-type: none"> Epstein's pearls: white pearl-like cysts on gum margins & palate NCLEX TIP 	<ul style="list-style-type: none"> Assess for cleft lip or palate  <p>Cleft lip Cleft palate</p>


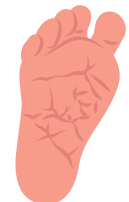
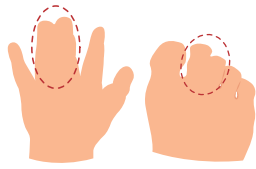
Newborn Assessment II



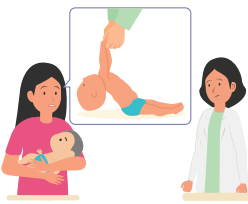
Maternity

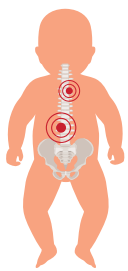

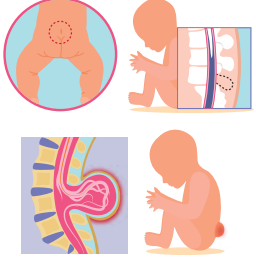
Assessment	Normal	NOT normal
Chest 	<ul style="list-style-type: none"> Heart: Listen for murmurs Lung Sounds: Crackles (rales) indicate fluid in the lungs & are expected immediately AFTER birth <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>HESI Question</p> <p>... expect to find while assessing a neonate during the first 30 minutes after birth?</p> <ul style="list-style-type: none"> Fine crackles </div> 	<ul style="list-style-type: none"> Lungs Sounds: REPORT Wheezes, stridor, or persistent crackles after the first few hours of birth Respiratory Distress: REPORT <ul style="list-style-type: none"> Chest wall retractions Nasal flaring Grunting Tachypnea (over 60/min.) 

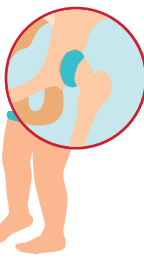
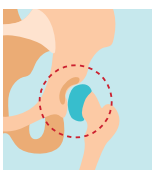

Assessment	Normal	NOT normal
Umbilical cord 	<ul style="list-style-type: none"> 1 vein, 2 arteries NCLEX TIP MEMORY TRICK: AVA: 2 Arteries 1 Vein Normal Finding: opaque or whitish-blue & covered with Wharton's jelly 	<p>REPORT TO HCP</p> <ul style="list-style-type: none"> Only 1 artery or any other abnormal findings <div style="text-align: center;">  </div> 

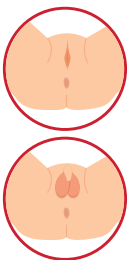
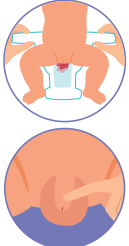
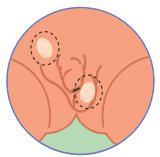
Assessment	Normal	NOT normal
Abdomen 	<ul style="list-style-type: none"> Bowel sounds may be absent or hypoactive until the first feed Voiding & passing meconium is expected within 24 hours 	<ul style="list-style-type: none"> No voiding in 24 hours NCLEX TIP REPORT Abdominal distention Olive shaped mass - Pyloric stenosis 

Assessment	Normal	NOT normal
Hand & Feet 	<ul style="list-style-type: none"> Plantar creases up the entire sole of the foot NCLEX TIP Acrocyanosis: Bluish discoloration on the hands & feet with a pink trunk 	<p>Preterm: 20 - 37 weeks</p> <ul style="list-style-type: none"> Very smooth soles of the feet Club foot: Talipes equinovarus Syndactyly: Fused fingers or toes 

Assessment	Normal	NOT normal
Reflexes & muscle tone 	<ul style="list-style-type: none"> Good muscle tone 	<p>Report to HCP</p> <ul style="list-style-type: none"> Decreased muscle tone hypotonia "head lag" NCLEX TIP 

Assessment	Normal	NOT normal
Back & Spine 	<ul style="list-style-type: none"> Birthmarks & Mongolian spots 	<ul style="list-style-type: none"> Sacral dimples → Spina bifida occulta NCLEX TIP Myelomeningocele 

Assessment	NOT normal
Hips 	<p>DDH - Developmental Dysplasia of the Hips</p>  

Assessment	Normal	NOT normal
Genitalia & Anus 	<ul style="list-style-type: none"> Female: discharge of blood or mucus Male: descended testes into the scrotum 	<ul style="list-style-type: none"> Anus: Imperforate anus Males: <ul style="list-style-type: none"> Hydrocele: fluid-filled sac around a testicle that swells within the scrotum. Hypospadias: misplaced meatus - urinary opening. Cryptorchidism: an undescended testicle that is typically NOT concerning since most will descend on their own by 6 months. 

Newborn Assessment III

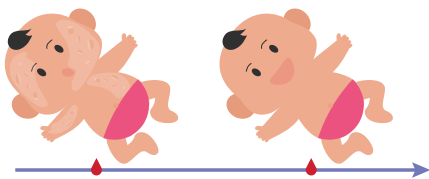
Maternity

Top Missed NCLEX Question

The nurse is performing assessments on several newborns. Which of the following should be reported to the health care provider (HCP)? Select all that apply

- Chest wall retractions
- No bowel sounds immediately after birth
- No voiding in 24 hours
- Decreased muscle tone
- Sacral dimple with a small skin tag
- Single artery in the umbilical cord
- Peeling skin in a 42 week newborn

Resolve on its own



Newborn Vital Signs

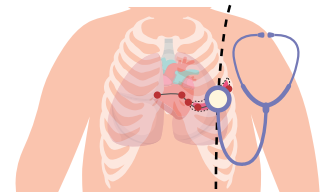
Assessed **every 30 min after birth** for 2 hours
Then every **4 - 8 hrs.** reassess

- **Heart rate** (resting - not crying)
 - 110 - 160 /min. We assess at the apical pulse listen for **1 full minute**
 - Put the **bell of the stethoscope** at the
 - **4th intercostal space - left midclavicular line**
- **Side note**
 - 80/min during rest
 - 180/min when crying or agitated
- **Respirations:**
 - 30 - 60 breaths/min - assess for 1 full minute
- **Axillary temperature:** (No rectal temp!)
 - 97.7-99.5 F (36.5-37.5 C)
- **Blood pressure:**
 - 73/55 mm Hg

Kaplan Question

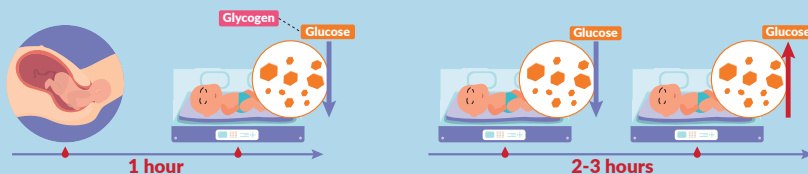
- ... **apical pulse** on a 8 lb 4 oz newborn infant. The nurse takes which action?
- Places the **bell of the stethoscope** at the **fourth intercostal space** at the **left midclavicular line**

4th intercostal space



Newborn Glucose Levels

During pregnancy the fetus stores large quantities of glycogen that are used during the transition to life outside the womb & into the world!
As a result glucose levels are decreased 1 hour after birth, then stabilize within 2 to 3 hours.



- **Blood glucose 40 or more** mg/dL **1 hour** after birth is expected
→ **encourage breastfeeding!**

HESI Question

- In most **healthy newborns**, blood glucose levels stabilize at **___mg/dL** during the **first hours** after birth.
- **50 - 60**

Medications

Eyes: **Erythromycin** ointment (given within 1 hour of birth)

Prevents Ophthalmia neonatorum (conjunctivitis) → **blindness** **HESI**

Thighs (Vastus Lateralis Muscle) **ATI**

- **Vitamin K:** helps produce clotting factors to prevent internal bleeding (given within 6 hours after birth)
- **Hepatitis B** vaccine: provides antibodies against Hep B (given within 24 hours after birth)

HESI Question

- administer vitamin K ..
- **Vastus lateralis muscle**

ATI Question

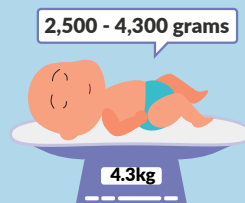
- vitamin K ...
- "The injection **prevents bleeding** as newborns have a higher risk."

Interventions for LGA

1. Assess for **birth injuries**
cephalhematoma, or clavicular fracture
2. Monitor for **hypoglycemia**
 - Blood glucose < 40 - 45 mg/dL **Report to HCP**
 - Glucose checks **prior to feedings**
 - Encourage **breast feeding every 2-3 hours**
 - Discuss the need for **feeding supplementation** if s/s of **hypoglycemia** occur

Body Measurements

- Head circumference: 33 - 35 cm
- Chest circumference: 30 - 33 cm
- Length: 45 - 55 cm
- Weight: 2,500 - 4,300 grams (5.5 to 9.5 lb)
 - SGA: less than 10th percentile
 - AGA: between 10th & 90th percentile
 - LGA: **over the 90th percentile**
 - Macrosomia: more than 4000 grams



Saunders Question

- ... the infant's weight is **4400 g...** may be at risk for which complications?
- **Hypoglycemia**
- **Fractured clavicle**
- **Congenital heart defect**

HESI Question

- ... **low birth weight (LBW)** based on which assessment finding?
- Weight is less than **2.5 lbs**

Newborn Complications I

Maternity

Hyperbilirubinemia

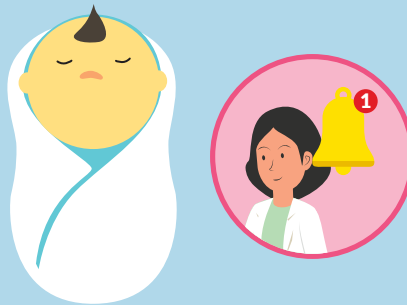
Hyperbilirubinemia, or **jaundice**, is the yellowing of skin from too much bilirubin - those dead RBCs in the blood.

Patho & Causes

- Pathologic
 - Structural defects in the liver → build up of bilirubin
- Physiologic
 - RBCs breakdown (from birth trauma) produces bilirubin
 - ◆ Immature & can't keep up hyperbilirubinemia → Jaundice
 - ◆ Can cause multisystem organ damage & irreparable brain damage

Signs & Symptoms

- Yellowish hues **Report to HCP**
 - Face or eyes (sclera)
 - Trunk & extremities



HESI Question

- ... **highest priority** to which finding?
- Skin color that is **slightly jaundiced** YES! Always report yellow skin!

Saunders Question

- Which **assessment finding** should alert the nurse to suspect the **potential for jaundice** in this infant?
- Presence of **cephalhematoma**

Treatment

Phototherapy - In the hospital setting most commonly include fiberoptic phototherapy blankets & pads. Bili lights (lamps) - where the baby is placed under heat lamps like a food item at a buffet

Treatment: Phototherapy

Nursing Interventions

1. Skin Care
 - Monitor **skin temperature** closely
 - **Reposition** every 2 hours
2. Dehydration risk → Give **fluids** every 2 hours
3. Eye care → Cover infants eyes with **protective pads**



ATI Question

- ... plan of care for an **infant receiving phototherapy**?
- Giving additional **fluids every two hours**

Hypothermia (cold stress)

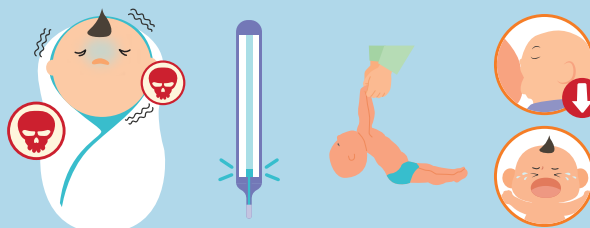
Cold babies with low body temperature, although easy to treat, it is VERY dangerous and can lead to hyperbilirubinemia, hypoxia (low oxygen), & hypoglycemia (low blood sugar)! This is because oxygen consumption and metabolism are increased leading to an unstable baby.

Signs & Symptoms 5 NCLEX TIPS

1. Altered mental status
"Irritability or lethargy"
2. Bradycardia, tachypnea & **hypoxia**
3. **Hypoglycemia** & feed intolerance
4. Hypotonia, weak suck & cry
5. **NO shivering** ability

Causes & Risk Factors

- Thin layer of subcutaneous fat
- Wet infant - Evaporation



HESI Question

Which signs indicate the need for placing the neonate in a **prewarmed radiant warmer**? Select all that apply.

- Hypotonia
- Bradycardia
- Feeding intolerance

ATI Question

- Q1:** Which of the following findings is **unexpected** when assessing a preterm newborn for **cold stress**?
- Shivering
- Q2:** ... cause of neonatal **hypoglycemia** in relation to **cold stress**?
- Increased metabolic rate

Newborn Complications II

Maternity

Hypothermia (cold stress)

Interventions 5 NCLEX TIPS

- **Skin-to-skin contact** newborn & mother
- **Dry the newborn** immediately after delivery & place hat
- Provide care under **radiant warmers**
- **Cover scale** with warmed blankets before weighing the newborn
- Use **prewarmed incubator** when transporting

Warm that baby up!

Remember a warm baby will decrease the risk for hypoglycemia, hypoxia, & hyperbilirubinemia!



ATI Question

The newborn infant is **pale** and **doesn't cry**... most appropriate **action**?

- Place the **infant in a radiant warmer** and **dry** him with a towel

Saunders Question

... **most effective in preventing heat loss** by evaporation?

- **Drying the infant** with a warm blanket

HESI Question

Which **nursing action** ... **immediately** following the vaginal birth?

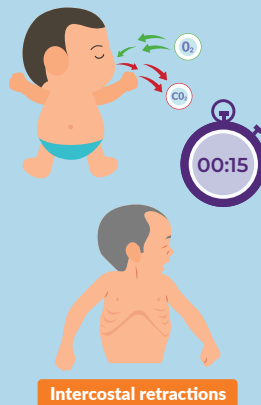
- **Drying the infant** on the mother's chest and then placing a hat on the infant

Hypoxia

As you know the newborn must transition quickly from a fluid-filled environment to an air-filled environment so the lungs must expand with the help of surfactant which prevents collapse of the alveoli within the lungs

Signs of Respiratory Distress

- Pathologic apnea
- **Intercostal retractions**
- Central **cyanosis**
- **Nasal flaring**
- Grunting, wheezing



Intercostal retractions

Causes

- Fluid or mucus obstruction
- Prematurity (lack of surfactant)
- Cardiac Defect (PDA or PFO)

Interventions

- Dry, stimulate, suction
- Support ventilation
- Give surfactant (Betamethasone)
- Monitor & Surgery

Hypoglycemia

Newborn blood glucose **should be kept above 40mg/dL at all times.**

Newborns are at risk for hypoglycemia because the placenta (the source of maternal glucose) is removed & the infant's pancreas is still producing insulin at a rate that matches the levels of maternal glucose during pregnancy.



Risk Factors

- Mom with **diabetes** (all types)
- **HYPOTHERMIA**
- Sepsis

Signs & Symptoms

- **Less than 40** mg/dL
- Shaking, sweating, & **irritability**
- **Lethargy**
- **High-pitched** or weak **cry**
- **Seizures**

Nursing Interventions

- **Breast feeding** is #1 !
- Identify high risk newborns
- Keep infant warm

Parent Education For Newborn Care & Circumcision Care

Maternity

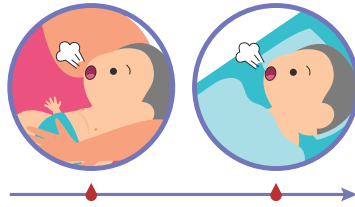
Parent Education For Newborn Care

Newborn GERD

Gastroesophageal Reflux Disease

NCLEX Key Points

- Burp **during & after** feeds
- Hold baby upright **20-30 minutes after each feeding**
- Offer **smaller, frequent** feeds



Kaplan Question

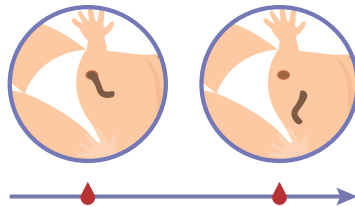
... newborn's umbilical cord... teaching is effective?

- "I will clean the cord and skin around it with water."
- "I will allow the cord to fall off on its own."

HESI Question

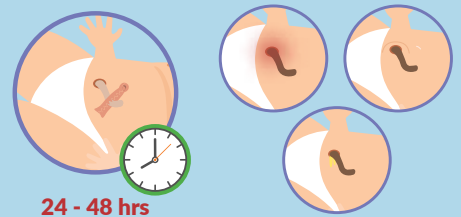
... newborn's cord care at home?

- Allow the cord to **air-dry** as much as possible



Umbilical Cord Care

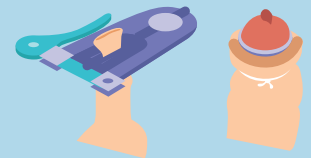
- **Goal:** prevent infection & hemorrhage
- **Interventions:**
 - 24-48 hrs: Cord clamp can be removed when cord is **DRY**
 - Clean cord stump with **WATER** and **AIR DRY (NOT Alcohol)**
 - Assess for **SIGNS OF INFECTION**
 - Redness
 - Swelling
 - Drainage
- **Parent Teaching:**
 - Fold **diaper down & away** from the stump
 - **NO bathing** in a tub (**submerged**) until cord stump falls off
 - Let cord **fall off on its own**
 - **DO NOT PULL CORD** (infection + hemorrhage risk)
 - **NO alcohol** to clean the cord only water



24 - 48 hrs

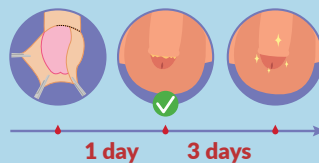
Circumcised & Uncircumcised

Newborn circumcision is an elective procedure that removes the foreskin from the male infant's penis using the clamp method or the plastic ring. It can be performed before discharge on the postpartum unit or on an outpatient basis with a pediatrician.

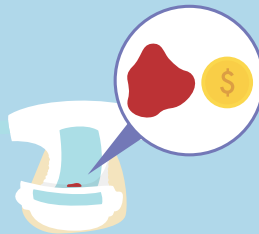


Nursing Care

1. Hand washing before care
2. **Petroleum Jelly** application at diaper changes
3. **Normal healing: yellow exudate** after the first day **NCLEX TIP**
4. Signs to report:
 - **Bleeding** exceeding the **size of a quarter**
 - Dry diaper or **No voiding 6 - 8 hours** after circumcision
5. Cleaning:
 - Warm water **without soap**
 - **AVOID** alcohol-based wipes or soap water



HCP



Kaplan Question

Which **action** should the nurse take immediately after the newborn is circumcised?

- Applies **petroleum gauze** and observes carefully for **bleeding**

ATI Question

... neonate who just underwent **circumcision**. If **bleeding** should occur, what is the **initial priority**?

- Use a **sterile gauze pad** to **apply light pressure** to the area

Saunders Question

... newborn after **circumcision** ... the circumcised area is **red with a small amount of blood drainage**. Which **nursing action** is most appropriate?

- Document the findings

Notes

NRP & NEC

Maternity

NRP - Neonatal Resuscitation Program

As you know, newborns are evaluated using APGAR immediately after birth. Any baby presenting unresponsive, or limp without spontaneous respirations should be immediately handled in the following way:

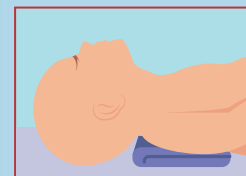
Indicator	0 Points	1 Point	2 Points
A Appearance (Skin color)	Blue; Pale	Pink Body; Blue Extremities	Pink
P Pulse	Absent	Below 100 bpm	Over 100 bpm
G Grimace (reflex irritability)	Floppy	Minimal Response to Stimulation	Prompt Response to Stimulation
A Activity (muscle tone)	Absent	Flexed Arms and Legs	Active
R Respiration	Absent	Slow and Irregular	Vigorous Cry



Critical Interventions

1. Place the **newborn on the warmer**
2. **Sniffing position** "appropriate for ventilating" **NCLEX TIP**
3. Suction airway
4. Dry & stimulate the newborn for **30 seconds**

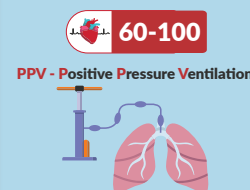
NCLEX TIP



Critical Interventions

Infant's heart rate

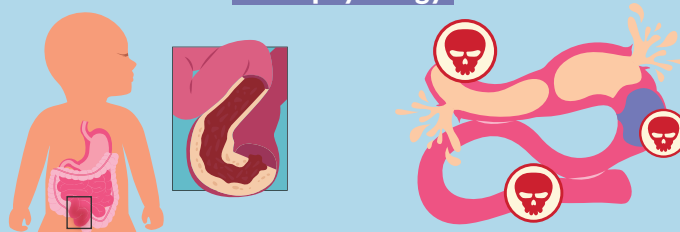
- **160 - 100/ minute** → **Positive Pressure Ventilation (PPV)** **NCLEX TIP**
- Below 60/ minute
 - Epinephrine
 - **Chest compression** **30 seconds after quality PPV** (heart rate remains less than 60)



Necrotizing Enterocolitis

This is an inflammatory disease of the gastrointestinal mucosa due to ischemia (low oxygenation), resulting in necrosis (dead tissue within the GI tract), & perforation of the bowel (basically an explosion of the bowel).

Pathophysiology



Signs & symptoms

- Feeding intolerance
- Abdominal distention
- Bloody stools

Risk Factors

- Prematurity
- Polycythemia
- Myelomeningocele



20 - 37 weeks

HESI Question

Which are **risk factors for necrotizing enterocolitis (NEC)** in **preterm** infants? Select all that apply.

- Polycythemia
- Myelomeningocele

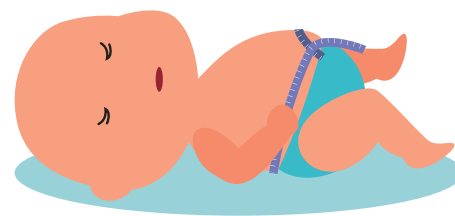
ATI Question

... **necrotizing enterocolitis (NEC)**. Which of the following findings should the nurse recognize as a **risk factor**?

- Gestational age of 35 weeks

Nursing Interventions

- Daily abdominal girth measurements **NCLEX TIP**



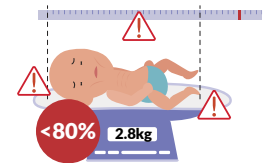
FTT & FAS

Maternity

FTT - Failure To Thrive

This growth failure is defined as a state of malnutrition, inadequate growth, or weight **less than 80%** ideal for age **within the first 3 years of life**.

The first **3 years** of life



Causes & Risk Factors

Socioeconomic

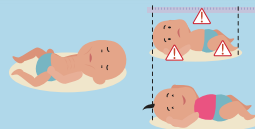
- Poverty: "unemployed"
- Primary caregiver **cognitive disabilities**
- **Abuse**: child or spousal
- Lack of nutritional knowledge
- **Parents social or emotional isolation**

Physiological

- **Anorexia nervosa** prior to having children
- Preterm birth
- Breast feeding difficulties
- Gastroesophageal reflux
- Cleft Palate

Signs & Symptoms:

- Signs of malnutrition
- Developmental delays
- Abnormal feeding behaviors
- Increased metabolism
- No eye contact



ATI Question

... **failure to thrive**. Which of the following **findings** should the nurse anticipate in this infant?

- The infant will avoid making eye contact

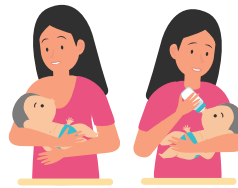
HESI Question

What **clinical manifestations** would the nurse expect in an infant diagnosed with **failure to thrive**?

- Malnutrition, developmental delays, feeding disorders

Nursing Interventions

- **Observe the child feeding** **NCLEX TIP**
- Develop a structured routine for bathing, sleeping, and playing
- Assess overall parenting skill



Kaplan Question

... **failure to thrive**... The nurse instructs the toddler's parents about mealtimes. Which **suggestion by the nurse is most appropriate**?

- Develop a **structured routine** for bathing, sleeping, and playing

FAS - Fetal Alcohol Syndrome

Fetal exposure to alcohol (**from maternal drinking**) is the leading cause of intellectual disability and developmental delay in the US.

Risk factors

NCLEX TIP

- ANY alcohol consumption in pregnancy

Signs & Symptoms

- Intellectual disability
- Developmental delay
 - **Hypotonia** (weak muscle tone)
 - **Poor sucking** reflex & feeding
 - Abnormal **palmar creases**
- Infant **irritability**
- **Minimal** response to stimuli
- **Distinct facial characteristics** **NCLEX TIPS**
 - Indistinct philtrum
 - Thin upper lip
 - Short palpebral fissures
 - Epicanthal folds
 - Flat midface

HESI Question

Prenatal exposure to which substance can result in **craniofacial anomalies in the newborn**?

- Alcohol

Saunders Question

Q1: ... **hypotonia, irritability, and a poor sucking reflex** in a full-term newborn ... The nurse suspects **fetal alcohol syndrome** and is aware that which additional sign would be consistent with this syndrome?

- **Abnormal palmar creases**

Q2: ... monitoring a **newborn born** to a client who abuses alcohol. Which findings should the nurse expect ...?

- **Irritability**
- **Minimal response to stimuli**

Diagnostics

- History of prenatal **alcohol exposure**
- Growth deficiency
- Neurological symptoms like **microcephaly**

Nursing Interventions

- Educate the mother on **NO alcohol consumption during pregnancy**
- Monitor the newborn's **response to feeding & weight gain pattern**



NCLEX TIP



NAS & RDS

Maternity

NAS - Neonatal Abstinence Syndrome

This results from habitual use of opioids or illicit drugs during pregnancy. Opioid abuse including those with the O's like HydrOCoDOne, MethadOne, mOrphine & even HerOin, but sedatives like benzOs can also contribute to this condition.

Symptoms typically present within 24-72 hours of birth, but can take days to weeks to appear.



Kaplan Question

... newborn delivered by a client addicted to narcotics. At which time is the nurse most likely to observe symptoms of narcotic withdrawal?

- Within 24-72 hours after birth

Pathophysiology

Signs & Symptoms

- CNS findings: Irritability, restlessness, high-pitched cry, abnormal sleep pattern (sleeping very short intervals)
- ANS findings: nasal congestion & frequent sneezing, tachypnea
- GI: poor feeding & diarrhea "loose stools"

Nursing Interventions:

- Swaddle and gently rock
- Side-lying position for feeding ATI
- Small, frequent feedings
- Skin protectants

ATI Question

... mother who used oxycodone daily during pregnancy. Which of the following is indicated in infants with neonatal abstinence syndrome?

- Swaddling the newborn and placing in a side-lying position for feedings

HESI Question

The nurse is caring for a newborn with a high-pitched cry, tremors, diarrhea, poor feeding, tachypnea, nasal stuffiness... What is the most common reason for these symptoms in a neonate?

- Drug withdrawal

RDS - Respiratory Distress Syndrome

This is a very **SERIOUS** respiratory disorder in newborns that is typically due to lung immaturity related to surfactant deficiency! As you know, surfactant helps the baby's lungs to be lubricated & expand in order to help get oxygen in!

Most full term babies can naturally produce surfactant, but is not always the case with premature infants.

Mature lungs in a baby have a 2 to 1 L:S ratio - the Lecithin Sphingomyelin ratio unless mom has diabetes - which delays surfactant production

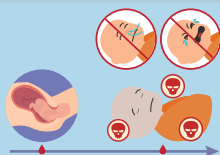
Pathophysiology

Risk Factors

- Preterm birth KAPLAN
- IUGR - Intrauterine growth restriction
- PPRM
- Maternal DM, HTN, or drug use
- Neonatal sepsis

Signs & Symptoms

- Absent breathing or crying at birth HESI
- Nasal flaring
- Intercostal retractions
- Audible grunting
- Cyanosis & Tachypnea



Saunders Question

... monitoring a preterm newborn for respiratory distress syndrome. Which assessment finding should alert the nurse to the possibility of this syndrome? Select all that apply.

- Cyanosis
- Tachypnea
- Retractions
- Audible grunts

HESI Question

Which infant behavior would the nurse recognize as indicating respiratory distress?

- Absent cry after birth

Diagnostics:

- Silverman-Anderson Index HESI

Nursing Interventions

- Steroids
- Betamethasone
- Surfactant (via ET tube) HESI
- Admit to NICU for stabilization

Feature	Score 1	Score 2	Score 3
Chest Movement	Equal	Respiratory Lag	Seesaw Respiratory
Intercostal Retraction	None	Minimal	Marked
Xiphoid Retraction	None	Minimal	Marked
Nasal Flaring	None	Minimal	Marked
Expiratory Grunt	None	Audible w/ stethoscope	Audible

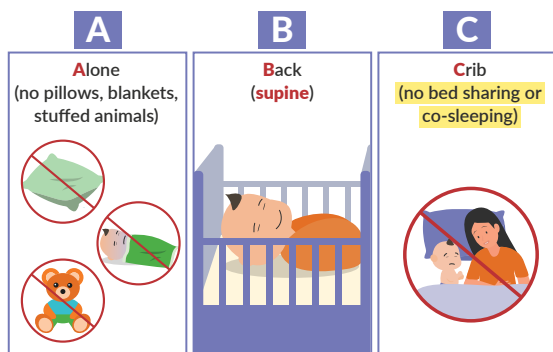
SIDS & Neonatal Sepsis

Maternity

SIDS - Sudden Infant Death Syndrome

Sudden Infant Death Syndrome is the unexpected death of an infant less than 1 year old. It occurs most frequently during sleeping in infants less than 6 months.

Memory Trick

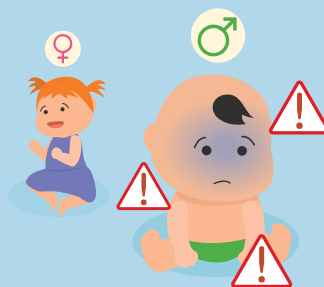


Educate Parents 6 NCLEX TIPS

- Place infants in **supine position during sleep**
 - “Put to sleep on their back” in a safe crib
 - Dress newborn in “wearable blanket” “sleep sack”
- Breastfeed** the infant
- Have up to date **vaccinations**
- Ensure a **smoke-free environment**
- Provide a **firm sleep surface** for the infant
- NO NO list**
 - Avoid** sleeping **with the infant** (**NO** bed sharing, **NO** cosleeping)
 - NO pillows**
 - NO loose or soft** items: blankets, toys, stuffed animals
 - NO bumper pads** on the sides of the crib

Risk factors

- Boys are at higher risk than girls
- Low **apgar** score at birth
- Infants with a **caregiver that smoke**



HESI Question

... high risk of developing **sudden infant death syndrome (SIDS)**?

- An infant whose **mother smokes**
- Infant with an **Apgar score of 4**

ATI Question

... **reduce the risk of SIDS** in infants?

- Placing the infant in the **supine position**

Neonatal Sepsis

Infection contracted by the neonate before, during, or after delivery, due to the newborn’s limited immunity and inability to localize infection, infections can spread quickly into the bloodstream.

Signs & Symptoms

- Lethargy**, irritability, poor muscle tone
- Respiratory distress: **Apnea or Tachypnea**
- Heart rate **instability**
- Temperature** instability
- Vomiting/diarrhea → **sunken fontanelles**
- Poor feeding**
- Blood glucose instability

HESI Question

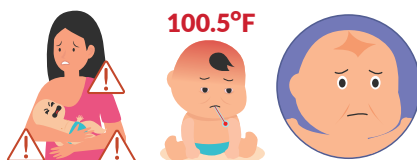
... **signs** of neonatal sepsis? Select all that apply.

- Lethargy**
- Tachypnea**
- Apnea**

ATI Question

... **immediately prioritized** for assessment and care?

- A 3-week-old infant who has been **feeding poorly** with a **temperature of 100.5 F** and **sunken fontanelle**



Risk Factors

- Premature** birth, **PROM**, prolonged labor
- Maternal **TORCH** infection
- Meconium** aspiration



Nursing Interventions

- Assess infection risks
- Draw labs/cultures
- IV access



Postpartum

Postpartum Assessment I

Maternity

Postpartum Assessment



POST-PARTUM ASSESSMENT "BUBBLE HE"

- B** Breast
- U** Uterus (fundus)
- B** Bladder
- B** Bowel
- L** Lochia
- E** Episiotomy
- H** Hemorrhoids
- E** Extremity (DVT signs)

B Breast

This assessment includes examining the areolas for cracking, tenderness, or masses and also assessing breastfeeding technique.



U Uterus (fundus)

Postpartum hemorrhage can happen rapidly and the client can bleed out. Remember, we **DO NOT** want a soft or boggy fundus. This indicates an increased risk for postpartum hemorrhage.

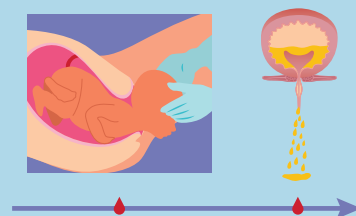


Postpartum hemorrhage

B Bladder

First, assess for bladder distension. Because a distended bladder can displace the fundus, making it more difficult for the uterus to get firm/contract, tell the client to empty their bladder shortly after delivery. A soft or boggy fundus increases the risk for hemorrhage.

Assess for Urinary Tract Infections (UTI) by asking about common symptoms including: dysuria, urinary urgency, and urinary frequency.



B Bowel

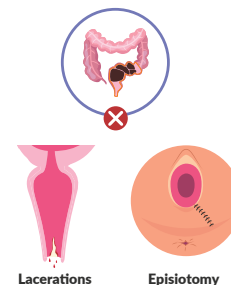
Auscultate bowel sounds and ask when the last bowel movement occurred.

The main goal is to prevent postpartum constipation, as we want to prevent straining.

Remember, the client may have stitches for lacerations or an episiotomy.

Any pressure from bearing down can cause immense pain and even rip stitches.

Teach clients to preventatively administer their stool softeners or laxatives and increase the 3 F's-Fluid, Fiber, and Freaking walk around man.



Lacerations

Episiotomy

L Lochia

Lochia is the vaginal discharge after birth containing a mixture of blood, mucus, and uterine tissue. Assess amount, color, odor, and size of clots. Normal signs include: a small-moderate amount of discharge that is Rubra (red). Abnormal findings that should be reported to the provider include:

- Large clots!
- Malodorous "Foul odor"
- Excessive bleeding: (soaking through 1 pad per hour)
- Check under the client for pooled lochia

Lochia Assessment

- Large clots!
- Malodorous "Foul odor"
- Excessive bleeding: **1 pad in 15 minutes**
- Check under the client for **pooled lochia**

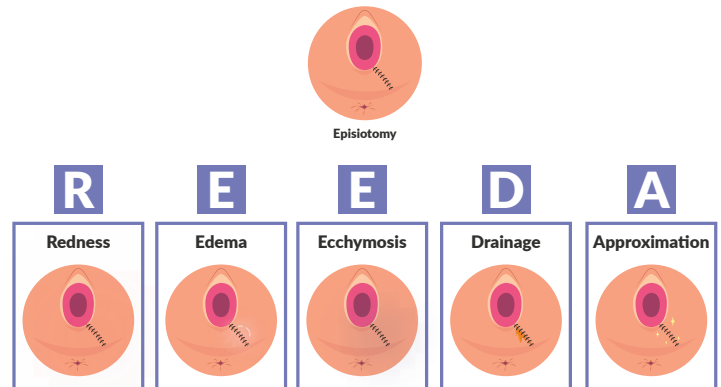
Postpartum Assessment II

Maternity

E Episiotomy

Episiotomy as you know is a surgical incision of the perineum between the vagina to anus. It's typically performed during delivery to prevent tearing & help to quickly enlarge the opening for the baby to pass through.

Use the memory trick **REEDA** for quick assessment of this wound:



H Hemorrhoids

Hemorrhoids are swollen veins in the lower rectum area that result from the pressure in this area during pregnancy. It causes much discomfort & minor bleeding.

As mentioned before, topical witch hazel is good for inflammation. Side note - a few resources use this H for Homan's sign to assess for DVT risk.

SIDE NOTE

H Homan's sign

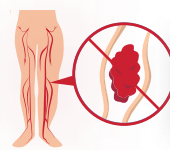


E Extremity (DVT signs)

This is where a blood clot forms in a deep vein, typically 1 of the legs, due to the hypercoagulable state of pregnancy.

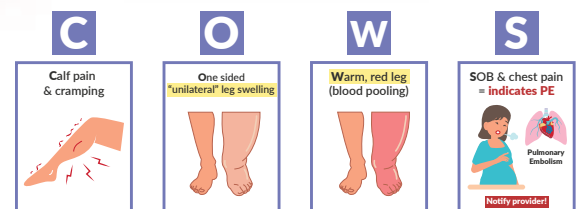
Three factors that contribute to DVTs in pregnant clients are:
Blood stasis - think of that **HUGE** uterus compressing vessels
Altered coagulation - thanks, hormones
Localized vascular damage from the recent birth!

In terms of assessment we use the acronym **cows** - since the affected leg beefs up like a little baby cow. All signs must be reported to the provider.



Complication for DVT

- **PE: Pulmonary Embolism**



Emotional wellbeing

Assessments to include:

- Emotional & psychological status (mainly sadness)
- Attachment
- Fatigue
- Affect disorders

Sadness can turn into postpartum depression even though depression typically manifests when the client gets back home. Make sure the mother is bonding with the infant & participating in the care of the newborn and look at social issues concerning the child.



Education

The BIG focus is on sex after labor, but we want to educate the mother about nutrition/ fluids and balancing rest & activity.

Teach the client to use condoms BEFORE menses returns NOT after, unless their goal is to **get pregnant again very soon!**

E Education

- **AVOID sex until:**
 - Vaginal discharge is white: **Lochia alba**
 - Episiotomy is healed
- OTC lubricants during sex
- Ovulation may occur **4 weeks** after delivery **BEFORE menses returns!**
- Use **contraception** (condoms) immediately!

Complications Postpartum I

Maternity

Infection

Infection is common postpartum. We already expect the mother to have elevated WBCs & a higher temperature after birth - this is normal.

Normally, WBCs are between 5,000-10,000, but postpartum, we may see a WBC count up to 30,000. This is expected after birth, but leukocyte counts that do not decrease require further evaluation.

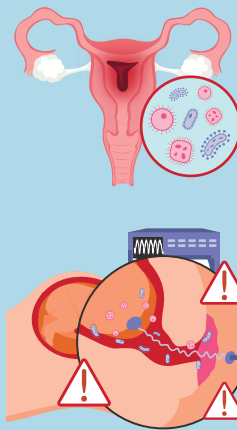
Endometritis

Pathophysiology

- Inflammation or irritation of the lining of the uterus caused by infection.

Causes & Risk Factors

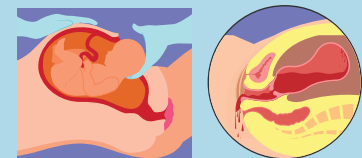
- Prolonged labor **NCLEX TIP**
- Prolonged rupture of membranes (water broke) **over 24 hours**
- Cesarean section delivery
- Internal fetal monitoring
- Postpartum hemorrhaging
- Retained placenta fragments



HESI Question

Which risk factors are associated with an **increased risk for postpartum infection**? Select all that apply.

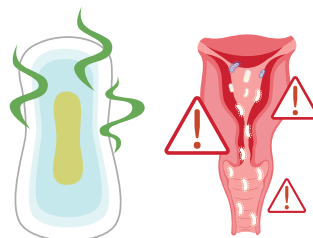
- Hematoma
- Prolonged labor
- Cesarean delivery
- Postpartum hemorrhage
- Prolonged rupture of membranes



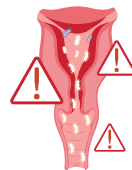
Endometritis

Signs & Symptoms

- Foul-smelling lochia "offensive" or "musty"
Report this! NCLEX TIP
- Fever (**Over 100.4 F**) within the first 24 hours
- **Elevated WBC** over 10,000 (leukocytosis)
- Tachycardia
- Uterine pain & **tenderness**



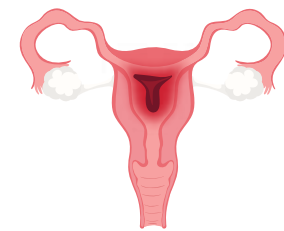
The **MOST** tested indicators of infection



HESI Question

... cesarean delivery reports **fever**, loss of appetite, **pelvic pain**, and **foul-smelling lochia**... **increased pulse rate** and **uterine tenderness**. Which clinical condition would the nurse suspect?

- Endometritis



Endometritis

Interventions

- Draw blood for culture & sensitivity (before antibiotics)
- Antibiotics: **Clindamycin NCLEX TIP**
- Good hand hygiene
- **Peri Care** (especially after an episiotomy)
 1. **Squeeze bottle with warm water**
 2. Wipe front to back
 3. Blot perineum dry



ATI Questions

Q1: Which of the following measures ... to **reduce the risk of infections**?

- Wash your hands before and after voiding
- Change the perineal pad from **front to back** after voiding

Q2: ... **episiotomy** after vaginal delivery ... proper **perineal care**?

- Use a **squeeze bottle with warm water** to keep the site clean

Q3: ... **heart rate of 100/min**, a temperature of 38.3 C (101 F), and dark **malodorous lochia**. The prescriber has entered orders to initiate antibiotics, obtain a blood specimen for culture and sensitivity, and administer a fluid bolus... most appropriate **initial intervention**?

- Draw blood for **culture and sensitivity**

Complications Postpartum II

Maternity

Mastitis

Mastitis

Pathophysiology

- **Inflammation** of breast tissue that can result from **poor breastfeeding** technique, inadequate **milk duct drainage** & may include infection.

Causes & Risk Factors

- **Blocked milk ducts**
- Poor **breastfeeding** technique (only sucking nipple & not entire areola)
- Poor **hand hygiene**

Signs & Symptoms

- Flu like symptoms
 - **Fever**
 - Muscle aches
- Unilateral **breast swelling**, pain & **inflammation** (redness, warmth, edema)

Mastitis

Interventions NCLEX TIPS

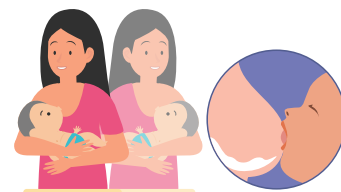
Breastfeeding

- Continue **breastfeeding frequently** (every 1-3 hrs)
"ensure complete emptying of the breasts"
- Teach **proper technique**:
Alternate feeding positions & **proper latch**
- Education:
 - Apply **warm compresses** to breast & massage
 - Increase **oral fluid intake**
 - **Wash hands** before & after feeding
 - **AVOID tight bras** or underwire bras
- Pharmacology:
 - **Antibiotics**: dicloxacillin, cephalexin
 - **Ibuprofen** or acetaminophen for pain

HESI Question

... **mastitis**. Which **instruction** should the nurse provide to this client?

- Breastfeed the infant, ensuring that **both breasts are completely emptied**



UTI - Urinary Tract Infection

UTI - Urinary Tract Infection

Pathophysiology

- Infection & inflammation of the urinary tract

Causes & Risk Factors

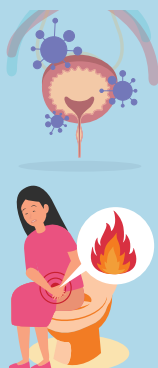
- Urinary catheters
- Cesarean section delivery
- Frequent pelvic exams

Symptoms

- **Burning** pain upon urination
- Urinary **urgency & frequency**
- Cloudy, foul odor in the urine
- Fever

Diagnostics

- UA: Urinalysis
 - Elevated WBC
 - Nitrites



UTI - Urinary Tract Infection

Treatment

- Antibiotics: **Levofloxacin**
- **Increase fluid** intake
- Cranberry juice
- **AVOID**:
 - Wiping back to front
 - Bubble baths
 - Spandex



DVT - Deep Vein Thrombosis

Pathophysiology

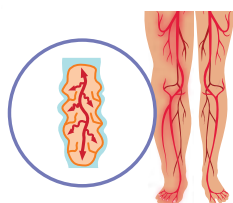
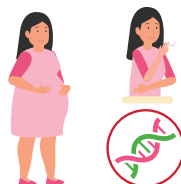
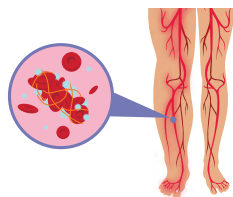
- A **DVT** is a blood clot in the deep vein, typically **1 leg**.
- Thrombophlebitis is an **inflammatory process** that causes a **blood clot to form** & block one or more veins.

Causes & Risk Factors

- Cesarean section (C-section)
- Obesity
- Smoking

Complication

- PE: Pulmonary Embolism



Signs & Symptoms

C Calf pain & cramping	O One sided "unilateral" leg swelling	W Warm, red leg (blood pooling)	S SOB & chest pain
----------------------------------	---	---	------------------------------

Treatments Prevention of DVT

C Calf exercises (flex toes in bed)	A Ambulate early & frequently ■ Avoid crossing legs ■ Avoid smoking & sitting for long (car, airplane, bedrest)	L Leg compression stockings (Tedd hose & SCD)	F Fluids increase (2 - 3 L per day)
---	---	---	---

Treatments During a DVT

D Do not walk or massage legs!	V Venous return (elevate the entire leg) NO pillows "under the knee" Entire leg must be elevated above heart	T Touch or leg massage AVOID!!!
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ATI Question

... **tenderness, warmth, and redness** of the **lower extremity**. Which of the following does this finding most likely represent?

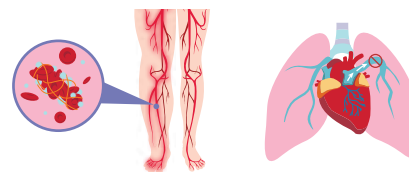
- Thrombophlebitis

Complications Postpartum III

Maternity

PE - Pulmonary Embolism

A major complication of a DVT is a **Pulmonary Embolism (PE)**. The DVT clot breaks loose from the leg & travels to the lungs! It can be very deadly, as it blocks blood flow to the lungs!



Signs & Symptoms

- #1 Sign = **Hypoxemia**
 - Restlessness
 - Agitation, anxiety
 - Mental status changes

Assessment **NCLEX TIP**

Obtain **oxygen saturation** reading by **pulse oximeter**

- Chest pain** "pleuritic chest pain"
- SOB & **Dyspnea**
- Tachypnea**
- Tachycardia**



Nursing Interventions

- Assess respiratory status
- Oxygen
- Notify the HCP!

Pharmacology

- Anticoagulants
 - Heparin
 - Warfarin (contraindicated during pregnancy)
- Thrombolytics "clot busters"
 - tPA
 - Alteplase
 - Streptokinase



Top Missed NCLEX Questions

While assessing a postpartum client **after a cesarean section**, the client reports **anxiety, pain**, appears **restless**, and **breathing quickly** with a **heart rate of 122**. What action should the nurse take first?

- Obtain **oxygen saturation** reading by pulse oximeter



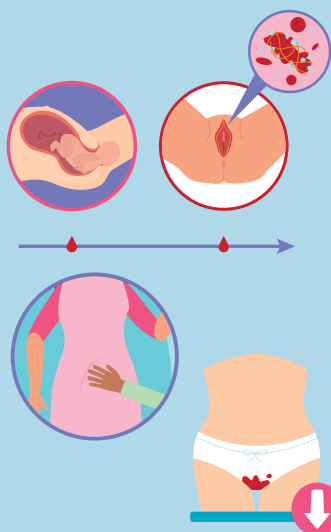
ATI Question

... a client at **12 weeks gestation** for treatment of a **deep vein thrombosis**. Which of the following medications is **contraindicated during pregnancy**?

- Warfarin**



Vaginal Hematoma



Pathophysiology

- A vaginal hematoma is formed when there is **trauma to the tissues of the perineum**

Causes & Risk Factors

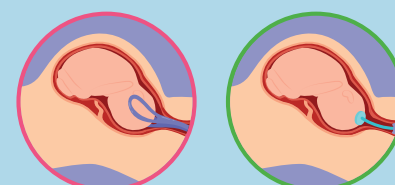
- Forceps or vacuum** assisted vaginal birth
- Episiotomy

Signs & Symptoms

- Persistent **severe vaginal pain**
- Feeling of **fullness**
- Firm, midline uterus
- Large hematomas:
 - Decreased hemoglobin levels (Hgb)
 - Vital sign changes: low BP, fast HR

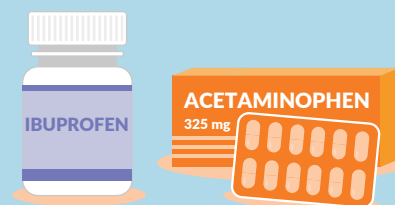
Interventions

- Cool compress
- Ibuprofen & acetaminophen



Forceps

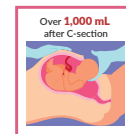
Vacuum



Postpartum Hemorrhage

Maternity

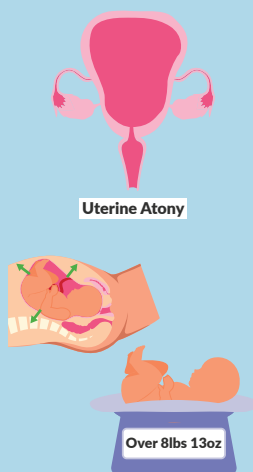
Massive bleeding after giving birth, defined as over 500mL blood loss after vaginal birth and over 1,000mL after C-section.



Causes & Risk Factors

Uterine Disorders

- **Uterine atony:**
Boggy soft uterus that fails to contract after birth
 - #1 intervention = **massage that fundus!**
 - Every 15 minutes x 1 - 2 hours
- **Overdistention** of the uterus:
 - **Macrosomia** (big baby over 8lbs 13 oz) **NCLEX TIP**
 - Multiple gestation (Twins, triplets, or more)
 - Multiparity (many pregnancies)
 - Polyhydramnios (excess amniotic fluid)
- Uterine fatigue (labor lasting **over 24 hours**)
- Uterine **rupture** or **inversion**: uterus tears or turns inside out
- **Precipitous** Labor: quick labor in 3 hour or less

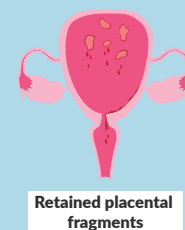


Medications

- **Magnesium sulfate**
- Terbutaline
- Inhaled anesthesia (general anesthesia)
- Prolonged use of **oxytocin**

Placental disorders:

- Placental abruption
- **Placenta Accreta**: placenta attaches to the **uterus too firmly**
- Retained **placental fragments** or fetal demise

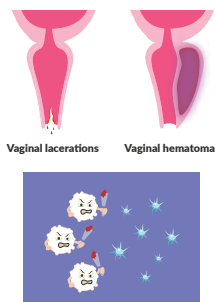


Trauma & HTN

- Vaginal **lacerations** & hematoma: use of forceps or vacuum
- Preeclampsia (hypertension)

Thrombin Disorders

- **DIC**: Disseminated Intravascular Coagulation
- **ITP**: Idiopathic Thrombocytopenic Purpura



ATI Questions

Q2:... postpartum hemorrhage. Which of the following may have **increased the risk** of the client's condition? Select all that apply.

- **Magnesium sulfate** during labor
- **Large** for gestational age neonate



Interventions

- Boggy, soft fundus
- **Saturated perineal pads** within 15 min. - 1 hour **Notify the HCP**
- **Heavy bleeding** with blood clots (days after birth)
Blood clots - **BIGGER** than a quarter
- Steady flow or **"constant oozing of blood"** from vagina
- H & H is **decreased**
HgB less than 7 = Heaven **NCLEX TIP**
- **Hemorrhagic shock** from excess bleeding:
 - Tachycardia & hypotension
 - **Cold clammy** skin
 - **Long capillary refill** time



HESI Question

Which is an early sign of hemorrhagic shock?

- **Capillary refill** time of 4 seconds



Start with fundal massage, then use meds to stop the bleeding. If that doesn't work, try a tamponade balloon next. A total or complete hysterectomy (removal of the entire uterus) can be performed as a last resort to stop postpartum hemorrhage.

- **Firmly massage** the fundus (every 15 min x 1-2 hours)
- Empty bladder
- IV fluids for hypotension & Start a **secondary IV line** for blood transfusion
- Pharmacology:
 1. Oxytocin bolus
 2. **Methylergonovine** (Methergine)
NOT for clients with high blood pressure **NCLEX TIP** (preeclampsia & pre-existing HTN)
- Misoprostol: **safe** for clients with hypertension **NCLEX TIP**

ATI Question

postpartum client ... blood pressure of **146/94 mm Hg**. Which of the following **prescriptions** should the nurse **clarify** with the provider?

- **Methylergonovine** 0.2 mg IM now

Postpartum Depression & Baby Blues Maternity

Postpartum mood disorders are classified into 3 buckets or classifications:

Postpartum Baby Blues

This is our small problem. It's the shortest in duration & typically resolved on its own.

Postpartum Depression (PPD)

Is the medium problem lasting longer & interventions are needed.

Postpartum Psychosis

Is the **BIG** problem, **VERY SEVERE!** Lasting the longest & early interventions are required for the safety, as mothers lose touch with reality.

Postpartum Baby Blues



Postpartum Depression

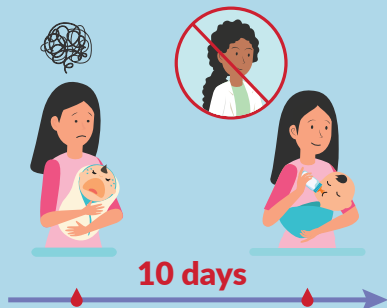


Postpartum Psychosis



Postpartum Baby Blues

- 10 days or less & resolves on its own
- Signs: (not debilitating)
 - Crying & sadness but don't know why
 - Fatigue, exhaustion



Postpartum Depression (PPD)

- 2 weeks or more
- Onset within 4 weeks after delivery
- Signs: (debilitating)
 - Anxiety, panic
 - Overwhelmed & stressed
 - Persistent sadness & mood swings
 - Apathy (loss of interest)
 - Decreased appetite & anorexia
 - Insomnia: Inability to sleep
- Requires interventions
 - Longer maternity leave
 - Depression therapy
 - Medication
 - More frequent follow ups

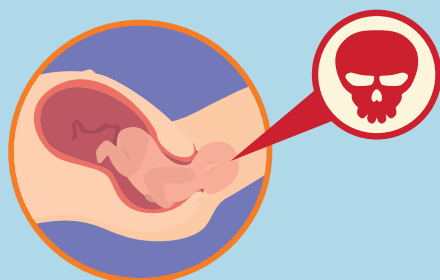


Postpartum Psychosis

- Within 2-3 weeks of delivery
- Risk factor: History of bipolar disorder
- Signs: (extremely debilitating)
 - Confusion
 - Delusions & hallucinations
 - Paranoia
 - HIGH RISK for harm "thought of harming self / baby"
- Immediate Interventions
 - Inpatient Hospitalization treatment: therapy & meds
 - Psychiatric care
 - Rule out other causes: Hypothyroidism
 - Counseling/ Talk therapy: "psychotherapy"
 - Meds:
 - Antidepressants
 - Antipsychotics
 - Mood stabilizers
 - ECT: Electroconvulsive therapy



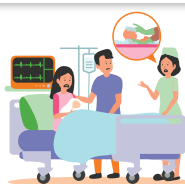
- Interventions: Fetal Demise
 - Stillborn infant who has died before or during delivery.



This is very traumatic for both the parents & family members. It requires specific therapeutic interventions.

4 NCLEX TIPS

- Allow parents to stay with the baby as long as they want
- Ask the parents if they would like to help bathe the infant
- Encourage the parents and family members to hold the infant
- Offer to obtain handprints, footprints, & photographs of the infant



HESI Question

- Which priority action would be most beneficial in helping a couple cope with fetal loss after the delivery of a stillborn?
- Allow the parents to hold and view the baby after delivery if they so request

Adoption Interventions

4 NCLEX TIPS

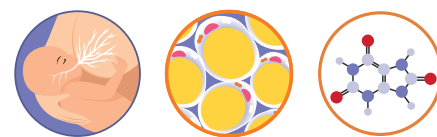
- Alert other staff of the adoption plan
- Acknowledge adoption plan EARLY (before birth)
 - This encourages the client to express emotions & be involved in decision-making
- Encourage the birth mother to hold the newborn, take pictures, & offer the birth mother a chance to say goodbye
- Use phrases & words that portray adoption as a decision of love, not abandonment
 - AVOID: "giving up" "giving away" your baby
 - Use: "choosing adoption"



Breastfeeding I

Maternity

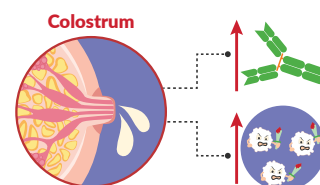
Breastfeeding is very important for both the mother & newborn. NOT ONLY does it contain powerful nutrients like fats, protein, & antibodies to which help strengthen the newborn's immune system to fight infection, as well as lowering rates of allergies, sudden infant death syndrome (SIDS), & other disorders! BUT, it also helps the mother & baby to bond with skin to skin - which should be done soon after birth.



Prolactin helps to produce milk and **oxytocin** helps with the let down of the milk. Breastfeeding helps the mother, too, primarily in reducing uterine bleeding & preventing severe postpartum hemorrhage. The act produces natural oxytocin release in the mother, which stimulates uterine contractions to prevent postpartum hemorrhage.



Along with other added benefits like reduced risk of certain cancers, osteoporosis, arthritis, heart disease, & other disorders. Initially, the breast makes **colostrum** - a yellowish fluid that is rich in antibodies. Immune cells coat the newborn's GI tract, helping the baby to pass meconium - the baby's first stool.



Colostrum is secreted during pregnancy & for 2-3 days after delivery. Milk is produced 3-5 days after delivery & has higher fat content than colostrum.

Correct Breastfeeding Technique

Before

1. **Wash hands** prior to feeding



Correct Breastfeeding Technique

During

2. **Good Latch:**
 - Baby's **mouth wide open** covering both the areola & the nipple
 - Ensure the **bottom of the areola** is in baby's mouth
 - **Nipple up** against the **roof of the mouth**
 - Baby's **tongue** against the **bottom of the areola**
 - Reposition the baby's latch → always use **1 finger to break the suction first**
- NCLEX TIP**

Correct Breastfeeding Technique

- Bad Latch:** Shallow latch
- Only the **tip of the nipple** inside the baby's mouth!
 - Causes **less milk flow** & nipple **soresness, cracking & bleeding**

- **Apply breast milk to sore nipples & allow to air dry**

SIDE NOTE

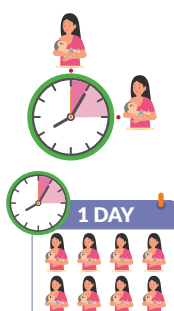
If the mother is unsuccessful, the first intervention is **EDUCATION & demonstration**. Do not go to bottle feeding first! Teach the mother good latch technique **FIRST** & don't let the NCLEX trick you with offering formula feeding first. This is wrong!



Correct Breastfeeding Technique

After

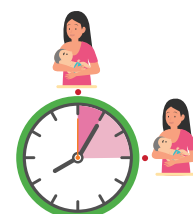
3. **Fully empty** the breasts with each feeding
Use a breast pump if needed
4. Initially: feed **every 1-3 hours**
x 8 - 12 feeds per day



ATI Question

... **initiating breastfeeding**. Which of the following should the nurse relay to this client?

- The mother should **awaken the baby at least every 3 hours** during the day to feed

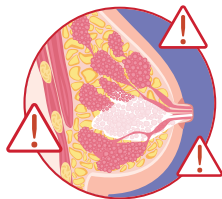
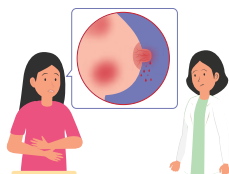


Breastfeeding II

Maternity

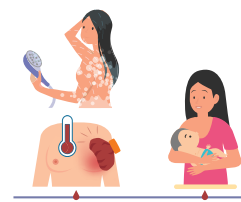
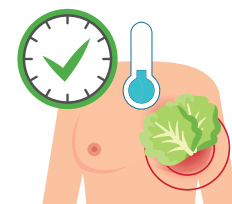
Education

- Encourage **fluid intake** for adequate milk production
- Wear a supportive bra
- Mastitis signs **Report to HCP**
 - Flu like symptoms
 - **Fever** & muscle aches
 - Unilateral **breast swelling**, pain & **inflammation** (redness, warmth, edema)
- Blocked milk duct
 - **Before** breastfeeding: Apply **warm compress** to breasts to open milk ducts & prevent blockage
 - **After**: Apply **cool** compresses



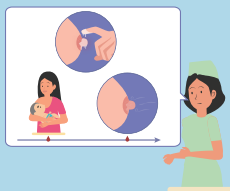
Education

- Breast engorgement
 - Feed or pump more regularly (at least every **1-3 hours**)
 - Recognize **feeding cues** from the baby: *rooting reflex, suckling motion, hand-to-mouth movements.*
 - Use **chilled, fresh cabbage leaves** on breasts throughout the day **NCLEX TIP**
 - **Before breastfeeding** or pumping: **Warm compresses or a warm shower**
 - Apply **breast milk to sore nipples** & allow to air dry after feeding



ATI Questions

- Q1: ... client is experiencing **engorgement**... most **appropriate response** from the nurse?
- **"Before you try to feed your baby again, take a warm shower"**
- Q2: ... breast discomfort and **engorgement**?
- The client should **apply a small amount of breast milk to sore nipples** and let them **air dry** after feeding



HESI Question

- Which **early feeding-readiness cues** are exhibited for a breastfed newborn? Select all that apply.
- **Rooting reflex**
 - **Suckling motions**
 - **Hand-to-mouth movements**



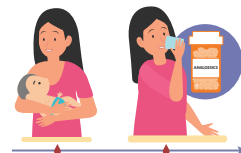
AVOID during breastfeeding

- Alcohol (wait **2 hours or more** after consumption to breastfeed)
- Smoking
- Drugs



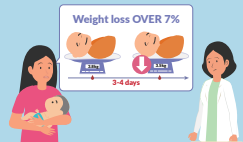
HESI Question

- ... taking **analgesics** ... and is anxious that the **medication may pass into her breast milk**
- Take the medication **immediately after breastfeeding**



Newborn weight loss during the first 3 to 4 days of life

- Normal newborn weight loss is 5 - 6%
- **REPORT** weight loss **OVER 7%** within **3 to 4 days of life** **NCLEX TIP**

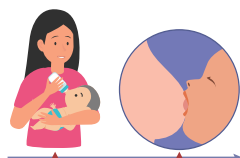


Infant Formula

7 Rules & NCLEX TIPS

1. **Wash the top** of formula cans **before opening**
2. **Refrigerate** unused formula & **discard after 48 hours**
3. **Throw away leftover** formula after feeding
4. **Boil or wash in a dishwasher:** bottles, nipples, caps & other parts
5. Before feeding, **warm the formula & test the temperature** on the inner wrist before serving. It should be lukewarm, not hot!
6. **NEVER over dilute** or **over concentrate** the formula

- Breastfeeding support
- **Formula supplementation**



TOP TESTED



Prenatal Care

Pregnancy Assessment I

Maternity

Signs of Pregnancy

Presumptive signs mean you **MIGHT** be pregnant
 Probable signs mean you are **PROBABLY** pregnant
 Positive signs mean you are **DEFINITELY** pregnant

1. Presumptive signs
2. Probable signs
3. Positive signs



Presumptive Signs: Subjective "self-reported"

1. Amenorrhea (no period)
2. Nausea & vomiting
3. Quickening (movement)
4. Urinary frequency
5. Breast tenderness & fatigue



ATI Question

... **presumptive signs of pregnancy**. Which of the following findings should the nurse **expect the client to report**? Select all that apply.

- Amenorrhea
- Nausea and vomiting
- Quickening

HESI Question

- ... symptoms of pregnancy?
- Urinary frequency

Probable Signs: Objective Signs

- **Goodell's Sign:** cervical softening. "a soft cervix is a GOOD sign"
Memory trick: Goodell's = Good sign!
- **Chadwick's Sign:** blue/purple birth canal.
Memory trick: "Chad is a bully and he'll beat you black and blue!"
- **Hegar's Sign:** softening of the lower uterine segment.
Memory trick:
 H - Hegar is like a soft pillow uterus where the
 H - HEad GOes
- Ballottement
- **Positive Pregnancy HCG test:** elevated levels of HCG, but gestational trophoblastic disease can also cause this positive result

Goodell's = Good sign



ATI Question

... **bluish discoloration of the cervix** ... observed as early as 8-10 weeks... It is known as:

- Chadwick's sign

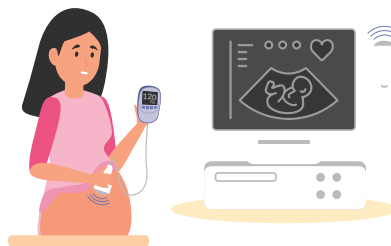
ATI Question

- ... **home pregnancy test**.
- Perform the test the **first time you urinate in the morning**

Positive signs: Diagnostic

1. **Fetal heartbeat** heard by **Doppler device** at 10 - 12 weeks **NCLEX TIP**
2. **Ultrasound** visualization of the fetus **NCLEX TIP**
3. Fetal movement (palpated or observed by HCP)

10 - 12 weeks



KAPLAN Question

- ... client is **certain of pregnancy** and reports feeling the **baby move**. Which response by the nurse is best?
- "Lie down so that I can **listen for the fetal heart tones with the Doppler.**"

Notes

Pregnancy Assessment II

Maternity

EDB (Expected Date of Birth)

This is also referred to as **EDD (expected due date)**. Determining this is vitally important because planning & interventions during pregnancy are based on this information. Labor induction & diagnosing preterm labor are two examples. The gold standard for determining EDB is the use of ultrasound technology.

EDB
(Expected Date of Birth)

Nägele's Rule
First day of LMP - 3 months + 7 days = EDB

Example Question 1
1. First day of LMP: April 1
2. Subtract - 3 months: January 1
3. Add + 7 Days: January 8 = **EDB January 8**

Example Question 2
1. First day of LMP: October 1
2. Subtract - 3 months: July 1
3. Add + 7 Days: July 8 = **EDB July 8**

Example Question 3
1. First day of LMP: June 25
2. Subtract - 3 months: March 25
3. Add + 7 Days: April 1 = **EDB April 1**

EDB

1st day of LMP - 3 month + 7 days

Don't let
NCLEX
TRICK YOU

Nägele's Rule

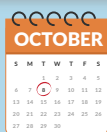
1st day of **LMP** (last menstrual period)
- 3 months
+ 7 days
= **EDB** (estimated date of birth)

1st day of the last menstrual period

ATI Question

... reporting that her **last menstrual period** began on **January 1** and ended on January 5. She notes she had unprotected intercourse on January 15 and some spotting on January 22. According to **Naegel's rule**, which of the following is the **estimated date of delivery**?

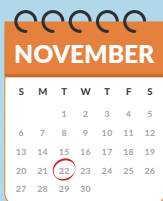
▪ **October 8**



HESI Question

... **last menstrual period** began on **February 15** and that previously her periods were regular (28 day cycles). what is this client's ... **expected date of birth**?

▪ **November 22**



Top Missed NCLEX Question

A client presents to the hospital stating that she tested **positive on a home pregnancy test**. The client's **last menstrual period was August 7**. Today is **November 7**. Which of the following options are correct for this client?
Select all that apply.

- ✓ Expected date of delivery is **May 14**
- ✓ Auscultation of the fetal heartbeat via Doppler is possible
- ✓ Urinary frequency is a common

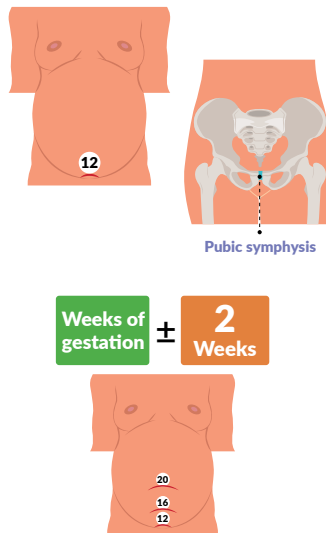
12 weeks

Pregnancy Assessment III

Maternity

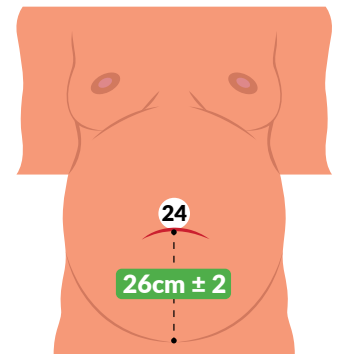
Uterine Growth & Fundal Height

- 12 weeks** - above the symphysis pubis **NCLEX TIP**
- 16 weeks** - Halfway between the symphysis pubis and umbilicus
- 20 weeks** - At the umbilicus
Memory Trick
Fundal height (in cm) should = weeks of gestation + or - 2 weeks.
- 36 weeks** - at Xiphoid process
- 38 - 40 weeks** - the fetus engages & the fundal height drops



ATI Question

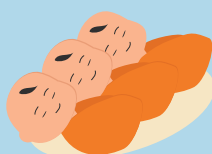
.. 24 weeks' gestation... most likely fundal height?
 ■ 26 cm



GTPAL Assessment

- G Gravidity:** (Gravida)
Number of pregnancies
Including: abortion, miscarriages & current pregnancy
 - **Nulligravida:** number of pregnancies is zero
 - **Primigravida:** the first pregnancy
 - **Multigravida:** the patient has been pregnant more than once
- P Para:** the number of deliveries after 20 weeks gestation
- T Term Births:** Number of births over 37 weeks
- P Preterm births:** the number of births between 20 - 37 weeks
- A Abortion** (or miscarriage)
- L Living Children:** Live births

Number of live births **1**



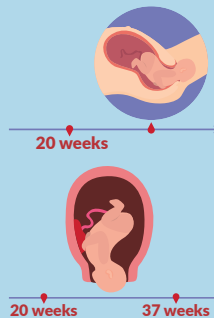
Number of pregnancies **0**



Number of pregnancies **1**



Number of deliveries **1**



ATI Question

... a nurse reads the following data: **G2 T1 P0 A1 L1**. Based on this information, what does the nurse know is true about the client? Select all that apply.

- The client has delivered **one newborn at term**
- The client has had **no preterm deliveries**
- The client has had **two prior pregnancies**
- The client has **one living child**

KAPLAN Question

A client is **pregnant for the third time**. The client has **one living child** and has had **one abortion**. Which description does the nurse record?

- **G3, L1, A1**

Top Missed NCLEX Question

A client is being seen in the pregnancy clinic for a new pregnancy. Last year she had a **spontaneous abortion at 3 months gestation**. What will the nurse document in the client's chart regarding her GTPAL?

- ✓ **G2 T0 P0 A1 L0**

Notes

Discomforts of Pregnancy I

Fundamentals of Nursing

Morning sickness

Nausea during the **first trimester**

Interventions

- Consume **high-protein snacks** upon awakening **NCLEX TIP**
- **Small** frequent meals
- Drink fluids **between meals** (30 minutes before or after)
- Ginger
- Vitamin B6



HESI question

... pregnant client experiencing **nausea and vomiting**?

- Eat small, frequent meals (every 2 to 3 hours)

ATI question

morning sickness ... appropriate nursing response?

- Advise the client to **consume a high-protein snack** when she awakes

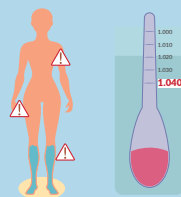


Hyperemesis gravidarum

- Persistent nausea & vomiting **PAST 12 weeks** → considerable **weight loss** (5% pre-preg weight), fluid/electrolyte imbalance, & malnutrition.

Signs & Symptoms

- Excessive vomiting → dehydration
- Electrolyte imbalance (**hypokalemia**)
- Urine Analysis **NCLEX TIP**
 - **Ketonuria** (Ketones in the urine)
 - **High specific gravity**
- Weight loss & nutritional deficits



ATI question

... **severe hyperemesis gravidarum**... manifestation of this condition?

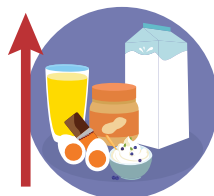
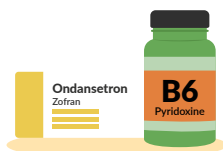
- **Urine ketones** present



Hyperemesis gravidarum

Interventions

- Monitor: weight and I&Os
- IV fluids
- Antiemetics:
 - Ondansetron
 - Pyridoxine (B6) Vitamin
- Increase → dairy, lemon water, & protein



HESI question

... self-management for .. **hyperemesis**? Select all that apply.

- Try to **eat more dairy**
- Consume **protein** after eating a sweet snack
- Try drinking your **water with a slice lemon**

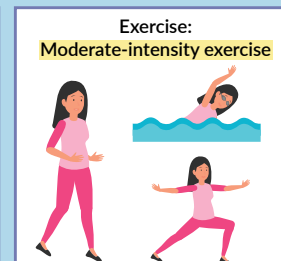
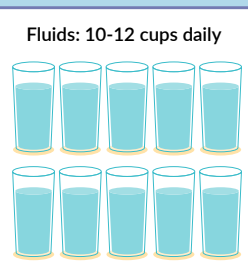
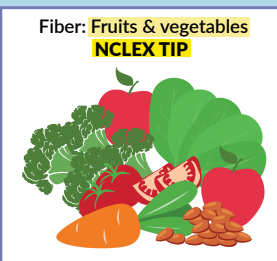


Constipation

- Increased progesterone levels **decreased GI motility** & slowed further by **iron supplementation**.

AVOID:

- **Dairy**: 2 hrs before & 1 hr after **iron supplement** → **decreases absorption**
- **Laxatives & stool softeners**: dehydration & electrolyte imbalance
- **Caffeine**: limited to 200-300mg daily



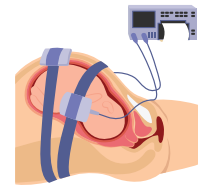
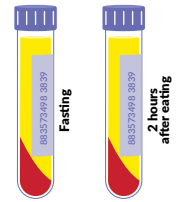
Treatments:
Increase

Discomforts of Pregnancy II

Fundamentals of Nursing

Intrahepatic Cholestasis

- Liver disorder during pregnancy
 - Generalized **itching** on hands & feet that worsens at **night** but **no rash** **NCLEX TIP**
 - Increases **the risk of fetal death**
- Priority Assessments & Interventions
 - Bile acid testing
 - Fetal monitoring
 - Ursodeoxycholic acid



UTI

Signs & Symptoms

- Urinary **frequency**, urgency, **burning** & foul-smelling urine

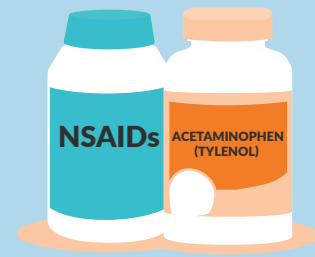
*"Running to the bathroom **all the time**"*
*"**Pain** during urination with **smelly** urine"*

- Pyelonephritis (Kidney Infection)

Report: Fever or pain in the lower back or flank area **NCLEX TIP**
 → increased risk for **preterm labor**.

Treatment

Antibiotics & give analgesics for the pain



Heartburn (Pyrosis)

Education **2 NCLEX TIPS**

1. Eat several **small meals** each **day** (6 per day)
2. **Eliminate** fried fatty foods
3. **Other Interventions**
 - Keep **head of bed elevated** using pillows
 - **Avoid** lying down immediately after eating
 - **Avoid** tight-fitting clothes
 - No caffeine, **chocolate**, **peppermint** & spicy food



ATI question

... 23 weeks' gestation with a complaint of significant **heartburn**?

- **Eat 6 small meals daily**



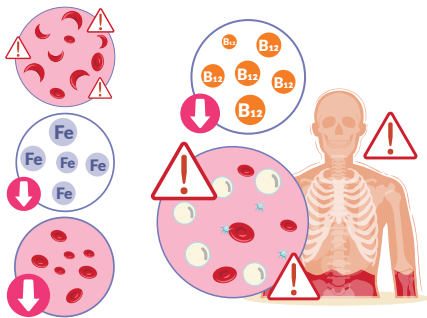
Notes

Anemia & Pica I

Maternity

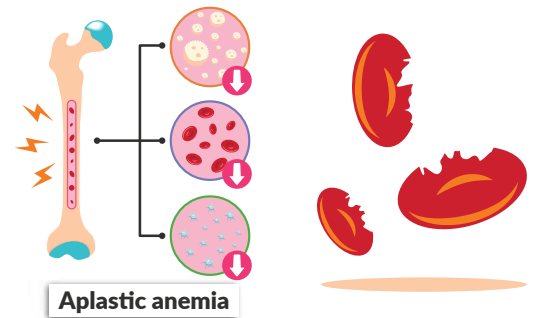
Anemia

The body **lacks adequate RBCs (Red Blood Cells) to carry oxygen** around the body to perfuse the tissues. Clients present fatigued, pale skinned, dizzy, and with shortness of breath, as the body lacks oxygen.



Top Tested

- Iron deficiency Anemia**
- Sickle cell anemia**
- Pernicious Anemia
- Aplastic anemia
 - Impairment in bone marrow
 - **Pan**cytopenia (Low RBC, WBC, Platelets)
- Hemolytic anemia
 - Destruction of RBCs
 - Incompatible blood transfusion (antigen-antibody reactions)



Anemia Causes

- **Blood loss:** surgery, trauma, excessive menstruation etc.
- **Chemotherapy & Immunosuppressants:** suppresses the bone marrow where the RBCs are made.
- **Lack of iron, B12 & other building blocks:** like with iron def. anemia & pernicious anemia

NCLEX TIP

Hemoglobin

- Normal: 12 +
- Bad: 8 - 9
- **Less than 7 = Heaven**

Iron Deficiency Anemia - Causes

- **Diet low in:** meat, fish, & poultry
- Gastric bypass surgery
- **Pregnancy:** fetus stores iron
- **Pica**
 - **LOW hematocrit and hemoglobin levels** **NCLEX TIP**
- **Other Causes:**
 - Low vitamin B12
 - **Hypochlorhydria** (low stomach acid)
 - Gastric atrophy (Atrophic gastritis)

Infants & Children

1. Premature birth
2. Insufficient oral intake
3. **Excessive intake of milk** **NCLEX TIP**
4. Preterm infants **exclusively bottle-fed** with breast milk
5. **Vegan diet** **NCLEX TIP**
 1. Fortified breads & cereals
 2. **HIGH** iron foods with **HIGH vitamin C**
 3. Calcium & Vitamin D

Signs & Symptoms

GI Manifestations:

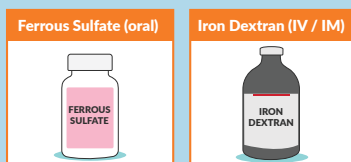
- Stomatitis - inflammation of mouth & lips
- Glossitis - inflammation of the tongue



Pharmacology

KEY POINTS

- Dark or black stools = **Normal & Expected** NOT GI BLEED
- Empty stomach **1 HOUR BEFORE** medications



Treatment

Rich in iron

1. Meat, fish, poultry
2. Green leafy veggies like spinach
3. Whole grains

Infants & Children

Limit **EXCESSIVE** milk intake

Iron + Vit. C

HIGH iron foods
HIGH vitamin C

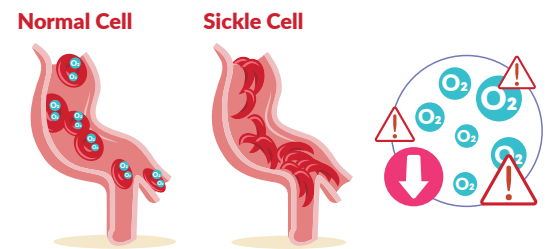


Anemia & Pica II

Maternity

Sickle Cell Anemia

The RBCs have a distorted shape, transforming from a nice round, plump shape to a **skinny, sucked in shape**. These misshapen RBCs die quicker than normal RBCs, **carry less oxygen** to the body, & get clogged in tiny blood vessels - **blocking or occluding the blood supply** & causing ischemia (low oxygen) to the organs. A vaso-occlusive crisis or "sickle cell crisis" can occur, causing **extreme pain** from the lack of oxygen!



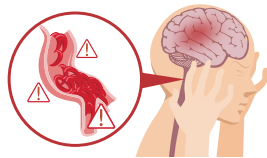
Signs & Symptoms

Blood Clot Manifestations

- **One-sided** arm weakness
- Swelling of the feet and hands (Dactylitis)

EXAM TIP

- **New-onset** paralysis of extremities
- **Sudden** inability to be aroused

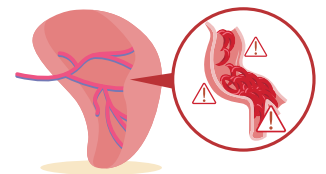


Complication

Splenic sequestration crisis

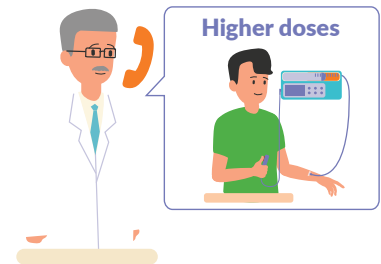
- Rapidly enlarging spleen
- Low blood pressure

Splenomegaly



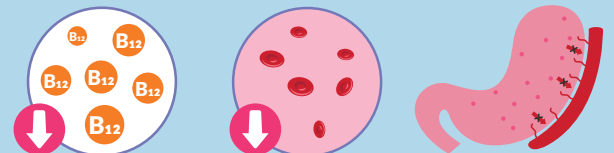
Treatment

- Hydration: **IV fluids**
- Bed rest
- **Pain Control NCLEX TIP**
 - PCA - patient control analgesia pump
 - **Call the HCP for Higher doses**



Pernicious Anemia

The body **cannot absorb B12**, which is a vital building block to create RBCs. Clients **lack intrinsic factor** in the GI tract, which **helps the body take in B12**.



Signs & Symptoms

- Glossitis: **EXAM TIP**
 - Inflamed red smooth tongue
- Extreme weakness
- Jaundice: "pale yellow skin"



Treatment

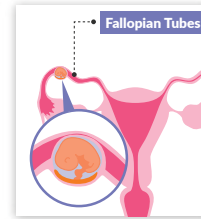
- **B12** - Injection: IM or IV
- **NOT orally (PO)**

Notes

Ectopic Pregnancy

Maternity

This occurs when a fertilized egg implants outside the uterus, most often in the fallopian tubes.

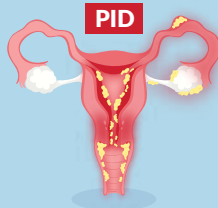


Memory Trick

- E** - Ectopic
- E** - Exit
(egg implants outside the uterus)

Risk factors

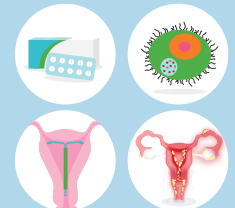
- Recurrent STIs (chlamydia)
- **PID**: Pelvic Inflammatory Disease
- Tubal surgeries, damage/scarring
- IUD



Saunders Question

... assessment findings predispose the client to an ectopic pregnancy? Select all that apply.

- Use of fertility medications
- History of Chlamydia
- Use of an IUD
- History of PID



Diagnostic

- Positive HCG test
- **Empty** uterus upon ultrasound

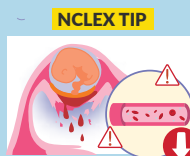


Signs & Symptoms

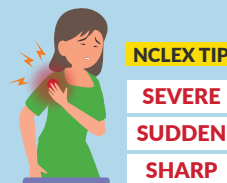
- Red vaginal spotting
- Positive urine pregnancy test
- 1 sided lower abdominal pain

Ruptured Ectopic Pregnancy

- Hypovolemic Shock **NCLEX TIP**
 - **Hypotension**: Low blood pressure
 - **Tachycardia**: Fast HR **over 100/min.**
 - **Dizziness**
- Shoulder pain
"Severe, Sudden, Sharp" **NCLEX TIP**
- Peritonitis
 - Rigid abdomen
 - Tenderness
 - Low grade fever 100.4



NCLEX TIP



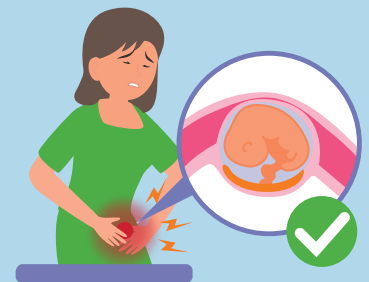
NCLEX TIP

- SEVERE**
- SUDDEN**
- SHARP**

ATI Question

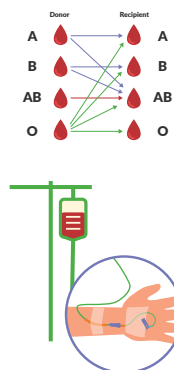
... client who has an **intrauterine device (IUD)**. reports **abrupt, sharp, lower abdominal pain** and bright **red vaginal bleeding**:

- Ectopic pregnancy



Interventions

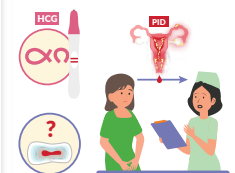
- **Monitor vitals** closely
- Prep for **blood transfusion**
 - Blood type & cross
 - Large bore IVs
- Prep for **surgery**



HESI Question

... severe lower left **abdominal pain** and **vaginal spotting**. Her last menstrual period was **5 weeks ago**... **next actions?**
Select all that apply.

- Check the **results of the HCG test**
- Ask the client to **describe the color of the vaginal bleeding**
- Ask the client if she has ever been diagnosed with **pelvic inflammatory disease**
- Draw the client's blood for a **type and crossmatch**



Gestational Diabetes

Fundamentals of Nursing

This is impaired blood glucose regulation due to hormonal changes during pregnancy including rising blood sugar levels & even insulin resistance. As you know glucose & insulin needs increase throughout pregnancy but now the insulin has trouble getting sugar into the cell with insulin. Unstable glucose levels during pregnancy can result in DANGEROUS effects on both the mother & the baby.



Newborn Complications NCLEX TIPS

- **Macrosomia** (Over 4,000 grams - 8 lbs 13 oz.)
- **Hypoglycemia** in the newborn
 - "Jitteriness"
 - Glucose 40 - 60 mg/dL → encourage breastfeeding!
- **Elevated Hematocrit** (polycythemia)
- Preterm labor & **PROM**
- **RDS**: Respiratory distress syndrome (**Immature lungs**)
- Fetal death: miscarriage & **stillbirth**



Saunders Question

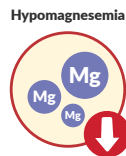
... at risk for developing gestational diabetes during this pregnancy?

- The client's last baby weighed 10 pounds at birth



Newborn Complications NCLEX TIPS

- **Hypomagnesemia** (low magnesium)
- Mother: **Pre-eclampsia** (hypertension)



HESI Questions

- Q1: ... maternal and neonatal risk associated with gestational diabetes mellitus?
- Maternal **preeclampsia** and fetal **macrosomia**
- Q2: ... associated with maternal diabetes?
- Decreased **magnesium**
 - **Hypoglycemia**
 - Respiratory distress syndrome



Risk Factors

- **Advanced maternal age (35+)**
- **Overweight (over 25 BMI)**
- **Multiple gestation:** twins, triplets etc.



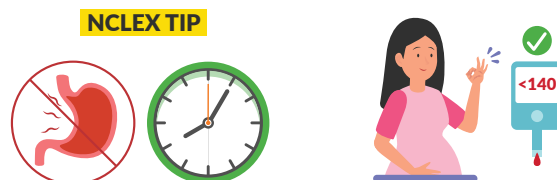
HESI Question

- ... increased risk for developing gestational diabetes?
- The client is **37 years old**
 - The client is having **twins**
 - The client's **pre-pregnant weight was 190 lbs/86 kgs**



Diagnostics

- 1 hour **Glucose Challenge Test (GCT)**
 - **No fasting is required initially** **NCLEX TIP**
 - **Less than 140 glucose = Normal**
 - **Over 140 glucose** → 3 hr GCT: **fasting** & hourly BG checks



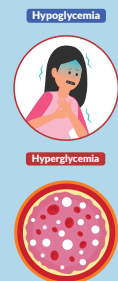
Signs & Symptoms

Hypoglycemia

- **Cool**, pale, headaches, tremors, **clammy**

Hyperglycemia

- **Polyuria** - Increased **Urine**
- **Polydipsia** - Increased **thirst**
- **Polyphagia** - Increased **eating**
- Drowsiness & constipation



Saunders Question

... newborn of a mother with diabetes melitus. What is the **priority nursing consideration**?

- **low blood glucose levels**

HESI Question

- ... symptoms of **hyperglycemia**? Select all that apply.
- Thirst
 - Drowsiness
 - Constipation



Treatment

- Increased fetal monitoring **NST: Non Stress Tests**
- **Diet & Exercise:**
 - Nutritional counseling: fruits, veggies, whole grains!
 - Eat every 3 - 4 hours
- **Meds:**
 - Oral meds
 - Insulin



Saunders Question

... gestational diabetes at **29 weeks**. Which information should the nurse discuss with the client? Select all that apply.

- Plan for **weekly non stress tests** at 32 weeks
- Obtain **nutritional counseling**

HESI Question

... gestational diabetes indicates an understanding?

- I will **not go more than 4 hours** throughout the day **without eating**

Kaplan Question

... gestational diabetes ... **teaching is effective** if the client selects which dessert?

- **Fresh fruit**

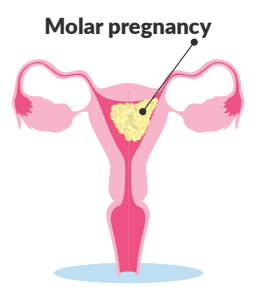


Hydatidiform Mole & Oligohydramnios

Maternity

Hydatidiform Mole

Also called **molar pregnancy** - is a type of gestational trophoblastic disease that results from abnormal fertilization. It causes rapid abnormal growth of villi in the placenta that form grape like clusters & can sometimes turn into choriocarcinoma - a type of fast growing cancer that can KILL the mother. **Very deadly!**



The sad part is that there is **NO baby** but these grape like clusters produce **HIGH amounts of HCG** which makes couples think there is a pregnancy but this pregnancy is completely non-viable at any point & the couple will have to be supported emotionally for their loss.

Signs & Symptoms

- **Dark, brown vaginal bleeding** "prune juice color"
- **Elevated hCG** levels



ATI Question

... molar pregnancy. Which of the following manifestations should the nurse expect?

- Dark brown vaginal discharge

Saunders Question

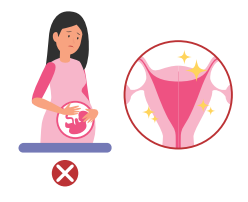
... hydatidiform mole ... which findings are associated? Select all that apply.

- Vaginal bleeding
- Excessive nausea and vomiting
- Elevated levels of hCG



Education

- **AVOID pregnancy** until cleared by HCP **NCLEX TIP**



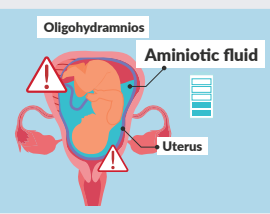
Treatment

- Uterine evacuation of pregnancy
- **Rhogam**: for clients with Rh-negative blood types

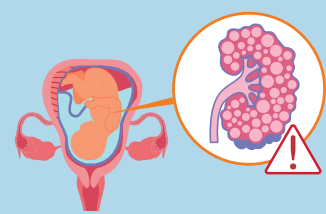


Oligohydramnios

Is a condition where there is low amniotic fluid volume within the uterus that **puts the baby at risk** for decreased lung development & cord compression! Fluid volume gradually declines after 41 weeks gestation.



Fetal kidney



Causes

- Undiagnosed **rupture of membranes (ROM)**
- **Fetal kidney** anomalies

Complications

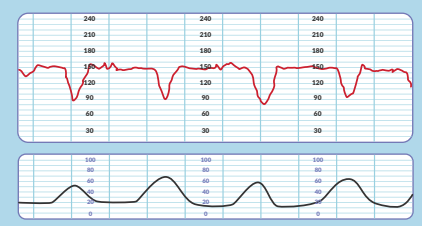
- **Pulmonary hypoplasia**: small, underdeveloped **fetal lungs**
- Umbilical **cord compression** → continuous fetal monitoring for **variable decels**

Interventions

- **Additional** neonatal personal present to help support with birth **NCLEX TIP**



Variable decelerations



Placenta Previa

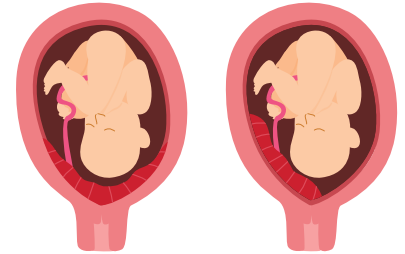
Maternity

Pathophysiology

This is the **abnormal implantation** of the placenta over the cervix either completely or partially at the bottom of the uterus. As you know, the cervix is the door to the baby condo which is now blocked by the placenta, making a normal vaginal delivery impossible.

As pregnancy progresses, the placenta grows in size & can migrate away from the cervical opening. This means it may resolve on its own by the 3rd trimester.

Therefore, additional ultrasounds are typically performed closer to the time of delivery - around 36 weeks to reassess placental location.



Complete previa

Partial previa

Causes & Risk factors

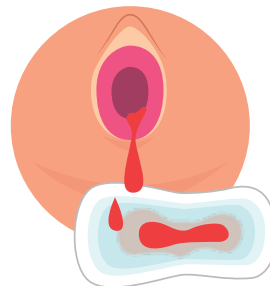
- Scar tissue
- Previous **cesarean section**, abortion, uterine surgery, multiparity (twins, triplets)
- Maternal age 35 or older
- Smoking



Age 35 or older

Signs & Symptoms

- **Painless** vaginal bleeding **"bright red"** **NCLEX TIP**
- Decreased H&H



ATI Question

... at 24 weeks ... **painless, bright red vaginal bleeding**. Which of the following conditions does the nurse suspect?

- Placenta previa

HESI Question

... after 20 weeks... **painless bright red vaginal bleeding**:

- Placenta previa

Kaplan Question

... at 29 weeks ... reporting **vaginal bleeding**... indicative of a **placenta previa**?

- "The bleeding scares me, other than that, **I feel fine**"

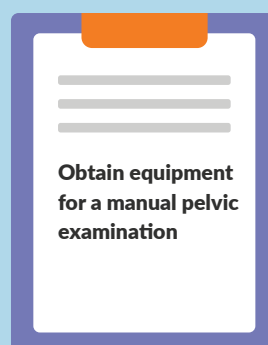
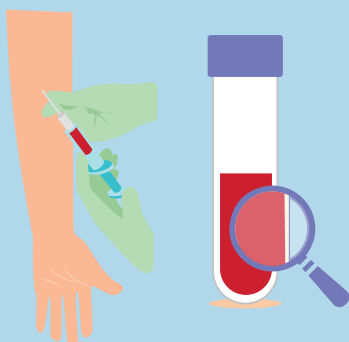
Interventions **NCLEX TIPS**

- Anticipate Blood Transfusion
 - Initiate **2 large-bore IV catheters**
 - **Draw blood** for type and screen
- **Pad counts** to assess for bleeding
- Electronic **fetal monitoring**
- **Cesarean** birth before the onset of labor
- **Betamethasone**: preterm newborns for lung development **ATI**
- **NO** vaginal exams, "digital exams"

Saunders's Question

... **placenta previa**... question which **prescription**?

- Obtain equipment for a **manual pelvic examination**



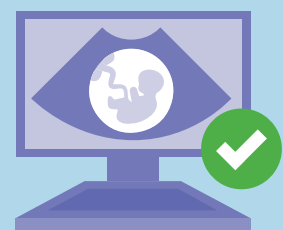
Obtain equipment for a manual pelvic examination

Education **NCLEX TIPS**

- Pelvic rest (**no sex**, **no douching**, **no vaginal examination**)
- **Additional ultrasound** around **36 weeks** gestation & prior to onset of labor

Discharge home

- Only if **bleeding stops** and **fetal status is reassuring**
- Instruct to **return to the hospital if bleeding occurs**
- **Bedrest**: decrease physical activity
- **Scheduled cesarean** birth before onset of labor



Placental Abruption

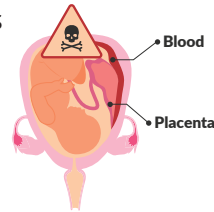
Maternity

Pathophysiology

It is a deadly condition where the placenta prematurely detaches from the uterine wall while the baby is still inside, like ripping off a scab.

It's either **partial detachment, complete, or concealed**. Either way, it results in the mother having **severe pain & major bleeding** in the uterus.

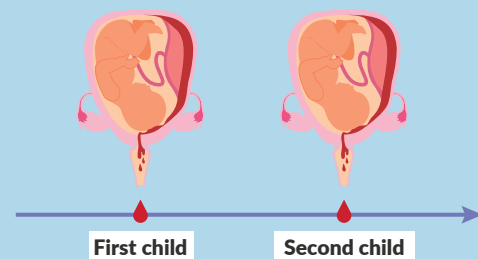
The fetus suffers from hypoxia (lack of oxygen), which can be deadly, as it has no means of getting oxygen or nutrients.



Placenta prematurely **detaches** from the **uterine wall** while the **baby is still inside**

Causes

- **Trauma:** motor vehicle accident, fall, blunt force trauma, etc.
- Hypertension
- Stimulants: **cocaine** & smoking
- **History** of previous abruption

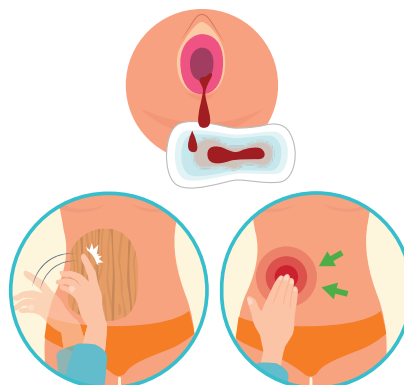


Signs & Symptoms Report to HCP

- **Dark red vaginal bleeding** **NCLEX TIP**
- Severe continuous **abdominal pain**
- **Rigid & tender uterus**
- Decreased H&H and **Hypovolemic shock**

For the baby

- Abnormal fetal heart patterns
- Uterine **tachysystole**



HESI Question

Which signs and symptoms ... with **abruptio placentae**? Select all that apply.

- Abdominal pain
- Vaginal bleeding
- Uterine tenderness

ATI Question

... **abruptio placentae** ... **complications** associated with this problem.. ?

- Hypovolemic shock

Interventions

Interventions 4 NCLEX TIPS

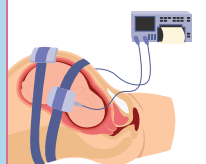
1

Anticipate **emergent cesarean birth**



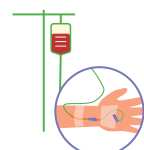
2

Apply continuous **external fetal monitoring**



3

IV access & draw blood for type and screen → **blood transfusion**



4

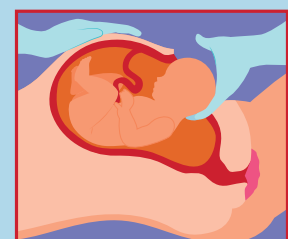
Monitor for **signs of hypovolemic shock**
Pallor, tachycardia, hypotension



Saunders Question

... **placental abruption** is present. Which intervention should the nurse prepare for?

- **Delivery** of the fetus



Notes

Preeclampsia & HELLP

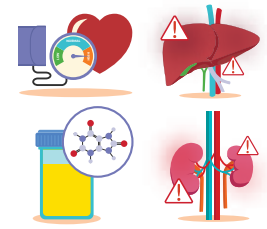
Maternity

Pathophysiology

Preeclampsia is a potentially dangerous complication of pregnancy characterized by high blood pressure, proteinuria, & signs of damage to other organs like the liver & kidneys.

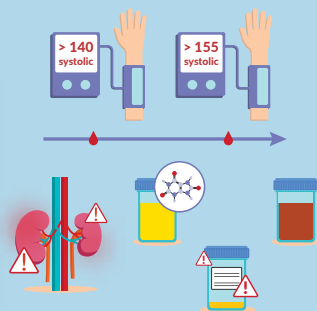
It can be deadly to both the baby & mother if left untreated.

Typically, it begins after 20 weeks of pregnancy in women with NORMAL blood pressure, often presenting with NO symptoms.



Signs & Symptoms

- **High blood pressure** (over 140/ systolic)
 - Increase in blood pressure of **15 mmHg** since last visit **NCLEX TIP**
- **Proteinuria**: Protein in the urine
- **Peripheral edema**: swelling in face & fingers
- **Weight gain** = Water gain
- Seizures (eclampsia)



Saunders Question

... mild preeclampsia ... call the HCP if which occurs?

- **Weight increases** by more than 1 pound in a week

REPORT



Complications

HELLP Syndrome

Hemolysis Elevated Liver enzymes Low Platelets

Critical Signs:

- **3rd trimester with** right upper quadrant pain, nausea & vomiting **NCLEX TIP**
- Epigastric pain

Other Complications from HTN

- Placental abruption: placenta prematurely detaches from the uterine wall

Report to HCP

Dark red vaginal bleeding **NCLEX TIP**

- Urine output **30ml/hr or less** = Kidney Distress! **Report to HCP**
- Persistent **headache** with **blurred vision**

HESI Question

... preeclampsia. Which statement would the nurse include in discharge teaching?

- **Return to the hospital** if you have epigastric pain

HESI Question

magnesium sulfate... discontinuing the therapy?

- Respiratory rate is **10 breaths/min**

HESI Question

... magnesium sulfate therapy... **drowsiness, slurred speech, and depressed respiration.** Which medication would the nurse anticipate ?

- Intravenous **calcium gluconate**

ATI Question

... **37 weeks' gestation.** The healthcare provider should be called immediately:

- Severe **headache** and **blurred vision**

Pharmacology

Magnesium Sulfate (Mellows the body)

Prevents seizures

8 NCLEX TIPS

1. Therapeutic range: **4 - 7 mEq/L**
2. Successful → Seizure activity stops

Toxicity Signs

3. Over **7 mEq/L = TOXIC!**
4. Low DTRs (Assess hourly)
 - Absent or decreased DTRs (**hyporeflexia**)
 - Example: **0/4 patellar reflex**
5. Low Vitals:
 - Respirations **less than 12 /min**
 - Low blood pressure & HR
 - Decreased mental status
6. Low urine output: **30 ml/hr or less** = kidney distress!

Treatment

7. **Stop** IV magnesium
8. Antidote: **Calcium gluconate** **NCLEX TIP**
Supplemental oxygen **8-10 L/min** by **facemask** & suction supplies ready

HESI Question

... severe preeclampsia ... on an intravenous infusion of magnesium sulfate. ... treatment is a success?

- **Seizures do not occur**

Antihypertensives

B Beta blockers

- Labetalol

C Calcium channel blockers

- Nifedipine
- Cardizem

V Vasodilators

- Hydralazine

Avoid the A's **NCLEX TIP**

- A** ACE inhibitors: Lisinopril, Enalapril

- A** ARBs: Losartan, Valsartan

ATI Questions

Q1: ... severe preeclampsia ... sign of magnesium sulfate toxicity? Select all that apply.

- Respiratory rate **less than 12/min**
- Decreased level of consciousness

ATI Questions

Q2: ... preeclampsia ... infusion of magnesium sulfate. Which of the following actions will be implemented? Select all that apply.

- **Monitor urine output**
- Assess **deep tendon reflexes**

Nursing Interventions

- Seizure Precautions:
 - **Hyperreflexia or clonus** → seizure activity is impending
 - **Seizure precautions** (padded bed, suction supplies, & oxygen)
 - Decrease environmental stimuli (dim lights & **limit visitors**) to minimize stimulation **NCLEX TIP**
- Ensure adequate protein intake

Saunders Question

... severe preeclampsia. Which nursing action should be included? Select all that apply.

- Keep the **room semi-dark**
- Initiate **seizure precautions**
- **Pad** the side rails of the bed
- **Avoid** environmental stimulation
- Reduce **external stimuli**

Toxoplasmosis & TORCH Infections

Maternity



TORCH is an acronym for a list of infections. Contraction of these infections pose a **GREAT RISK** to the fetus as they cross the placental barrier.

We will be covering only the top tested need to know key points here:

T	Toxoplasmosis
O	Other infections (Syphilis, chicken pox, mumps, HIV)
R	Rubella
C	CMV
H	Herpes

T TOXOPLASMOSIS

Parasitic infection

- **Cat feces** (litter box exposure)
- **Soil-contaminated** fruits & veggies (Educate clients who garden & eat homegrown vegetables) **NCLEX TIP**
- Raw or undercooked meat



ATI Question

... prevention of a TORCH infection.

- **Avoid** consuming **undercooked meat** while pregnant

HESI Question

Which infection could be contracted through contact with a cat?

- **Toxoplasmosis**

Kaplan Question

... **prenatal clinic**. The nurse is most concerned if a client makes which statement?

- "I clean the cat's litter box daily."

S SYPHILIS

Treatment

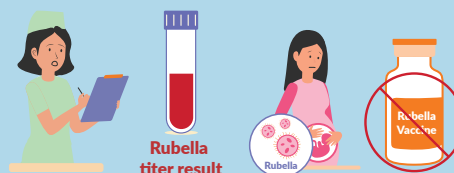
- IM penicillin injection
- Allergy to penicillin: **NCLEX TIP** *penicillin desensitization is required to receive appropriate treatment*

This is a sexually transmitted infection that crosses the placenta & may cause **birth defects**. All pregnant clients are screened at their initial prenatal visit and HIGH risk clients are screened again during their 3rd trimester & before labor!

R RUBELLA

KEY POINTS

- **No rubella vaccine** until **AFTER** childbirth
- If exposed: check rubella titer results immediately



ATI Question

... a **pregnant client is not immune to rubella**.

- **Do not provide the vaccine** to a pregnant client. The client cannot receive the vaccine until **after childbirth**

Saunders Question

A pregnant woman ... reports **exposure to a child with rubella**.

- I will check your **rubella titer results**, and we can **immediately identify** whether interventions are needed

H HERPES

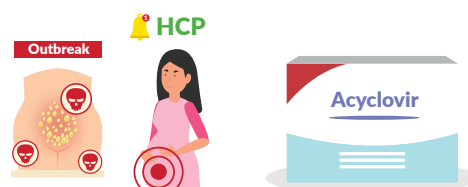
Active outbreak → **painful genital lesions**

Report to the HCP

Interventions

- Immediate antiviral therapy: **Acyclovir**
- Active lesions before delivery → **cesarean section**

Is another **STI** that presents with periods of remission & outbreak.



Saunders Question

... **positive history of genital herpes** but has **not had lesions during this pregnancy**. What should the nurse plan to tell the client?

- You will be **evaluated at the time of delivery for genital lesions** and if any are present, a **cesarean delivery will be needed**

Prenatal Care I

Fundamentals of Nursing

We must educate pregnant mothers on a variety of information.

AVOID Medications During Pregnancy

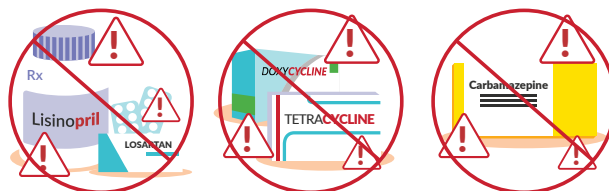
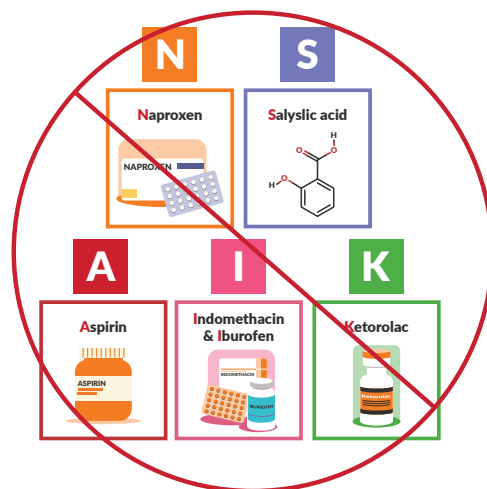
NSAIDS

- N** - Naproxen
- S** - Salyslic acid
- A** - Aspirin
- I** - Ibuprofen & Indomethacin
- K** - Ketorolac

- ACEs & ARBs = Avoid during pregnancy**
- "-pril" Lisinopril (**NO Prils during Pregnancy**)
 - "-sartan" Losartan (**Sartans = Satan to pregnancy**)

- Doxycycline & Tetracycline**
- **Cycling on a bike is dangerous** during pregnancy

Carbamazepine: seizures drug



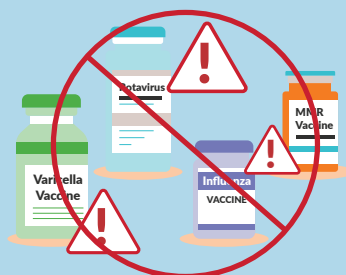
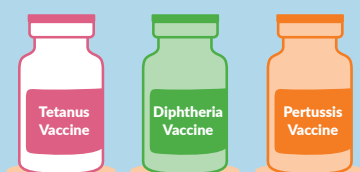
Vaccine Safety

Pregnant clients have a suppressed immune system & are at increased risk for illness. In general, **no live virus vaccines are given during & up to 1 to 3 month before pregnancy**, as live vaccines cause serious birth defects to a developing fetus in utero.



Safe during pregnancy	NOT Safe NO Live Vaccines! (Safe after pregnancy)
- Inactivated Influenza (flu shot) Tdap vaccine 27 - 36 weeks T - Tetanus D - Diphtheria P - Pertussis	- Varicella-zoster (chickenpox) - Rotavirus - Live or Activated Influenza - MMR: measles, mumps, rubella

27 - 36 weeks



ATI Questions

- Q1: 30 weeks' gestation.... vaccines are considered safe?**
- Tetanus, diphtheria, and pertussis (Tdap)
- Q2: routine education ... for a pregnant client?**
- Get a **flu vaccine** to protect against influenza infection

HESI Question

- ... **postpartum** client before administering the **varicella vaccine**?
- You must return for a **second dose in 4 to 8 weeks**
 - Use **contraception for 1 month** to avoid pregnancy

Newborn

- **Rhogam:** 72 hrs after birth to Rh negative mom with Rh positive baby
- **Hepatitis B vaccine:** to newborns with infected moms

Notes

Prenatal Care II

Fundamentals of Nursing

Education For Pregnancy **NCLEX TIPS**

- **Avoid alcohol & tobacco** products
- Obtain testing for **rubella immunity**
- Schedule **dental wellness appointment**
- **Second Trimester:**
 - **Gestational diabetes & preeclampsia screening**
 - Anticipate **quickening** "light fetal movements"
 - **Abdominal ultrasound evaluation**
- **Weight Gain:**
 - Expected weight gain: **25 - 35 pounds** during pregnancy
 - Maintain **BMI of 18.5 - 24.9 kg**
 - **Gain of 1lb per week** if pre-pregnancy BMI was normal (2nd & 3rd trimester)



25 - 35 pounds

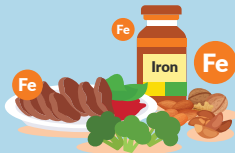
Kaplan Question

- By the fifth month of pregnancy ...**gained 14 pounds:**
- Inform the client the **weight gain is appropriate**



Education For Pregnancy **NCLEX TIPS**

- **Diet & Vitamins**
 - **Folic Acid 400 mcg / day** → prevents neural tube defects
 - **Calcium 500 mg** daily
 - **Iron rich foods** meat and dried fruit
 - **Iron supplements** (ferrous sulfate) → prevent anemia
 - Take on an **empty stomach**
 - Risk for **constipation**
 - **Increase Vitamin C** to aid absorption (Orange juice)



ATI Questions

- Q1: **folic acid deficiency**. Which of the following **complications..** ?
- Fetal neural tube defects
- Q2: ... **ferrous sulfate**.... which of the following beverages... **increase the absorption of the medication?**
- Orange juice

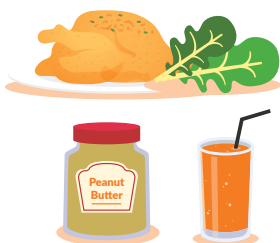
HESI Questions

- Q1: ... **pre-pregnancy instructions?**
- 400 mcg of folic acid daily
- Q2: ... **risk is associated with iron supplementation for the pregnant client?**
- Constipation



Education For Pregnancy **NCLEX TIPS**

- **Protein foods** rich with calcium, iron, & B vitamins
Example: Grilled **chicken**, turnip **greens**, **peanut butter**, & juice **NCLEX TIP**
- **Food to Avoid**
 - **Unhealthy:** excess salt, butter, fat, margarine
 - **Unsafe dairy:** unpasteurized or suspicious Brie cheese, Raw milk, **Deli-made egg salad** / sandwich



HESI Question

Which examples of **protein-containing foods ... vegetarian client?** **Select all that apply.**

- Dried beans
- Seeds
- Peanut butter
- Peas

ATI Question

8 weeks of gestation.... good source of calcium?

- **Dark green, leafy vegetables**

HESI Question

Which foods ... **avoid during pregnancy?**

- Brie cheese
- Unpasteurized milk
- Deli made egg salad



Maternal Pharmacology

Pediatric MEDICATIONS

Drug	Moa	Indication	Contraindication / adverse effects	dose / route	Nursing action
Phytonadione Vit K	Helps prevent bleeding by activating clotting factors	Prevention and treatment of hypoprothrombinemia	Pain, swelling, flushing, , dizziness, rapid heartbeat, sweating	IM Subcut, IV (Children 1 mo): 1– 2 mg single dose.	Monitor for frank and occult bleeding pulse and BP frequently;. Apply pressure to all venipuncture sites for at least 5 min; avoid unnecessary IM injections.
Erythromycin Erythrocin	Suppresses protein synthesis at the level of the 50S bacterial ribosome	Infections caused by susceptible organisms including	infantile hypertrophic pyloric stenosis, pancreatitis, interstitial nephritis. rash. benzyl alcohol should be avoided in neonates.	IV/ P.O PO (Neonates): Ethylsuccinate—20– 50 mg/kg/day divided q 6– 12 hr. IV (Children 1 mo): 15– 50 mg/kg/day divided q 6 hr, maximum 4 g/day.	Monitor for allergic reaction.
HEP B vaccine	Causes a primary immune response.	Provides immunity against HEP B	Do not give if baby is already +	5 mcg/0.5 mL ; 5 mcg/mL ; 10 mcg/0.5 mL	Assess patient anaphylaxis (hypotension, flushing, chest tightness, wheezing, fever, d
HEP B IG BayHep B, Nabi-HB	Confers passive immunity to hepatitis B infection post exposure	hepatitis b infection in neonates born to HBsAg- + women, provides passive immunity.	erythema at IM site, pain, swelling, tenderness Hypersensitivity to immune globulins, glycine, or thimerosal.	IM : 0.5 mL within 12 hr of birth.	Assess patient anaphylaxis (hypotension, flushing, chest tightness, wheezing, fever, dizziness.

Postpartum

Drug	Mode of Action	indications	Contraindications/ side effects	dose/route	Nursing actions
Hydrocodone bitartrate/acetaminophen (Norco)/ Lortab	Bind to opiate receptors in the CNS.	Management of moderate to severe pain.	Avoid chronic use <ul style="list-style-type: none"> Dizziness, sedation, respiratory depression, hypotension 	ROUTE PO —2.5– 10 mg q 3– 6 hr as needed;	Monitor respirations Do not give laxatives
Rho(d) immune globulin (human)	Prevent production of anti-Rho(D) antibodies in Rho(D)-negative patients who were exposed to Rho(D)-positive blood.	Administered to Rho(D)-negative patients who have been exposed to Rho(D)-positive blood by: Pregnancy or delivery of a Rho(D)-positive infant,	Prior hypersensitivity reaction to human immune globulin; Rho(D)- or Du-positive patients. <ul style="list-style-type: none"> HTN, hypotension, anemia 	ROUTE IM/IV 600 IU (120 mcg) w 40– 125 mg qid, after meals and at bedtime (up to 500 mg/day)	Assess vital signs periodically during therapy
Simethicone Gas-X	Passage of gas through the GI tract by belching or passing flatus	Relief of painful symptoms of excess gas in the GI tract that may occur postoperatively	Not recommended for infant colic <ul style="list-style-type: none"> None significant 	ROUTE 40– 125 mg qid, after meals and at bedtime (up to 500 mg/day)	Assess patient for abdominal pain, distention, and bowel sounds prior to and periodically throughout
Docusate Peri-Colace,	Promotes incorporation of water into stool, resulting in softer fecal mass	Prevention of constipation (in patients who should avoid straining, such as after MI or rectal surgery)	Hypersensitivity; Abdominal pain, nausea, or vomiting,	ROUTE PO : 2 tablets once daily at bedtime; maximum 4 tablets twice daily.	Assess for abdominal distention, presence of bowel sounds, and usual pattern of bowel function.

Neonatal Intensive Care Unit (NICU)

Drug	MOA	Indication	Contraindication/ Side effects	route/dose	Nursing actions
Surfactant (beractant)	Replaces surfactant in premature infants	Treatment of respiratory distress syndrome in premature infants.	None <ul style="list-style-type: none"> O₂ desaturation 	Intratracheal: (4 mL/kg birth weight); 4 doses may be given in first 48 hr of life, q 6 hr apart	Monitor ECG, heart rate, color, chest expansion, o ₂ sat, and ET tube patency continuously Continuous bedside monitoring for 30min
Caffeine citrate	Decrease periods of apnea	Short-term treatment of idiopathic apnea of preemie infants between 28 and 33 wk gestational age.	Hypersensitivity <ul style="list-style-type: none"> Tachycardia, feeding intolerance, gastritis 	ROUTE IV/PO Maintenance dose—starting 24 hr after loading dose 5 mg/kg	necrotizing enterocolitis (abdominal distension, vomiting, bloody stools, lethargy).
Prostaglandin E1 (alprostadil)	relaxes smooth muscle of the ductus arteriosus	Temporary maintenance of patent ductus arteriosus in neonates	Respiratory distress syndrome <ul style="list-style-type: none"> Seizures, cerebral bleeding, 	ROUTE IV 0.05– 0.1 mcg/kg/min initially; may be increased up to 0.4 mcg/kg/min until satisfactory response	respiratory rate, heart sounds, and neurological status frequently
ampicillin	Binds to bact cell wall	Treat bacterial infections	Hypersen to PCN <ul style="list-style-type: none"> Seizures, pseud colitis 	ROUTE IM/IV Children 40 kg): 100– 200 mg/kg/day in divided doses q 6– 8 hr (not to exceed 12 g/day).	Observe for anaphylaxis (rash, pruritus, laryngeal edema, wheezing).
HMF (human milk fortifiers) enzymes	Increased digestion of fats, carbs, and proteins in the GI tract.	Pancreatic insufficiency	Hypersen to hog proteins <ul style="list-style-type: none"> Shortness of breath, dyspnea 	ROUTE PO (Children 1 yr): 2000– 4000 lipase units per 120 mL of formula/breast milk.	Monitor stools for high fat content Stools will be foul-smelling/frothy. Assess patient for allergy to pork

Pediatrics

Physical assessment & Vital signs

Pediatric Vital Signs I

Pediatrics: Assessment

PEDIATRIC VITAL SIGNS CHEAT SHEET

HEART RATE

AGE	HEART RATE
Neonate (1-28 days)	110 - 180 bpm
Infant (1-12 months)	110 - 160 bpm
Toddler (1-3)	80 - 110 bpm
Preschool Child (3-6)	70 - 110 bpm
School-age Child (6-12)	65 - 105 bpm
Adolescent (12-18)	60 - 100 bpm

RESPIRATORY RATE

AGE	RESPIRATORY RATE
Neonate (1-28 days)	30 - 60 breaths/min
Infant (1-12 months)	30 - 60 breaths/min
Toddler (1-3)	24 - 40 breaths/min
Preschool Child (3-6)	22 - 34 breaths/min
School-age Child (6-12)	18 - 30 breaths/min
Adolescent (12-18)	12 - 18 breaths/min

BLOOD PRESSURE

AGE	SYSTOLIC	DIASTOLIC	SYSTOLIC HYPOTENSION
Neonate (1-28 days)	60 - 90	20 - 60	<60 (0-28 days old)
Infant (1-12 months)	70 - 105	35 - 55	<70 (1mo - 12mo)
Toddler (1-3)	85 - 105	40 - 65	<70 + (age in year x 2)
Preschool Child (3-6)	90 - 110	45 - 70	<70 + (age in year x 2)
School-age Child (6-12)	97 - 120	55 - 70	<70 + (age in year x 2)
Adolescent (12-18)	110 - 130	65 - 80	<90

TEMPERATURE

AGE	TEMPERATURE
Infants - children < 5 years old (the younger the child, the higher the baseline temperature)	Rectum: 97.9°F (36.6°C) - 100.4°F (38°C) Oral: 95.9°F (35.5°C) - 99.5°F (37.5°C) Axillary: 97.8°F (36.5°C) - 99.5°F (37.5°C) Ear: 96.4°F (36.7°C) - 100.4°F (38°C)
Children > 5 years old	98.6°F (37°C)

OXYGEN SATURATION

GOAL ALWAYS: > 95% SpO₂

TEST TIP Focus on the highlighted information! **Most exams** focus on **heart rate, respiratory rate & blood pressure**, specifically in the neonate, infant & toddler age ranges, as these are the MOST vulnerable clients.

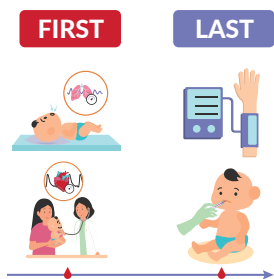
*Ranges will vary by textbook & nursing school. These vital signs were verified by **5 textbooks** and **NCLEX** standards.

Pediatric Vital Signs II

Pediatrics: Assessment

Key Points

1. **Talk to parents 1st** & then the child 2nd
2. Always start with **least invasive vitals FIRST**
3. Infants - should be in caregiver's lap during the assessment



ATI Question

Which of the following should the nurse **assess first** on a well-child exam in a **6 week old infant** who is sleeping?

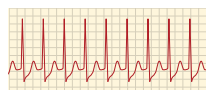
- Auscultation of lung and heart sounds



TOP Missed NCLEX Question

10-month old ... **crying & vomiting** with **abdominal distension** for the past 6 hours. The infant is now quietly resting with a pulse of **220/min** and blood pressure of 85/45. What should the nurse **report to the HCP?**

- ✓ Client is now **lethargic with tachycardia**



Tachycardia

HEART RATE	
AGE	HEART RATE
Neonate (1-28 days)	130 - 180 bpm
Infant (1-12 months)	100 - 160 bpm
Toddler (1-3)	80 - 130 bpm

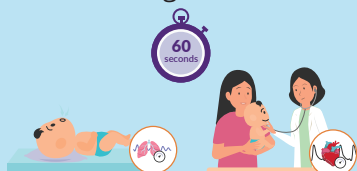
BLOOD PRESSURE			
AGE	SYSTOLIC	DIASTOLIC	SYSTOLIC HYPOTENSION
Neonate (1-28 days)	60 - 90	20 - 60	<60 (28 days old)
Infant (1-12 months)	80 - 100	28 - 55	<70 (1mo - 12mo)
Toddler (1-3)	85 - 105	40 - 65	<70 + (age in year x 2)

The question says:

220 85/45

Heart & Respiratory Rate

- Count & listen for **1 full minute (60 seconds)** for infants and toddlers, to screen for irregularities.



HESI Question

... assessing the heart rate of a **1 year old?**

- Listen to apical pulse for a **full minute**

Saunders Question

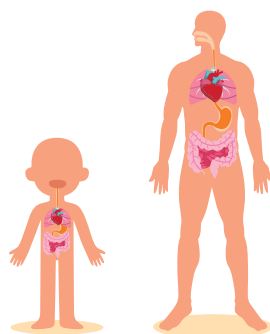
12 month old with respiratory infections ... **respiratory rate of 36:**

- Document the findings

RESPIRATORY RATE	
AGE	RESPIRATORY RATE
Neonate (1-28 days)	30 - 60 breaths/min
Infant (1-12 months)	30 - 60 breaths/min
Toddler (1-3)	24 - 40 breaths/min
Preschool Child (3-6)	22 - 34 breaths/min
School-age Child (6-12)	18 - 30 breaths/min
Adolescent (12-18)	12 - 18 breaths/min

Blood Pressure

- Children have a **lower BP** than adults due to the smaller size of their organs.



ATI Question

Blood pressure: 2 year old ... **92/60 mm Hg.** ... this blood pressure would be:

- Normal

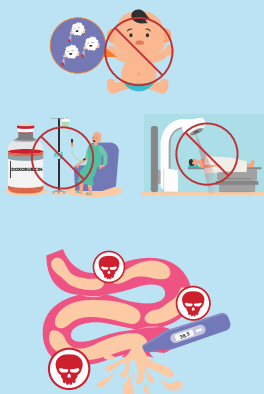
BLOOD PRESSURE			
AGE	SYSTOLIC	DIASTOLIC	SYSTOLIC HYPOTENSION
Neonate (1-28 days)	60 - 90	20 - 60	<60 (0-28 days old)
Infant (1-12 months)	70 - 105	35 - 55	<70 (1mo - 12mo)
Toddler (1-3)	85 - 105	40 - 65	<70 + (age in year x 2)
Preschool Child (3-6)	90 - 110	45 - 70	<70 + (age in year x 2)
School-age Child (6-12)	97 - 120	55 - 70	<70 + (age in year x 2)
Adolescent (12-18)	110 - 130	65 - 80	<90

Temperature

- Oral temp: 5 - 6 yrs old
- Axillary: all ages
- Rectal: Infants (most common)
 - Risk for perforation of the bowel!
 - **NOT** for immunosuppressed clients & those on chemotherapy & radiation
 - **NOT** for clients with cardiac conditions
 - **NOT** for clients with diarrhea / fecal impaction

O2 saturation

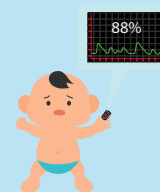
- Accurate wave form "**steady wave**" matching the child's pulse



ATI Question

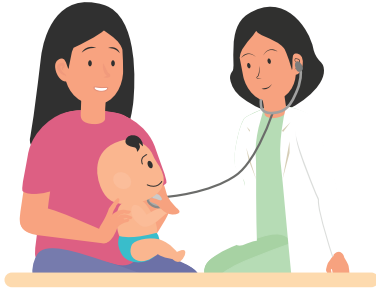
... child has an **oxygen saturation of 88%**.. most appropriate initial action?

- Verify the **position of the pulse oximetry probe**



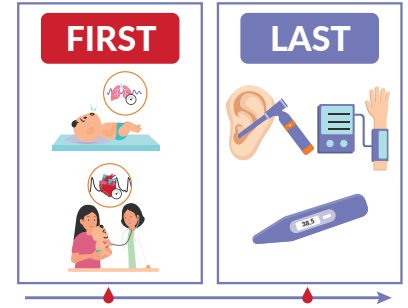
Pediatric Physical Exam I

Pediatrics: Assessment



4 KEY POINTS

1. Interact with **parents 1st** & child 2nd
2. Encourage the parent **to be involved with the child** **NCLEX TIP**
3. Communicate with age appropriate "simple language"
4. Keep medical **equipment out of sight**
5. Invasive procedures always **LAST!**
(Ex: ear exam, BP cuff)



ATI Question

physical examination of a **toddler ... appropriate nursing intervention?**

- Keep the **medical equipment out of the toddler's sight** until its needed



TOP Missed NCLEX Question

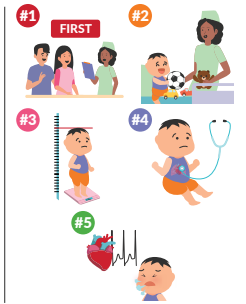
While preparing to perform a **physical assessment** on a 22-month-old child, the nurse should **complete the following actions in which order?**

Unordered Options

- #1 Take the child's weight & height
- #2 Use a toy to play with the child
- #3 Obtain vital signs
- #4 Interact with the parent first
- #5 Listen to heart & lung sounds

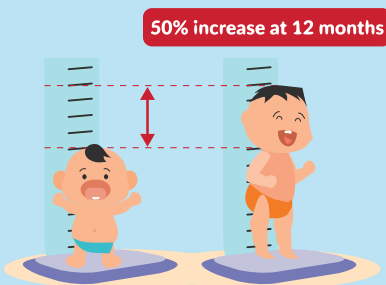
Ordered Response

- #4 Interact with the parent first
- #2 Use a toy to play with the child
- #1 Take the child's weight & height
- #5 Listen to heart & lung sounds
- #3 Obtain vital signs



Infants 0-12 Months

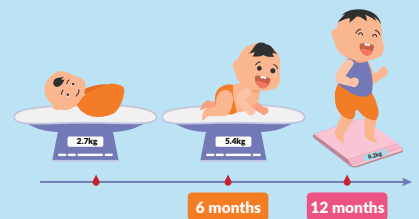
Growth



1. Height
 - 1 inch per month
 - 50% increase at 12 months
2. Weight
 - **Doubles at 6 months** **NCLEX TIP**
 - Triples at 12 months

Example: Newborn baby weighs **6 lb (2.7kg)**

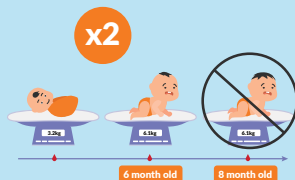
- 6 month = 12 lb (5.4 kg)
- 12 months = 18 lb (8.2 kg)



Kaplan Question

8-month-client ... possible delay in growth and development?

- "My child has **almost doubled the birth weight.**"



TOP Missed NCLEX Question

Which assessment finding **should the nurse report** to the health care provider?

- ✓ **6-month-old child with birth weight of 8 lb 5 oz (3.8 kg) who now weighs 14 lb 4 oz (5.4 kg)**



Pediatric Physical Exam II

Pediatrics: Assessment

Infants 0-12 Months

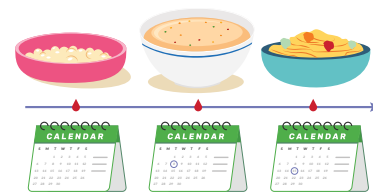
Nutrition

- Breast milk or iron fortified formula (No cow's milk)

- Solids begin at **4 - 6 months**

ONLY 1 NEW food per week **NCLEX TIP**

4-6 months of age



Only 1 NEW food per week

Head

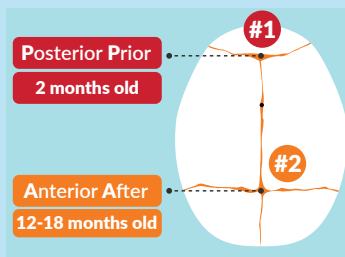
Fontanelles:

- Bulging (at rest): Meningitis, Increased ICP
- Sunken: Dehydration, FVD

Closure of Fontanelles **NCLEX TIP**

- **Posterior** fontanelle by **2 months**
- **Anterior** fontanelle by **12 - 18 months**

HESI | ATI

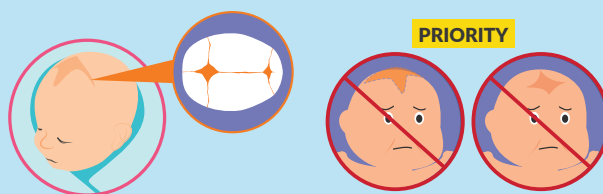


Saunders Question

3 month old ... monitoring for signs of **increased intracranial pressure...** anterior fontanel is **soft and flat...** most appropriate action?

- Document the finding

At birth, the head circumference is **slightly bigger than the chest** but equals in size around **12 to 18 months**. Fontanelles on the top of the head should be flat & only slightly pulsate when the baby cries, coughs, or lies flat. These **fontanelles should never be bulging at rest or sunken!** This is a priority!



Respiratory Distress

- Nasal flaring
- Accessory muscle use
- Abdominal breathing
- **Nonproductive cough**

Excessive Crying **NCLEX TIP**

- **Assess** infants pattern, frequency, & quality of crying

- High pitched = increased ICP or brain damage

Pattern

Frequency

Quality



1st - Assess
2nd - Interventions

Interventions

Assessments

Teeth

- First tooth: 6-10 months (lower central incisor)
- **Signs of teething:**
 - Drooling & irritability
 - Intervention: Teeth care with washcloth

6 - 10 months



Pediatric Physical Exam III

Pediatrics: Assessment

Infants 0-12 Months

Infant reflexes

Top 3 Tested

1. Babinski reflex: 0 - 12 months
 2. Rooting (sucking) reflex: 0 - 4 months
 3. Tonic neck reflex: 0 - 4 months
- Moro reflex: 0 - 4 months
 - Stepping reflex: 1 month +
 - Palmar grasp: 0 - 3 months
 - Plantar grasp: 0 - 8 months

Kaplan Question

9-month-old ... the nurse expects which reflex?

- Babinski

HESI Questions

- Q1:** What is the reflex assessed by **stroking the outer sole** of the foot?
- Babinski
- Q2:** How will the nurse assess the **rooting reflex**?
- By **stroking the cheeks** of the newborn

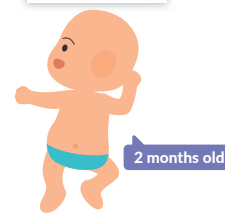


ATI Question

2 month old infant ... placed on their back & head turned to one side. The infant responds by flexing the arm on the opposite side and extending the arm that is pointing in the same direction she is facing. Which of the following best describes this reflex?

- Tonic neck reflex

Tonic neck reflex



GI assessment

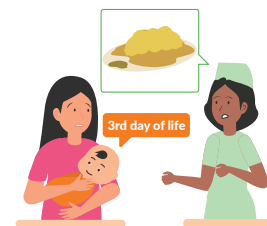
- Bloody mucus in a newborn's diaper? **NCLEX TIP**
- Continue to monitor the **color, amount, & consistency**



HESI Question

What color stool would the nurse explain to **expect on the third day of life**?

- **Yellowish brown-colored stools**



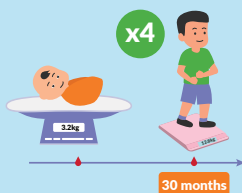
Toddlers 1-3 years

Growth

1. Height
 - 3 inches per year
2. Weight
 - Average yearly gain **of 4 - 6 lb** (1.8 - 2.7 kg)

NCLEX TIP

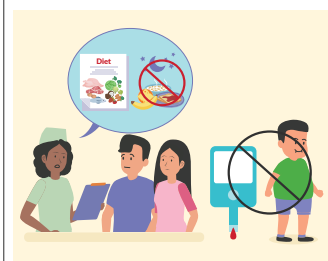
At 30 months (2.5 yrs) weight should be **4 times greater than birth weight**



TOP Missed NCLEX Question

39-month-old child. Which finding requires immediate **follow up with the primary care provider**?

- ✓ Weight is **6 times greater** than birth weight



Head circumference increases by 1 inch (2.5 cm) during the **2nd year**, but then slows by half until age 5.

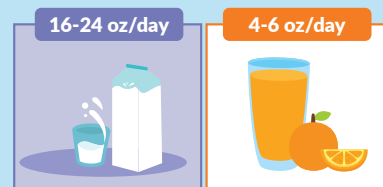
Chest circumference exceeds abdominal circumference by **age 2**. The body begins to sprout up like a green plant = taller & more slender appearance.



Nutrition

- Milk: **16 - 24 oz** per day (2 - 3 cups)
- Juice: **4 - 6 oz** per day

LIMIT



Pediatric Physical Exam IV

Pediatrics: Assessment

Toddlers 1-3 years

Safety Teaching

Choking Hazard

- Cut food into **bitesize pieces**
- Sit child up when eating & Cut food into bite size shape
- **Avoid** Round Foods!

Burns

- Cover electrical outlets
- Face handles inward = stove top pots & pans
- Apply sunscreen SPF 15 or greater **BEFORE** going outside & reapply every **2-3 hours** while in the sun

Drowning

- **Never** leave child alone near a body of water

Children under the age of 4, avoid...



Crib safety

- Infant on back to **prevent SIDS**
- **Never** on stomach/
prone position unattended = SIDS!
- **DON'T** put the infant to bed with a bottle = dental caries
- **Remove** crib musical mobiles at **4-5 months**

Car seat

- **Rear facing** in the back seat at 45 degree angle
- **NEVER** place the car seat in front seat
- **NEVER** place padding under or behind an infant or child in a car seat (it can eject the child during a car crash)
- Used until 30 lbs (13.6 kg)

Booster seat

- 8 - 12 years
- 4'9 tall
- 35 - 80 lbs (15.9 - 36.3 kg)

Preschool & Kindergarten 3 -6 years

Growth

1. Height: 2 - 3 inches per year
2. Weight: gain of **4.5 - 6.5 lb** per year

Nutrition

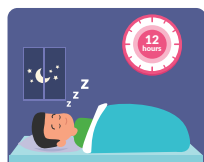
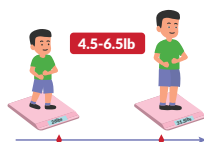
- 50% Less calories than adults

Activity & Sleep

- 1 hour of activity
- 12 hours of sleep (at around 7:00pm)

Beliefs

- Magical thinking



Common NCLEX Question

4-year-old beliefs?
Select all that apply.

- ✓ Believe that an injury is the result of **misbehaving**
- ✓ Feels **responsible** for being placed for adoption **NCLEX TIP**

Magical thinking
(Do **NOT** understand cause & effect)

3-6 years old



Saunders Question

4 year-old-child. When experiencing pain, the nurse anticipates... **Select all that apply.**

- Views pain as **punishment**
- **Blames someone** else for the pain
- Believes pain will **disappear magically**

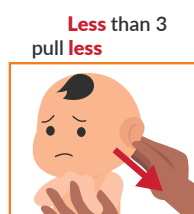


Ear Assessment

- **Less** than 3 years: Pull **Down** & Back
- **Over** 3 years: Pull **Up** & Back

Memory Trick

- Growing **UP** - pull it **UP** & back
- **Less** than 3 - pull **less** (down & back)



HESI Questions

Q1: ... position the pinna to visualize the eardrum of a 4 year old child?

- Up and back

Q2: ... direction to **pull the pinna** of an infant during an ear exam?

- Down and back

Pediatric Physical Exam V

Pediatrics: Assessment

School Age 6-12 years

Growth

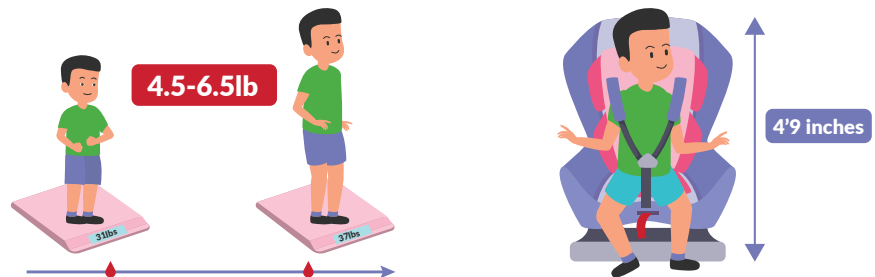
1. Height: 2 inches per year
2. Weight: yearly gain of **4.5 - 6.5 lb**

Activity & Sleep

- Competitive & team play
- 9 hrs of sleep per night

Safety

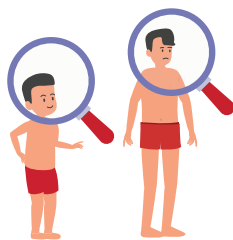
- Use car seat until **4 feet 9 inches**
- **Never** in/near pool alone



Physical Examination

Treat them like **mini adults**

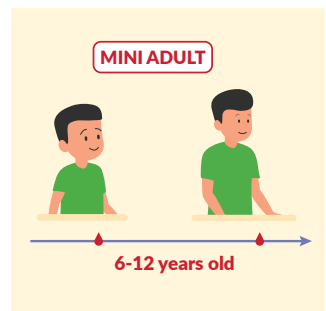
- **Same** head-to-toe assessment
- **Same** pain scale assessment
- **Same** subjective assessment
- **Explain** results of the exam to the child
- **Respect privacy** **NCLEX TIP**



Top Missed NCLEX Question

11-year-old client with abdominal discomfort ... What are the best actions during a physical exam?
Select all that apply.

- ✓ Complete a full head-to-toe assessment in the same way as an adult
- ✓ Explain the results of the examination to both parent & child
- ✓ Ask the child to describe their primary symptoms
- ✓ Respect the request to be examined without guardian present



Adolescents 12-18 years

Growth

1. Boys stop growing 18 - 20 years old
2. Girls stop growing 2.5 years old **after 1st period** (menarche)

Activity

Priority Intervention

- **Encourage meeting with friends & peers** **NCLEX TIP**

NO Socialization

1. Immediate Post-Op
2. **Immunocompromised** (Chemo, radiation)
3. Contagious infectious disease



HESI Questions

Q1: Growth difference between girls & boys?

- Growth in height ceases **2 to 2.5 years after menarche in girls**

Q2: General **puberty age**... for girls and boys?

- 10 years for girls
- 12 years for boys

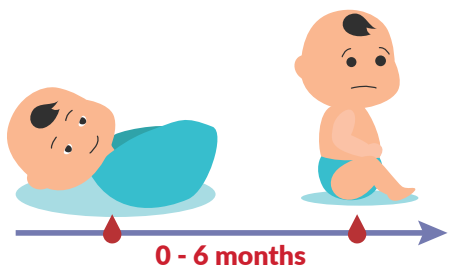
Q3: **16 year old girl** who has **not started menstruation**?

- Refer the adolescent for an evaluation

Pain Scale Assessment

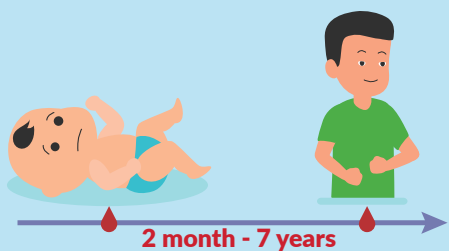
Pediatrics: Assessment

Cries Scale 0-6 months



C Crying 	R Requires oxygen 	I Increased vital signs 	E Expression 	S Sleepless
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Flacc Scale 2 months - 7 years



F Face 	L Legs 	A Activity 	C Cry 	C Consolability
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Faces Scale 3 years & up

Children 3 - 6 years old view pain as **"magical thinking"**, thinking pain is a punishment, or that pain will magically disappear & even blaming someone else for the pain.

0 NO HURT	1 HURTS LITTLE BIT	2 HURTS LITTLE MORE	3 HURTS EVEN MORE	4 HURTS WHOLE LOT	5 HURTS WORST

Saunders Question

4-year-old child. When experiencing pain, the nurse anticipates: Select all that apply.

- Views pain as **punishment**
- **Blames** someone else for the pain
- Believes pain will **disappear magically**

Numeric Scale 5 years & up

0	1	2	3	4	5	6	7	8	9	10
No Pain	Mild Pain	Moderate Pain	Severe Pain	Very Severe Pain	Worst Pain Possible					

O	Onset
P	Provocation
Q	Quality
R	Radiation
S	Severity
T	Time

Assessment of Growth and Development of the Infant

Head should measure 13.75 cm at birth

- Posterior fontanelle should close by 2nd month
- Anterior fontanelle should close in 12-18 months

Height and weight

- In the first 6 months, birth weight doubles and baby should grow 6 inches
- By 12 months birth weight should triple and baby should grow 10-12 in.

Skeleton

- Is made up of cartilage at 3 month gestation and continues to ossify and grow throughout life.
- Bone age, injury, abuse or nutritional deficits can be determined by X-Ray.

Circulation

- Hemoglobin and RBCs decrease when respiratory system takes over until 3 months of age

Neuro

- Nerve cells grow and coordination begins in an orderly pattern.

Well checkup schedule

- Second week of life
- 2, 4, 6, 9 months of age.

Vitals

- **HR:** 70 resting - 180 awake and crying (accurate HR is taken apically)
- **RR:** 30 but can range from 20-50 with increase or decrease of activity.
- **BP:** 85/60 mmHg
- **Temp:** 98.6

Physical Milestones

- Jerky quivering arm movements,
- Brings hands to mouth, makes fists
- Head flops back if unprepared
- Strong reflexes
- 5-8 feedings per day - 3 meals 2 snacks
- Progresses from sleeping 20 hours a day to 10-12 hours at night and two naps by 12 months, place awake child in crib to sleep

Psychological Milestones

- Focuses 8-12 in away
- Eyes wonder and cross
- Likes black and white/ high contrast patterns.
- Prefers human face to other patterns
- Hearing is fully mature, may turn toward sound
- Likes sweet smells, dislikes sour
- Likes soft sensations
- Likes to be handled gently

Social Milestones

- 0-1 month: extensive sleep, dependent, eye contact
- 0-3 months: smiles and fixes on faces, solitary play
- 3-6 mo: enjoys peekaboo, smiles at familiar faces
- 6-12 mo: knows name, gives and takes objects, understands easy commands.

Emotional Growth

- 0-1 mo: general tension
- 1 mo: happy and sad emotions
- 6 mo: separation anxiety
- 6-12 mo: stranger anxiety, shows curiosity by 12 months.

Language

- 0-3 mo: Cries, grunts and Coo
- 0-6 mo: Babbling, vowels, half consonants
- 12 mo: 1-2 words, imitation, responding to simple commands

Nutrition

- Rapid growth causes a need for the greatest amount of nutrients
- 4-6 mo - 12 mo: breast milk or commercial formula, introduction of solid foods. One food at a time starting with veggies.
 - You may need to supplement Vit C/D iron, fluoride.
 - 6 mo: iron-rich foods are needed to supplement
 - 7-8 mos: self-feeding begins by grasping and bringing food to mouth. Ends with use of utensils
 - WIC program helps children and women get proper nutrition when they qualify

Age	Theorist	Stage	Description	Nursing Care
Birth - 18 months	Sigmund Freud	Oral	Pleasure center in mouth	Encourage self-feeding. Avoid putting objects in mouth
1st year	Erik Erikson	Trust vs mistrust	Depends on parents to meet needs to create trust	Encourage bonding and family relationships
Birth - 2 yrs	Jean Piaget	Sensorimotor stage	Coordinates sensory experiences with physical action	Plan tactile activities with use of colorful materials

Assessment of Growth and Development of the Toddler 1-3

Physical growth

- Slows
- Communication and mobility skills increase
- Stubbornness, explore, dependent
- Begin to explore Autonomy "I DO MYSELF"

Height and weight

- Gain 5 to 10 LBs per year
- Grow 3 inches per year
- Normal to go on food jags

Learns to stand alone and walk,
1 year Need 12-14 hours a day of sleep
3 years Need 10-12 hours

Safety

- Proper restraint in car seat
- Never leave the toddler alone in water even buckets pose a drowning risk
- Put away poisons and medications with locks
- Burns from hot appliances and water are common

Discipline

Training and instructing to produce positive behavior patterns

- Self-control is gradual
- 2 yrs: begin accepting responsibility
- Consistency and timing are key
- Calmly remove the child from the situation
- Tell child the behavior is bad, not them

Well visits

- 15 mo for shots
- Annually after that
- Assess growth/ development, caregiver skill, and relationship between toddler and parent

Physical Milestones

- Lordosis and pot belly, organs adapt moderately to stress
- Well established walking
- Growth is slowed and stable
- Bones and muscles still immature requires nutrition and exercise for adequate development

Psychological Milestones

- Well established walking
- Hand eye coordination
- Progressive development of fine motor skills
- They begin to draw and write
- Bladder control is gained, with occasional relapses
- Brain is 90% developed by age 5

Social Milestones

- Moves to parallel play, mostly imitates role models
- Does Not share readily until later toddler years
- Separation anxiety is overcome easily

Emotional Growth

- Many emotions in one day
- Increased use of emotion language and understanding of emotion
- Causes/ consequence understanding

Language

- Vocabulary begins to increase names objects, body parts, animals, and familiar locations
- Primary method of communication
- Continuous questioning "why"
- Toys that talk are preferred
- Brief sentences

Nutrition

- Require about 1000-1400 calories a day
- Toddlers should be active 60 min a day
- Fruits: 1-1.5 cups
- Veggies: 1-1.5 cups
- Grains : 3-5 oz
- Protein : 2-4 oz
- Dairy : 2-2.5 cups
- Allow children to eat when hungry instead of forcing meals.

Age	Theorist	Stage	Description	Nursing Care
18 months - 3 years	Sigmund Freud	Anal	Pleasure center in the anus	Encourage the family to teach good hygiene
1-3 years	Erik Erikson	Autonomy vs shame and doubt	Mastering environment and building self-esteem	Support bonding and family relationships
2-7 years	Jean Piaget	Preoperational	Sensory / action coordination, symbolic thinking. Represent world and words together	Plan drawing and writing, tactile experiences. Use colorful materials to stimulate senses

Assessment of Growth and Development of the Preschool Child

Growth rate has slowed

- Language and play change remarkable
- Soak up info "little sponges, let them choose their own clothes"
- 3 yrs still chubby-faced
- 5 yrs leaner and taller and better coordinated but can't distinguish fantasy from real life.

Height and weight

- Gains 3-5 lb a year and grows 2.5 in. a year
- By 12 months birth weight should triple and baby should grow 10-12 in.

Skeleton

- Gross motor skills improve by age 5 they can climb, jump, catch and throw a ball and ride a bicycle.
- 5 yrs, leaner taller and better coordinated, teach them to wash hands thoroughly
- Bathing and brushing teeth still need supervised, can't wash own hair.

Dentition

- The skull is 90% of adult size by age 6
- Early preschool insidious teeth have completely emerged ,you floss their teeth.
- End of preschool teeth have erupted w/ incisors being first.

Well Checkup Schedule

- Boosters and vaccines 4-6yrs
- Annual exams for growth and health

Vision

- Still immature
- Distance judgement faulty
- Screen for amblyopia
- 20/20 vision by age 6
- Depth perception occurs at 8-10 yrs old.

Physical Milestones

- Aware of their sexuality
- May be attracted to parent of the opposite sex
- Parents should teach accurate sexual info
- Teach the difference between good and bad touch
- Calm matter of fact response to masturbation
- Teach safety and privacy regarding genitals

Psychological Milestones

- Develop imagination
- May have an imaginary friend
- Magical thinking
- May be afraid of the dark or have nightmares
- **4: Temper tantrums**, pushing, hitting, and manipulating environment
- **Discipline**: teach the child responsibility and self control and consistency.
- Taking favored away is more effective than hitting

Social Milestones

- Preschoolers use imitative play, all types of play are needed for development
- **Dramatic play**: act out situations and control it
- **Cooperative play**: organized groups
- **Associative play**: play together but unorganized and no leader
- **Solitary**: playing alone away from groups

Emotional Growth

- 0-1 mo: general tension
- 1 mo: happy and sad emotions
- 6 mo: separation anxiety
- 6-12 mo: stranger anxiety, shows curiosity by 12 months .

Language

- **3-4**: non communicative w/ language
- **4**: communicate with language
- **4-5**: use naughty words
- **Converse** in a way they can understand
- **Delays** can be caused by: hearing impairment, lack of stimulation

Nutrition

- Do not need large quantities of food, keep portions small.
- Requires high amount of protein
- Erratic appetite, frequent small meals are better
- Guide them when choosing food
- Provide healthy snacks
- Rituals are important.eals.

Age	Theorist	Stage	Description	Nursing Care
3-6 years	Sigmund Freud	Phallic	Pleasure center in the genitals	Explain to the family and teach hygiene
3-5 years	Erik Erikson	Initiative vs guilt	Child develops a conscious and sense of right and wrong	Monitor and protect from injury and poisoning. Encourage them to ask questions
2-7 years	Jean Piaget	Preoperational phase	The child sees the world egocentrically	Plan drawing and writing activities

Growth and Development of the School Aged Child

Head Should measure 13.75 cm at birth

- School starts
- Thinking skills develop

Height and weight

- Growth is slow and steady gains 5-6 lb a year
- Grows 2.5 in. a year until pre-teen
- Spine straightens and abdomen flattens
- Long bone growth is noted

Dentition

- Starts to lose baby teeth at about 6
- Eruption of permanent teeth begins

Neuro

- Refines motor and cognitive skills
- Engages in meaningful tasks

Well Checkup Schedule

- Annual physicals
- Booster tetanus and diphtheria
- Visit the dentist 2x a year
- Screening for scoliosis at 10-11
- Vision and hearing screen

Substance abuse

- Teach family values
- Teach right and wrong
- Set rules and enforce
- Teach facts about drugs and alcohol
- Actively listen

The birds and the bees

- Help develop a positive attitude of sexuality
- Sexual roles
- Satisfaction with being a boy or girl

Physical Milestones

- Slowed growth, graceful on their feet
- Strength and abilities double
- Loss of baby teeth
- Structural bone changes
- Girls begin to experience secondary sex characteristics

Psychological Milestones

- Displays a sense of duty and accomplishment
- Applies energy from play to complete tasks
- Develops positive sense of self
- Magical thinking, sit still for short periods
- Understands taking turns, enjoys groups
- Enjoys real life activities
- Give consistent rules, positive attention, and clear expectations, questions parents standards

Social Milestones

- Develop confidence in family and explore relationships outside of family
- Peers become important
- Motivated by accomplishment
- Success/ failure have a strong impact

Emotional Growth

- Greater understanding of complex emotions
- Understands they can have more than one emotion
- Greater ability to control emotion
- Uses strategies to redirect feelings

Language

- Language is refined via grammar education
- Ability to use words to express knowledge
- Narrative skills improve
- Able to make inferences
- Able to evaluate speech and messages

Nutrition

- Requires more food for increased energy demands
- Choose foods from all food groups
- Food jags and increased appetite are normal
- Limit fat intake, supervise snack habits
- Offer choices.

Age	Theorist	Stage	Description	Nursing Care
6-10 years	Sigmund Freud	Latency	Preparing for adult life but awaiting maturity	Encourage sibling and peer contact. Assess for sexual activity in later stage
6-10 years	Erik Erikson	Industry vs Inferiority	Developing sense of self worth and talent	Provide activities based on talents and abilities
2-7 years	Jean Piaget	Preoperational phase	The child sees the world egocentrically	Plan drawing and writing activities

Assessment of Growth and Development of the Adolescent 11-18 years

Head Should measure 13.75 cm at birth

- Puberty : reproductive maturity
- Starts at age 10 in girls and ends with menstruation
- Starts age 12 in boys and ends sperm production

Growth

- Girls achieve 98% of height by 16 yrs
- Skeletal growth outpaces muscle growth
- Nonvoluntary with early menses, 13-15 ovulation begins
- Boys : grow rapidly from 13-20
- Muscle strength and coordination develop rapidly
- Larynx becomes enlarged
- Both sexes : body takes on contours
- Primary sex organs develop, hormonal activity increases
- Bone growth continues until 20s
- Anorexia and bulimia can happen due to body image issues

Well checkup schedule

- 2x during teens
- Immunizations, hearing, vision, scoliosis, thyroid and pelvic for sexually active girls
- BP, height and weight

Physical Milestones

- Girls : 9-11: growth spurts last 18 months
- Grows 3 in annually until menarche
- Begin to develop figure
- Boys: 11-13: slower and steadier than girls
- Changes in penis, testes and scrotum
- Nocturnal emissions " wet dreams"

Psychological Milestones

- They wonder who they are
- What will they become
- More mobile
- Seek out intimate relationships
- Most are heterosexual, homosexuality can be difficult emotionally
- Body image is closely related to self esteem
- Underdevelopment causes anxiety

Social Milestones

- Greater focus on peers develops a separate self from parents
- Moral development
- Less egocentric
- Focused on mixed gender friendships

Emotional Growth

- Rebellious
- Emotional highs and lows
- Focus on appearance
- Sexually active teens may have impaired self image
- Privacy becomes important

Language

- Able to communicate complex thoughts

Nutrition

- Rapid growth causes a need for the greatest amount of nutrients
- Appetite increases and teens eat frequently
 - Food choices not always wise
 - May skip meals
 - Can have nutritional deficits of vit A, D and B, folic acid, iron and zinc. Due to menses, girls need additional iron.

Age	Theorist	Stage	Description	Nursing Care
Puberty	Sigmund Freud	Genital	Pleasure center in the genitals	Encourage safe sex, educate on teen pregnancy and STI
10-20 years	Erik Erikson	Identity vs role confusion	Integrating multiple roles, self-image and peer pressure	Support self-esteem, be honest maximize positive aspects of image and minimize defects
11- adulthood	Jean Piaget	Formal operational stage	Reasons in more abstract idealistic ways	Discuss conditions openly with client. Allow privacy to discuss

Developments Milestones & communication

Erikson's 8 Stages - Psychosocial Development

Pediatrics: Development

Age & Stage	Attributes	Need & Focus	Good Outcome	Bad Outcome
0-18 months Infant	Trust vs. Mistrust Virtue: Hope & Optimism	Safety w/ Mother (caregiver)	Trust & faith in environment and with caregivers	Fear & suspicion with people & environment
18 mo. - 3 yrs. Toddlers & Early childhood	Autonomy vs. Shame & Doubt Virtue: Will use freedom & self-restraint	Independent from parents	Independence & control over behavior & skills = Autonomy	Failure to achieve autonomy leads to shame & doubt
3 - 6 yrs. Preschool	Initiative vs. Guilt Virtue: Purpose, ability to start activities & goals	Powerful within family & exploring	Initiative + Assertive = Sense of purpose	Asserting too much power = disapproval & guilt
6 - 12 yrs. School Age	Industry vs. Inferiority Virtue: Competence in intellectual, social & physical skills	Good w/ Neighbors, Classmates, & friends	Feeling competent with social & academic demands	Failure in social & academia = feeling inferior
12 - 18 yrs. Adolescence	Identity vs. Role Confusion Virtue: Fidelity, fitting into the world as own person	Socializing & Fit into Peer Groups	Sense of self & personal identity <i>Staying true to yourself</i>	Confused with self identity = Lonely, isolated
19 - 40 yrs. Early Adulthood	Intimacy vs. Isolation Virtue: Love, finding & losing self in others & career.	Love Partners & Friends	Strong relationships (intimate & loving)	Weak relationships = lonely & isolated
40 - 65 yrs. Adulthood	Generativity vs. Stagnation Virtue: Care Guidance & teaching new generation	Provide value to household / society "Give a gift"	Feeling of accomplishment & usefulness in family & society	Shallow sense of self with limited involvement in the world.
65+ yrs. Maturity	Integrity vs. Despair Virtue: Wisdom Fulfillment & satisfaction	Reflection on life "Receive a gift"	Wisdom & fulfillment while reflecting on life	Regret, bitterness & despair with life

Kaplan Question

... **adolescence** ... associated with establishment of which developmental goal?

- Sense of **identity**



ATI Questions

Q1: Which age group experiences the stage of autonomy vs shame and doubt?

- **Toddlers**

Q2: successful achievement of Erikson's ... for the **3-year-old toddler**?

- **Encouraging the child to assist** in removing the dressing on his leg



HESI Questions

Q1: Which task... belongs to **infancy**?

- Trust

Q2: A **4-year-old**... Which stage of Erikson's theory ... is the nurse addressing when teaching **inhalation therapy**?

- Initiative

Q3: ... most significant impact on the socialization of **school age children**?

- Classmates



Saunders Questions

Q1: **8-year-old** ... seems to be **more attentive to friends than anything else**. Using Erikson's ... which response?

- At this age, the child is **developing his own personality**

Q2: **2 ½ year old child**... Using Erikson's which should the nurse plan care around?

- **Autonomy** versus **Shame and Doubt**



Erikson's 8 Stages - Psychosocial Development II

Pediatrics: Development

Age & Stage	Attributes	Need & Focus	Good Outcome	Bad Outcome
0-18 months Infant	Trust vs. Mistrust Virtue: Hope & Optimism	Safety w/ Mother (caregiver)	Trust & faith in environment and with caregivers	Fear & suspicion with people & environment
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Age & Stage	Attributes	Need & Focus	Good Outcome	Bad Outcome
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65 + Maturity	Integrity vs. Despair Virtue: Wisdom, Fulfillment	Reflection on life "Receive a gift"	Wisdom & fulfillment while reflecting on life	Regret, bitterness & despair with life

Notes

Piaget Theory of Cognitive Development I

Pediatrics: Stages of Development

Age	Stage	Teaching	Example
0 - 2 Infant & Toddler	Sensorimotor Thinks in the present moment through the senses. (not past or future) HESI Object permanence (objects are still there even if you can't see it) Example: Peekaboo	Teach in the present moment! Teach them: "What you ARE doing while you ARE doing it " (pre-procedure teaching for the parents not child)	Foley catheter insertion for an 18 month child? Teach the child what you ARE DOING as you do it
3 - 6 Preschool	Preoperational Thinking Imaginative, Symbolic thought Magical thinking (Do NOT understand cause & effect) <i>scraped knee was caused by earlier misbehavior</i> Understands the Future & Past	Teach shortly before. Teach them: "The day of..." "The morning of..." or "A few hours before.."	Foley catheter insertion for a 4 year old child? Teach the child what you are GOING to do
7 - 11 Skill learning	Concrete Operational Logical thought, Follows rules, rigid thinking Only 1 way to do something ATI Limited abstract thoughts HESI	Teach days before. Include skills like: - Insulin injections Demonstration & reading Teach them: "Tomorrow we will..." "You will do this every day"	Which child can the nurse teach bandage placement skills? 7 year old & up
12 - 15 (adolescents) Adults Learning	Formal Operational Developing abstract thought , Cause & effect thinking (example: Love, hate, morality)	Teach like an adult! Med Surg style 12 yrs + can Manage their own care Teach them: "Report these findings ..." "If you see this follow up with your provider"	Which child can manage their own care? 14 year old with DM type 1 NCLEX TIP Risk-taking behavior = non-compliance

Notes

Piaget Theory of Cognitive Development II

Pediatrics: Stages of Development

Age	Stage	Teaching	Example
0 - 2 Infant & Toddler	Sensorimotor Thinks in the present moment through the senses. (not past or future) HESI Object permanence (objects are still there even if you can't see it) Example: Peekaboo	Teach in the present moment! Teach them: "What you ARE doing while you ARE doing it" (pre procedure teaching for the parents not child)	Foley catheter insertion for an 18 month child? Teach the child what you ARE DOING as you do it I am inserting Foley catheter?

Age	Stage	Teaching	Example
3 - 6 Preschool	Preoperational Thinking Imaginative, Symbolic thought Magical thinking (Do NOT understand cause & effect) <i>scraped knee was caused by earlier misbehavior</i> Understands the Future & Past	Teach shortly before. Teach them: "The day of..." "The morning of..." or "A few hours before..." Today we will your procedure.	Foley catheter insertion for a 4 year old child? Teach the child what you are GOING to do I'm going to insert Foley catheter for you.

Age	Stage	Teaching	Example
7 - 11 Skill Learning	Concrete Operational Logical thought. Follows rules, rigid thinking Only 1 way to do something ATI Limited abstract thoughts HESI MEMORY TRICK	Teach days before. Include skills like: - Insulin injections Demonstration & reading Teach them: "Tomorrow we will..." "You will do this every day" Tomorrow you will take insulin injection.	Which child can the nurse teach bandage placement skills? 7 year old & up 7 years old & up

Age	Stage	Teaching	Example
12 - 15 (adolescents) Adult Learning	Formal Operational Developing abstract thought. Cause & effect thinking. (example: Love, hate, morality)	Teach like an adult! Med Surg style 12 yrs can Manage their own care Teach them: " Report these findings ..." "If you see this follow up with your provider"	Which child can manage their own care? 14 year old with DM type 1 NCLEX TIP Risk-taking behavior = non compliance

TOP Missed NCLEX Question

A **14-year-old** with type 1 diabetes ... admitted to the ICU with a blood glucose over **500 mg/dL**.... What is contributing to the **noncompliant behavior**?

- ✔ Client's **psychosocial developmental stage**



ATI Question

Which of the following children would be classified as being in the **concrete operational stage**, as defined by Piaget?

- An **8-year-old** third grade student



HESI Questions

- Q1:** Which phase of cognitive development are **infants**?
- **Sensorimotor**
- Q2:** What description characterizes **normal cognition** during the period of early adolescence (**11 to 14 years**) ?
- Limited abstract thoughts

7 - 11 Skill learning	Concrete Operational Logical thought. Follows rules, rigid thinking Only 1 way to do something ATI Limited abstract thoughts HESI
11-14 years old	

Saunders Questions

- Q1:** ... behavior is characteristic of the **formal operations stage**?
- The child has the ability to think abstractly
- Q2:** 6 year old does not **recognize the objects exist** when the objects are **outside the visual field**... which action should the nurse take?
- **Report it to the pediatrician**

0 - 2 Infant & Toddler	Sensorimotor Thinks in the present moment through the senses. (not past or future) HESI Object permanence (objects are still there even if you can't see it) Example: Peekaboo
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Notes

Developmental Milestones I

Pediatrics: Stages of Development

Age	Gross Motor	Fine Motor	Language	Social/Cognitive
1 month	<ul style="list-style-type: none"> Head lag (poor head control) 	<ul style="list-style-type: none"> Grasp reflex 0 - 3 mo. Babinski reflex 0-12 mo. Rooting reflex 0 - 4 mo. Tonic-neck reflex 0 - 4 mo. 	<ul style="list-style-type: none"> Responds to touch & voices Sensory motor communication 	<ul style="list-style-type: none"> Finds safety with caregiver & Looks at face
2 - 3 months	<ul style="list-style-type: none"> Kicks legs NCLEX TIP Memory Trick: 2 legs kick at 2 months Raises head when prone Less head lag 	<ul style="list-style-type: none"> Grasp reflex diminishes 	<ul style="list-style-type: none"> Response to sounds Able to make sounds with mouth 	<ul style="list-style-type: none"> Smiles & coos when seeing a familiar face NCLEX TIP Memory Trick: Smiles - Second month
4 - 5 months	<ul style="list-style-type: none"> NO more head lag (Report if head lag is found after 4 months) NCLEX TIP Memory Trick: After month 4 = head lag NO MORE 5 months rolls from front to the back Kaplan ATI 	<ul style="list-style-type: none"> Grabs object voluntarily (Grabs rattle) HESI Diminished Moro reflex (startle reflex) & other reflexes 	<ul style="list-style-type: none"> Mimics sounds heard Able to change cry tone for different needs 	<ul style="list-style-type: none"> Soothed by caregiver's voice Copies expressions Cries when doesn't get their way
6 - 9 months	<ul style="list-style-type: none"> Birth weight DOUBLES at 6 months NCLEX TIP 6 - 9 Months Rolls from back to front Can sit up unsupported Can pull self up 	<ul style="list-style-type: none"> 6 months holds a big bottle 7 months Transfers objects from 1 hand to the other 	<ul style="list-style-type: none"> Babbling words ATI "Mama Dada" Responds to name NOT babbling 9 months? MUST REPORT IT 	<ul style="list-style-type: none"> Identifies faces & strangers Separation anxiety begins at 6 months NCLEX TIP Memory Trick: Separation at Six mo.
10 - 12 months	<ul style="list-style-type: none"> 10 months - prone to sitting position 	<ul style="list-style-type: none"> 10 months: 3 NCLEX TIP 1. Pincer grasp "Pick up small finger foods" 2. Grasps a rattle or doll by the arm 3. Transfers objects from hand to hand Memory Trick: 10 months uses 10 fingers to grab things 	<ul style="list-style-type: none"> Able to make a variety of sounds Mimics gestures Understands simple words Yes & No 	<ul style="list-style-type: none"> Vocalization & speech (Talking toys & books) Purposeful play
12 months	<ul style="list-style-type: none"> 2 NCLEX TIPS Birth WEIGHT TRIPLES Sits down from standing Crawls up stairs Walks 1st steps while holding hand Saunders 	<ul style="list-style-type: none"> 3 NCLEX TIPS 1. Fully developed 2 finger pincer grasp 2. Tries to build 2 block tower unsuccessfully 3. Attempts to turn book pages Memory Trick: 12 mo. use fingers 1 & 2 - fully developed pincer grasp 	<ul style="list-style-type: none"> 3 - 5 words Nonverbal gestures (waving, head nodding) 	<ul style="list-style-type: none"> Shy: stranger danger Can follow short simple directions Searches for hidden objects (Object permanence)

Developmental Milestones II

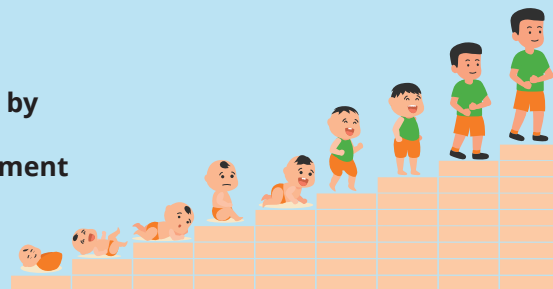
Pediatrics: Stages of Development

Age	Gross Motor	Fine Motor	Language	Social/Cognitive
18 months	<p>2 NCLEX TIPS</p> <ul style="list-style-type: none"> Walk up/down stairs while holding a hand Throws ball Jump in place with both feet <p>HESI</p> <p>MEMORY TRICK 18 months 1 hand helps the baby that looks like an 8 (looks like a baby snowman)</p>	<p>2 NCLEX TIPS</p> <ul style="list-style-type: none"> Turns 2 pages in a book at a time (uncoordinated) Holds cup & spoon Build tower of 4 blocks Scribbles with crayon <p>NO finger dexterity</p> <ul style="list-style-type: none"> No Scissors No color pencils 	<ul style="list-style-type: none"> 10 + words Follows commands "don't touch that" Uses gestures to show what they want <p>Top missed NCLEX Question: 18-month old ... What findings should the nurse report to the provider for follow-up developmental screening? Select all that apply</p> <ul style="list-style-type: none"> ✓ 1. Uses 4 words ✓ 2. Cannot hold a spoon or cup ✓ 3. Unable to sit down from standing position ✓ 4. Finds it difficult to pick up small food items with thumb & index finger. 	<ul style="list-style-type: none"> Angry baby: temper & ownership "mine" <p>Parallel Play 1 - 3 yrs. "Children play NEXT to each other & "NO direct interaction with others"</p>
2 years	<p>1. Walks without help</p> <ul style="list-style-type: none"> Run & kick ball Walks up & down stairs independently 1 step at a time HESI <p>Memory Trick: 2 years, 2 legs for walking 2 names (first & last) 2 - 3 word sentences Toilet Trained by Two</p>	<p>2. Builds a tower of 7 blocks HESI</p> <ul style="list-style-type: none"> Draws vertical lines Books: able to turn 1 page at a time Open doors by turning door knobs Saunders 	<p>3. Says own name NCLEX</p> <ul style="list-style-type: none"> 300 + words 2-3 word sentences Identifies pictures with names 	<p>Imitates adult behavior</p> <ul style="list-style-type: none"> T - Toilet Training T - Toddlers by age T - Two yrs old (up to 24 months) <p>Gains independence</p>
3 years	<ul style="list-style-type: none"> Tricycle & jumps forward ATI Learning balance Walks up stairs with alternating feet 	<ul style="list-style-type: none"> Draws circles Spoon feeds self ATI Undresses self Holds crayon with fingers instead of fist <ul style="list-style-type: none"> - Yes - Scissors Zips up a zipper ATI 	<ul style="list-style-type: none"> 3-4 word sentences Asks "why" a lot Knows age Follows more complex instructions 	<p>Associative Play 3 - 6 yrs.</p> <p>"Unorganized play without a goals or rules"</p> <ul style="list-style-type: none"> Imaginary friends & Symbolic Play
4 years	<ul style="list-style-type: none"> Skips, hops on 1 foot Catches a ball 50% of the time Climbs & jumps 	<ul style="list-style-type: none"> Draw 4 sided shapes like a square/ rectangle Can pour drinks & make food <p>Memory Trick: 4 years 4 sided shapes</p>	<ul style="list-style-type: none"> Able to tell stories Can memorize alphabet & numbers 	<ul style="list-style-type: none"> Imaginary play: Dress up & Tea Party Plays with other children rather than alone

Developmental Milestones I

Pediatrics: Stages of Development

Developmental milestones are a **list of skills that most children can do by a certain age**. It is vitally important! If a child does **NOT meet these key milestones** it can likely indicate **developmental delay & severe disablement** (if not caught & addressed early).



Age	Gross Motor	Fine Motor	Language	Social/Cognitive	Age	Gross Motor	Fine Motor	Language	Social/Cognitive
1 month	Head lag (poor head control)	Grasp reflex 0 - 3 mo. Babinski reflex 0-12 mo. Rooting reflex 0 - 4 mo. Tonic-neck reflex 0 - 4 mo.	- Responds to touch & voices - Sensory motor communication	Finds safety with caregiver & Looks at face	18 months	2 NCLEX TIPS - Walk up/down stairs while holding a hand - Throws ball - Jump in place with both feet HESI Memory Trick: 18 months 1 hand helps the baby that looks like an 8 (looks like a baby snowman)	2 NCLEX TIPS - Turns 2 pages in a book at a time (uncoordinated) - Holds cup & spoon - Build tower of 4 blocks - Scribbles with crayon - NO finger dexterity • No Scissors • No color pencils	- 10+ words - Follows commands "don't touch that" - Uses gestures to show what they want Top missed NCLEX Question: 18-month old ... What findings should the nurse report to the provider for follow-up developmental screening? Select all that apply ✓ 1. Uses 4 words ✓ 2. Cannot hold a spoon or cup ✓ 3. Unable to sit down from standing position ✓ 4. Finds it difficult to pick up small food items with thumb & index finger.	- Angry baby: temper & ownership "mine" Parallel Play 1 - 3 yrs. "Children play NEXT to each other & NO direct interaction with others"
2 - 3 months	Kicks legs NCLEX TIP Memory Trick: 2 legs kick at 2 months Raises head when prone Less head lag	Grasp reflex diminishes	- Response to sounds - Able to make sounds with mouth	- Smiles & coos when seeing a familiar face NCLEX TIP Memory Trick: Smiles - Second month		2 years	1. Walks without help - Run & kick ball - Walks up & down stairs independently 1 step at a time HESI Memory Trick: 2 years, 2 legs for walking 2 names (first & last) 2 - 3 word sentences Toilet Trained by Two	2. Builds a tower of 7 blocks - Draws vertical lines HESI - Books: able to turn 1 page at a time - Open doors by turning door knobs Saunders	3. Says own name NCLEX - 300+ words - 2-3 word sentences - Identifies pictures with names
4 - 5 months	NO more head lag (Report if head lag is found after 4 months) NCLEX TIP Memory Trick: After month 4 = head lag NO MORE 5 months rolls from front to the back Kaplan ATI	Grabs object voluntarily (Grabs rattle) HESI Diminished Moro reflex (startle reflex) & other reflexes	- Mimics sounds heard - Able to change cry tone for different needs	- Soothed by caregiver's voice - Copies expressions - Cries when doesn't get their way	3 years	- Tricycle & jumps forward ATI - Learning balance - Walks up stairs with alternating feet	- Draws circles - Spoon feeds self ATI - Undresses self - Holds crayon with fingers instead of fist - Yes - Scissors - Zips up a zipper ATI	- 3-4 word sentences - Asks "why" a lot - Knows age - Follows more complex instructions	Associative Play 3 - 6 yrs. "Unorganized play without a goals or rules" - Imaginary friends & Symbolic Play
6 - 9 months	Birth weight DOUBLES at 6 months NCLEX TIP 6 - 9 Months - Rolls from back to front - Can sit up unsupported - Can pull self up	6 months holds a big bottle 7 months Transfers objects from 1 hand to the other	- Babbling words ATI - Responds to name NOT babbling 9 months? MUST REPORT IT	- Identifies faces & strangers - Separation anxiety begins at 6 months NCLEX TIP Memory Trick: Separation at Six mo.	4 years	- Skips, hops on 1 foot - Catches a ball 50% of the time - Climbs & jumps	- Draw 4 sided shapes like a square/ rectangle - Can pour drinks & make food Memory Trick: 4 years 4 sided shapes	- Able to tell stories - Can memorize alphabet & numbers	- Imaginary play: Dress up & Tea Party - Plays with other children rather than alone
10-12 months	10 months - prone to sitting position	10 months: 3 NCLEX TIP 1. Pincer grasp "Pick up small finger foods" 2. Grasps a rattle or doll by the arm 3. Transfers objects from hand to hand Memory Trick: 10 months uses 10 fingers to grab things	- Able to make a variety of sounds - Mimics gestures - Understands simple words Yes & No	Vocalization & speech (Talking toys & books) Purposeful play	12 months	2 NCLEX TIPS - Birth WEIGHT TRIPLES - Sits down from standing - Crawls up stairs - Walks 1st steps while holding hand Saunders	3 NCLEX TIPS 1. Fully developed 2 finger pincer grasp 2. Tries to build 2 block tower unsuccessfully 3. Attempts to turn book pages Memory Trick: 12 mo. use fingers 1 & 2 - fully developed pincer grasp	- 3 - 5 words - Nonverbal gestures (waving, head nodding)	- Shy: stranger danger - Can follow short simple directions - Searches for hidden objects (Object permanence)

HESI Questions

- Q1: Fine motor skills of a 2-year-old?
• Draws a vertical line
- Q2: Gross motor skill at 18 months of age?
• Jumps in place with both feet



ATI Questions

- Q1: 9 month old... need for further investigation?
• The child is not babbling
- Q2: 6 month old... expected finding?
• Rolls over in both directions
- Q3: 3-year-old... developmental delay?
• Unable to use a spoon to feed himself
- Q4: 3-year-old child... age-appropriate development.
• Copies a circle
• Rides tricycle
• Undresses without help



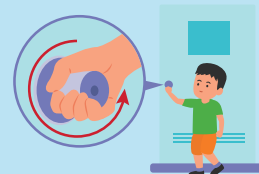
Kaplan Questions

- Q1: 4-month-old (full-term)... The nurse is most concerned with which finding?
• The infant's head lags when pulled from a lying to a sitting position
- Q2: 5-month-old... The nurse expects to make which observation?
• The infant rolls to back (supine) from prone position
- Q3: Child walks up and down steps... has steady gait & can use short sentences ... how many months?
• 24 months (2 years old)



Saunders Questions

- Q1: Expected growth & development by 12 months:
• Walks while holding on to someone's hand
- Q2: 24-month-old child... highest-level developmental milestone?
• The child opens a door by turning the doorknob



Notes

Developmental Milestones II

Pediatrics: Stages of Development

Age	Gross Motor	Fine Motor	Language	Social/Cognitive
1 month	Head lag (poor head control) 	Grasp reflex 0 - 3 mo. Babinski reflex 0-12 mo. Rooting reflex 0 - 4 mo. Tonic-neck reflex 0 - 4 mo. 	- Responds to touch & voices - Sensory motor communication	Finds safety with caregiver & Looks at face

2-3 months	Kicks legs NCLEX TIP Memory Trick 2 legs kick at 2 months Raises head when prone Less head lag 	Grasp reflex diminishes 	- Response to sounds - Able to make sounds with mouth 	- Smiles & coos when seeing a familiar face NCLEX TIP Memory Trick: Smiles - Second month
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4-5 months	NO more head lag (Report if head lag is found after 4 months) NCLEX TIP Memory Trick: After month 4 = head lag NO MORE 5 months rolls from front to the back Kaplan AT1 	Grabs object voluntarily (Grabs rattle) HESI Diminished Moro reflex (startle reflex) & other reflexes 	- Mimics sounds heard - Able to change cry tone for different needs 	- Soothed by caregivers voice - Copies expressions - Cries when doesn't get their way
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18 months	NCLEX TIPS 1. Walk up/down stairs while holding a hand 2. Throws ball 3. Jump in place with both feet HESI Memory Trick: 18 months 1 hand helps the baby that looks like an 8 (looks like a baby snowman) 	2 NCLEX TIPS - Turns 2 pages in a book at a time (uncoordinated) - Holds cup & spoon - Build tower of 4 blocks - Scribbles with crayon NO finger dexterity • No Scissors • No color pencils 	- 10 + words - Follows commands "don't touch that" - Uses gestures to show what they want 	- Angry baby: temper & ownership "mine" Parallel Play 1 - 3 yrs. "Children play NEXT to each other & NO direct interaction with others"
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2 years	1. Walks without help - Run & kick ball - Walks up & down stairs independently 1 step at a time Kaplan Memory Trick: 2 years, 2 legs for walking 2 names (first & last) 2 - 3 word sentences Toilet Trained by Two 	2. Builds a tower of 7 blocks - Draws vertical lines HESI - Books: able to turn 1 page at a time - Open doors by turning door knobs Saunders 	3. Says own name NCLEX - 300 + words - 2-3 word sentences - Identifies pictures with names 	Imitates adult behavior Toilet Training Toddlers by age Two yrs old Gains independence
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Age	Gross Motor	Fine Motor	Language	Social/Cognitive
6-9 months	Birth weight DOUBLES at 6 months NCLEX TIP 6 - 9 Months - Rolls from back to front - Can sit up unsupported - Can pull self up 	6 months holds a big bottle 7 months Transfers objects from 1 hand to the other 	- Babbling words ATI "Mama Dada" - Responds to name NOT babbling begins at 6 months NCLEX TIP MUST REPORT IT 	- Identifies faces & strangers - Separation anxiety begins at 6 months NCLEX TIP Memory Trick Separation at Six mo.

10-12 months	10 months - prone to sitting position 	10 months: 3 NCLEX TIP 1. Pincer grasp "Pick up small finger foods" 2. Grasps a rattle or doll by the arm 3. Transfers objects from hand to hand Memory Trick: 10 months uses 10 fingers to grab things 	- Able to make a variety of sounds - Mimics gestures - Understands simple words Yes & No 	Vocalization & speech (Talking toys & books) Purposeful play
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12 months	2 NCLEX TIPS - Birth WEIGHT TRIPLES - Sits down from standing - Crawls up stairs - Walks 1st steps while holding hand Saunders 	3 NCLEX TIPS 1. Fully developed 2 finger pincer grasp 2. Tries to build 2 block tower unsuccessfully 3. Attempts to turn book pages Memory Trick: 12 mo. use fingers 1 & 2 - fully developed pincer grasp 	- 3 - 5 words - Nonverbal gestures (waving, head nodding) 	- Shy: stranger danger - Can follow short simple directions - Searches for hidden objects (Object permanence)
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3 years	- Tricycle & jumps forward ATI - Learning balance - Walks up stairs with alternating feet 	- Draws circles - Spoon feeds self ATI/NCLEX - Undresses self - Holds crayon with fingers instead of fist - Yes - Scissors - Zips up a zipper ATI 	- 3-4 word sentences - Asks "why" a lot - Knows age - Follows more complex instructions 	Associative Play 3 - 6 yrs. "Unorganized play without a goals or rules"
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4 years	- Skips, hops on 1 foot - Catches a ball 50% of the time - Climbs & jumps 	- Draw 4 sided shapes like a square/ rectangle - Can pour drinks & make food Memory Trick: 4 years 4 sided shapes 	- Able to tell stories - Can memorize alphabet & numbers 	- Imaginary play: Dress up & Tea Party - Plays with other children rather than alone
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Language & Communication

Pediatrics: Stages of Development

Language & Communication

Newborns 0 - 1 month

- Respond to touch & voices
- Sensory motor communication

HESI Question

Which age would the nurse expect the infant to be able to say, "mama" and "dada" with meaning?

- 10 months



Infants 1 - 12 months

- At around 10 months
Say "Momma" & "Dada"
- Over 12 months: Up to 3 - 5 words

Saunders Question

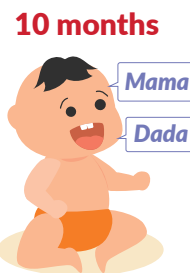
Expected growth & development at 9 months

- Select all that apply.
- Should be able to say "mama" and "dada"
 - Will pull up and stand for several seconds holding on to furniture
 - Will be able to pick up small pieces of food

Kaplan Question

An infant client is able to stand holding on to objects, plays "peek-a-boo", and is starting to say "mama" and "dada." ... which age?

- 9 months



Toddlers & Preschool 1 - 5 years

- **Priority Finding** to report to HCP **NCLEX TIP**
2-year-old "does not talk or respond" while being assessed

ATI Question

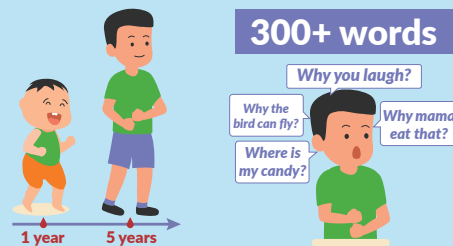
Assessing speech development ... refer for further examination?

- An 18-month-old who only says "no"

Kaplan Question

Speech impairment?

- A 5-year-old who only answers with single words



School age 6 - 12 years

- Uses logic

Adolescence 12 - 18 (teenagers)

- Abstract thinking
- Privacy - ask certain questions without the parents present
- Encourage peer contact **NCLEX TIP**
HUGE Risk for social isolation!
1. "have friends to come visit at the hospital"
- 2. "meeting other teens who are receiving similar treatment"

HESI Question

16-year-old refusing classmates visits... Which concern will the nurse plan to address first?

- Social isolation

Saunders Question

- Q1: A 16-year-old admitted to the hospital ... Which nursing intervention is most appropriate?
- Allow the client to interact with others in his or her same age group
- Q2: 14-year-old girl ... hospitalized & has been placed in traction. Which nursing action would be appropriate to meet the child's needs?
- Let the child wear her own clothing when friends visit



Notes

Play Types I

Pediatrics: Development

Age	Best Toy	Play Type	Description
0-6 month	Musical Mobile or Soft & large toy	Sensorimotor & Solitary Play	Stimulates both motor & sensory
6-9 month	Cover & Uncover toys (Peek a boo/ Jack in the box)	Sensorimotor & Solitary Play	Learning Object permanence
9-12 month	Talking toys, books Hard plastic blocks ATI (Tickle me Elmo)	Sensorimotor & Solitary Play	Learning Vocalization & Speaking Purposeful play: "Build, sort, stack, make, construct"
1-3 yrs. Toddlers	Push / Pull Toy (Wagon, stroller, Stacking hard plastic blocks) Kaplan & ATI	Parallel Play HESI "Children play NEXT to each other NO direct interaction with others" Memory Trick: 1 - 3 yrs they play 1 by 1 separate	Learning Gross motor skills (running & jumping) NO finger dexterity • No Scissors • No color pencils
3-6 yrs. Preschool	Pretend Play (dolls, puppets, tea party, dressup, imitating adults) Kaplan Arts & Crafts (crayons & coloring) Saunders Memory Trick: F - Four years F - Fake Play (dolls, dressup)	Associative Play, Imaginary Play, Symbolic Play ATI	Learning Fine motor & Balance • Yes - Scissors • Yes - Tricycles
6-12 yrs. School Age	Legos, board games Collecting cards, Blank paper & crayons (encourage creativity) Saunders	Cooperative Play C - Creative C - Collecting C - Competitive	Learning Creativity & Creation
12-18 yrs. Adolescent	Meeting, texting, talking with friends Priority Encourage meeting with friends & peers	Socialization	Learning Peer group socialization NO Meeting 1 - Immediate Post-Op 2 - Immunocompromised 3 - Contagious

Notes

Play Types II

Pediatrics: Development

Age	Best Toy	Play Type	Description
0 - 6 month	Musical Mobile or Soft & large toy	Sensorimotor & Solitary Play	Stimulates both motor & sensory
6 - 9 month	Cover & Uncover toys (Peek a boo/ Jack in the box)	Sensorimotor & Solitary Play	Learning Object permanence
9 - 12 month	Talking toys, books Hard plastic blocks ATI (Tickle me Elmo)	Sensorimotor & Solitary Play	Learning Vocalization & Speaking Purposeful play: Build, sort, stack, make, construct 9+ months
1 - 3 yrs. Toddlers	Push / Pull Toy (Wagon, stroller, Stacking hard plastic blocks) Kaplan & ATI	Parallel Play HESI "Children play NEXT to each other NO direct interaction with others" Memory Trick: 1 - 3 yrs they play 1 by 1 separate	Learning Gross motor skills (running & jumping) NO finger dexterity • No Scissors • No color pencils
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12 - 18 yrs. Adolescent	Meeting, texting, talking with friends Priority Encourage meeting with friends & peers	Socialization	Learning Peer group socialization NO Meeting 1 - Immediate Post-Op 2 - Immunocompromised 3 - Contagious

Play is an integral part of how a little **baby brain learns & develops cognitively**. During hospitalization, play can also serve as a therapy to relieve stress & anxiety.

Top 3 Considerations

- Safety
 - Choking Hazard**
 - Under 4 yrs. = **No small toys**
 - No metal** toys near **oxygen** use (sparks = fire)
 - Infection: Hard toys for the **immunosuppressed** (easier to clean)
- Age appropriate
- Realistic



Saunders Questions

- Q1: 10-month-old infant ...** the most appropriate intervention?
 • Consistent routine with **touching, rocking, & cuddling**
- Q2: 5-year-old ...** most appropriate
 • **Crayons and coloring book**
- Q3: 7-year-old child ...** most appropriate play activity?
 • **A board game**

HESI Question

Which type of play ... **toddler?**
 • **Parallel**

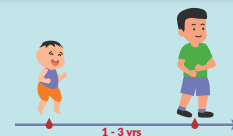
Top Missed NCLEX Questions

Q1: What age group does the nurse suspect ... children are observed borrowing blocks from each other **without direct interaction with others?**

Memory Trick
1 - 3 yrs they play 1 by 1 separate

✓ **1 - 3 years old (Toddlers)**

Age	Best Toy	Play Type	Description
1 - 3 yrs. Toddlers	Push / Pull Toy (Wagon, stroller, Stacking hard plastic blocks) Kaplan & ATI	Parallel Play HESI "Children play NEXT to each other NO direct interaction with others" Memory Trick: 1 - 3 yrs they play 1 by 1 separate	Learning Gross motor skills (running & jumping) NO finger dexterity • No Scissors • No color pencils

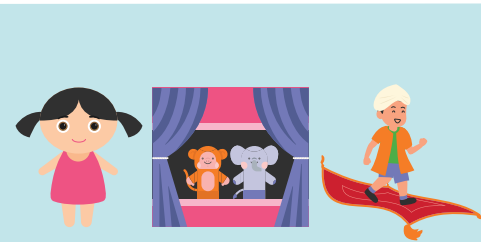


Top Missed NCLEX Questions

Q2: Long-term hospitalization of a 4-year-old ... Which toy is most appropriate to aid in the development of this child? **Select All That Apply**

Memory Trick
Preschoolers 3 - 6 yrs. Pretend (dolls, puppets, dress up, tea parties)

- ✓ **1. Dolls**
- ✓ **2. Puppets**
- 3. Stacking hard plastic blocks
- 4. Jack in the box
- ✓ **5. Dress up clothing**
- 6. Meeting with peers



ATI Questions

- Q1: 13-month-old toddler ...** best toy to promote development at this age?
 • **A pull toy**
- Q2: Symbolic play?**
 • **A 3-year-old pretends a rug is a magic carpet**
- Q3: 11-month-old infant who is hospitalized ...** Best toy?
 • **A bucket of plastic blocks**

Kaplan Questions

- Q1: A push-pull toy:**
 • **18 to 20 months**
- Q2: preschool-age ...** play activity?
 • **Imitating the actions of the nurse or health care provider**

Toilet Training

Pediatrics: Stages of Development

Toilet training begins during **toddler age** during **18 - 24 months**, as anal & urethral sphincter control occurs during this timeframe.

The body is **NOT ready before 18 months old!** Memorize this! Some exam & nlex questions try to trick you with 15 month olds & toilet training, but **don't get tricked**.

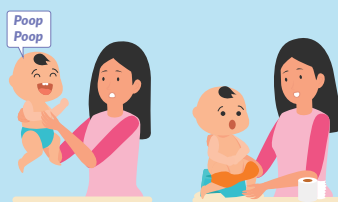
Don't get tricked

18 - 24 months
NOT 15 months



Memory Trick for NCLEX

- **T** - Toddlers (18 - 24 months)
- **T** - Toilet Training
- **T** - Tell you they need to poop
- **T** - Two years old
 1. Bowel control
 2. Bladder control (around 24 months)



HESI Question

control of the **anal and urethral sphincters**... typically achieved?
 • **18 to 24 months**



The **NCLEX** stresses that the below factors also **determine readiness**, rather than simply the child's age alone

Determine Readiness

1. Follow **simple commands**
2. Walk to & sit on the toilet
3. Remain on the **toilet for 5 - 8 min.**
4. Pull clothes **up & down** (Does not have to fully dress themselves)

PRIORITY



Key Point Do **NOT punish** the child if they make a mistake! Simply clean it up & go on with life, it is a learning process.

ATI Question

... which of the following indicates the **child is ready to begin toilet training?**

- The child can **communicate and follow directions**

Saunders Question

.... need for **further information regarding toilet training?**

- Bladder control is usually achieved before bowel control

HESI Question

What major task characterizes **toddlerhood?**

- **Toilet training**

NCLEX TIPS

T	T	T	T
<p>Toddlers (18 - 24 months)</p> <p>18 months 24 months</p>	<p>Toilet Training</p>	<p>Tell you they need to poop</p>	<p>Two years old</p> <ol style="list-style-type: none"> 1. Bowel control 2. Bladder control around 24 months

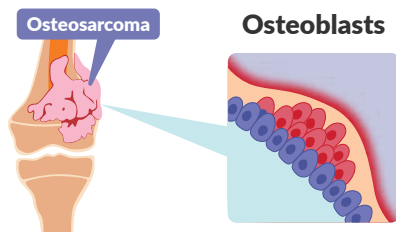
Cancer- Oncology

Osteosarcoma vs. Ewing's Sarcoma

Pediatrics: Cancer

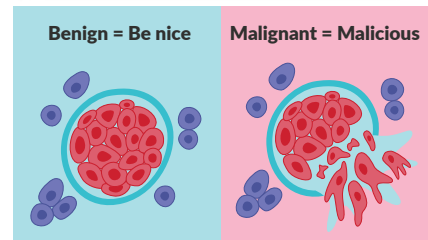
Osteosarcoma - Pathophysiology

Osteosarcomas are **types of bone cancer** that begin in the **osteoblasts** (the cells that form bones). They simply "blast out" too much osteoid tissue & form a big tumor, commonly around the ends of long bones.



MEMORY TRICK

- Malignant = Malicious (Cancer)
- Benign = Be nice (non-cancerous)

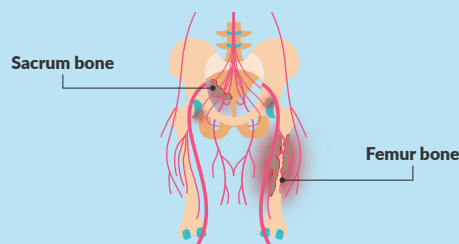


Ewing's Sarcoma - Pathophysiology

Ewing's sarcoma is **bone cancer** that commonly starts in the **femur and sacrum bones**, or in nearby soft cartilage & nerves. These tumors can develop at any age, but are commonly developed from **ages 10 - 20 years old**.

MOST common

10 - 20 years old



Signs & Symptoms

For both conditions:

1. Bone pain
2. Swelling
3. Fractures

Common s/s of Cancer

- Fever, Fatigue, Weight loss



Diagnostics

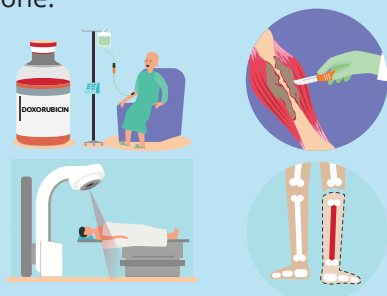
- **Imaging** - X-ray, CT scan, MRI
- **Biopsy** of the tumor or bone marrow
- **Blood tests** - CBC - complete blood count measures the levels of white blood cells, red blood cells, and platelets in the blood.

An abnormal CBC result might suggest the cancer has spread to the bone marrow, where these blood cells are made.



Treatment

- **Chemotherapy & Radiation therapy** - to kill cancer cells & decrease the size of the tumor.
- **Surgery** - to take out the tumor & even amputation may be done.



Therapeutic Communication

ATI

New diagnosis of **Ewing's sarcoma**. Which of the following actions should the nurse take?

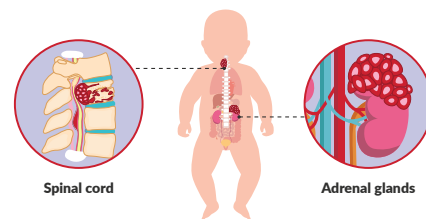
- **Spend time** with the adolescent to answer any questions

Neuroblastoma

Pediatrics: Cancer

Pathophysiology

Neuroblastoma is **cancer that develops from immature nerve cells**, specifically neural crest cells found **in the spinal cord & adrenal glands**. During infant development these neural crest cells do not differentiate properly & begin to form tumors, which can easily **spread to bone marrow, liver & lymph nodes**.



EXAM TIP

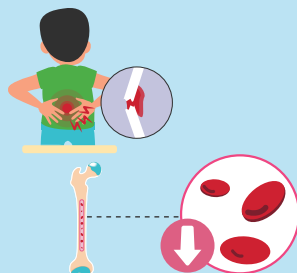
Neuroblastoma is **NOT** to be confused with Nephroblastoma (Wilms tumor) which is a tumor in the **Nephron** of the kidney.

Signs & Symptoms

- Fever
- Weight Loss
- Fatigue

Location of Tumor:

- **Lungs:** difficulty breathing, chest pain,
- Neck & face:
 - Periorbital ecchymosis
 - Exophthalmos
- Bones:
 - **Bone pain & fractures**
 - Decreased RBC
- Abdominal mass with pain & swelling



HESI Question

Which is the main difference between neuroblastoma and Wilms tumor?

- **Wilms tumor is confined to one side of the abdomen**

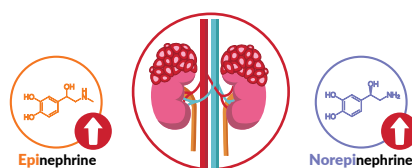
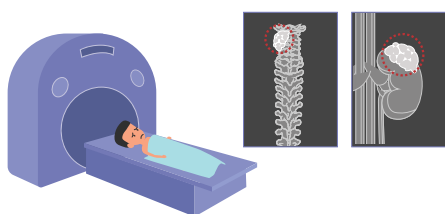
ATI Question

... Neuroblastoma of the adrenal gland with **primary metastasis**. Which of the following findings should the nurse expect? **Select all that apply.**

- Bone pain
- Periorbital ecchymosis
- Exophthalmos
- Fatigue

Diagnostics

- **CT scans** can check for the presence of tumors.
- Urine & blood tests can check for **catecholamines like norepinephrine & epinephrine**, as neuroblastoma cells can produce excess amounts of these chemicals.

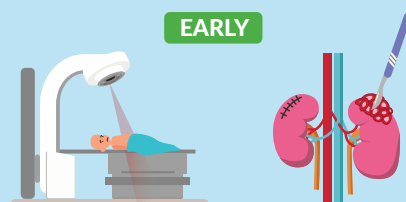


Treatment

Early: Radiation & surgery can be used to both shrink and surgically remove the tumor.

Late: If the cancer has **metastasized** (spread around the body):

- **Chemotherapy** can be used to kill the cancer cells
- **Immunotherapy** is used to stimulate the immune system to fight the cancer cells
- **Bone marrow transplant** is used to rebuild the immune system & blood after chemotherapy.



Wilms Tumor (Nephroblastoma)

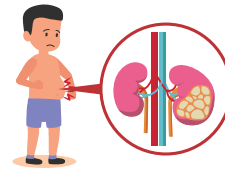
Pediatrics: Cancer

Pathophysiology & Causes

Nephroblastoma is the most common type of kidney cancer in children. When **kidney cells do not fully develop to maturity**, the cells overgrow resulting in a Wilms tumor.

MEMORY TRICK

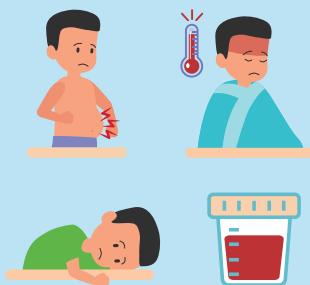
Nephro blastoma



Nephro - meaning kidney

Signs & Symptoms

- **One-sided abdominal mass "bulging"** **NCLEX TIP**
- Fever
- Fatigue
- Hematuria



HESI

Q1: Which is the main difference between neuroblastoma and Wilms tumor?

- Wilms tumor is confined to one side of the abdomen

Q2: Which are the clinical manifestations of Wilms tumor? **Select all that apply.**

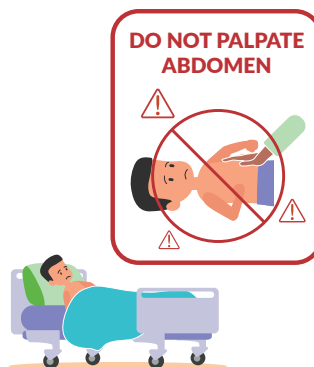
- Fever
- Fatigue
- Hematuria
- Abdominal swelling or mass

Intervention

- **DO NOT PALPATE** the abdomen **NCLEX TIP**

Place a **BIG SIGN** over the patient's bed stating **DO NOT PALPATE Abdomen**.

*Palpating the abdomen increases the risk of rupturing the encapsulated tumor, which **could cause cancer cells to spread all over the body.***



HESI

Wilms tumor: What is the most important safety precaution for a child?

- Place a "do not palpate abdomen" sign on head of bed

ATI

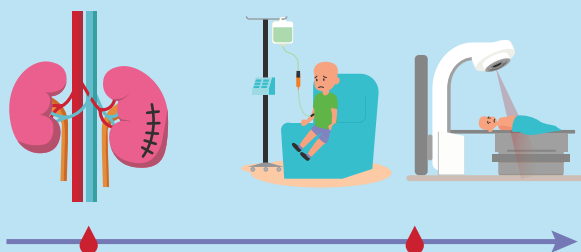
Wilms tumor: Which of the following signs should the nurse place over the child's bed?

- Do not palpate abdomen

Treatment

Nephrectomy surgery is done to remove either the whole kidney or only part of the kidney & surrounding tissues.

After surgery, chemotherapy & radiation therapy is used to ensure the elimination of cancer cells.



HESI

A 3 year old child is scheduled for **surgery to remove a Wilms tumor** ... What treatments ... will be necessary after surgery?

- **Chemotherapy** with or without radiotherapy is indicated

Cardiac

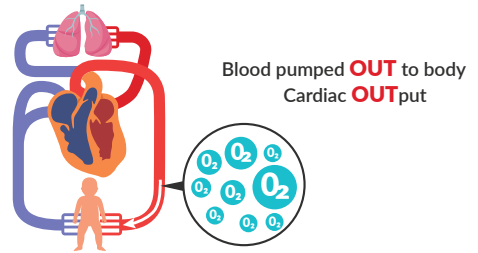
Congenital Heart Disease I

Pediatrics: Cardiac

Pathophysiology

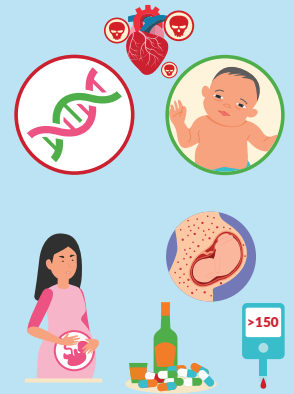
These are abnormalities in the heart that **develop before birth**. There are 1 or more problems with the heart's structure that change the way blood flows through the heart & out to the body.

Normal Heart Function	Heart Defects
<ol style="list-style-type: none"> 1. Deoxygenated blood is vacuumed back to the heart via the veins (through the vena cava into the right side of the heart) 2. Next, the RIGHT side of the heart pumps this blood into the lungs to get oxygenated. 3. This oxygenated blood is pushed into the LEFT side of the heart to be pumped OUT to the body & this is cardiac OUTPUT - oxygen rich blood OUT to the body. 	<p>Heart structures are changed!</p> <p>Decreased cardiac OUTPUT = Decreased blood is pumped OUT to the body.</p> <ul style="list-style-type: none"> ■ Decreased cardiac OUTPUT meaning ■ Less oxygen rich blood OUT to the body



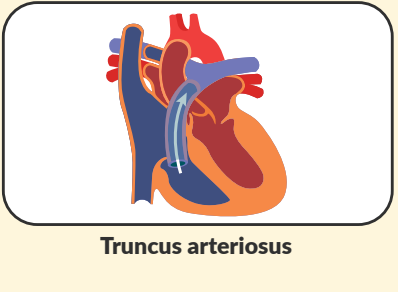
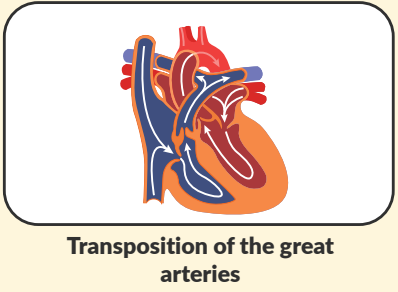
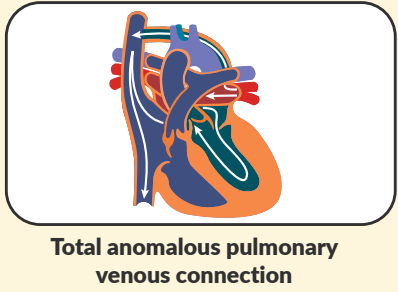
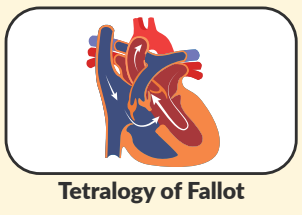
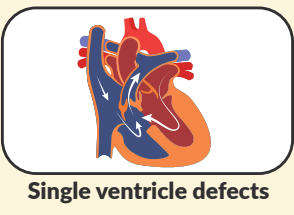
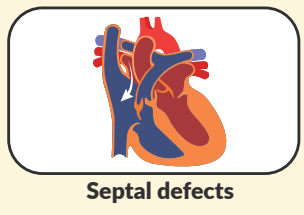
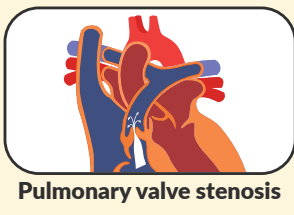
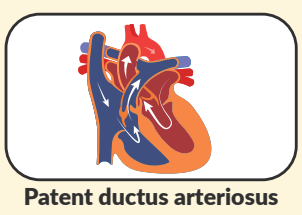
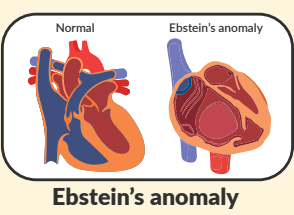
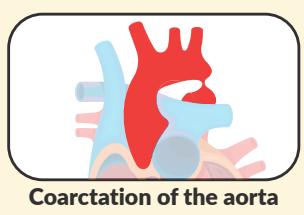
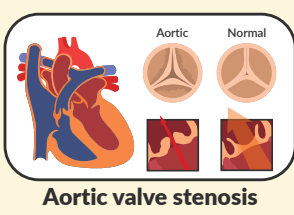
Causes & Risk Factors

- **Genetics**
 - Family history
 - Down Syndrome
- **During pregnancy**
 - Infection (Rubella)
 - Alcohol/Drug abuse
 - Diabetes



Types of Heart Defects

Congenital Heart Defects type



Congenital Heart Disease II

Complications: Hypoxia & CHF

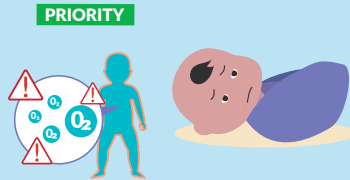
Complications

Hypoxia (low O₂)

RIGHT to left blood flow: TOF, TGA

Memory Trick

- T** - Trouble!
- **T** - Tetralogy of Fallot (TOF)
- **T** - Transposition of the Great Vessels (TGA)
- T** - Truncus Arteriosus
- **T** - Tricuspid Atresia



If it starts with a
T think **T**rouble!
Always priority!

These defects **take blood away from the lungs** & push blood from the **RIGHT** to the left side of the heart, resulting in **hypoxia** (low oxygen making blue babies).

Signs & symptoms

- Cyanosis (blue skin)
- Poor feeding & weight gain
- Clubbing fingers
- Dyspnea & Tachypnea
- **Polycythemia**
Blood clot risk!
Report **Hemoglobin level**
OVER 22 g/dL NCLEX TIP

Priority intervention = **Hydration**

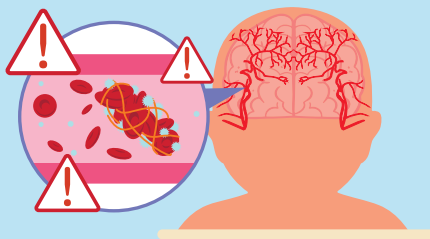
Priority: Report Hemoglobin level **OVER 22** = high risk for blood clots!

Polycythemia:

Increased production of red blood cells due to **hypoxia!**
The body makes **loads of new red blood cells (RBCs)** to compensate for this low oxygen.

Instead of perfusing the body the extra RBCs cause a traffic jam within the blood vessels leading to **deadly blood clots.**

CVA - Cerebral Vascular Accident



CHF (Congestive Heart Failure)

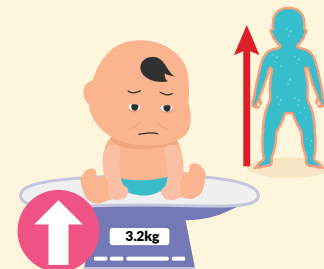
LEFT to right: ASD, VSD, PDA, AVSD

Memory Trick

- HF - Heart Failure
- HF - Heavy Fluid

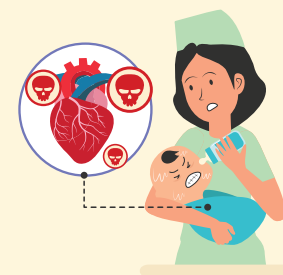
Signs & symptoms

- **Weight Gain** = Water Gain **NCLEX TIP**
 1. Pale, cool **extremities**
 2. **Puffiness** around the eyes (periorbital **edema**)
 3. Reduction in number of **wet diapers**
- Diaphoresis & **Grunting** (during feedings) **NCLEX TIP**
- Dyspnea
- Tachypnea & Tachycardia
- Poor weight gain



These defects are **less deadly**, as hypoxia is **NOT** a primary problem.

Blood is pushed from the LEFT side of the heart to the right side & into the lungs. This **OVERLOADS the lungs with too much blood flow**, making it difficult to breathe during feedings!



KAPLAN Question

The nurse knows a **cyanotic congenital heart defect** is associated with which **symptom**?

- **Poor feeding** with no or very **poor weight gain**

Saunders Question

.. infant with **congenital heart disease.... chronic hypoxia:**

- **Clubbing** of the fingers

... child with a diagnosis of a **right-to-left cardiac shunt... which is the most common assessment finding?**

- **Bluish discoloration** of the skin

Kaplan Question

Cyanotic congenital heart defect. The nurse understands that **chronic hypoxia** from this disorder can result in which finding?

- **Polycythemia**

HESI Questions

Q1: Polycythemia.. **highest priority?**

- Maintaining adequate **hydration**

Q2: ... primary reason for a newborn with **congenital heart disease** to be kept well-hydrated?

- To **reduce the risk** of **cerebrovascular accidents (CVA)**

Congenital Heart Disease III

Right to Left Blood Flow Disorders = Hypoxia

T TOF: Tetralogy of Fallot

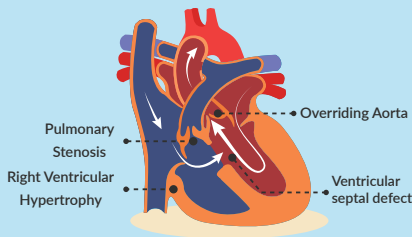
4 defects (Tetra = 4)

1. **P** - Pulmonary Stenosis
2. **R** - Right Ventricular Hypertrophy
3. **O** - Overriding Aorta
4. **V** - VSD (ventricular septal defect)

Symptoms

- "TET Spells" **MOST TESTED**
 - Cyanosis (blue skin)
 - Hypoxemia: **O₂ sat 65 - 85%**
- Clubbing fingertips
- Polycythemia = **Blood clot risk!**
- Report Hemoglobin level **OVER 22 g/d** **NCLEX TIP**

4 defects in 1



MEMORY TRICK

Tetra like Tetris = 4



Hemoglobin **OVER 22 g/dL**



Hypercyanotic Spell "TET spells"

5 NCLEX TIPS

During an Episode

1. Infants: **Knees to chest**
Older children: Squatting position

Prevention

2. **DO NOT** interrupt sleep & Provide a calm quiet environment upon waking up
3. Offer a pacifier during crying
4. Small & frequent feedings
5. Swaddle or hold the infant during procedures

ATI Question

A child with a cardiac defect assumes a squatting position...
● Less dyspnea

HESI Question

Infant ... which action when a hypercyanotic spell occurs?
● Knee-chest position

Saunders Question

A child with Tetralogy of Fallot who is experiencing a hypercyanotic spell... order of priority. (Order response)

1. Knee to chest position
2. 100% oxygen
3. Morphine sulfate as prescribed
4. IV fluids
5. Document

Treatment

- Surgical repair

HESI Question

... Tetralogy of Fallot repair. Which postoperative finding indicates that the repair is successful? Select all that apply.

- Absence of cyanosis when feeding
- Lips are pink when crying
- Respiratory rate of 32 breaths/min

5 Heart Failure signs

To REPORT **NCLEX TIPS**

Memory Trick

- HF - Heart Failure
- HF - Heavy Fluid

1. **Weight Gain** = Water Gain
2. **Puffiness** around the eyes (**periorbital edema**)
3. Pale, cool **extremities**
4. Reduction in number of **wet diapers**
5. **Decreased** feeding

T TGA: Transposition of the Great Vessels

- **Reversal** of the 2 main arteries leaving the heart (pulmonary artery & aorta)

Treatment

- Surgical repair

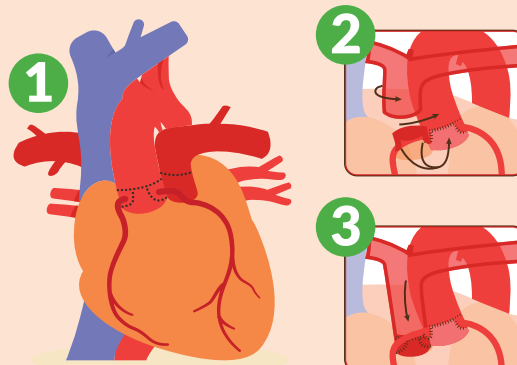
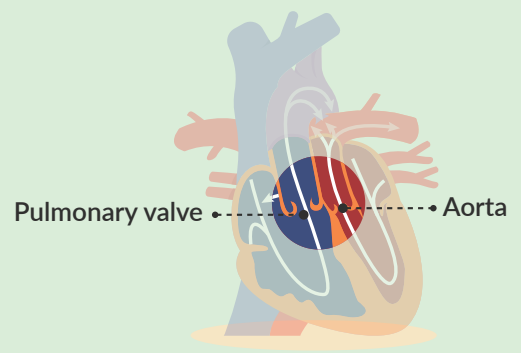
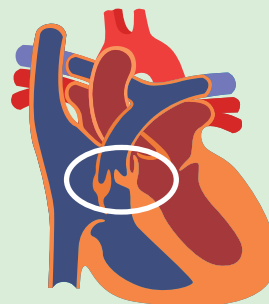
T Tricuspid Atresia

1. Closure of the **tricuspid valve**
2. ASD (atrial septal defect)
3. VSD (ventricular septal defect)

T Truncus arteriosus

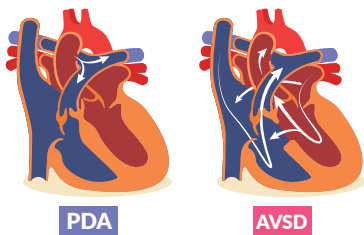
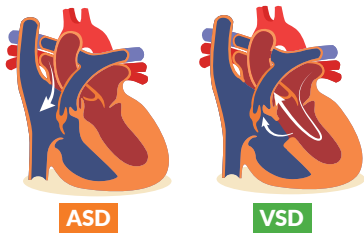
- **Connection** between the aorta & pulmonary artery & VSD (ventricular septal defect)

Normal Heart



Congenital Heart Disease IV

Left to Right Blood Flow Disorders = CHF



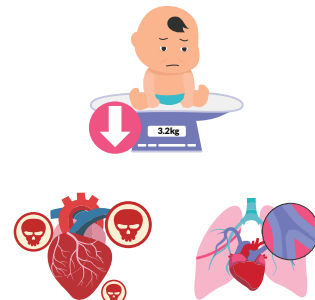
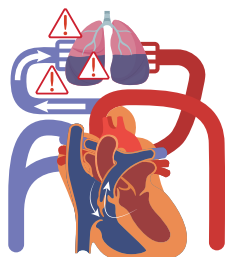
- ASD** Atrial Septal Defect
- VSD** Ventricular Septal Defect
- PDA** Patent Ductus Arteriosus
- AVSD** Atrioventricular Septal Defect

Left-to-right Cardiac Shunts

4 NCLEX TIPS

1. Diaphoresis (during feedings)
2. Heart murmur
3. Poor weight gain
4. Increased Risk: heart failure & Pulmonary HTN

*Increased blood flow into the lungs makes it very difficult to breathe with **decreased lung compliance** & **increased risk for heart failure.***



ASD Atrial Septal Defect

- Hole between the **Atria**

Symptom

- Murmur (normal & to be expected) **NCLEX TIP**

Treatment

- Closes naturally
- Surgical repair

VSD Ventricular Septal Defect

- Hole between the **Ventricles** (septal opening)

Symptoms

- **Grunting** during feeding **NCLEX TIP**
- Systolic heart murmur (left sternal border)

Treatment

- Closes naturally
- Surgical repair

Don't let

NCLEX TRICK YOU

Murmurs are Expected!

Grunting = Priority (breathing problem)

Surgical Repair is Main Treatment

PDA Patent Ductus Arteriosus

- Opening that connects aorta to pulmonary artery

Symptom

- Loud **machine-like** murmur **NCLEX TIP**

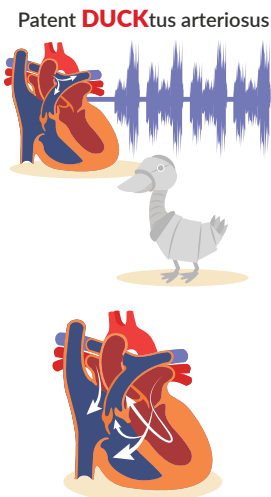
Memory Trick: Loud machine like **DUCK**

Treatment

- Indomethacin (NSAID)
- Surgical ligation

AVSD Atrioventricular Septal Defect

- Both ASD & VSD
- **2 holes:** Atria & Ventricles



Saunders Question

... **machinery-like murmur** on auscultation of the heart and **signs of heart failure**... which disorder?

- Patent ductus arteriosus

HESI Question

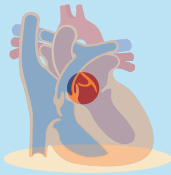
Surgical repair for patent ductus arteriosus (**PDA**) is performed to **prevent which complication?**

- A worsening of **pulmonary vascular congestion**

Congenital Heart Disease V

Stenosis = Stiff Valves

Stenosis (stiff valve)



S Stenosis **S** Stiff & narrow

Memory Trick:

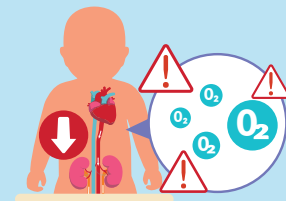
- **S** - Stenosis
- **S** - Stiff & narrow

Stenosis is the **stiffening & narrowing** of the heart valves resulting in a **blockage of blood flow out** of the heart chamber, **backing up of blood & decreased cardiac output**.

2 Types of Stenosis:

- Pulmonary Stenosis (pulmonic)
- Aortic Stenosis

Decreased cardiac **OUT**put
Less oxygen rich blood **OUT** to the body



Pulmonic Stenosis

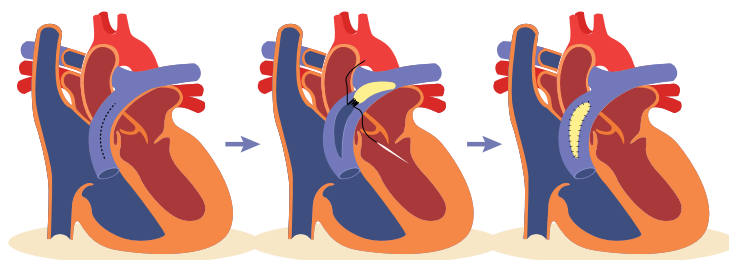
- Pulmonary valve: stiff, small, narrow valve.

Symptoms

- Right ventricular **hypertrophy**
- Loud "systolic ejection" heart **murmur**

Treatments

- Balloon **angioplasty**
- Surgical repair (Valvotomy)



Aortic Stenosis

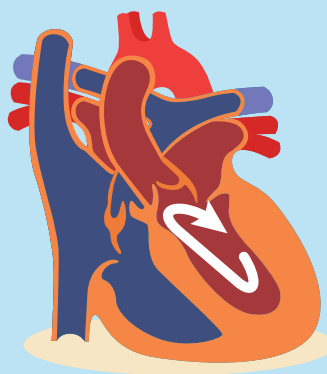
- Aortic valve: narrowing

Symptoms

- **Decreased** cardiac **OUT**put
Decreased O₂ blood **OUT** to the body
- Activity **intolerance**
- Vitals: Low BP, Tachycardia
- Left ventricular **hypertrophy**
- Pulmonary **congestion**

Symptoms

- Balloon **angioplasty**
- Surgical repair (Valvotomy)



HESI Questions

Q1: pathophysiology of a newborn with **aortic stenosis**?

Select all that apply.

- **Decreased** cardiac output
- Left ventricular **hypertrophy**
- Pulmonary vascular **congestion**

Q2: Which cardiac defect causes **narrowing of the aortic valve**?

- Aortic stenosis

Saunders Question

... suspected **aortic stenosis**. The nurse expects ... which clinical manifestation?

- Activity **intolerance**

COA: Coarctation of the Aorta

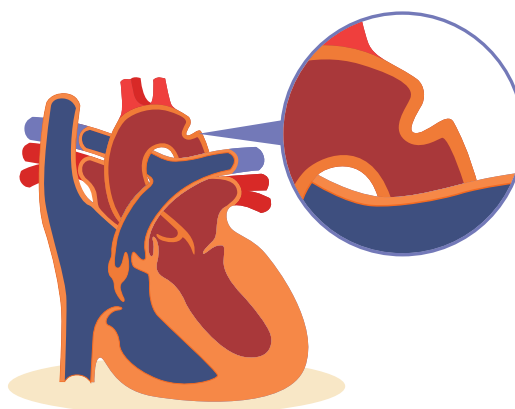
Narrowed aorta:
decreased cardiac **OUT**put
(Decreased O₂ blood **OUT** to the body)

Symptoms

- Upper extremities: High BP, **Bounding pulses**
- Lower extremities: **Cool**, low BP & diminished pulses

Symptoms

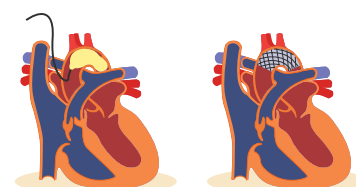
- Balloon angioplasty
- Stents



HESI Question

coarctation of the aorta... child's initial assessment supports this medical diagnosis? Select all that apply.

- **Bounding** pulses in the arms
- **Cool** lower extremities



Balloon angioplasty

Stents

Congenital Heart Disease VI

Treatments

Treatments

Cardiac catheterization (often called **cardiac cath**) is a **procedure used to treat & diagnose certain cardiac conditions**. A long thin tube called a catheter is inserted in an artery or vein in the groin, neck or arm and threaded through the blood vessels to the heart.

Cardiac Catheterization

BEFORE

- Allergy to iodine
- NPO 4 - 6 hours (children)
Shorter NPO status (infants)
- **Report to HCP**
Severe diaper rash **NCLEX TIP**

AFTER

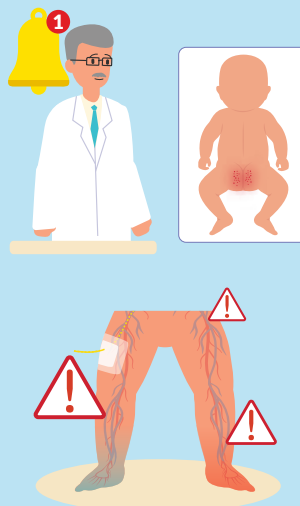
Priority Assessments:

1. Pulses **distal to cath site!**

Normal: Weak pulse **NCLEX TIP**

NOT normal: Cool, cold, pale extremity

2. Straight leg for 4 - 8 hours
3. Incision site:
 - Assess for **bleeding**
 - Infection - no baths



HESI Questions

- Q1: After cardiac catheterization, the nurse assesses that the pulse distal to the catheter insertion site is weaker. Which is the nurse's best action?
- Record the data on the nurse's notes
- Q2: After cardiac catheterization of a child, which assessment finding is most concerning to the nurse?
- The affected extremity feels cool when touched
- Q3: ... child who has just undergone cardiac catheterization. Which intervention does the nurse implement? Select all that apply.
- Keep the site clean and dry
 - Administer acetaminophen or ibuprofen to relieve the child's pain
 - Assess pulses, temperature, and color of extremities
 - Remove the pressure dressing the day after catheterization and cover the site with an adhesive bandage

Chest Tube Monitoring

Chest tubes are placed during cardiac surgery to help drain excess fluid & air for lung expansion. After surgery, it remains in place to drain excess blood.

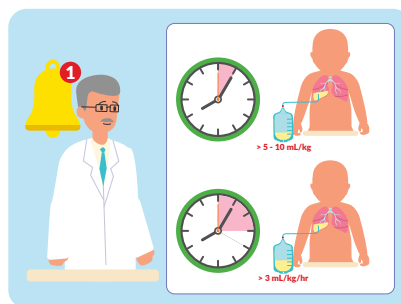
Priority Report to HCP **NCLEX TIP**

- 1 hour: **Over 5 - 10 mL/kg**
- 3 hours: **Over 3 mL/kg/hr**

Indicates: severe bleeding & cardiac tamponade

For example

- Child weighs **6 kg**
- 1 hour: 30 - 60 mL/kg
- 3 hours: 6 kg x 3 mL = **18mL/hr** (54 mL in 3 hours)



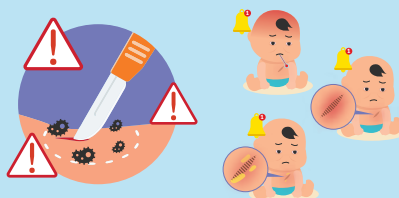
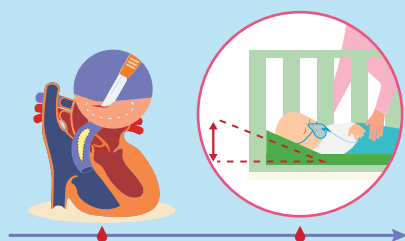
HESI Questions

- Q1: The nurse is assessing the chest tube drainage of a 2 kg infant after cardiac surgery. Which drainage would prompt the nurse to contact the provider immediately?
- 2 kg
- 1 hour: **Over 5 - 10 mL/kg** → 10 - 20 mL
 - 3 hours: **Over 3 mL/kg/hr** → **6 mL/hr** (18 mL in 3 hrs)
- Answer:**
Drainage greater than **12 mL/hr** for more than 3 hours
- Q2: ... drainage from the chest tube of 4 mL/kg/hr for the past 3 hours. What does this finding suggest?
- 1 hour: **Over 5 - 10 mL/kg**
 - 3 hours: **Over 3 mL/kg/hr**
- Answer:**
The child may be at risk for **cardiac tamponade**

Post-Op Care & Teaching

Elevate the head of bed (HOB) to reduce respiratory effort.

Surgical sites - infection! Report fever, warm surgical site, smelly purulent drainage & no heavy lifting or strenuous activity for the first 3 to 4 weeks.



Kaplan Question

Surgical repair of a congenital heart defect **most important** for the nurse to include in the postoperative care plan?

- **Elevate the client's head** to reduce respiratory effort

Saunders Questions

- Q1: ... after cardiac surgery. Which statement made by the parents indicates a need for further instruction?
- I can apply lotion or powder to the incision if it is itchy
- Q2: discharged after heart surgery asks the nurse when the child will be able to return to school?
- The child may return to school in 3 weeks but need to go half-days for the first few days

Heart Failure I

Pediatrics: Cardiac

Pathophysiology

Heart failure in pediatric clients has key clinical **manifestations & interventions that are different from adults.**

MEMORY TRICK

- **HF - Heart Failure** (failure to pump blood forward)
- **HF - Heavy Fluid** (backs up in lungs / body)
Weight Gain = Water Gain

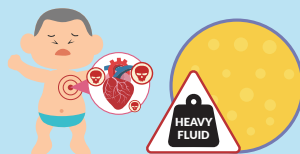


Signs & Symptoms

As the heart fails to pump blood forward, **heavy fluid can back up into the lungs** making it **difficult to breathe during breast or bottle feedings!**

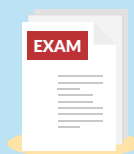
Fluid also backs up into the body resulting in **WEIGHT GAIN** from **Water Gain**.

- **HF** - Heart Failure
- **HF** - Heavy Fluid



1. **Weight Gain** = Water Gain **NCLEX TIP**
2. Difficulty breathing (fluid filled lungs)
Orthopnea (SOB while lying flat)
3. Sweating during **feeding** **Saunders**
4. Tachycardia & Tachypnea **HESI** **Saunders**

4 Signs



HESI Questions

- Q1:** Which is an **early sign** of congestive heart failure?
 • Tachypnea
- Q2:** 2 year old with ... **congestive heart failure**. Which information is **most important for the parents to report** to the health care provider?
 • Exhibits a **sudden and unexplained weight gain**

EARLY SIGN



Orthopnea

ATI Question

A nurse is assessing a preschooler who has heart failure. Which of the following manifestations should the nurse expect?
 • Orthopnea



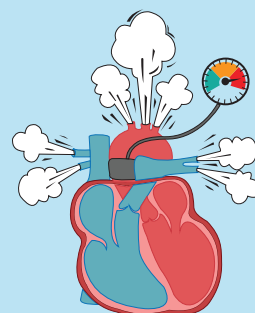
SAUNDERS Questions

- Q1:** ... infant with congenital heart disease. Which, if noted in the infant, should alert the nurse to the **early development of heart failure**?
 • Diaphoresis during feeding
- Q2:** infant with congenital heart disease ... early sign of **heart failure**?
 • Tachycardia
- Q3:** ...infant with **heart failure**... call the health care provider:
 • **Weight gain** of 1 lb (0.5 kg) in 1 day



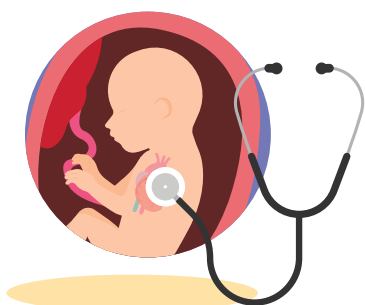
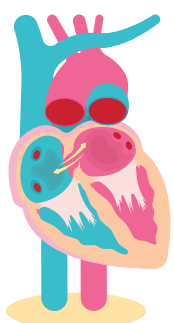
Other Classic Manifestations

R - RIGHT Sided HF R - ROCKS BODY with fluid	L - LEFT sided HF L - LUNG fluid
<ul style="list-style-type: none"> • Peripheral Edema • Weight Gain = Water Gain • JVD (big neck veins) • Abdominal Growth <ul style="list-style-type: none"> - Ascites (fluid in abdomen) - Hepatomegaly (big liver) - Splenomegaly (big spleen) 	<ul style="list-style-type: none"> • Pulmonary Edema • Crackles in lungs • "Rales that don't clear with a cough" • Pink Frothy "blood tinged" sputum • Orthopnea - difficulty breathing when lying flat



Causes

- **Congenital heart defects**



Congenital heart disease or defects, are the **BIGGEST CAUSE** of **heart failure** in children.

The child is **born with 1 or more problems with the heart's structure** that changes the way blood flows through the heart resulting in a backup of blood.

Heart Failure II

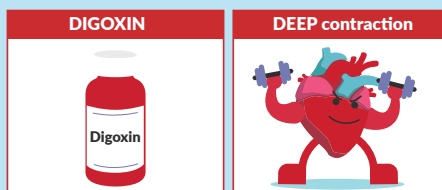
Pediatrics: Cardiac

Pharmacology

Digoxin 3 NCLEX TIPS

- A** - Apical Pulse (Listen **60 sec.**)
 - **Infants** (0-12 months) **100 - 160 beats per min.**
 - **Child 70 beats per min.**
- T** - Toxicity
 - **Over 2.0 ng/mL**
 - Vomiting / Poor feeding
- P** - Potassium **LOW**
 - Less than 3.5 means **Increased r/t toxicity**

D is for **DEEP** Contraction



#1 Tested Drug is Digoxin

Children with heart failure, the heart is weak & having trouble pumping blood forward.

Digoxin helps the heart **Dig** for a **Deep** contraction!

It is a **cardiac glycoside** that **increases contractility** within the heart. *Fancy words for a more forceful heart pump, which PUSHES blood FORWARD, so that it does not back up into the lungs & or body!*

Key Point

No more fluid filled lungs **means breathing is easier!**

ATI Question

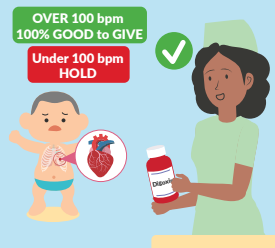
- infant who has heart failure and is taking digoxin.... therapeutic response?
- My baby is **breathing easier** than before

HESI Questions

- Q1:** An infant is receiving digoxin for congestive heart failure. The apical heart rate is 80 bpm. What action should the nurse take first?
- Obtain a **therapeutic drug level**
- Q2:** ...infant started on digoxin.... **poor feeding and vomiting**, and a heart rate of 96 bpm. The am digoxin level is 2.3 ng/mL. What is the nurse's next action?
- **Notify** the health care provider
- Q3:** ... important **laboratory test result** ... before administering digoxin for a child with congestive heart failure?
- Serum **potassium level**

SAUNDERS Questions

- Q1:** A 1 year old infant with heart failure is prescribed digoxin... the apical pulse **102 beats/minute**. What is the nurse's **best action**?
- Administer the medication
- Q2:** Newborn has a **digoxin blood level of 1.6 ng/mL** and an apical heart rate of **90 beats/min...** just vomited her formula. Which **intervention** should the nurse take?
- **Withhold the medication and notify** the primary health care provider

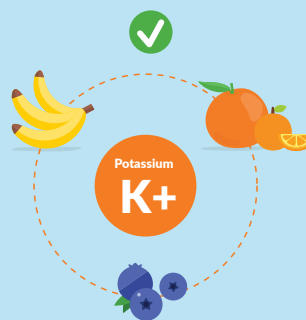


D DIURETICS Loop or Thiazide

Furosemide & HCTZ°

#2 MOST tested

- D** - **DIURETICS** Drain Fluid
- D**-Drains Fluid "**Di**uresis" "**D**ried"
- K+ Wasting**-Furosemide & Hydrochlorothiazide (caution: Low K+, Eat melons, banana & green leafy)
- K+ Sparing**-Spironolactone "**S**pares potassium" (AVOID Salt Substitutes, melons & green leafy)



ATI Question

- Bumetanide ... side effects? Select all that apply.
- Monitor for **postural hypotension**
 - Observe for **ototoxicity**

HESI Question

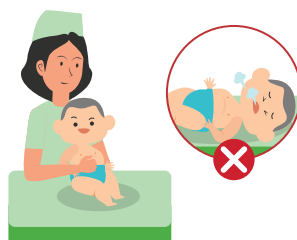
- ... child is on furosemide. What **high potassium selections** will the nurse encourage the mother to include in the child's diet?
- Bananas
 - Mandarin oranges
 - Blueberries

Interventions

Give the child a lot of rest in order to take work load off the heart & decrease that cardiac demand!

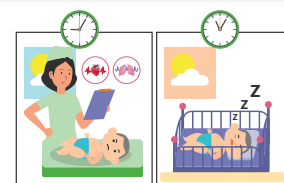
- ✓ Limit play time
- ✓ Cluster the care for uninterrupted sleep

- Rest:
 - Cluster Care
 - Uninterrupted sleep
- Sit up to **relieve dyspnea** at rest



HESI Questions

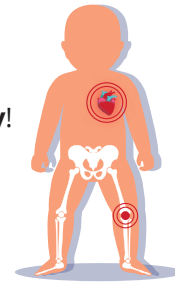
- Q1:** infant with heart failure... **best intervention** for decreasing the **cardiac demand** of the infant?
- Allow the infant to have uninterrupted periods of sleep
- Q2:** The nurse asks the parent of the **infant with pulmonary congestion** to help the infant sit up. What is the nurse trying to achieve?
- Relief from **dyspnea at rest**



Rheumatic Fever - Pathophysiology

This disease can result after **NOT treating strep throat** or **scarlet fever correctly!**
For example, not finishing the antibiotics or just not treating the infection.

The untreated infection causes **total body inflammation**, damaging the **heart valves** so clients will typically present with a **heart murmur**.



ATI Question

Acute **rheumatic fever**... Which of the following **assessments** is the nurse's **priority**?

- Auscultating the rate & characteristics of the child's heart sounds.

Signs & Symptoms

- Sore throat
- Fever
- Joint Pain



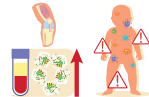
HESI Question

What assessment will the nurse include in a child's care plan with **rheumatic fever**?

- Sore throat in the past **2 to 6 weeks**.

Labs

- Elevated CRP & ESR
- Hemolytic strep
- Antistreptolysin O titer



Saunders

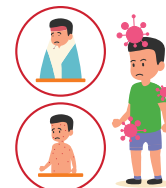
Laboratory results for a child with **rheumatic fever** ... expect to note which findings? Select all that apply.

- Elevated **ESR**
- Elevated **C-reactive protein (CRP)**
- Elevated **antistreptolysin O titer**
- Presence of group A beta hemolytic strep

Treatment

The goal of treatment is to **kill the streptococcal bacteria infection** (antibiotics) & **control the inflammation** (NSAIDs).

NEVER give Aspirin = High Risk for Reye's syndrome!



Saunders

Rheumatic fever... The nurse notes that **aspirin is prescribed** ... Which **nursing action** is most appropriate?

- Consult with the primary health care provider to **verify the prescription**

Kawasaki disease - Pathophysiology

Kawasaki disease think **K - Crazy inflammation within the blood vessels**, particularly the **coronary arteries**, the blood vessels that feed the heart oxygen! It also affects lymph nodes, skin, and mucous membranes.



Memory trick

- **K** - Kawasaki
- **K** - Crazy inflammation

Signs & Symptoms

- Fever
- **Gallop heart rhythm** **NCLEX TIP**
- **Decreased urine output**
- **Red strawberry tongue** **ATI**
- Red eyes, lips, hands & feet
- Skin peeling
- Joint pain

ATI Question

Kawasaki disease... which of the following criteria needs to be present?

- **Strawberry tongue**

Interventions

Priority 2 NCLEX TIPS

- Monitor for a gallop heart rhythm & decreased urine output
- Check temperature regularly

Saunders Question

Kawasaki disease... the nurse should monitor the child for signs of which condition?

- **Heart failure**

HESI Question

Which nursing interventions are most important ... child with **Kawasaki disease**?

- Monitor the **temperature** carefully
- Check the **patency of the IV line**

Discharge Instructions

NCLEX TIP

- If the child develops a **FEVER!**
*Reported to HCP immediately
- Monitor temp. Q 6 hours for first 48 hours



Treatment

- IV immunoglobulin (IVIG)
- Aspirin (be cautious with Reyes syndrome)

NCLEX TIP

- **NO live vaccines** for 11 months after IVIG

1. Measles, mumps, rubella (**MMR**)
2. Varicella (chicken pox)
3. Influenza

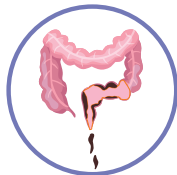
Dehydration & Diarrhea

Diarrhea & Dehydration

Pediatrics: Gastrointestinal

Pathophysiology

Diarrhea is loose watery stool with more frequent bowel movements, leading to SEVERE fluid & electrolyte depletion especially in pediatric patients.



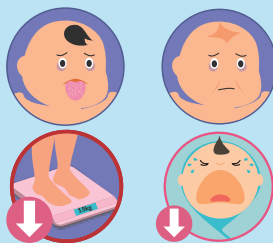
Memory trick

Where fluids FLOW
Electrolytes GO!

- **Hyp**onatremia (low sodium below 135)
- **Hyp**okalemia (low potassium below 3.5)

Signs & Symptoms

- **Sunken** eyes & fontanel (infants)
- **Dry** mucous membranes
- **Weight loss** = Water loss
- Fatigue, lethargy
- **Decreased** tearing
- Decreased **skin turgor**



ATI Question

- Q1:** A 5-month-old infant with vomiting and diarrhea ... started 3 days ago... focused assessment for which of the following?
Select all that apply.
- Sunken fontanel
 - Dry mucous membranes
 - **Weight loss**
 - Decreased or absent tearing
- Q2:** 13-year-old client with diarrhea. The client has dry lips and loss of skin turgor. What is the best course of action for the nurse?
- Notify the healthcare provider (HCP)

Kaplan Question

The 3-year-old child ... vomiting and diarrhea for the past three days. Which finding is the nurse most likely to see?

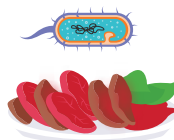
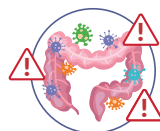
- **Sunken eyes**

HESI Question

- Q1:** Which skin assessment... adequate hydration and nutrition in a child?
- Skin turgor
- Q2:** A child presents with vomiting and diarrhea for 36 hours. Which finding is most concerning to the nurse?
- Urine specific gravity of 1.035

Causes

- Typically caused by **viruses** that can cause infection.
- **Bacteria and parasites** - typically from undercooked food causing salmonella & poor sanitation or lack of clean drinking water
- **Medications** - Antibiotic & even laxatives
- **Lactose intolerance**



HESI Question

- Q1:** Most common cause of diarrhea in children under 5?
- **Rotavirus**
- Q2:** Which factors predispose a child to diarrhea?
Select all that apply.
- Poor sanitation
 - Age of the child
 - Lack of clean water
 - Nutritional deficiency
- Q3:** Causes of acute diarrhea?
Select all that apply
- Laxative use
 - **Antibiotic** therapy
 - Upper respiratory infections

Interventions

Hydration

2 NCLEX TIPS

1. ORS: Oral Rehydration Solutions
2. IV fluids: 20 mL/kg - IV normal saline bolus



ATI Question

8-month-old infant with a 2 day history of diarrhea... temperature of 101F, heart rate 160/min, respiratory rate 35, and blood pressure 70/40 mm Hg. The anterior fontanelle is sunken... with capillary refill of 4 seconds. Which of the following is the most appropriate?

- Give 20 mL/kg bolus of 0.9% NS over 20 minutes

Kaplan Question

A toddler ... vomiting, and diarrhea. Which implementation is best for the nurse to use to maintain an adequate fluid intake?

- Offer oral rehydration solutions (ORS) to rehydrate

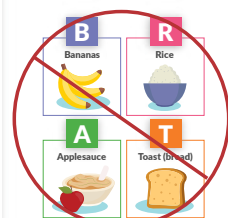
HESI Question

Which fluid is inappropriate when attempting to rehydrate a young child?

- Sports drinks

Education

- Normal diet (**solid foods**) = Acute Diarrhea
- NOT "**BRAT**" diet
 - B** - Bananas
 - R** - Rice
 - A** - Applesauce
 - T** - Toast (bread)
- **AVOID** antidiarrheal meds
Loperamide (brand: Imodium)



Endocrine

Diabetes – Type 1 & Type 2

Pediatrics: Endocrine

Pathophysiology Basics

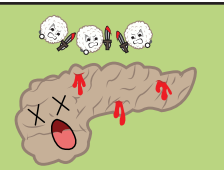
INsulin = puts **IN**to the cell (sugar & K+)

GLycogen = Stored **GL**ucose in Liver



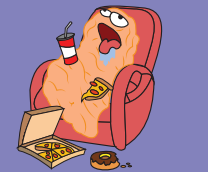
Type **ONE**

None: body does **NOT** produce insulin
Autoimmune (body attacks the pancreas)
SON: heredity "you can pass it on"



Type **TWO**

FEW-insulin receptors work
"Insulin resistance" (Diet)
YOU: your diet (high simple sugars) & sedentary lifestyle



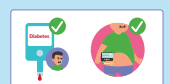
Lab Values

ATI

... School-aged child who has **type 1 diabetes mellitus**. Which of the following laboratory tests measures the **average blood glucose level over the past 120 days**?

- Glycosylated hemoglobin (**HbA1C**)

Glycosylated hemoglobin



HESI

Q1: Which is the best method for **assessing control of diabetes**?

- HbA1C

Q2: The child's blood reports show the **hemoglobin A1c is 6%**. What does the nurse tell the parents?

- The patient's **diabetes is under control**; please continue the same regime of treatment

	RANDOM	FASTING	GTT "TOLERANCE"	HgB _{A1C}
NORMAL	70-115	UNDER 100	UNDER 140	UNDER 5.7
PRE-DM	70-115	100-125	140-199	5.7-6.4
DM	200+	126+	200+	6.5+



Hyperglycemia - Signs & Symptoms

HIGH sugar

hot and dry = sugar high

"Hyperglycemia"

(blood turns to mud)

3 **Ps**: Polyuria

Polydipsia

Polyphagia

HESI

Q1: A nurse is caring for a 15-year-old girl who is experiencing **polyuria, polydipsia, and polyphagia**. The girl is underweight and reports being extremely fatigued over the past 3 days. The nurse anticipates testing will confirm which diagnosis?

- Type 1 diabetes

Q2: Which **action will the nurse take first** for the child known to have diabetes ... admitted to the emergency room?

- Take a blood glucose reading

ATI

... Teaching an adolescent who has diabetes mellitus about **manifestations of hyperglycemia**. **Select all that apply.**

- Increased urination
- Hunger
- Dark yellow-colored urine



Hypoglycemia - Signs & Symptoms

LOW sugar (70 or LESS)

cold and clammy need some candy

Hypoglycemia

MORE SEVERE! "Hypogly Brain will Die!"

- Cool, pale "pallor", sweaty, clammy = candy **NOT** hot or flushing
- Trembling, Nervous, Anxious
- HIWASH = Headache, Irritable, Weakness, Anxious, Sweaty, Shaky, Hungry

HESI

Q1: Which symptoms are associated with **newborn hypoglycemia**? **Select all that apply.**

- Tremors
- Jitteriness
- Eye rolling
- High-pitched cry

Q2: A child with **diabetes** who is treated with **insulin** is **trembling & sweating profusely**. The nurse learns that the child has **skipped lunch**. Which is the nurse's best action?

- Give the child **3 to 6 oz of orange juice**

Q3: Which food items to treat **hypoglycemia** will the nurse include in the teaching plan for the child with **insulin-dependent diabetes**?

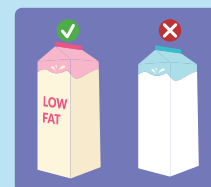
- Half cup of fruit juice
- Four sugar cubes
- One teaspoon of honey
- One small box of raisins



ATI

... Adolescent who has **type 1 diabetes mellitus**. Which of the following statements by the adolescent indicates an **understanding of the teaching**?






- "I should drink a glass of **low fat milk** when I am feeling irritable."

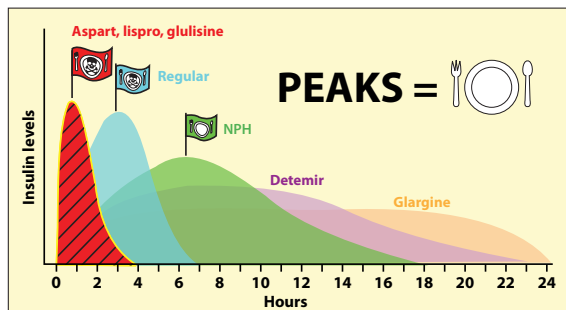


Diabetes - Type 1 & Type 2 II

Pediatrics: Endocrine

Insulin Types

LONG ACTING	NPH	REGULAR	RAPID
NO Peak NO Mix • Detemir • Glargine • Levemir = Long acting 	Intermediate NEVER IV drip or IV bag Mix clear to cloudy Given 2x per day 	Ready to go IV Regular goes right into the vein ONLY IV insulin 	Aspart/Lispro/Glulisine 
NO PEAK 	PEAK 4-12 hour	PEAK 2-4 hour	PEAK 30-90 hour ONSET 15 minute MOST DEADLY



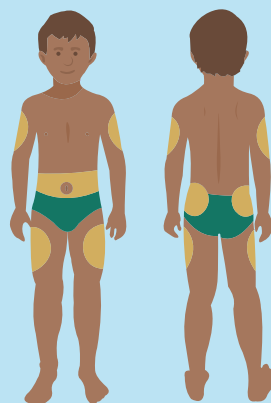
PEAK TIMES = Hypoglycemia risk 70 or Less
 Hypoglycemia brain will **DIE** NCLEX TIP

Memory Trick

- A - Aspart = MOVE your ASS-parts**
- L - Lispro = LESSpro LESS time**
- G - Glulisine = Go Limousine**

7 Insulin Tips

1. Peaks + Plates = Food during PEAK times (prevent **HYPO**gly=brain die)
2. **NO** Peak **NO** Mix = Long acting "old guys" - Detemir & Glargine
3. IVP or IVPB **ONLY** = Regular insulin "ready to go IV"
4. Draw Up: Clear to Cloudy "you want **CLEAR** days before cloudy ones"
5. Rotate locations-Macarena-**BEST** on abdomen (2 inches from: Umbilicus, Naval, "belly button")
6. DKA - Type 1-"sick days"-**YES INSULIN** without food!!!
7. Hypoglycemia (**70** or LESS)
 - Awake = **A**sk them to Eat (soda, juice, low fat milk)
 - Sleeping = **S**tay with IV D50 (dextrose 50)
 - "Unresponsive" "Responsive **ONLY** to pain"



HESI

- Q1: When does rapid-acting insulin peak?
- 30-90 minutes after injection
- Q2: The nurse is teaching an adolescent with newly diagnosed type 1 diabetes ways to minimize discomfort with insulin injections. Which recommendations? Select all that apply.
- Do not reuse needles
 - Remove all bubbles from the syringe before the injection
 - Do not move the direction of the needle-syringe during insertion or withdrawal

ATI

- Q1: ... Child with diabetes mellitus, nutrition and medication... teaching?
- You should give four or five injections around one area before switching sites
- Q2: A teen with type 1 diabetes mellitus is receiving NPH (Humulin N) insulin. A nurse is helping a teen and her parents plan her diet. The nurse explains that the primary purpose of bedtime snack is to provide which of the following?
- Nourishment with latent effect to counteract late insulin activity

Insulin Teaching

Key Point:

1. Encourage school-aged children **5 years and older** to participate in care & educate parents to transfer management of care to the child in small steps.
2. Children **less than 14 years of age** should **NOT** adjust insulin dose!

4 NCLEX TIPS

1. Recite a few signs & symptoms of low blood
2. Help clean the site for a finger-stick glucose testing
3. Identify insulin injection sites
4. Press the plunger of insulin syringe after a parent inserts and stabilizes the needle

Insulin Infusion Pump

- **Steady dose of insulin** = #1 benefit! Fewer swings in blood sugar
- Great for **non-compliant children with type 1 diabetes** who forget to take their insulin
- Push insulin bolus button at meal times

HESI

- Q1: How is the insulin infusion pump different from delivery of insulin through subcutaneous injection?
- Insulin infusion pump delivers fixed amounts of insulin continuously
- Q2: The mother of a child with type 1 diabetes mellitus asks why her child cannot avoid all "those shots" and instead take pills as the uncle does... most appropriate response?
- Your child needs to have insulin replaced



Diet Education

D-Diet "low sugar"
 LOW Calories & LOW Simple Carbs

- AVOID:** Simple Sugars (soda, candy, white bread/rice, juices)
- GOOD** Carbs
 High Fiber (complex carbs)
BROWN (bean, rice, bread, peanut butter)
 "whole wheat/grain/milk"



Top Missed NCLEX Question

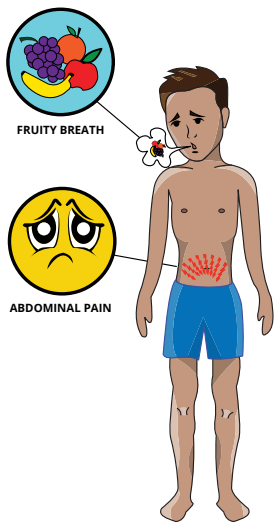
- After soccer practice an 11-year-old female with type 1 diabetes ... appears confused, with pale diaphoretic skin and shaky. What is the first priority action?
- 1. Prepare to give the child insulin
 - ✓ 2. Provide 6 oz of a regular soft drink
 - 3. Emergency IM injection of glucagon
 - 4. Dextrose IV push



DKA & HHNS

Pediatrics: Endocrine

DKA



Patho & Causes:

TYPE 1—FASTER & YOUNGER
“D COMES 1ST IN ALPHABET”

- S**—SEPSIS (INFECTION) **NCLEX TIP**
- S**—SICKNESS “STOMACH VIRUS & FLU” (MOST COMMON)
- S**—STRESS (SURGERY)
- S**—SKIP INSULIN EASIER FIX

Signs & Symptoms

- D**—DRY & HIGH SUGAR **250-500+** **NCLEX TIP**
- K**—KETONES & KUSSMAUL RESP. (DEEP/RAPID/REGULAR RESPIRATIONS AND FRUITY BREATH) **NCLEX TIP**
- A**—ABDOMINAL PAIN
- A**—ACIDOSIS METABOLIC **LESS THAN 7.35** (NORMAL 7.35—7.45)
HYPERKALEMIA (ABNORMALLY HIGH K+)

HHNS

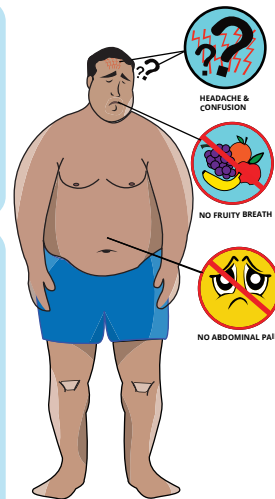
Patho & Causes:

TYPE 2—SLOWER & OLDER “H COMES 2ND IN ALPHABET”

- ILLNESS
- INFECTIONS
- OLDER AGE HARDER TO FIX

Signs & Symptoms

- H**—HIGHEST SUGAR **OVER-600+**
- H**—HIGHER fluid loss & **Extreme dehydration** **NCLEX TIP**
- H**—Head change—LOC, Confusion, Neurological Manifestations
- N**—No ketones **No Acid**, (NO fruity breath/ketones)
- S**—Slower Onset & Stable Potassium (3.5-5.0)



Interventions

Memory Trick

D	Dehydration 1st (0.9% Normal Saline)
K	Kill the sugar with IN sulin
A	Add potassium K+ (even when normal)

- D**—Dehydration **FIRST!** (0.9% normal saline) **NCLEX TIP**
- K**—Kill the sugar (**SLOWLY**) prevent low sugar
Hourly BS checks “land the plane slow & smooth”
Over 250: IV Regular **insulin ONLY** (bolus 1st)
Below 200 (or ketones resolve): SQ insulin + 1/2 NS with D5W IV
- A**—Add Potassium K+ (Yes even if norm: 3.5 - 5.0)
During IV Insulin **NCLEX TIP**
IN-sulin = sugar & K+ IN the cell

Common NCLEX Question

Q: Child is nauseous NOT eating—maybe vomiting—do you still give INSULIN?

A: **Yes**, we give sick day insulin to prevent DKA... because glucose is **HIGH** during times of illness.

ATI

... Child who has type 1 diabetes mellitus. Which of the following are manifestations of diabetic ketoacidosis?

- Dehydration

D K A

Dehydration

1st



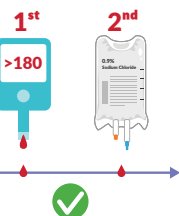
HESI

Q1: ... Signs and symptoms of diabetic ketoacidosis DKA? Select all that apply.

- Ketonuria
- Ketonemia
- Dehydration
- Acetone breath

Q2: The diabetic child ... with a fever & respirations are deep and rapid... priority nursing intervention for this child?

- Determine the **blood glucose level** of the child



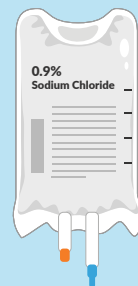
HESI Question

Urinalysis of a patient with type 1 DM shows **ketones, glucose, and high concentrations of H+ ions.**

On examination, the nurse finds that the patient's skin is **dry**, the **radial artery pulse is weak**, and the **level of consciousness is decreased.**

The nurse alerts the provider and prepares to perform which interventions? **Select all that apply.**

- Administer **intravenous fluids**
- Administer **insulin**
- Administer **potassium supplements**



ATI

A 13-year-old ... **type 1 diabetes mellitus...** **hot skin, dry mucous membranes,** and a blood glucose level of **375 mg/dL.** Arterial blood gases reveal a **pH of 7.28.** Which **action** should the nurse **prioritize first?**

- Begin infusion of **normal saline**

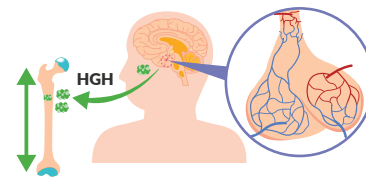


Hypo & Hyperpituitarism

Pediatrics: Endocrine

Normal Anatomy & Physiology

The pituitary is responsible for secreting important **hormones like GHG, human growth hormone responsible for growth & development.**



Hypopituitarism

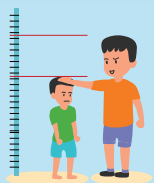
Clients present small & frail.



- **HYPO = LOW** amounts of growth hormones

Signs & Symptoms

- Short stature



HESI

... Common clinical manifestation of hypopituitarism that occurs due to deficiency of growth hormone (GH)?

- Short stature

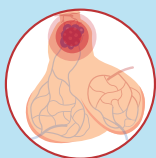
Kaplan

Hypopituitarism: clinical manifestation?

- Short stature

Causes

A tumor in the pituitary gland.



Diagnostics

CT - checks for a tumor or other pituitary gland problems.

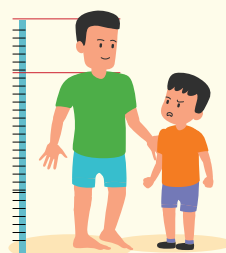
Treatment

- Growth hormone
- Corticosteroids
- Levothyroxine
- Testosterone & estrogen



Hyperpituitarism

Clients present as big & tall with **acromegaly**: enlarged face, jaw, hands & feet.



- **HYPER = HIGH** amounts of growth hormones

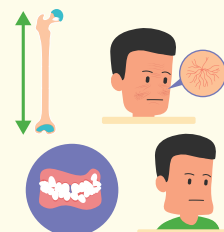
Signs & Symptoms

HYPER = HIGH amounts of growth hormones

HESI

Which assessment findings ... hyperpituitarism? Select all that apply.

- Overgrowth of the long bones
- Thickened, deeply creased skin
- Malocclusion of teeth & enlarged jaw



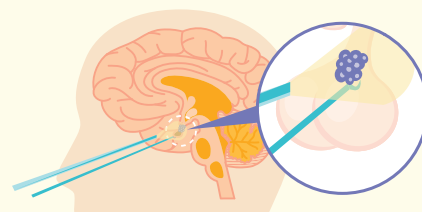
Causes

Noncancerous tumors.

Treatment

Hypophysectomy: Surgical removal of the tumor is considered the first line therapy.

Complications post-operative: Increased ICP, meningitis (infection in the brain), hypopituitarism & CSF leakage.



Hyperthyroidism & Hypothyroidism

Pediatrics: Endocrine

Thyroid Function

The thyroid produces many hormones to create energy & increase the body's metabolism.

HYPOTHALAMUS > TRH
(Thyrotropin-releasing hormone)

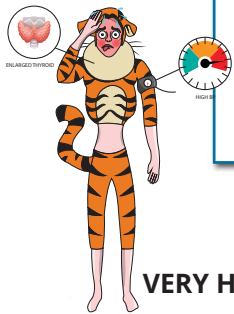
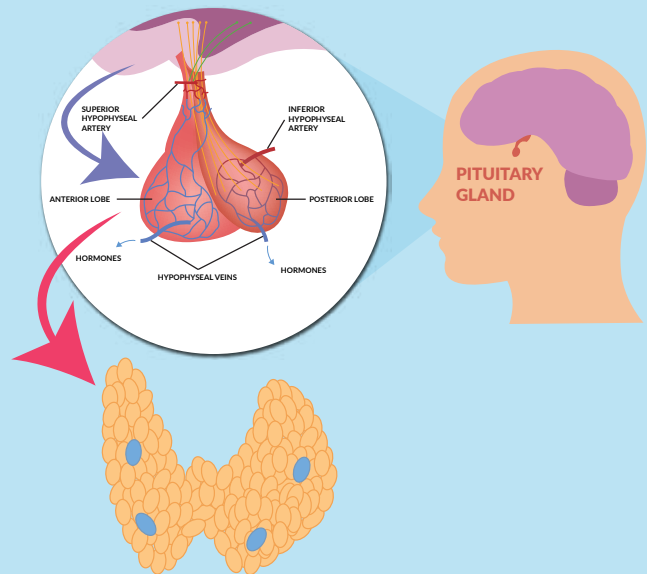
ANTERIOR PITUITARY > TSH
(Thyroid stimulating hormone)

3 KEY PLAYERS

T4 (thyroid hormone)

T3 (Active thyroid Hormone)

Calcitonin (puts a "TON" of Ca IN bone)



HYPERthyroidism
Graves = **GAINS "HIGH"**

EMERGENCY CONDITION:

Thyroid Storm "**thyrotoxicosis**"

VERY HIGH = "Agitation/Confusion" + **HTN crisis!**

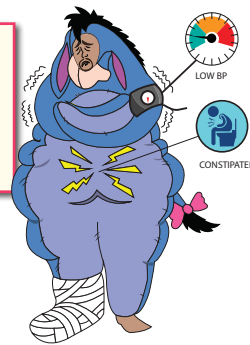
HYPOthyroidism
HashimOtos | **LOW & SLOW**

EMERGENCY CONDITION:

Myxedema Coma (Mini hypothyroid)

VERY Low/Slow:

Airway, Breathing, Low BP = **DEATH!**



Patho & Causes

HIGH T3 & T4 Thyroid Hormones

- Too much Iodine
- Too much Thyroid Meds. (**Levo**thyroxine)
- Autoimmune: Grave = **GAINS "HIGH"**

AUTOIMMUNE: Graves = **GAINS "HIGH"**

Patho & Causes

LOW T3 & T4 Thyroid hormones

- Low Iodine, Antithyroid Treatments
- Pituitary Tumor **NCLEX TIP**

• **AUTOIMMUNE:** Hashi**mO**tos | **LOW & SLOW**

Labs

HIGH T3 & T4 HYPER

Low—TSH

(look at T3 & T4 levels **FIRST**)

Labs

Low T3 & T4 hypo

- HIGH TSH

"TSH always opposite of T3 & T4"

Notes

Hyperthyroidism & Hypothyroidism II

Pediatrics: Endocrine

HYPERthyroidism
Graves = **G**AINS "**HIGH**"

Signs & Symptoms

HIGH & HOT!

CLASSIC SIGNS - NCLEX KEY WORDS

- G GRAPE EYE "Exophthalmos"**
(Use Eye patch/Tape Eyelids down) **NCLEX TIP**
- G GOLF BALLS** in throat "**Goiter**" **NCLEX TIP**
- HIGH BP**-HTN Crisis **180/100+**
(MI,CA, Aneurysms)
- HIGH HR**-Tachycardia **100+** (normal **60-100**)
- HEART PALPITATIONS** + Atrial Fibrillation
- HIGH TEMP. = NOT DRY!**
HOT & Sweaty Skin "diaphoresis"
Heat Intolerance **NCLEX TIP**
- HIGH GI** "Diarrhea"

ATI

... Adolescent who has **Grave's disease**...
expected findings? **Select all that apply.**

- Moist skin
- Tachycardia
- Weight loss

Critical Complication

PRIORITY: EXTREME HIGH = Thyroid Storm
"Agitation & confusion" early sign

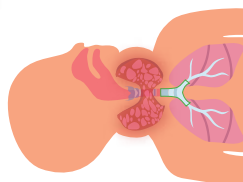
Diet

- HIGH METABOLISM**
- HIGH** calories (4,000–5,000 per day) **NCLEX TIP**
- HIGH** protein & carbs (meals & snacks)
- NOT** high fiber = **LOW FIBER!** (unless constipated)
- NO** caffeine (coffee, soda, Tea)
- NO** spicy food

HESI

An infant born with a **goiter**. Which are the priority nursing considerations for this infant?

- Preparation for **emergency ventilation**
- Having a **tracheostomy** set at the bedside
- Place the neck into a **hyperextended position**



HYPOthyroidism
Hashim**O**tos | **L**OW & **S**LOW

Signs & Symptoms

LOW & SLOW = HYPO

CLASSIC SIGNS

- LOW** energy "fatigue, weakness, muscle pains, aches"
- LOW** metabolism—Weight **GAIN**/Water **Gain** (Edema eyes)
- LOW** digestion "**Constipation**" **NOT** diarrhea
- LOW HAIR LOSS** "alopecia" **NOT** hirsutism **NCLEX TIP**
- LOW** mental—forgetful, ALOC (altered)
- LOW** mood—depression, "apathy, confusion"
- LOW** Libido—Low sex drive, infertile
- SLOW DRY** skin turgor **NCLEX TIP**

3 NCLEX TIPS

1. Difficult to awaken
 2. Dry skin
 3. Hoarse cry
- Enlarged fontanelles
 - Poor feeding
 - Protruding tongue
 - Constipation

Critical Complication

PRIORITY: EXTREME LOW = Myxedema Coma
Low RR—**Respiratory FAILURE**

- PRIORITY:** Place "Tracheostomy Kit" by bedside **NCLEX TIP**
- KEY WORD: "Endotracheal Intubation set up"**
- Low BP & HR "hypotension" "bradycardia" (below 60)
- Low Temp. "cold intolerance" **NO** electric blankets

Diet

- LOW** Metabolism
- LOW** Calories
- LOW** Energy "Frequent rest periods" **NCLEX TIP**

Hyperthyroidism & Hypothyroidism III

Pediatrics: Endocrine

HYPERthyroidism
Graves = **GAINS** "HIGH"

Pharmacology

- SSKI** (Potassium Iodide)
S-Shrinks the Thyroid
S-Stains Teeth (use straw + juice)
K-Keep 1 hour apart of other meds
- PTU**-Propylthiouracil **MEMORY TRICK**
 "Puts Thyroid Underground"
 Baby safe
REPORT: Fever/Sore Throat
- BETA BLOCKERS** "-lol" Propranolol
L-Low BP
L-Low HR

Treatments

RAIU-Radioactive Iodine Uptake (Destroys the Thyroid)

BEFORE:

- Pregnancy test before
REMOVE neck jewelry & dentures
5-7 days before Hold antithyroid Meds
AWAKE-NO anesthesia or Conscious Sedation
 Diet: Before-NPO 2-4 hrs
 After-NPO 1-2 hrs



AFTER: AVOID EVERYONE!

- NO** pregnant people **NO** crowds
NOT same restroom (Flush 3 x) **NOT** same food utensils
NOT same laundry as your family

Patient Education

- E**-Exophthalmos" (grape eyes)
Eye Exercise "full range of motion" (**YES MOVE EYES**)
Eye Drops "artificial tears in conjunctiva" (NO dry eye)
Dark Sunglasses (avoid irritation) **NO** Massaging
- T**-Tape the eyelids closed or use Eye Patch **NCLEX TIP**
- AVOID 5 S's**
 Can Trigger **THYROID STORM!** **NCLEX TIP**
NO Sodium (eye swelling) + HOB Up (drain the eyes)
NO Stimulants (Cluster care/ Dim Lights)
NO Smoking, Stress, Sepsis "sickness" (infection)
 Don't Touch Neck... release MORE T3 & T4

Thyroidectomy Surgery

Risk for **THYROID STORM!** **NCLEX TIP**

Priority: Stridor/Noisy breathing **NCLEX TIP**

- A**-Airway-**Endotracheal Tube** bedside **#1 Priority**
 Tracheostomy Set
- B**-Breathing-Laryngeal **Stridor** "Noisy breathing"
Keywords: "Monitor Voice strength & Quality"
- C**-Circulation-bleeding around pillow & Incision site
 Neutral head & neck alignment **NCLEX TIP**
- **NOT SUPINE!** HOB 30-45 degree
 - **NO FLEXING** or Extending Neck **NCLEX TIP**
- C**-Calcium **LOW below 8.6** (normal: **8.6-10.2**)
Chvostek (Cheek Twitch when touched)
Trousseau ("Twerk arm" with BP cuff x 3 min.)
Tingling around mouth/Muscle Twitching **NCLEX TIP**
MEMORY TRICK: "Remove the **T** (thyroid) Check the **C** (calcium)"



HYPOthyroidism

Hashim**O**tos | **LOW** & **SLOW**

Pharmacology

L-Levothyroxine (Lev**O** = HYP**O**)
 "Leaves" T3 & T4 in the body **MEMORY TRICK**

- L**-Lifelong + Long slow onset (3-4 weeks till relief)
- E**-Early morning /Empty stomach x 1 daily (**NOT** at night)
- V**-Very active (HIGH HR & BP) **Report** "agitation/confusion"
- O**-Oh the baby is fine! (pregnancy safe)
NO FOOD-take 1 hour **BEFORE** breakfast
NO Cure-med will **NOT** cure, only treat
NO Doubling doses (missed dose? Take it!)
NEVER "abruptly" **STOP** = Myxedema Coma

L

LIFELONG

+ Long slow onset
(3-4 weeks till relief)



E

**EARLY MORNING
EMPTY STOMACH**

x 1 daily (**NOT** at night)



V

VERY HYPER

(HIGH HR, BP, Temp.)
REPORT "agitation/confusion"



O

OH BABY IS FINE

(Pregnancy safe)



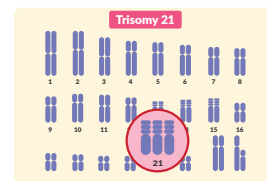
Genetic disorders

Down & Marfan's Syndrome

Pediatrics: Genetic Disorders

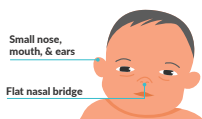
Down Syndrome - Pathophysiology

Down syndrome, also called **trisomy 21**, is a genetic disorder caused when abnormal cell division results in **extra genetic material from chromosome 21** leading to developmental delays both physically & mentally.



Signs & Symptoms

- Common: **Cardiac murmur** **NCLEX TIP**
- Facial appearance:
 - **Flat nasal bridge**
 - Small nose, mouth, & ears
- Short, stocky stature



HESI Question

Q1: A 2-year-old child with **trisomy 21 (Down syndrome)** ... Which assessment finding suggests the presence of a **common complication** often experienced by those with Down syndrome?

- Presence of a systolic **murmur**

Q2: Which **clinical manifestations** are appropriate for **Down syndrome**?

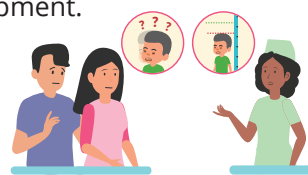
Select all that apply.

- Flat nasal bridge
- Separated sagittal suture
- High, arched, narrow palate
- Short stature, protruding tongue, and decreased muscle tone



Parental Teaching

Nurses should educate parents that children with Down syndrome usually have delays in physical and mental growth development.



Kaplan Question

... child with **Down syndrome**. Which parental statement indicates to the nurse that **further teaching is necessary**?

- "My child's **development** will become **more rapid in time**."



ATI Question

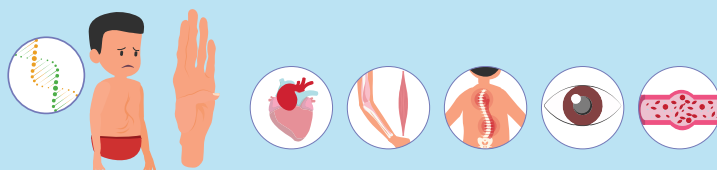
Which statement by the parents indicates that they have some **understanding of Down syndrome**?

- "There is a **broad spectrum** of mental capabilities and physical characteristics in children with Down syndrome."



Marfan's Syndrome - Pathophysiology

This is an inherited disorder that affects connective tissues, mainly in the heart, muscles, bones, eyes, & blood vessels.

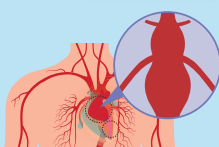
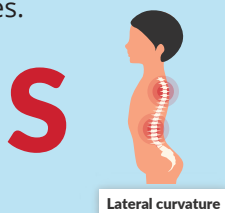


Marfan syndrome

Signs & Symptoms

Clients with Marfan syndrome develop very tall and thin with long arms, legs, fingers, and toes.

- **S** - Scoliosis
- **S** - "S" shaped Spine curvature of the spine
- **A** - Aorta Problems
- **A** - Aneurysm / Aortic Tear



Aortic aneurysms or dissections

Teaching

- **AVOID** contact sports **NCLEX TIP**



ATI Question

Marfan syndrome... What should the nurse prioritize in the **discharge teaching** for the parents?

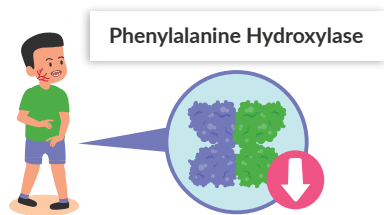
- Participation in **contact sports** should be avoided.

PKU: Phenylketonuria

Pediatrics: Genetic Disorders

Pathophysiology

Rare genetic disorder that causes severe brain damage & neurological impairment, especially during the developmental years from growing fetus during pregnancy, to the age of 12. With PKU, the body lacks the enzyme Phenylalanine Hydroxylase required to break down an amino acid phenylalanine into tyrosine. Amino acids found in high protein foods are essential for brain development, especially during pregnancy. But in PKU these unconverted amino acids build in the body, resulting in permanent brain damage occurring in the fetus & newborns.



HESI Question

- Q1** Which pathology pertains to **phenylketonuria (PKU)**?
- Defect in amino acid metabolism
- Q2** Which fetal abnormalities are prevented by monitoring ... a client with **phenylketonuria (PKU)** for high levels of **phenylalanine**? **Select all that apply.**
- Cardiac anomalies
 - Intellectual disability
 - Intrauterine growth restoration

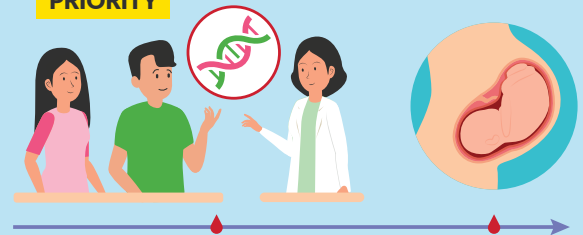


Causes

Genetics is number 1, passed on from both parents, so both parents need to be carriers in order to pass on the disorder. Therefore, genetic counseling is always recommended prior to pregnancy.



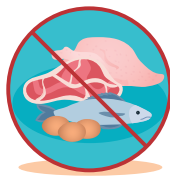
PRIORITY



Education

NCLEX TIPS

- Special infant formula
- **Low-phenylalanine** Diet is required
 - Fruits & veggies are best!
 - **AVOID "HIGH protein & iron foods"**
 - **NO meat, eggs, dairy products**
 - Peanut butter & jelly sandwich
- Tyrosine in diet is **GOOD**



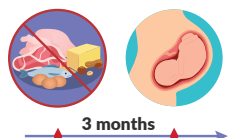
Kaplan Question

- Child client diagnosed at birth with **phenylketonuria (PKU)**... the nurse is **most concerned** .. with which statement?
- My child's favorite lunch is **peanut butter and jelly sandwich**.



ATI Question

- Teaching to a client who has **phenylketonuria (PKU)**.... indicates an **understanding** of the teaching?
- **Avoid foods high in protein** for at least **3 months prior to pregnancy**



Notes

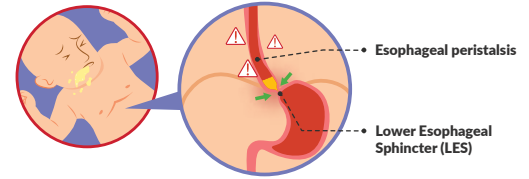
Gastrointestinal

Achalasia & Pyloric Stenosis

Pediatrics: Gastrointestinal (GI)

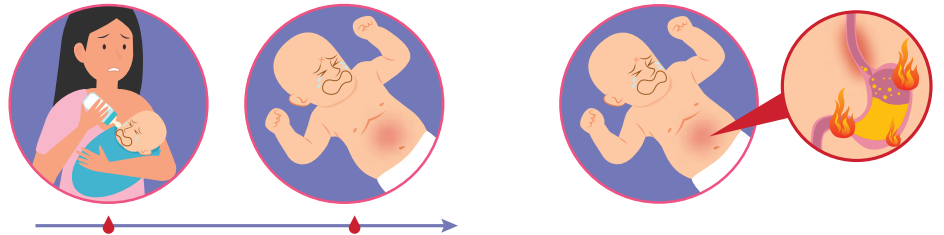
Achalasia - Pathophysiology

Achalasia is a condition where infants **regurgitate formula or milk after feeding**. It's a motility disorder characterized by limiting esophageal peristalsis and nonrelaxation of the lower esophageal sphincter (LES).



Signs & Symptoms

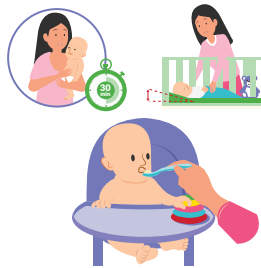
- Colicky behavior (frequent crying and fussiness), during or immediately after feeding
- Frequent or recurrent vomiting
- Refusing to eat or difficulty eating with choking or gagging



Education

After feeding:

1. Keep upright for 30 minutes
2. Elevate the head
3. Small frequent feedings



ATI

Achalasia: The visiting nurse instructs the infant's mother to...

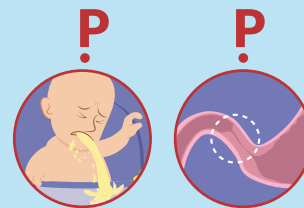
- Keep the infant in a **semi-sitting position**, especially after feedings



Pyloric Stenosis - Pathophysiology

Hypertrophic Pyloric Stenosis (HPS), is a condition in newborns, where the lower sphincter of the stomach becomes enlarged, preventing food from entering the small intestine. This blockage results in projectile vomiting immediately after feeding, which leads to **severe dehydration & constant hunger**.

Hypertrophic Pyloric Stenosis



Memory Trick

- P**rojectile Vomiting
- P**yloric Stenosis

Signs & Symptoms

NCLEX TIPS

1. **Projectile vomiting** after feeding
2. Abdominal distention & hunger
3. Poor weight gain & dehydration
 - **compare birth weight to current weight**

Labs NCLEX TIPS

- High Labs = **High Hematocrit**
- **Metabolic alkalosis (pH over 7.45)**
- **Low potassium (3.5 or less)**

HESI

... plan of care for an infant with **pyloric stenosis**?

- Observe for **projectile vomiting**

KAPLAN

The newborn is vomiting, has **abdominal distention**, & is diagnosed with **pyloric stenosis**. Which characteristic of the **newborn's emesis** does the nurse expect?

- **Projectile** and forceful

Causes

Unknown, but genetic and environmental factors might play a role.



Diagnostics

- **Olive-shaped lump** in the epigastric area to the right side of the belly button



Surgery Post Op Teaching

- Resume feeding = **No vomiting** after feeding **NCLEX TIP**

Once surgery for pyloric stenosis has been completed, the condition is cured!

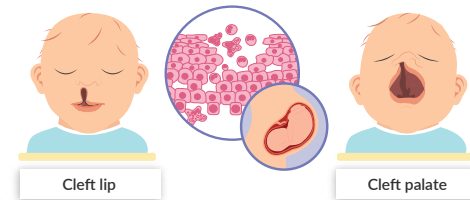
Cleft Lip & Cleft Palate

Pediatrics: Gastrointestinal (GI)

Pathophysiology

- **Cleft lip:** split of the lip
- **Cleft palate:** opening or cleft in the roof of the mouth (the palate) into the nasal cavity

Both occur when the **tissues don't fuse together** during fetal development before birth. Naturally a **HUGE** complication is **inadequate feeding**, as infants can not achieve proper suction. It becomes very difficult to pull milk or formula from the nipple & also are at **HUGE risk for aspiration**, breathing that milk or formula into the lungs!



Risk Factors

HESI

Which substance use is associated with **increased incidence of cleft lip**? Select all that apply.

- Alcohol
- Anticonvulsant
- Cigarette smoking



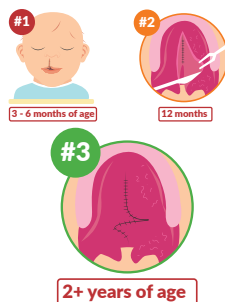
Diagnostics

Cleft lip and cleft palate are seen on ultrasound before the baby is born.



Surgery

1. **Cleft lip** repair: 3 - 6 months of age
2. **Cleft palate** repair: 12 months (or earlier)
3. Follow-up surgeries: between age 2 & teen years



Education

Oral Intake (before surgery)

5 NCLEX TIPS

1. Use **special** bottles or nipples
2. **Burp** often
3. **Upright position** during feeding
4. Point bottle **down & away** from the cleft
5. Slow feeding to 20 - 30 minutes



Postoperative Care

Interventions

4 NCLEX TIPS

1. **NO objects** into mouth (pacifiers, straws, tongue depressors)
2. Position after feeding = **upright, supine** with an **elevated head of bed**
3. Advise caregivers to **hold and comfort the child**
4. Elbow restraints: **Remove elbow restraints** per policy to **assess** skin & circulatory status

HESI

Q1: ... cleft lip repair. What is the **most important** reason to minimize this child's crying during the recovery period?

- **Crying stresses** the suture line

Q2: A 3-month old infant returns from **cleft lip surgery** with elbow restraints ... Which action should the nurse take to **maintain suture line integrity**?

- Place the **infant upright** in a seated position

ATI

12 month old infant ... 6 hours postoperative following **cleft repair**. Which interventions should the nurse include in the **infant's plan of care**? **Select all that apply**.

- Apply and release **elbow restraints** every hour
- Encourage the **parents** to rock the infant

Constipation, TEF & EA

Pediatrics: Gastrointestinal (GI)

Constipation - Pathophysiology

Infrequent bowel movements or difficult passage of stools that persists for several weeks or longer.



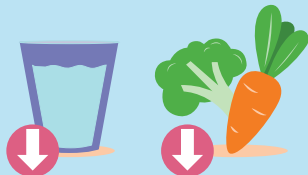
Signs & Symptoms

- Passing fewer than three stools a week
- Having lumpy or hard stools
- Straining to have bowel movements



Causes

- Stress
- Low Fluid & Fiber



Diet low in fiber, typically from not enough fruits, veggies, or whole grains. Fiber can also cause constipation if fluid intake is low, since fiber inflates with fluids to scrub the GI tract.

Treatment

- High **F**luid & **F**iber
- Ambulation (walking)



HESI

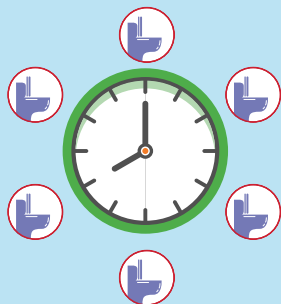
Q1: Which suggestion of the nurse helps the child in relieving constipation?

- You should eat a **high fiber diet**

Q2: A mother of a 4 year old... reports that her child has hard and dry stools. She reports a diet high in whole milk, processed meats, bananas, and macaroni and cheese. What is the **nurse's best reply?**

- Try replacing the macaroni with a **whole wheat macaroni**

Complications



Fecal incontinence (Encopresis)

3 Steps to Treatment

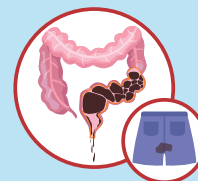
1. Laxatives & stool softeners
2. Fluid & fiber
3. Change Habits
 - Schedule regular toilet visits **after meals**
 - **Keep a diary** for toilet sessions
 - **Reward system for effort** **NCLEX TIPS** & **NOT** rewarding for each bowel movement



HESI

Which is **most associated** with a child with a fecal impaction?

- Encopresis

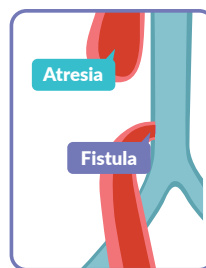


Encopresis

Tracheoesophageal Fistula & Esophageal Atresia - Pathophysiology

Tracheoesophageal Fistula (TEF) is an abnormal connection between the esophagus and the trachea, resulting in **high risk for aspiration during feedings!**

Esophageal Atresia (EA) is when the esophagus is divided into 2 segments without connecting to one another. Both of these conditions (**TEF & EA**) often occur together.



HESI

Atresia of the esophagus and tracheoesophageal fistulas:

- The upper and lower segments of the **esophagus end in a blind sac**
- The upper segment of the esophagus ends in a blind pouch; the **lower segment connects with the trachea** by small fistulous tract

Kaplan

Infant with... **excessive amount of oral secretions** after birth. During the first feeding the infant has a **choking episode** accompanied by cyanosis.

- Tracheoesophageal fistula

Signs & Symptoms

Choking & cyanosis during feeding **NCLEX TIP**



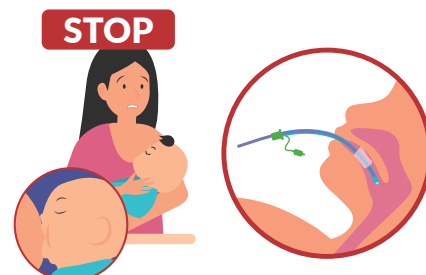
Interventions

1. Stop the feeding
2. Suction the mouth

HESI

The nurse assesses a newborn during an initial feeding of formula and notes **choking, coughing, and bluish lips**. What is the nurse's next action?

- **Stop the feeding**



Hirschsprung's & Pinworms

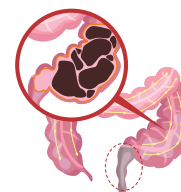
Pediatrics: Gastrointestinal (GI)

Hirschsprung's disease - Pathophysiology

A condition in infants that affects the large intestine (colon) & causes problems with passing stool. It results due to the **missing nerve cells in the colon**, which leads to bowel obstruction as the anal sphincter is unable to relax and coupled with no **peristalsis** (meaning no movement of the intestines).

Surgery is often **required to bypass the affected part of the colon** or remove it entirely.

Missing nerve cells
in the colon



Signs & Symptoms

2-day-old infant 3 NCLEX Keywords

- No passage** of stool (meconium)
Or thin **ribbon like stool**
- Distended** abdomen
- Refusing to **feed** & **vomiting** green bile

Complications

- Fever** & episodes of **foul-smelling diarrhea**
Report to HCP immediately!



ATI

... 1 day old infant who has suspected **Hirschsprung disease**. Which of the following should the nurse **anticipate on assessment** of this? Select all that apply.

- No passage** of meconium
- Abdominal distention**



Surgery

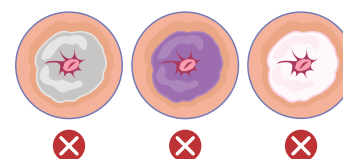
Stoma Assessment

- Priority to Report to HCP

Key words

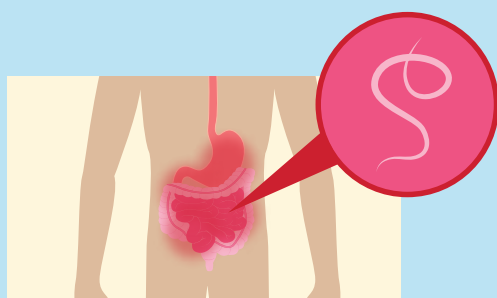
"Gray-tinged edges"
"Blue, purple, pale, dusky"

Report to HCP



Pinworms (Enterobiasis) - Pathophysiology

Intestinal worm infection



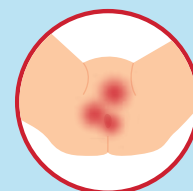
Signs & Symptoms

- Anal itching** that is **worse at night** **NCLEX TIP**

ATI Question

Pinworm infection... Which of the following symptoms does the nurse expect?

- Anal itching that increases at night**



Diagnostics

Tape Test: teach the caretaker to **place tape on the anus of the child** in the morning. If there are worms present on the tape then the child most likely has a pinworm infection.

HESI Question

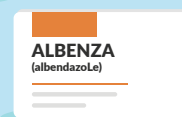
Tape test?

- Collect the **sample in the morning** when the child awakens



Pharmacology

- Mebendazole**
- Albendazole** (brand: Albenza)



HESI Question

Which drugs are administered to the child experiencing **bedwetting, perianal itching, restlessness, poor sleep**, who has also developed perianal dermatitis and excoriation? **Select all that apply.**

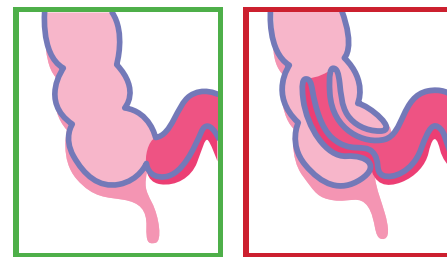
- Albendazole**
- Pyrantel pamoate**

Intussusception

Pediatrics: Gastrointestinal (GI)

Pathophysiology

Intussusception occurs when **1 part of the intestines slides inside another part of the intestines**, sort of like a telescope. This creates an **obstruction that blocks normal flow of bowels**, leading to increased pressure, swelling, and decreased blood flow within the bowels causing **ischemia** (lack of oxygen to the bowel tissues leading to tissue death)!



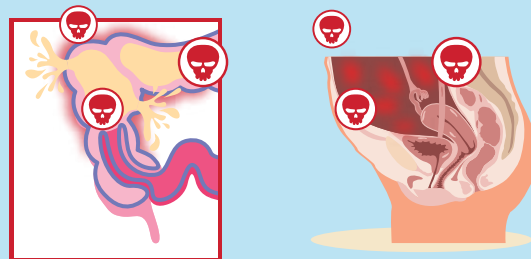
Normal

Intussusception

Complication

The most severe complications include **perforation & peritonitis** where the bowels explode & infection settles into the peritoneal cavity! This is a **medical emergency** as clients can go into sepsis & die quickly

Medical Emergency!



Signs & Symptoms

NCLEX TIPS

1. Stool: blood-streaked & mucus mix "Currant jelly" appearance"
2. "Sausage-shaped" abdominal mass
3. Vomiting (**non-projectile**)
4. Intermittent Pain!
 - Guarding
 - Crying & Drawing knees to chest

Peritonitis

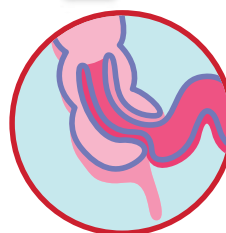
5. Fever
6. Abdominal rigidity
7. Rebound tenderness

MEMORY TRICK

Streaks of blood
with mucus

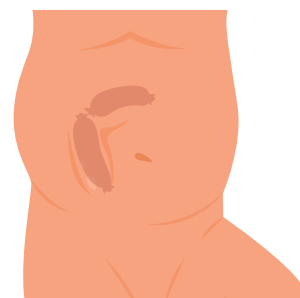


Intu **SS** usception



Intu **SS** usception

Sausage-shaped abdominal mass



Treatment

Enema NCLEX TIPS

1. Pneumatic (air) enema Primary intervention
2. Saline enema
3. Barium enema
"Clear liquid diet prior to procedure"

GOAL

4. Passage of "normal brown stool"
= Report to HCP



HESI Question

... child with **intussusception** who is scheduled for a **barium enema** prior to a surgical procedure. What action should the nurse take **first**?

- Place the child on a **clear liquid diet**

Dental Care

Pediatrics: Gastrointestinal (GI)

Important Dental Care Milestones

The first dental visit is recommended **within 6 months of the child's first tooth eruption** or at least by their **first birthday**.

SIDE NOTE

Teething is the process by which a baby's primary teeth erupt, or break through the gums, generally **occurring between 6 to 24 months of age**. Symptoms include **irritability, tender and swollen gums**, with drooling, sucking more frequently & placing objects or fingers into the mouth in an attempt to reduce discomfort.

Saunders Question

Which statement, if made by the mother, indicates a need for **further instruction**?

- "Proper dental care is **not necessary for the toddler until the permanent teeth erupt**"

HESI Question

Q1: 6 month old infant ... with drooling, sucking more often on the fingers, and biting on objects?

- Teething

Q2: Relief for teething pain?

- Give the child a **cold teething ring to relieve inflammation**

Teething



2 NCLEX TIPS

1. Initial dental visit: within **6 months after the child's first tooth**
2. Risk of **malaligned teeth** happens when thumb sucking / pacifier use **AFTER eruption of permanent teeth**

Kaplan Question

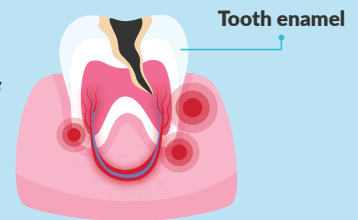
The 17-month-old client sucks the thumb, especially at night ... Which is an appropriate **suggestion by the nurse**?

- "Don't intervene; it will subside. The behavior usually peaks at 24 months."

Dental Caries (Cavities) - Pathophysiology & Causes

Cavities are **permanent damage to areas of the teeth**, caused from poor dental hygiene, sugary foods or drinks like candy, desserts & sodas. These sugary foods **lead to a buildup of slimy sticky plaque on the teeth** where bacteria settle in to cause tooth decay.

Over time, **plaque wears away protective tooth enamel resulting in cavities**, these tiny holes in the teeth can reach deep into the tooth to trigger the nerve pain!



Signs & Symptoms

Toothache: spontaneous mild or sharp pain when eating or drinking something sweet, hot, or cold.



Fillings & Root Canal

Untreated cavities that result in tooth decay must be **filled with a filling or a crown**. Severe cases may need a root canal or total tooth removal.



Education

8 NCLEX TIPS

Diet

1. **Sugar-free gum**
2. Limit **consumption of sweet, sticky foods** (soda, candy, & **dried fruit**)
3. Whole grains & vegetables
4. **Dairy**: milk, yogurt, & cheese

Routine

5. **DO NOT** put infants to **sleep with a bottle of milk or juice**
6. **Rinse mouth with water after meals** (when brushing is not available)
7. Brush & Floss at least **twice a day**
8. Drink tap water (fluoride)

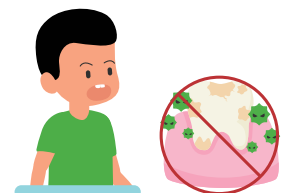
HESI Question

Q1: Childhood dental caries:

- **Bottle of milk or juice at naptime or bedtime** predisposes the child to this syndrome

Q2: Preventing **dental caries** in school age children?

- **Brushing teeth** after meals, after snacks, and at bedtime



Dental Injury

Pediatrics: Gastrointestinal (GI)

Tooth Avulsion

Tooth Avulsion is a **dental emergency** where the tooth falls out or gets **separated from the gums!** It's an **emergency since the tooth can die if not reinserted to re-establish blood supply.**



Priority Action

Rinse & reinsert the tooth into the gum **immediately to re-establish blood supply!** If the tooth cannot be re-inserted, it should be **kept moist by submerging** into cold milk, sterile saline, or even saliva as a last line measure.

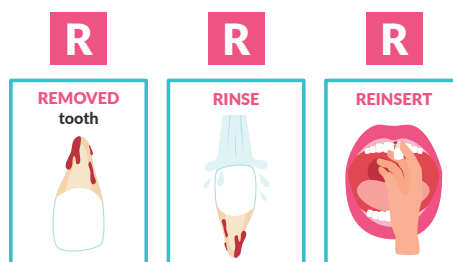
Priority Action

NCLEX TIPS

1. **Rinse** the tooth
2. **Reinsert** into the gingival socket within 15 minutes & hold it in place



NEVER scrub the tooth as this can damage the root & **NEVER** wrap the tooth in sterile gauze as this would dry the tooth out



HESI Question

Actions: **avulsed permanent tooth?**
Select all that apply.

- Recover tooth
- If tooth is dirty **rinse under water** or saline
- **Insert tooth into gingival socket** and have child hold it in place

Oral Mucositis

Refers to open sores & ulcers inside the mouth, and is a very common complication of cancer treatment.



ATI Question

Oral mucositis: Which of the following **interventions** should the nurse implement?
Select all that apply.

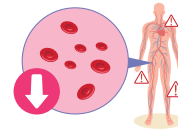
- Offer the child a **straw for drinking fluids**
- Provide a **soft, disposable toothbrush** for oral care
- Encourage **gargling with a warm saline** mouthwash

Notes

Hematological Blood

Anemia Pathophysiology

Anemia is when the body lacks enough RBCs (Red Blood Cells) to carry **oxygen** around the body to perfuse the tissues. Clients present with tired, fatigued & pale skin, with shortness of breath and dizziness, as the body lacks oxygen.



- Top Tested**
1. Iron deficiency Anemia
 2. Sickle cell anemia
 3. Pernicious Anemia

Anemia Causes

- **Blood loss:** surgery, trauma, excessive menstruation etc.
- **Chemotherapy & Immunosuppressants:** which suppresses the bone marrow where the RBCs are made.
- **Lack of iron, B12 & other building blocks:** like with iron def. anemia & pernicious anemia

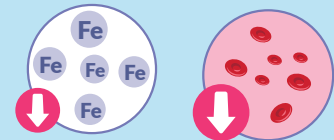
NCLEX TIP

Hemoglobin

- Normal: 12 +
- Bad: 8 - 9
- **Less than 7 = Heaven**

Iron Deficiency Anemia

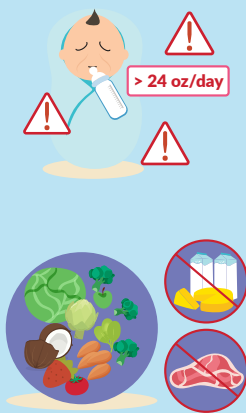
The body lacks iron (Fe) a critical building block to help make RBCs - red blood cells. This is the most common form of anemia globally



Causes

Infants & Children

1. Premature birth
2. Insufficient oral intake
3. **Excessive intake of milk** **NCLEX TIP**
4. Preterm infants **exclusively** bottle-fed with breast milk
5. **Vegan diet** **NCLEX TIP**
 1. Fortified breads & cereals
 2. **HIGH** iron foods with **HIGH vitamin C**
 3. Calcium & Vitamin D



Treatment

Rich in iron

1. Meat, Fish, Poultry
2. Spinach "green leafy" & whole grains

Infants & Children

Limit **EXCESSIVE** milk intake

Iron + Vit. C
HIGH iron foods
HIGH vitamin C



Kaplan Question

The nurse counsels a client diagnosed with **iron deficiency anemia**. The nurse determines teaching is effective if the **client selects which menu?** Select all that apply

- Flank steak & green leafy vegetables
- Liver & onions, spinach



Signs & Symptoms

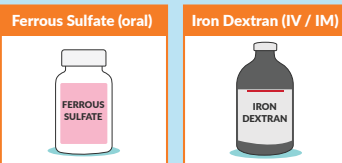
- **Dyspnea**
- **Pallor "pale skin"**
- **Tachycardia**

ATI Question

Teaching to the parent of a school-age child who has **iron-deficiency anemia** and a new prescription for a **liquid iron supplement**. Which of the following parent statements indicates an **understanding of the teaching?**

- I will administer this medication **using a straw**

Pharmacology



KEY POINTS

- Dark or black stools = **Normal & Expected** NOT GI BLEED
- Empty stomach **1 HOUR BEFORE** medications

HESI Question

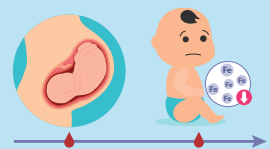
A nurse is educating a patient with **iron deficiency on foods high in iron**. Which meal, if chosen by the patient, demonstrates an understanding of **iron-rich foods?**

- **Grilled chicken thigh**, sauteed spinach, and whole grain bread



ATI Question

- Q1:** ... toddler who has **iron deficiency anemia**. Which of the following **food choices... best source of iron?**
- 1 cup of diced **chicken breast**
- Q2:** Which **best describes why infants** are started on solid foods at about **5 to 6 months** of age?
- The fetal reserve of **iron is depleted by this age**



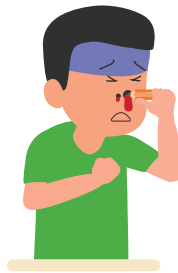
Epistaxis

Pediatrics: Nosebleed

Patho & Causes

Epistaxis is the medical term for a **nose bleed**, described as an **acute hemorrhage from the nostril, nasal cavity, or nasopharynx**.

Typically caused from dry mucous membranes, like when exposed to dry air or elevation, and also from trauma like nose picking or shoving a foreign body in the nose.



NOSEBLEED or bloody nose

Interventions

4 NCLEX TIPS

1. Sit up & **lean forward**
2. Direct **pressure** below the nasal bone by **pinching the nostrils**
3. **Cold pack** to the bridge of the nose
4. Keep **calm & quiet**



HESI Question

- Q1:** Appropriate way to stop an epistaxis?
- Having the child **sit up and lean forward**
- Q2:** Bloody nose... What actions will the nurse take?
Select all that apply
- Have the child **pinch the nose closed tightly**
 - Set the timer for **10 minutes**

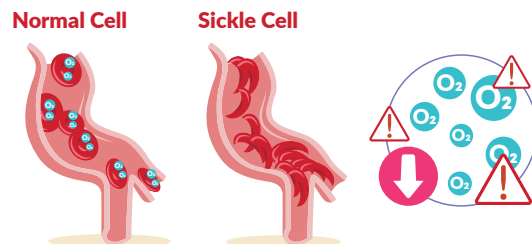
Notes

Sickle Cell Anemia & Pernicious Anemia

Pediatrics: Hematological

Sickle Cell Anemia

The RBCs have a distorted shape, transforming from a nice round plumb shape to a **skinny sucked in sickle shape**. These misshaped RBCs die quicker than normal RBCs, **carry less oxygen** to the body & get clogged in tiny blood vessels - **blocking or occluding the blood supply** causing ischemia (low oxygen) to the organs. A vaso-occlusive crisis or **"sickle cell crisis"** can occur, causing **extreme pain** from the lack of oxygen!



Signs & Symptoms

- **One sided** arm weakness
- Swelling of the feet and hands (Dactylitis)

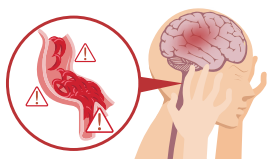
NCLEX TIP

- **New-onset** paralysis of extremities
- **Sudden** inability to be aroused

Kaplan Question

Client experiencing a **vaso-occlusive crisis**. The nurse determines care is appropriate if which observation is made?

- The client receives regular **neurological assessments**

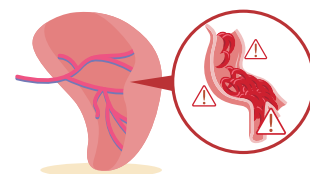


Complication

Splenic sequestration crisis

- Rapidly enlarging spleen
- Low blood pressure

Splenomegaly



Treatment

- Hydration: **IV fluids**
- Bed rest
- **Pain Control NCLEX TIP**
 - PCA - patient control analgesia pump
 - **Call the HCP** for **Higher doses**

ATI Question

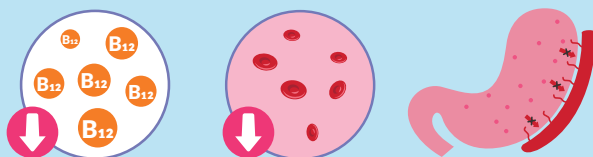
A pediatric nurse is giving instructions to a **12-year-old client with sickle cell disease** and his parents. To **prevent a crisis**, the nurse explains that the child should do **which of the following?** Select all that apply.

- Stay away from **sick children**
- **Increase fluids**
- Be aware that **high altitudes** may lead to a crisis



Pernicious Anemia

The body **can not absorb B12**, which is a vital building block to create RBC's. Clients **lack intrinsic factor** in the GI tract, which **helps the body take in B12**.



HESI Question

Which factor results from **pernicious anemia?**

- The **absence of intrinsic factor** secreted by the gastric mucosa

Signs & Symptoms

- Glossitis: **EXAM TIP**
 - Inflamed red smooth tongue
- Extreme weakness
- Jaundice: "pale yellow skin"

Kaplan Question

Clinical manifestations of **pernicious anemia?**

- Glossitis: A **smooth, red tongue**

HESI Question

The nurse is caring for a patient who reports **extreme weakness and glossitis**, and the nurse identifies **pale yellow skin**. Which type of **anemia** does the nurse anticipate in the patient?

- Pernicious anemia



Treatment

- **B12** - Injection: IM or IV
- NOT orally (PO)

HESI Question

A nurse is caring for a patient with **pernicious anemia** secondary to total gastrectomy. The nurse would **question which provider's order?**

- **Vitamin B12 supplement, PO**



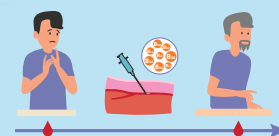
Kaplan Question

Client diagnosed with **pernicious anemia** asks why vitamin B12 cannot be **given in pill form**. Which response by the nurse is **best?**

- "Stomach **doesn't secrete** the necessary substance for **B12 to be absorbed orally.**"

A client asks the nurse **how long injections of vitamin B12** will be needed. Which response by the nurse is best?

- You may need **lifelong injections**

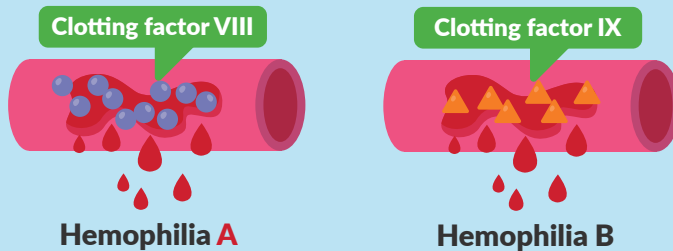


Hemophilia

Pediatrics: Hematological

Pathophysiology

Hemophilia is an inherited bleeding disorder in which the **blood cannot clot normally**. Clients have an increased **risk of excessive bleeding** from small injuries like a paper cut or a fall on the ground.



Hemophilia A

- Lack of clotting factor **VIII** (8)

Hemophilia B

- Lack of clotting factor **IX** (9)

HESI Question

A nurse is caring for a patient diagnosed with **hemophilia A**. The nurse knows this type of hemophilia is caused by an **absence of which clotting factor**?

- VIII

Signs & Symptoms

- Pain, Bruising, & Petechiae
- Ineffective tissue perfusion
- Joint stiffness & Lack of mobility

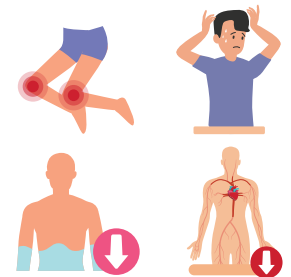


HESI Question

A nurse is caring for a patient with **hemophilia**. Which concerns would be expected on the nursing care plan?

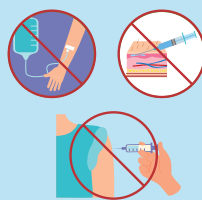
Select all that apply.

- Pain
- Anxiety
- Deficit of fluid volume
- Ineffective tissue perfusion



Treatment

- **AVOID Injections:** IV, IM, SQ
- Administers **coagulation replacement factors**
- **Ice packs** & **Elevate** the affected area



Kaplan Question

Q1 Client with **hemophilia** develops painful swelling of the knee after **bumping the leg**... which **initial action** is most appropriate for the nurse to take?

- Apply **ice** to the knee and **elevate** the leg

Q2 The nurse reviews the medical record for a client diagnosed with **hemophilia**. It is most **important** for the nurse to **question** which entry?

- Meperidine 75mg IM q 4 hr for severe pain



Education

4 NCLEX TIPS

1. Wear a **medical alert bracelet** at all times
2. **Avoid** giving the child over-the-counter **aspirin**
3. Noncontact sports: **swimming, jogging**
4. **Joint destruction** = long-term complication



The big **bleed risk**



Vaccinations

2 NCLEX TIPS

1. Admin vaccines via **subcutaneous route** with the **smallest needle**
2. Hold pressure on the injection site for **5 minutes or more**.



Thrombocytopenia

Pediatrics: Hematological

Pathophysiology

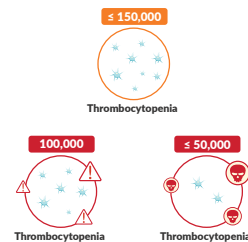
Thrombocytopenia occurs when clients have low platelets.

Platelets

Normal: 150,000 - 400,000

Thrombocytopenia:

- 150,000 or less
- 100,000 = MAJOR RISK
- **50,000 or Less = DEADLY**



Signs & Symptoms

Huge risk for hemorrhaging, like a ticking time bomb.

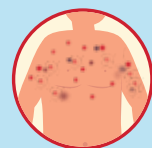
Any small bump or fall will cause **major bleeding**

- Bleeding gums
- Tachycardia
- Petechiae (Tiny red brown-purple spots on the skin)

HESI Question

Which sign is observed in the patient with **thrombocytopenia**?

- Petechiae



Petechiae

Causes

- Immunosuppressants
- Liver disease (Hep. / Cirrhosis)
- ITP - Immune **thrombocytopenia** purpura



NCLEX

Complication

Bleeding - Huge risk for injury, like a ticking time bomb



PRIORITY



Kaplan Question

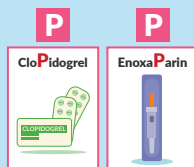
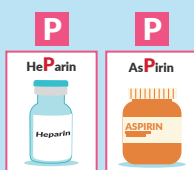
The nurse cares for a client diagnosed with immune **thrombocytopenia** purpura. Which nursing diagnosis is a **priority** when caring for this client?

- Risk for injury

Interventions

Platelets Less than 100k

- Hold the P's
 - He**P**arin
 - As**P**irin
 - Clo**P**idogrel
 - Enox**aP**arin
- Notify the HCP
- Obtain vital signs

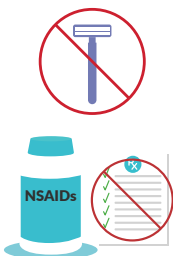


The NCLEX will give lab values & ask for priority action!
THINK: **what KILLS the patient first!**

Immunosuppressants & Surgery	Labor & Epidural	Cirrhosis
Exhibit	Exhibit	Exhibit
Laboratory result	Laboratory result	Laboratory result
WBCs 3,000	Blood group A+	Albumin 2.7 g/dL
Hemoglobin 9.5 g/dL	Rh factor Negative	Bilirubin Negative
Platelets 68,000	WBCs 18,000	Platelets 45,000
	Platelets 75,000	Ammonia 125

Teaching

- **NO** Razors
- **NO** NSAIDs over the counter



1. Look for the most critical lab!
All are less than 100,000, but cirrhosis is the lowest - less than 50,000.
2. It's **your JOB as a nurse to SAVE LIVES!**
The NCLEX will make sure you do.
3. This is why **you MUST know your numbers.**

Immunization Dates & Types

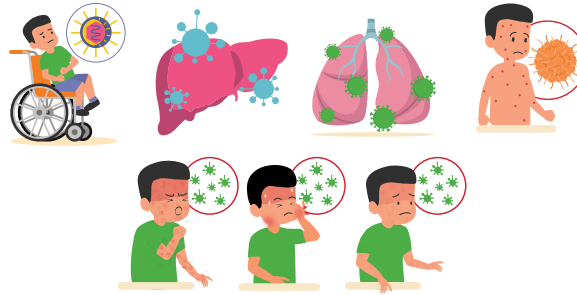
Immunization – Dates & Types

Pediatrics: Infectious Disease

Basic Concepts

Immunizations, also called vaccines, are **little doses of big dangerous viruses**. It helps the body develop early immunity, so that it can form a **defense system early in age**. Immunizations are given to children, as the **primary means of protecting the body** against deadly communicable diseases like:

- Polio,
- Hepatitis,
- Pneumonia,
- Varicella,
- Measles,
- Mumps,
- Rubella (MMR)



ATI Question

Communicable diseases... best **primary prevention strategy**?

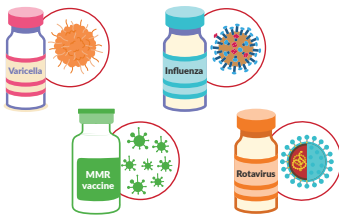
- Obtaining scheduled immunizations

HepB										
DTaP										
Hib										
IPV										
RV										
PCV13										
Flu										
MMR										
Varicella										
HepA										

Top Tested Key Points

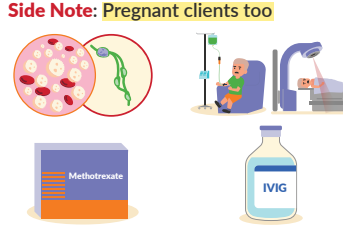
NO LIVE Vaccines!

- **Varicella-zoster** (chickenpox) **NCLEX TIP**
- **Influenza** (flu shot)
- **MMR: measles, mumps, rubella**
- Rotavirus



Low Immune System

- Cancer: **Leukemia**, Lymphoma etc. **NCLEX TIP**
- **Chemotherapy & Radiation**
- **Immunosuppressants** (Methotrexate)
- **IVIg** (immunoglobulin therapy)



*Pregnant mothers don't have a low immune system but we don't give any live vaccines

Top Missed NCLEX Questions

The nurse should clarify with the provider **before administering which vaccination**?

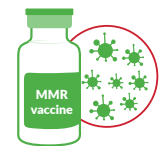
- ✓ **Varicella-zoster** vaccine for client recently diagnosed with leukemia



Saunders Question

child receiving long-term **immunosuppressive therapy**... which vaccine is **contraindicated**?

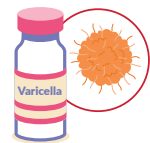
- MMR



HESI Question

Contraindicated for children who are **immunocompromised**?
Select all that apply.

- Varicella
- Measles, mumps, and rubella (MMR)



Reaction After Vaccination

Common (expected)

- **Mild fever** **NCLEX**
- **Redness & swelling** at injection site
(Apply cold pack to site)

Side NOTE:

If the client has a common cold/minor illness?
Yes still give vaccine. TEST TIP



Severe! (NOT expected)

- **Fever above 102 F (38.9 C)** **NCLEX**
 - **Febrile seizures!**
- Ask parents calling in:
"What is your child's temp right now?"
Administer acetaminophen

Over 102



ATI Question

Six month old infant scheduled for routine immunizations ... **fever of 103 degrees**... nurse's **BEST response** is to:

- Advise the parent to have the child seen by the pediatrician but the immunizations will need to be postponed until the baby is well

Saunders Question

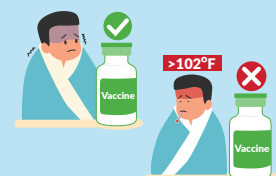
The student should question **whether to administer immunizations** to a child with which condition?

- A severe febrile illness

HESI Question

Varicella and measles, mumps, and rubella (MMR) vaccines?

- Children can be vaccinated when they have the common cold



Immunization - Dates & Types II

Pediatrics: Infectious Disease

Immunization Schedule

Organized by Vaccine

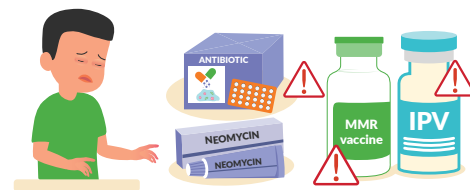
Immunization	Age of child
HepB Hepatitis B	0, 2, 6 months (0, 1-2 months, 6-18 months) ATI HESI Questions 12 year old child who has not received the hepatitis B vaccine? • The three-dose series would be started at this time
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IPV Inactivated Polio Vaccine	2, 4, 6 months 4 - 6 years
PCV Pneumococcal Vaccine	2, 4, 6, 12 months
Hib Haemophilus influenzae type B	2, 4, 6, 12 months
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HPV Human Papillomavirus	9 - 12 years (Boys & Girls) HESI Questions HPV vaccine is to prevent what? • Cervical cancer
MCV Meningitis "Meningococcal"	11 - 12 years 16 - 18 years booster

Organized by Age

Age	Memory Trick	Immunization
Birth	Hep B at Birth	Hepatitis B (HepB) 0,2,6 months ATI 0, 1-2 months, 6-18 months
2 months	B DR. HIP	B Hepatitis B (HepB) 0,2,6 months D DTaP Diphtheria-Tetanus-Pertussis R RV RotaVirus H Hib Haemophilus influenzae type B I IPV Inactivated polio vaccine P PCV Pneumococcal vaccine
4 months	DR. HIP	Same 2 months (no Hep B) Memory Trick "I FOUR-got the Hep B"
6 months	B DR. HIP Flu	Same as 2 months B DR. HIP • Influenza (flu shot) 1st dose
12 months (1 year)	MAD HPV	M MMR (1 & 4 years) A Hepatitis A 2 doses by 2 years (6 mo. btwn doses) D DTaP H Hib P PCV V Varicella (1 & 4 years)
4 - 6 yrs.	Very DIM	VERY Varicella (1 & 4 years) D DTaP (2,4,6,12 mo. & 4-6 yrs) I Influenza & IPV "polio" (2,4,6 mo. & 4-6 yrs) M MMR (1 & 4 years)
11 - 12 yrs.	MITH	M eningitis, I nfluenza, T daP, H PV
16 - 18 yrs.	Men Flu	M eningitis booster & Annual flu shot

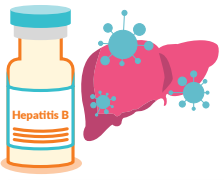
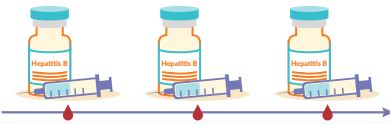
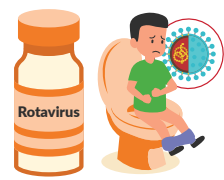
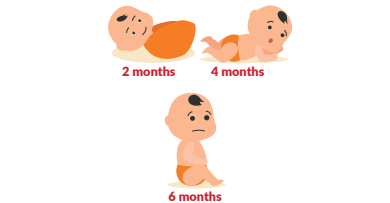
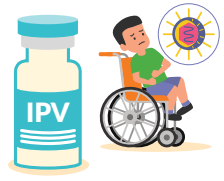
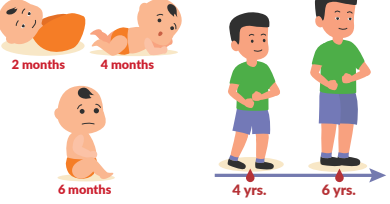
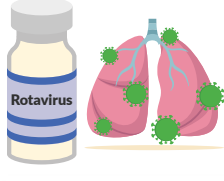
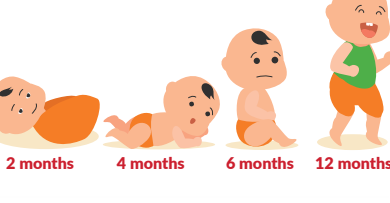
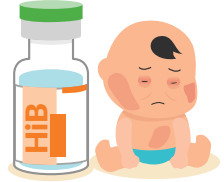

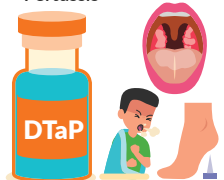

Immunization	Allergy / Adverse Effect
Influenza Flu shot	Allergic reaction to eggs HESI
MMR Measles, mumps, rubella	Prior allergic reaction to neomycin HESI Adverse effect: Arthritis Kaplan
HepB Hepatitis B	Prior anaphylactic reaction to yeast ATI
IPV Inactivated Polio Vaccine	Prior anaphylactic reaction to neomycin Saunders

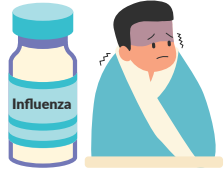
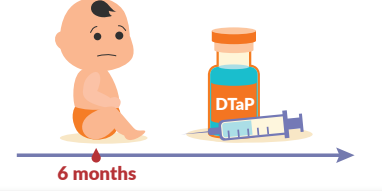
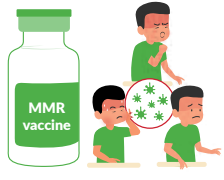
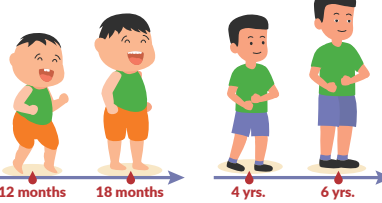
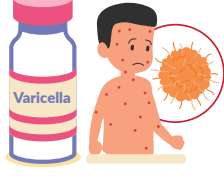
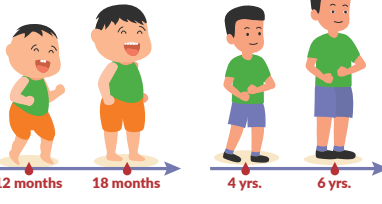
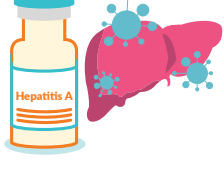
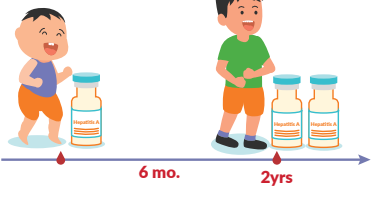
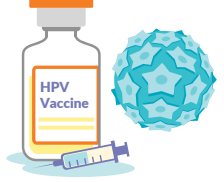
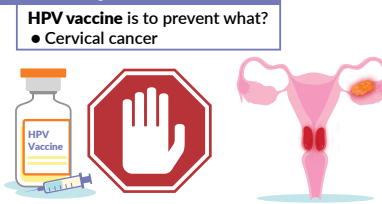
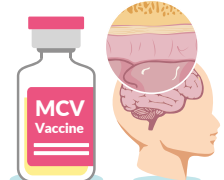
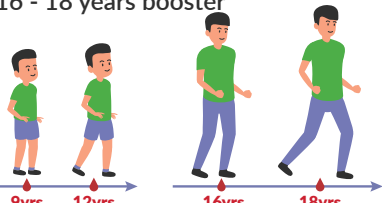
Any client who has had an allergic reaction to neomycin will probably have a reaction to MMR & polio vaccine.



Immunization - Dates & Types III

Pediatrics: Infectious Disease

Immunization	Age of child
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Injections & Safe Med Admin

Pediatrics: Infectious Disease

4 Key Points

1. Communication

- Use simple, age-appropriate language & tell the truth!
- "This medication will go under the skin" **NCLEX TIP**
- "The skin may sting for a few minutes"

2. School age (6 - 12 yrs) fear loss of control

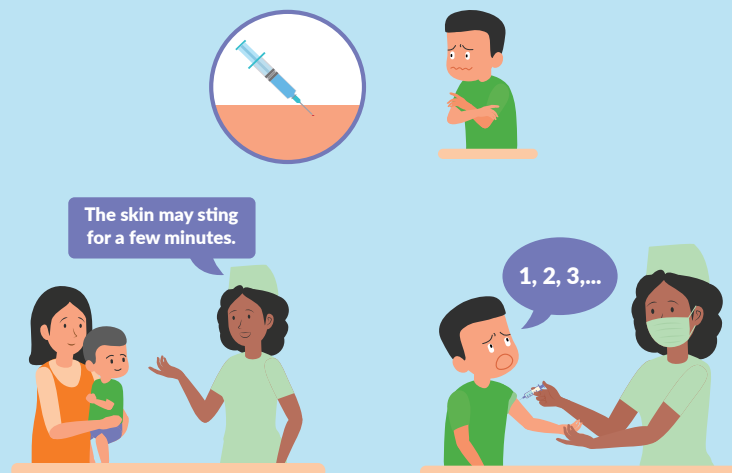
- Ask these children to count out loud during injection **NCLEX TIP**

3. Encourage caregiver to hold child during injection (on lap or in arms)

4. Hiding procedural objects:

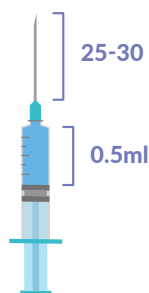
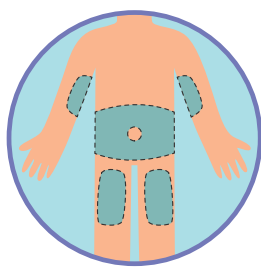
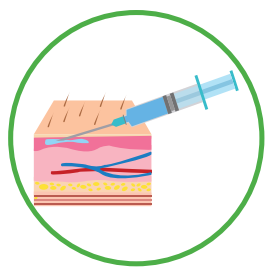
- Appropriate: Toddlers (1 - 3 yrs)
- NOT appropriate: School Age (6 - 12 yrs) **NCLEX TIP**

Injections can be downright **SCARY** for anyone, especially children! Be sure to follow the **4 key points** outlined.



SQ - Subcutaneous

- Subcutaneous fat tissues: Abdomen, behind arms, interior thigh.
- 25-30 gauge needle, less than 0.5 ml



Saunders Questions

Q1: MMR vaccine to a 5 year old child.

The nurse should administer this vaccine by which method?

- Subcutaneously in the **outer aspect of the upper arm**

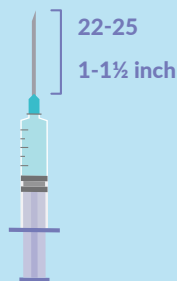
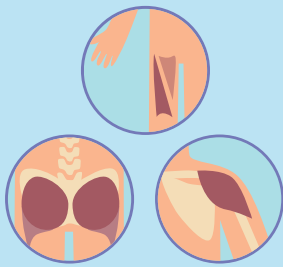
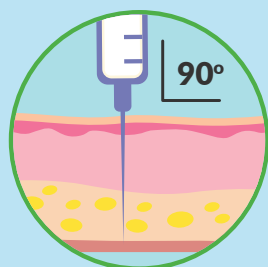
Q2: Correct sequence of priority.

All options must be used.

1. **Verify** prescription
2. Assess for **allergies**
3. Obtain **parental consent**
4. Check **expiration** & lot number
5. Select appropriate **site** & **administer** vaccine
6. Provide vaccination **records** to the parents

IM - Intramuscular

- 22-25 gauge, 1-1½ inch length
- Vastus lateralis, gluteal, or deltoid



■ Infants (0-12 months)

vastus lateralis is the recommended site

ATI Question

intramuscular injection to a 6 month old child. Which site should be used?

- Vastus lateralis

Infectious disease

Airborne vs. Droplet Precautions

Pediatrics: Infectious Disease

Droplet

P - Pertussis
I - Influenza
M - Meningitis
P - Pneumonia

1. **Surgical Mask** & Goggles
2. Single room

ATI

Teach unlicensed personnel to **wear a mask**

Airborne

M - Measles
T - TB (Tuberculosis)
V - Varicella (shingles/chicken pox)

1. N95 mask - Staff
2. Neg. Pressure Room
3. Door closed
4. Transport - **Patient wears surgical mask**

MEMORY TRICK

- On AIR with MTV
- "PIMP my ride" the old show like **DROPPing** lowrider



Top Missed Exam Question

When caring for a patient with bacterial meningococcal **meningitis**, the nurse implements which of the following?

Select all that apply

- 1. Advise unlicensed personnel to wear surgical mask
- 2. Implement padded side rails
- 3. Keeps light & noise low in room
- 4. Places patient to negative pressure room
- 5. Puts on N-95 mask before entering room

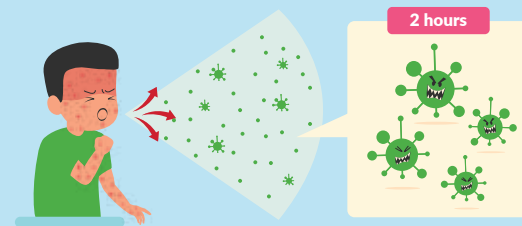


MMR (Measles, Mumps, Rubella)

Pediatrics: Infectious Disease

Measles - Pathophysiology

Measles is a **very contagious viral illness** that is spread via **the air**. When an infected person sneezes or coughs, it **projects the virus** into the air or on surfaces, where it can remain for **up to 2 hours!**



Signs & Symptoms

Manifestations typically **don't appear until 7 to 14 days after exposure**. They include:

- Cough
- Runny nose
- Inflamed eyes
- Sore throat
- Fever
- Red, blotchy skin rash

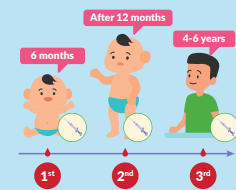
DON'T let the NCLEX trick you!
NOT itchy pruritic rash, this is typical of varicella (chickenpox)



Interventions

NCLEX TIPS

1. Airborne precautions:
 - Negative-pressure isolation room
 - N-95 mask (staff)
 - Door closed
2. **Recommend measles vaccine** for exposed family members
3. **Vitamin A** = decreases risk of death
4. Vaccination
 - 1st dose: 6 months old
 - 2nd dose: After 12 months old
 - 3rd dose: 4 - 6 years



Saunders Question

... measles. Which supplies.. to **prevent transmission of the virus?**

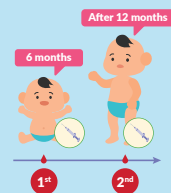
- N-95 Mask and gloves



HESI Question

measles vaccination?

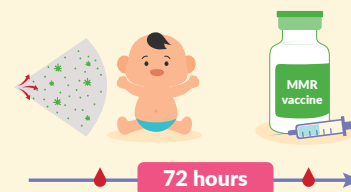
- **First dose** of measles vaccine is given at **6 months**, with a **second** one after **12 months** of age



TOP Missed NCLEX Question

An infant **less than 12 months** old, who is not yet vaccinated with MMR is exposed to **measles**, what is the most **appropriate action** by the nurse?

- ✓ ● Recommend parents to bring the child in to get the **measles, mumps, rubella (MMR) vaccine**

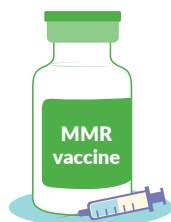


MMR Immunization Consideration

HESI Question

Which vaccine ... to avoid because of **risk of allergic reaction from neomycin?**

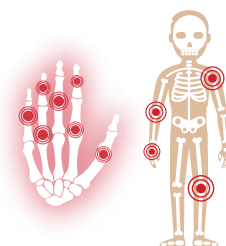
- MMR



Kaplan Question

Adverse effect most often identified with measles, mumps, and rubella (MMR) immunizations?

- Arthritis

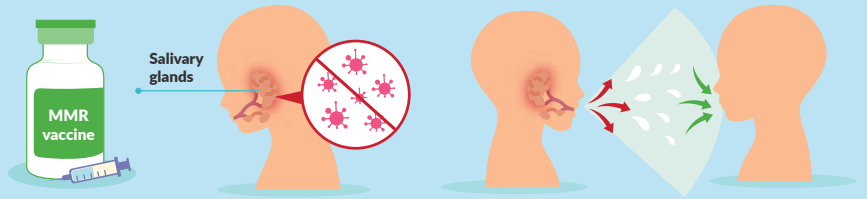


MMR (Measles, Mumps, Rubella) II

Pediatrics: Infectious Disease

MUMPS - Pathophysiology

MUMPS are viral infection that affects the **salivary glands**, so the disease spreads through infected saliva.



Signs & Symptoms

Flu like symptoms -

- Fever
- Muscle pain
- Poor appetite
- Painful swelling of salivary glands

Some clients can present **asymptomatic** (without symptoms).



Treatment

Treatment focuses on **symptom relief**, as there are no specific antiviral medications used.

Teach clients to **eat soft foods & encourage fluids**, AVOID fruit juices, as they stimulate production of saliva.

Recovery takes about **two weeks**. The disease can be prevented by the MMR vaccine.



Rubeola & Rubella - Pathophysiology

Rubeola & Rubella, called German measles, both **viral infections** that **spread via the airborne route**, when a person comes in direct contact with saliva or mucus of an infected person.

Symptoms often appear **two to three weeks after exposure**.



- Runny, stuffy nose, sneezing, & cough
- High Fever
- **Koplik Spots:** Rash on mucus membranes



Kaplan Question

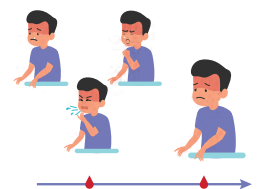
Which signs or symptoms of **rubeola** are exhibited before the appearance of the rash?

- Runny nose, sneezing, and coughing

ATI Question

Symptoms of **rubeola** generally include:

- A high fever and Koplik spots in the mouth



Interventions

- MMR Vaccination
- No treatment (established infection)

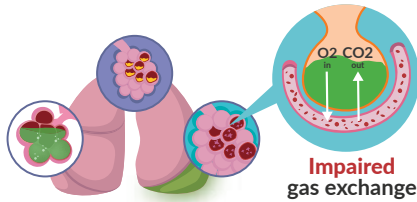


Pneumonia

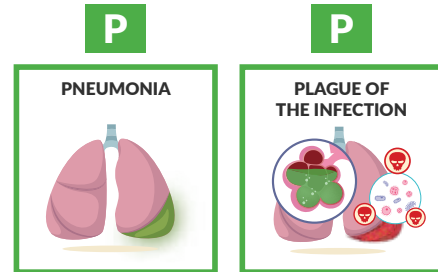
Pediatrics: Infectious Disease

Pathophysiology

Infection that causes severe inflammation in the lungs which makes the alveoli to fill with mucus, fluid, & debris leading to **impaired gas exchange** where CO₂ can't get out & oxygen now can't get IN, resulting in hypoxia (low oxygen).



Memory Trick

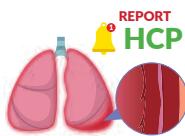


Signs & Symptoms

1. Altered Mental Status
Restlessness, Agitation, Confusion
2. **Fever** (Over 100.4 F/ 38°C)
3. Productive cough **"Yellow Sputum"**
4. Fine or Coarse **Crackles**
5. **Dyspnea** "Shortness of Breath"
6. Pleuritic Chest pain
(Pleural friction rub) Report to HCP
"Sharp chest pain upon inspiration or coughing"

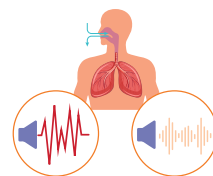


Big Sign



KAPLAN

Pleural friction rub?
 ■ **Grating sound or vibration heard during inspiration and expiration**



Common NCLEX Question

Priority Patient: who to see first?

- ✓ **Post-operative** patient with suspected pneumonia temp. of 98.2F, SpO₂ 94% ... **becoming restless & agitated.**

KEY TERM



Critical Complications

1. Pleural Effusion **NCLEX TIP**

Fluid that fills the pleural space (space between the lung itself & the chest wall). This prevents full expansion of the lung, resulting in decreased gas exchange.

KEY SIGNS

1. D - During **inhalation** = Chest pain
2. D - Dyspnea
3. **D - Diminished** breath sounds
4. **D - Dull** resonance on percussion

Priority to report

- **Asymmetrical** Chest Expansion
- **Decreased** Breath sounds

2. ARDS (acute respiratory distress syndrome)

Deadly STIFF lungs - ARDS - think HARDs hard stuff lungs.

KEY SIGNS

Refractory Hypoxemia = Low PaO₂

MEMORY TRICK

- **RE**sistant to Oxygen
- **RE**fractory Hypoxemia

#1 Sign of **Low O₂** = Altered Mental status

1. Confusion
2. Agitation
3. **Restlessness**



3. Septic Shock

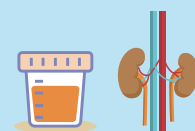
If the infection gets severe, the body releases chemicals into the bloodstream to fight the infection resulting in severe low blood pressure & total body inflammation which can damage multiple organs causing them to fail, known as MODS - multiple organ dysfunction syndrome.

MEMORY TRICK

- S** - Shock
- S** - Severely Low BP & perfusion

Key signs

- Hypotension **NCLEX TIP**
 - Systolic < **90** mm Hg
 - MAP < **65** mm Hg
- Cap refill over 3 - 4 seconds
- Tachycardia
- Early - Fever (Over 100.4)
- **Late - Hypothermia (Under 96.8)**
- Elevated WBC (norm: 10,000 or less)
- Decreased Urine Output
 - **30 ml/hr or Less** = Kidney Distress



Pneumonia II

Pediatrics: Infectious Disease

Risk Factors & Causes

#1 - Advanced AGE

Over 65 years old

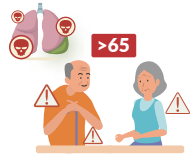
VAP - "Ventilator Associated Pneumonia"

1. Reposition side to side **Q 2 hours**
2. Oral Care & Suctioning **Q 2 hours**

3. Chlorhexidine

Best indicators of VAP **NCLEX TIP**

- **positive sputum culture**
- **Fever**
- Chest X-ray: new infiltrates



- Prolonged immobility - secretions are not mobilized & get stuck in body
- Post-Operative - Anesthesia - the body is put to sleep which traps infection in the lungs

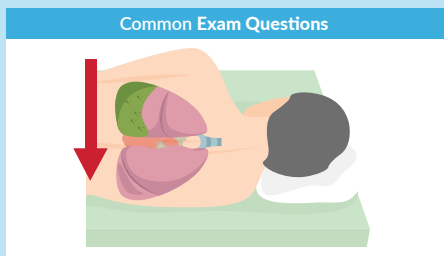
Patient Care

Mobilize secretions & Expand Lungs

- Chest physiotherapy
- TCDB - turn **cough** & deep breath!
 - Huff **coughing** technique **NCLEX TIP**
 - **AVOID** cough suppressants
- **Fluid** 2 - 3 L per day
- Positioning
 - HOB UP! **High Fowler's**
 - **Hypoxia** in Unilateral Pneumonia? = Good Lung Down **NCLEX TIP**



Common Exam Questions



Early ambulation

(within **8 hours** after surgery)

Cough with splinting

Handwashing

Mouth Care Q 12 hour

- Chlorhexidine swab
- Incentive Spirometer **Q Hour**

GIVE Pain Meds



Diagnostics

- Elevated WBC - white blood cell count
 - Over 10,000
- **Sputum Culture** = Positive

TEST TIP Cultures are always taken first - BEFORE antibiotics

- Think **A** - Antibiotics **A** - AFTER cultures, in order to identify the causative bacteria.



Common NCLEX Question

Best indicator of **ventilator associated pneumonia (VAP)**?

- ✓ Positive sputum culture

Best blood lab value shows effective treatment of pneumonia after **IV antibiotics**?

- ✓ White blood cell count



HESI

Encourage **3L of fluid intake** per day to promote expectoration



Discharge Teaching

Mobilize Secretions

- **Avoid** cough suppressants
 - Antitussives: Codeine
- **Cool mist humidifier** at night
- Increase Fluid

Re-expand Alveoli

- **IS - Incentive spirometer** at home

Prevent Reinfection

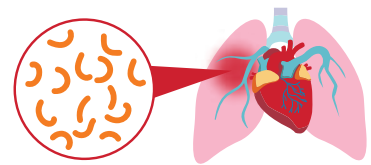
- **Finish oral antibiotics** at home
- **Pneumonia vaccine** (Every 5 years)
- Smoking cessation
- Handwashing
- **Schedule follow up** & Chest X-ray
- **Report:** increased or worsening
 - Fever
 - Confusion
 - SOB, cough, sputum

TB: Tuberculosis

Pediatrics: Infectious Disease

Pathophysiology

- Bacterial infection in lungs caused by the bacteria *M. Tuberculosis*
- Spread via the **air**, once inhaled it enters the lungs & spreads to the lymph & blood stream.



Signs & Symptoms

KEY POINTS

- **Night Sweats**
- Anorexia: **Weight loss**
- Cough + Hemoptysis
"Blood tinged sputum" **NCLEX TIP**
- Dyspnea & SOB
- **Fever** & chills



Memory Trick

T

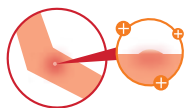
 Terrible cough "**blood tinged**"

B

 Bad infection:
 Fever, **night sweats**, **weight loss**

Diagnostics

- **Intradermal injection** (mantoux test) requires a 2 to 3 day window for reading.

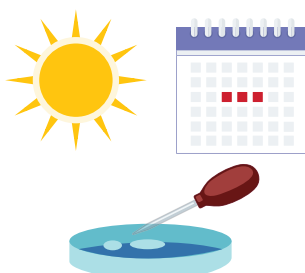
 Over **15 mm** induration
 = **positive TST**

 Patient has a
TB infection

- **Chest X-ray & sputum cultures** test for active form.

Key point

Sputum Culture Diagnosis

- **Early morning** sterile sputum specimen
3 consecutive days



Pharmacology (see pharmacology TB study guide)

ATI

 Precautions for a patient with suspected **tuberculosis (TB)?**

- **Airborne** precautions

HESI Question

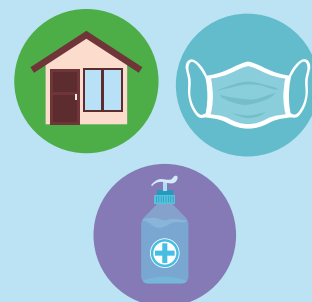
 First action for a patient with **night sweats**, **weight loss**, **hemoptysis**, **fever** and **chills**.

- **Airborne** precautions

KAPLAN Question

 Client with **anorexia**, low-grade **fever**, **night sweats** and a productive cough.

- Priority action: Initiate **airborne** precautions.



HESI Question

 Most accurate description of **tuberculosis (TB)?**

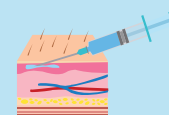
- "Most people who become infected with the TB organism, **do not progress to active disease**"



KAPLAN

 Route of administration for **Mantoux test?**

- **Intradermal**



ATI

- Sputum cultures are taken until **3 negative** cultures
- Family members should be **tested for TB**

TB: Tuberculosis II

Pediatrics: Infectious Disease

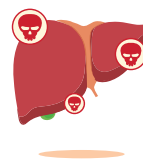
5 TB Tips

5 NCLEX TIPS

1. Meds Last **6 - 12 months**
2. N-95 mask worn all the time
3. Family tested for TB
4. Sputum samples every 2 - 4 Weeks
5. **3 Negative** cultures on **3 different days** = NO Longer infectious



MEMORY TRICK



ALL are **LIVER TOXIC!!!!**
So some instructors just use the acronym:

R I P E

R

RIFAMPIN
RED-FAMPIN

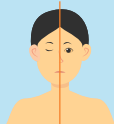


KEY Points:

1. **NORMAL**
 - Red, Orange: Tears, Urine, Sweat

Teach:

 - Wear glasses instead of contacts due to discoloration of tears **NCLEX TIP**
2. Oral contraceptives ineffective
"Use **non-hormonal** **Back-up birth control!**"
3. Monitor for Jaundice



I

INH
ISONIAZID

#1 TESTED TB DRUG

I - Interferes with absorption of B6 (pyridoxine)
- Low **Vitamin B6** = Peripheral **Neuropathy**
- Take **Vitamin B6** 25 - 50mg/day

N - Neuropathy
REPORT:
- New Numbness
- Tingling extremities
- Ataxia

H - Hepatotoxicity
REPORT Immediately!!!
- Jaundice (yellow) **Skin / Sclera**
- Dark urine **NCLEX TIP**
- Fatigue
- Elevated liver enzymes (AST/ALT)
HOLD the Med
- Teach: NO ETOH!!

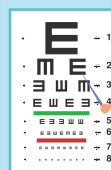
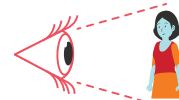
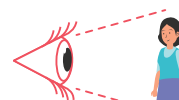


E

ETHAMBUTOL - Eye

KEY POINT:
REPORT!

- Blurred vision
- Color changes



P

PYRAZINAMIDE

Did not come up 1 x in 10,000 questions.
it's a nice to know but NOT A NEED TO KNOW

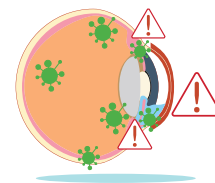
This information has come up in multiple sections!
TEACH to have baseline eye exams and routine **EYE** appointments! For **EEEEthambutol**

Conjunctivitis

Pediatrics: Infectious Disease

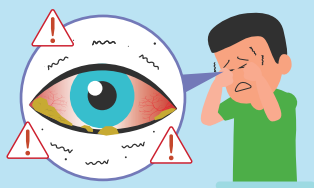
Pathophysiology & Causes

Conjunctivitis, also called pink eye, is the inflammation or infection of the **conjunctiva** (the transparent membrane that covers the **white part of the eyeball**).



Signs & Symptoms

Red, itchy, swollen - affected eye



A gritty feeling & even purulent discharge in one or both eyes that forms a crust.

Causes

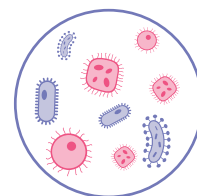
- Viruses
- Bacteria
- Allergies

Pink eye common In newborns, a blocked tear duct leads to a buildup of bacteria.

HESI Question

Which agent would produce **purulent discharge** from the eyes, **crusting** and **swollen eyes** in a child?

- Bacteria



Treatment

Prevent Transmission

- **Wash hands** before and after eye drop instillation **NCLEX TIP**

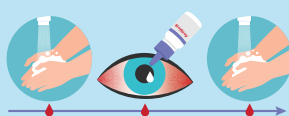
Medication

Bacterial conjunctivitis: Antibiotics

- **Sulfacetamide** **HESI**
- Fluoroquinolones (Levofloxacin)

Allergic Conjunctivitis

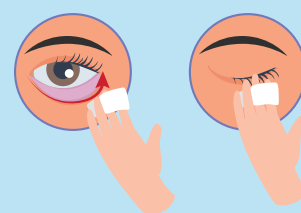
- Steroids
- Antihistamines



HESI Question

instruct the parent ... child who has **bacterial conjunctivitis**?

- Wipe from the inner canthus **downward and outward** away from the opposite eye



Notes

Mononucleosis & Fifth Disease

Pediatrics: Infectious Disease

Mononucleosis - Pathophysiology

Mono is spread via **saliva**, by sharing drinks or even kissing so it's often **called the kissing disease**.

Caused by the **Epstein-Barr virus**. When introduced into the oropharynx, the virus spreads through the **lymphatic system & becomes a lifelong infection**, with periodic reactivation.



HESI Question

Mononucleosis?

- Epstein Barr virus is the principal cause



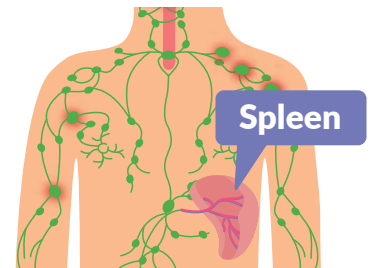
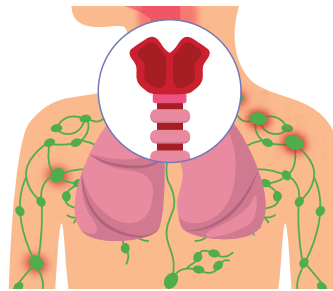
Kissing disease

Signs & Symptoms

- Fatigue
- Fever
- Sore throat

Deadly complications

- Swollen lymph nodes**
Airway obstruction "Stridor"
- Splenomegaly** (big spleen)
Abdominal pain = Splenic rupture
- Hepatomegaly (big liver)



Splenomegaly

Treatment

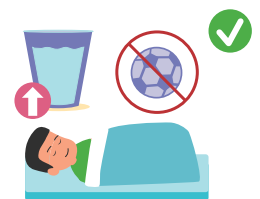
- NO** antibiotics **NCLEX TIP**
- Rest
- Increase fluid intake
- Avoid strenuous activity & contact sports



ATI Question

mononucleosis. Which of the following statements .. indicates an **understanding**? Select all that apply.

- I should **drink plenty of liquids**
- I should **avoid playing football** while I am sick
- I should **rest** often



Fifth Disease - Pathophysiology

This is a viral infection that is a common, highly contagious childhood illness.

- Caused by **human parvovirus (HPV-B19)** **NCLEX TIP**

HESI Question

Which causative agent is responsible for ... **fifth disease**?

- Human parvovirus B19**

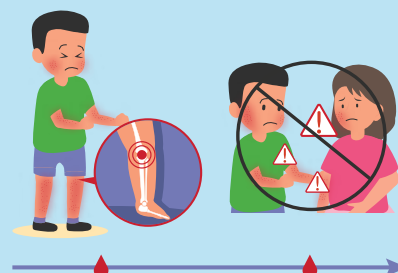


Signs & Symptoms

- Red rash on the cheeks
- Joint pain

Key Point & NCLEX TIP

Once the **rash & symptoms appear**
- the child is **NO LONGER** infectious!



Treatment

Since it is a virus, **antibiotics can NOT be used**, and the infection usually goes away on its own. Encourage **rest & increased fluid intake**.



Pertussis (whooping cough)

Pediatrics: Infectious Disease

Pathophysiology & Causes

Pertussis is a very dangerous respiratory tract infection **spread via droplets**. It is caused by the pertussis bacteria, which attach to small hairs in the airway causing swelling, making it particularly **dangerous for infants**, as **airway structures** are smaller and easily obstructed.

HESI Question

Which mode of **transmission of pertussis** (whooping cough) is common?

- Droplet



Signs & Symptoms

Spasmodic cough

“Whoop” (seal bark)
Coughing spasms

This **coughing is often violent & uncontrollable**, making it **hard to breathe** & becoming very deadly for infants if untreated.

Other symptoms include:

- Mild fever,
- Runny nose also called Rhinorrhea,
- Nasal congestion,
- Red, watery eyes

ATI Question

Pertussis... manifestations should the nurse expect? Select all that apply.

- Coughing spasms
- Rhinorrhea
- Fever



Don't let
NCLEX TRICK YOU



DO NOT give cough suppressants! The goal is for the client to **cough up the mucus**. Suppressing the cough may cause **airway obstruction**.

Diagnostics

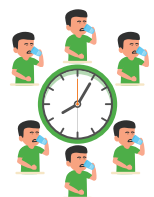
- Nose or Throat culture
- Blood Tests



Treatment

NCLEX TIPS

1. Put client on **droplet precautions**
 - Staff: surgical mask & goggles
 - **Single private room** (**NOT** neg. pressure room = airborne)
2. Assess & monitor for **airway obstruction**
3. Antibiotics: azithromycin
4. Humidified oxygen, suction airway & **give small amount of fluids frequently**



Notes

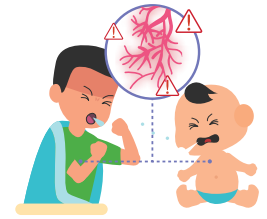
RSV (Respiratory Syncytial Virus)

Pediatrics: Infectious Disease

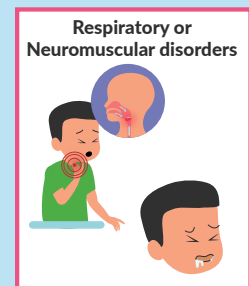
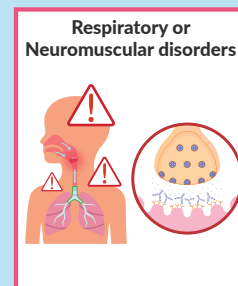
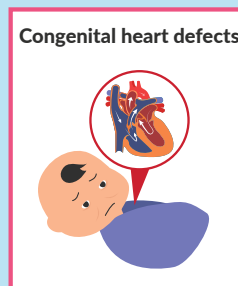
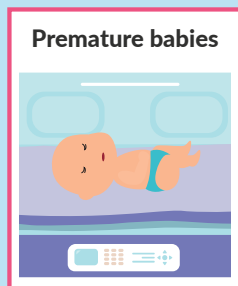
Pathophysiology

RSV is a very contagious **viral infection** that affects the **respiratory tract**, specifically the **bronchioles**, and usually infects most children before their 2nd birthday.

RSV is spread via **droplets**. Children typically get the virus from being coughed or sneezed on from other infected children.



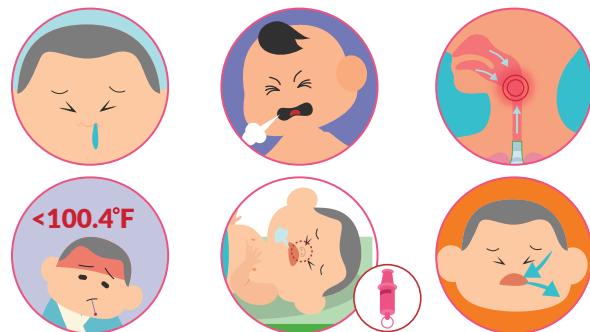
Risk Factors & Causes



Signs & Symptoms

It looks just like a cold or respiratory infection

- Runny nose
- Dry Cough
- Sore Throat
- Low-grade Fever
- Wheezing
- Nasal flaring
- Short, shallow, and rapid breathing



Complications

Airway is always **#1 PRIORITY!**

Removing secretions from the nose is **critical before bed & before feedings**.

Don't let the NCLEX Trick you!

Airway is always a priority.

NOT giving medications & do not stop breastfeeding the baby, since fluids are needed to prevent dehydration during the illness.

PRIORITY



Key terms

Bronchiolitis due to RSV

- Use **drops of saline** & a **bulb syringe** to suction nose **NCLEX TIP**

Pharm & Education

- Medication: **palivizumab**



HESI Question

Palivizumab. What is the **purpose of this medication?**

- Prevent **respiratory syncytial virus (RSV)** infection

ATI Question

Preventing the transmission of respiratory syncytial virus (RSV). Which of the following should be **included in the teaching?** Select all that apply

- Spread by **direct contact**
- Spread by **indirect contact**

Frequent hand washing helps reduce the spread of RSV

Rotavirus & Roseola

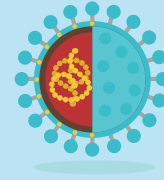
Pediatrics: Infectious Disease

Rotavirus - Pathophysiology

Rotaviruses are the **most common cause of diarrheal disease** among children. Nearly every child in the world is infected with a rotavirus by the age of five.

The primary mode of **transmission is the fecal-oral route**, by scratching the anus & putting fingers in the mouth.

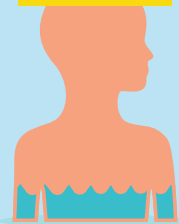
MOST COMMON



Signs & Symptoms

- Diarrhea & Vomiting
- Dehydration: **NCLEX TIPS**
 - Decreased urinary output
 - Dry Mucous membranes
 - Orthostatic hypotension

PRIORITY



HESI Question

Rotavirus ...causing **severe diarrhea** is admitted for treatment. **Which action should the nurse take first?**

- Insert an IV line and begin IV fluids

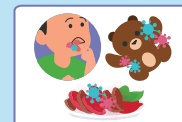


Education

Teaching has been effective?

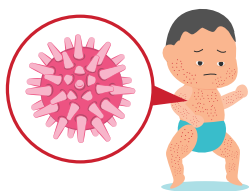
NCLEX TIPS

- "Handwashing is extremely important"
- "I will monitor my child for a **decrease in urinary output & dry mucous membranes.**"
- "The infection can **spread with contaminated hands, toys, and food.**"

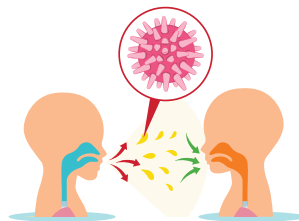


Roseola - Pathophysiology

This is a **viral illness** most commonly affecting kids between **6 months and 2 years old**. It is spread via respiratory **secretions & saliva**.



MOST COMMON
6-24 months of ages



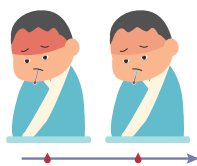
Saunders Question

Child with **roseola**... **prevention of the transmission** to siblings:

- Avoid** allowing the children to **share drinking glasses or eating utensils** because the disease is **transmitted through saliva**

Signs & Symptoms

- High fever** followed by drop in temp.
- Rash



ATI Question

Most common characteristic finding of **roseola**?

- High fever** followed by a drop in temp., and then a rash



Treatment

- Bed rest,
- Fluids,
- Medications to reduce fever.



Scarlet Fever & Scabies

Pediatrics: Infectious Disease

Scarlet Fever - Pathophysiology

This is a complication that develops from **streptococcal pharyngitis (strep throat infection)** in the back of the throat. This nasty strep infection can travel down to the kidneys & cause renal issues like **glomerulonephritis & cardiac issues like rheumatic fever.**

- Streptococcal pharyngitis (strep throat)

Signs & Symptoms

- Bright Red **pruritic rash**: chest & neck
"Looks like sunburn"
"Sandpaper rash"
- Strawberry tongue (red & bumpy)

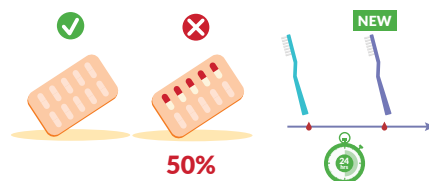


Treatment

Streptococcal Pharyngitis

3 NCLEX TIPS

1. Complete **all the antibiotics** even if feeling better
2. Cool liquids & soft diet
3. Replace **toothbrush 24 hours** after starting antibiotics



Diagnostics

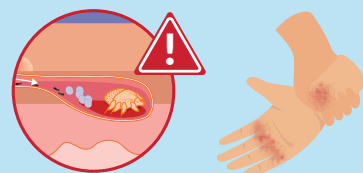
- Rapid streptococcal antigen test **NCLEX TIP**

Key term



Scabies - Pathophysiology

Scabies is a highly contagious **infestation of little bugs or mites that tunnel down into skin**, causing massive irritation & itching. These little mites **lays eggs under the skin** where the infestation spreads and become highly contagious.

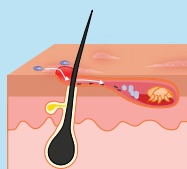


Signs & Symptoms

- Severe Itching
- Thin, irregular burrow tracks

Infants & children - Common sites

- Scalp
- Palms & soles of the feet
- Behind the knees



HESI Question

The mother of a 1 year old states "Look at those **red raised areas** all over my baby! What could they be?" ... **next nursing action?**

- Ask, "Has the baby been around anyone with **scabies?**"



Treatment

4 NCLEX TIPS

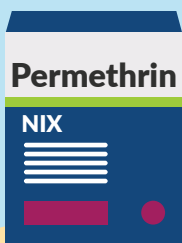
Education

1. All people in **close contact** with the patient **needs treatment**
2. Wash the **clothing and bedding** in hot water
3. **Non washable** belongings = sealed in bag for **over 3 days**

Pharmacology

4. Put **Permethrin Cream** on all **skin** surfaces

TOP tested NCLEX



ATI Question

2 year-old diagnosed with **scabies**, which of the following points should the nurse include?

- The **entire family** should be treated



Varicella (Chickenpox)

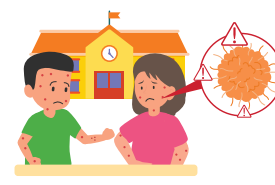
Pediatrics: Infectious Disease

Pathophysiology

Varicella is a highly contagious viral infection that is **spread via the air**. It causes an **itchy, blister-like rash on the skin**, typically seen in school aged children.

It is caused by the **varicella zoster virus**, the same virus that causes **shingles in adult clients**. It is spread from contact with skin lesions or the respiratory tract. Therefore, **airborne precautions** are used, including:

- **N95 mask**, gloves, & gown
- Placing the client in a **negative pressure room**.



HESI Question

contact and airborne isolation precautions for a child with which illness?

- **Chickenpox**

Signs & Symptoms

■ Skin lesions

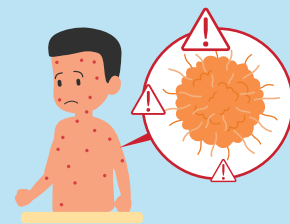
- Pruritic rash (itchy)
- Papules and vesicles
- Weeping
- **Crusts over within 7 days (no longer infectious)** **NCLEX TIP**
- Fever
- Malaise



HESI Question

Which disease presents with **fever, malaise**, and a highly **pruritic rash** that started as a **papule** and became a **vesicle**?

- **Varicella**



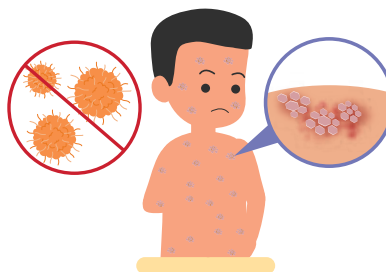
Treatment

NCLEX TIPS

1. Stop the Itch:
Apply topical **diphenhydramine cream** to lesions after shower & bath
2. **Acetaminophen** (brand: Tylenol)
NO Aspirin = Reye syndrome risk
3. Immunocompromised clients
 - **Acyclovir** (antiviral)
 - **NO** "Live vaccines" (Varicella Vaccine)
4. No longer infectious
AFTER the lesions have CRUSTED over!

KEY TERM

NOT Contagious
Lesions **CRUST** over



ATI Question

Interventions for healthy children ... who develop **chickenpox**? Select all that apply.

- **Diphenhydramine**
- Application of mittens

Kaplan Question

chickenpox: The nurse determines that **teaching is effective** if the parent makes which statement?

- "My child can **return to school** when the **lesions are crusted**."

SAUNDERS Question

Mother... asks the nurse if the child is **infectious to the other children**? Which response is **most appropriate**?

- The infectious period begins 1 to 2 days before the onset of the rash and **ends about 5 days after the onset & crusting of the lesions**

Immunization

Key term

- Cover the vesicles with a small band-aid **until they are completely dry**

Key term: After a varicella immunization (chickenpox shot), be sure to cover the vesicle with a bandage until **completely dry or crusted over!**

This is done to **reduce the risk of transmission** from any **pus or fluid** that may leak out.

Normal side effects after immunization include **discomfort, redness, & even presence of a few vesicles at the injection site**. This is **very common & completely normal**. **NO** need to alert the HCP.

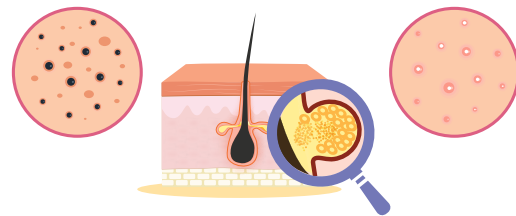
Integumentary skin

Acne

Pediatrics: Integumentary

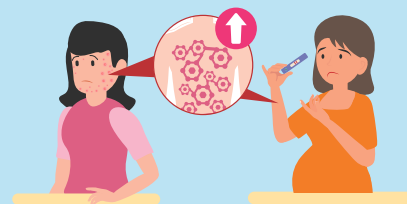
Pathophysiology

Acne is a common skin disorder where **obstructed sebaceous glands** within the skin results in blackheads & white heads. When bacteria settles in, it can cause inflammation resulting in **pustules & papules**.



Causes & Risks

- **Puberty & pregnancy** (explosion of hormones)
- Bacteria overgrowth
- Genetics
- Stress



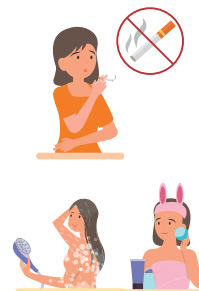
Education

- **AVOID: NCLEX TIPS**
 - **Vigorous scrubbing** / washing
 - **Squeezing or picking** lesions
 - **Antibacterial soap**
 - Smoking
- Wash hair & skin frequently "gently"
- Apply
 - Moisturizer
 - Skincare products "**non-comedogenic**"
- Diet:
 - "**well balanced**"
 - **Fluid** intake: 8 glasses of water / day

HESI

The nurse is teaching .. **interventions** to maintain healthy skin. Which teaching does the nurse include?
Select all that apply.

- Refrain from **smoking** any tobacco
- **Wash your hair and skin** frequently
- **Apply moisturizer after showering**
- **Drink eight glasses of water** per day



Treatment



- Tetracycline
- Isotretinoin



Notes

Eczema

Pediatrics: Integumentary

Pathophysiology

Eczema is a chronic disorder of the skin in which the skin becomes red, itchy, & dry. It's common in children but can occur at any age. It tends to flare up periodically when exposed to allergens.

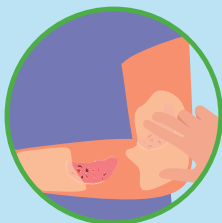


HESI

Eczema... The nurse knows the **treatment plan** is centered on which concept?

- **Decreasing exposure to the allergen**

Interventions



NCLEX TIPS

- Trim **nails**
- Lukewarm "tepid" **sponge baths** with soap
 - **Pat dry** with towels
 - Apply **moisturizer immediately** after bathing
- **Cotton** clothing (soft)
 - **NOT** wool clothing



Notes

Lice & Impetigo

Pediatrics: Integumentary

Lice - Pathophysiology & Causes

Head lice are **wingless insects that live on the human scalp and feed on human blood**. Infestations are common in children and are typically caused by coming in contact with another child with lice.



Pediculosis **Capitis**

Memory Trick

- **Cap**-itis
- **Cap** = hat

Signs & Symptoms

Itching & sores on the scalp, neck, and shoulders.



Diagnostics

School screenings are done to look for lice eggs called nits or full grown lice.



Treatment

Pharmacology

- Permethrin (brand: Nix)

Education

- Wash with **HOT water**: clothing, sheets, & towels
- Seal **non-washable** items in **airtight plastic bags**
- **DO NOT share** hats, scarfs, brushes

ATI

... teaching the guardian of a child who has pediculosis capitis...? **Select All That Apply**

- Use medication containing 1% permethrin
- Seal non-washable items in airtight plastic bags

HESI

Which drug is used ... pediculosis capitis?

- Permethrin 1% cream rinse



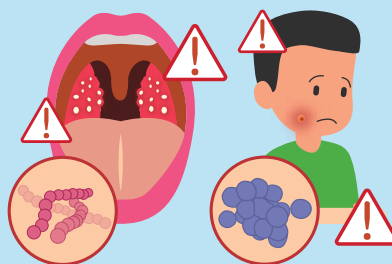
1% permethrin



Impetigo - Pathophysiology & Causes

Impetigo is a **highly contagious skin infection** affecting infants & children. It is caused by a strep or staph infection, which is really dangerous in children, as **strep infections can travel down to the kidneys causing glomerulonephritis**.

Strep infection Staph infection



Memory Trick

Impetigo
Infant -igo

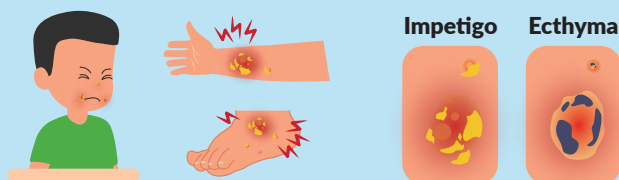
- Glomerulonephritis secondary to **streptococcus infection**

Signs & Symptoms

- Itchy red sores
- Mainly on the nose & mouth

If sores burst & dry into **honey-colored crusts**, this is when the infection is **MOST contagious & most easily spread!**

Ecthyma is a **more serious form of impetigo** that penetrates **deeper into the skin** causing painful sores to turn into deep ulcers.



Treatment

NCLEX TIPS

1. NO **school** / daycare
2. **Wash hands before & after** touching infected areas
3. **Separate child's clothes & towels** from other laundry & wash with **HOT WATER**
4. Short & filed **finger nails**
5. Softly remove crust & debris



HESI

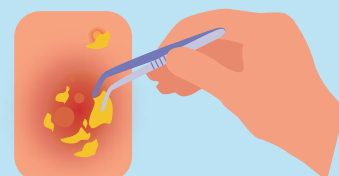
... Child has **impetigo**. What action should the nurse take?

- Send the child home with the parents to see the HCP

KAPLAN

... Care for a **child with impetigo**. Which information does the nurse include in the teaching plan?

- Soften and remove crust and debris



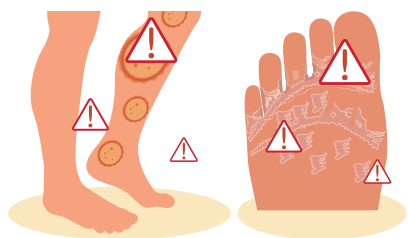
Ringworm (Tinea)

Pediatrics: Integumentary

Pathophysiology

Both are very contagious fungal infections that live on the surface of the skin.

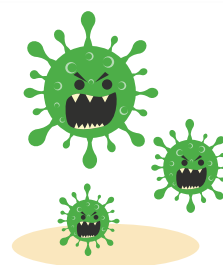
- **Tinea** - ringworm infection
- **Tinea pedis** - athlete's foot infection



HESI

Tinea capitis, tinea corporis, and tinea pedis are examples of which type of infection?

- Fungal infections



Signs & Symptoms

- Circular rash
- Scaly
- Pruritus (itchy)

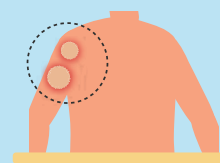
HESI

Q1: A patch of skin that itches on the right forearm... a well-defined circular rash with a red border and clear center. The nurse anticipates a diagnosis of which skin disorder?

- Tinea corporis

Q2: A patient with tinea pedis has increased moisture and pruritus around the toes. Which instructions does the nurse give? Select all that apply.

- Wear cotton stockings
- Use warm soaks for the toes
- Keep your toes clean and dry
- Soak the toes in Burow's solution



Education

PRIORITY: Tinea Corporis **NCLEX TIPS**

- **Most important** to teach ways to prevent the spread

Ringworm is spread very easily (HIGHLY tested) so we **must educate the clients NOT to share personal items** like brushes, towels, hats, clothes, & anything else.

Treatment

Griseofulvin = Tinea corporis (Ringworm)

Key Points

- **Takes** weeks to months
- **DO NOT discontinue** once itching stops
- **BEST** absorbed after eating a high fat meal

HESI

The nurse is caring for a patient with **tinea capitis**. The nurse anticipates administering which drug?

Griseofulvin

Mental Health

Child abuse & Neglect

Pediatrics: Mental Health

Interventions

When child abuse is suspected, the first thing that must be done in nursing process is **assessment**.

Assessment

- Conduct a **detailed interview & physical examination** **NCLEX TIP**
- Assess **parent-child interaction**
 - Abuse: blaming, refusal to comfort, & belittling
 - Changes in story



ATI

A 2-year-old boy ... **severe dental caries**, dry mucous membranes, and a diaper that is **soaked with urine and stool**. Which of the following is the next step in managing this patient?

- **Assess caregiver interactions** with the child

HESI

Q1: The parent and a 6-year-old child presents to the clinic ... The child weighs **35 pounds** (15.9 kg), is wearing **torn and dirty clothing**, and sits quietly with an apparent **subtle rocking motion**... **nurse's next actions?**
Select all that apply

1. Take the child's **height and vital signs**
2. **Assess** the child for any bruising or lacerations
3. Ask the accompanying **parent to leave the room**
4. **Ask the child** about attendance at school
5. **Stay with the child** during the healthcare provider's assessment

Q2: Suspected child abuse: What **type of questions** would help the nurse to elicit information from the person?

- **Open-ended questions** that require **descriptive responses**

Report to Authorities

- After a **detailed assessment** & full history



Communication

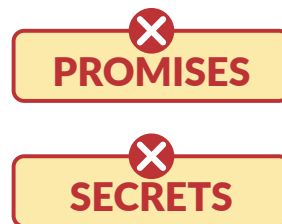
1. Not your fault & you are **not to blame**
2. You are **not in trouble** & did the right thing

ATI

... Child reports being **physically abused** by his guardian. Which of the following **statements** should the **nurse make**?

- "It is **not your fault** that this happened."

3. **NO promises or secrets!** **NCLEX TIP**



HESI Question

... Suspected child abuse?

- **Report any case** of suspected child abuse

Characteristics of perpetrators

The Abuser Risk Factors

6 NCLEX TIPS

1. Grew up in an **environment of domestic violence**
2. History of **alcohol / substance abuse**
3. **Low self-esteem** / Acts impulsive
4. **Authoritarian & overly critical**
5. **Teenage parents** or single-parent home
6. Child with developmental delays



ATI Question

Q1: A nurse is **teaching a group of newly licensed nurses** about **risk factors** for child maltreatment. Which of the following **risk factors** should the nurse include in the teaching?
Select all that apply

- A parent who has a **history of alcohol use disorder**
- A parent who often **acts on impulse**
- A parent who believes in an **authoritarian approach** to raising their child
- Expresses **unrealistic expectations** of an infant

Q2: ... In-service for a group of elementary school teachers about **identifying risk factors** for maltreatment of children:

- The child lives in a **single-parent home**
- The child was born premature and has **developmental delays**
- A toddler who has **autism**

Notes

Child abuse & Neglect II

Pediatrics: Mental Health

Signs

Neglect Failure of a parent or primary caregiver to provide **basic necessities**: food, clothing, shelter, supervision.

ATI Question

Q1: ... Education seminar about child maltreatment. Which of the following factors would indicate neglect? Select all that apply

- The child is undernourished
- The child is dirty and poorly clothed
- The child has untreated dental conditions

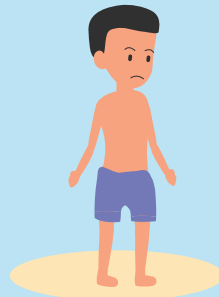
Q2: ... Parents do not use a child safety seat when transporting the child:

- Child neglect

HESI Question

Which form of child maltreatment is considered the most common?

- Neglect



Physical Abuse Any **non-accidental physical injury** to the child: striking, kicking, burning, biting etc.

ATI Question

Expected finding of physical abuse? Select all that apply

- Burns on bilateral hands
- Spiral fracture of the right forearm
- Reddened welt across the back

HESI Question

A child arrives in the emergency department with cigarette burns on the arm. Which type of abuse does the nurse document?

- Physical abuse



Emotional Abuse

Injury to emotional stability of the child as evidenced by an observable or substantial change in behavior, emotional response, or cognition, for example: **anxiety, depression, withdrawal, or aggressive behavior.**

HESI Question

Q1: A 4-year-old child tells the nurse, "I'm a bad boy. Daddy always says I'm not worth a second look"... is an example of?

- Emotional abuse

Q2: Which statement made by the child ... emotional neglect?

- My father does not praise me even when my teacher praises my drawings



ADD & ADHD

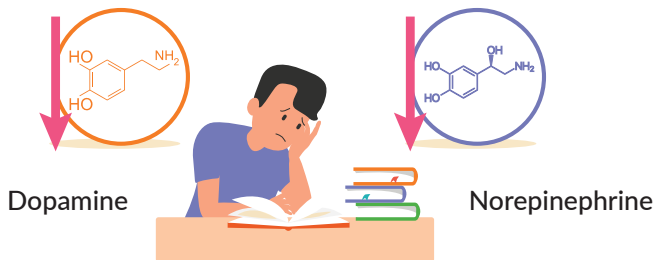
Pediatrics: Mental Health

Pathophysiology

ADD - Attention Deficit Disorder

ADHD - Attention Deficit Hyperactivity Disorder

The brain has low levels of the neurotransmitters dopamine & norepinephrine which help the brain focus on reward vs. risk and control impulsivity & mood, making patients with ADHD more likely to have anxiety & substance abuse problems.



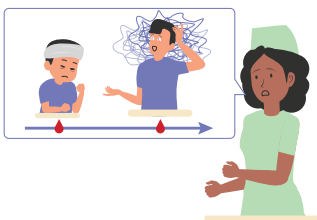
Signs & Symptoms

1. **Hyperactivity** "restless"
2. **Inattention** "reduced ability to focus"
3. **Impulsiveness** "excessive talking"
4. **Low self-esteem & impaired social skills** **NCLEX TIP**



Causes & Risk Factors

- **Head trauma: TBI (traumatic brain injury)**
Children who have had a serious head injury are more likely to develop ADHD later on in age.



ATI Question

Risk factors of ADHD... Which of the following should the nurse include in the teaching?

- History of head trauma

Management

- Give a **written schedule** of daily **activities** **NCLEX TIP**
- **Aggressive behavior:** distract the child & ask them to **blow up a balloon**
- Increased **risk for injury**



Always think **calm with ADHD**



ATI Question

9 year old hospitalized client on bedrest who has **attention deficit disorder...** Which of the following should the nurse **prioritize**?

- Provide the child with a **daily schedule that is typed or written**

HESI Question

A **nursing diagnosis** that should be considered for a child with **attention deficit hyperactivity disorder** is

- Risk for injury

ATI Question

... new diagnosis of **ADHD...** which of the following statements should the nurse include in the **teaching**?

- Your child is at an **increased risk for injury**



Communication

1. **Eye contact first** (before speaking)
2. **Simple language**
3. Child **repeats back** what was said
4. **Offer praise** upon task completion

ATI Question

6 year old client with ... ADHD. What techniques should the nurse use to **communicate most effectively** with the client when asking the client to **complete a task**? **Select all that apply.**

- Obtain **eye contact** before speaking
- Use **simple language**
- **Have him repeat** what was said
- **Praise him** if he completes a task

Kaplan Question

... child with **attention deficit disorder.** Which statement by the nurse is most appropriate?

- "Hug your child **after a task is completely performed.**"

Classroom Strategies

ATI Question

... **classroom strategies** for children who have **ADHD.** Which of the following information should the nurse plan to discuss with the teachers? **Select all that apply.**

- Allow for **regular breaks**
- **Combine verbal** instruction with **visual cues**
- Establish **consistent classroom rules**
- **Decrease** the amount of **homework** assigned

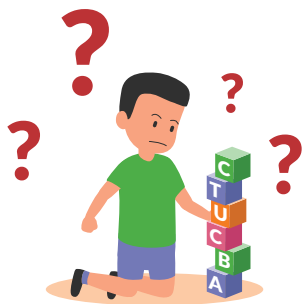


Autism Spectrum Disorder

Pediatrics: Mental Health

Pathophysiology

ASD is a developmental disorder that impairs a child's ability to communicate and interact. The cause of autism is unknown.



HESI

Delayed developmental milestones

ATI

Autism can usually be diagnosed when the child is approximately:

2 years of age

Risk Factors

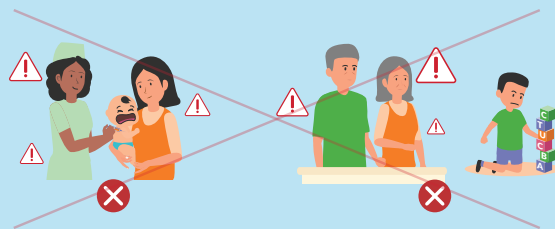
Highest risk factor = **sibling with autism**



For example - while performing a developmental screening on 2 siblings. If the older sibling has autism then the younger sibling is at highest risk for having it too.

Don't let **NCLEX** trick you

Highest risk factors are **NOT** having early vaccinations & **NOT** having parents of older age - this is according to the NCLEX.



Signs & Symptoms

Does NOT

- Maintain **eye contact** **NCLEX TIP**
- Interact with gestures
- Like being cuddled & plays alone



Does NOT

- **Respond to questions** **NCLEX TIP**
- **Display** nonverbal behavior
- Delay in language development



Repetitive

- Actions "Ritualistic behavior"
- Words (**echolalia**)

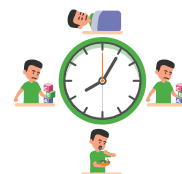
Education

Routines & Consistency

Give a **schedule** of daily activities **NCLEX TIP**

Maintain **daily routines** when possible **HESI**

Avoid making acute changes in their environment



ASD - Autism Spectrum Disorder



HESI

Child who **plays alone**, does **not maintain eye contact**, repeatedly twists fingers, has **inadequate speech**, and does **not interact with gestures**

- Autism spectrum disorder (ASD)

Kaplan

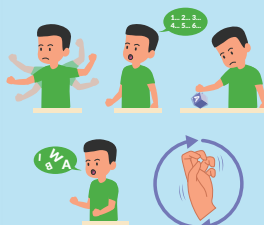
Child with **autism** is admitted to the pediatric unit ... Which response by the nurse is best?

- "The **inability to maintain eye contact** is a characteristic of autism."

ATI

Which of the following **manifestations** ... are indications of **autism spectrum disorder**? **Select all that apply.**

- **Nonverbal** behavior
- **Repetitive** counting
- Spins a toy **repetitively**
- Delayed **language development**
- Exhibits **ritualistic behavior**



HESI

Q1: Child with autism spectrum disorder (ASD). The parents say, "We are going to move our child to a **different bedroom in our home.**" Select the nurse's therapeutic response.

- "Children with autism spectrum disorder usually **prefer for things to stay the same.**"

HESI

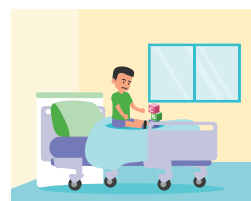
Q2: Child with autism spectrum disorder. Which statements by the parents indicate ... that they understand the teaching? **Select all that apply.**

- **Repetitive movements** are common
- **Non-verbal communication is limited**
- Maintain a **daily routine** whenever possible



Prevent Overstimulation

- **Limit number** of visitors & choices
- **Private room** away from the nurse's station **NCLEX TIP**



ATI

What is the **most important intervention** when admitting a child with **autism spectrum disorder**?

- Placement in a **private room** down the corridor from the nurses' station

Separation Anxiety

Pediatrics: Mental Health

Pathophysiology

Separation anxiety occurs when the primary caregiver leaves the child, which produces **more stress & anxiety** than any other factor. This is common during hospital stays when the parents/ caregiver may leave & a new nurse or other caregiver must assume care.

Key Point

- **Begins at 6 months** **NCLEX TIP**
- Peaks at age 10 - 18 months
- Usually resolves after the child turns 3

3 Stages

1. Protest: cries & screams
2. Despair: quiet & withdrawn
3. Detachment: suddenly happy

Kaplan

When the parents leave, the **18-month-old child** starts to **cry loudly**... After a while the **child stops crying & becomes quiet and withdrawn**. The nurse thinks that the child has accepted the situation and has adjusted well to the separation. **Which statement is TRUE?**

- The nurse fails to see that the child has entered the **second stage of separation anxiety**

HESI

Q1: During which phase of **separation anxiety** is a toddler most likely to **cling to the parent**?

- Protest

Q2: Signs of separation anxiety in the **protest phase**?

- **Attacking strangers verbally & crying**

Nursing Interventions

6 months & older

6 NCLEX TIPS

1. Encourage the **parent to remain with the child** whenever possible
2. Keep the same **home routine / "daily schedule"** during hospital stay (meal & sleep times)
3. Provide a **quiet sleep environment**
4. Give many **opportunities for play & activity**
5. Upset child → **STAY** with the child (calm presence)
6. Familiar objects:
 - Blanket
 - Parent's shirt
 - Child's **favorite toy or stuffed animal**
 - **Picture of the child's family**



HESI

Ease the feelings of separation from home?

- Surround the child with **familiar items**

ATI

Most appropriate intervention ... separation anxiety?

- Encourage the parents to **leave the child's favorite toys and books**

Kaplan

Which action should the nurse take to **minimize separation anxiety**?

- **Keep toys from home in the bed with the child**

A top missed NCLEX Question:

Parents of a **2-month-old** have to leave the infant in the care of hospital staff while they work. The nurse educates the parents about **separation anxiety**. Which statement by the parent is correct?

- ✓◎ "I know **my baby will not cry** because we are leaving, since my baby is too young."

Key Point

- **Begins at 6 months** **NCLEX TIP**
- Peaks at age 10 - 18 months
- Usually resolves after 3-years-old



Musculoskeletal

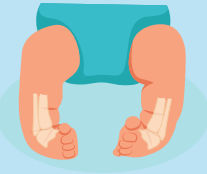
Clubfoot & Scoliosis

Pediatrics: Musculoskeletal

Clubfoot - Pathophysiology

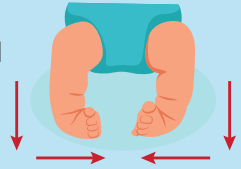
Clubfoot, also called **Talipes equinovarus**, is a bone deformity in which either one or both feet are twisted out of shape or position.

Talipes equinovarus



Signs & Symptoms

The foot or feet point down and inwards, and the soles of the feet face each other.



Treatment

Casting usually begins soon after birth. The HCP places a **long-leg cast on the affected foot or feet & weekly recasting over 5 to 8 weeks**. This is needed for gradual foot reposition & to maintain foot correction after casting. The client is often put in a **Denis Browne brace** that sort of looks like a snowboard for babies.

- **Never** place these children on their stomach to sleep!
- **High Risk for SIDS** - Sudden Infant Death Syndrome

Education 4 NCLEX TIPS

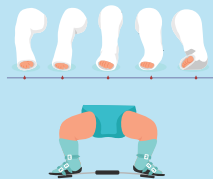
1. New cast placed **every week** for **5 to 8 weeks**
2. Check toes **several times a day = pink & warm**
3. **Keep the cast dry** = bathing & changing diapers
4. **DO NOT elevate** feet with a pillow during sleep & **NOT on stomach** during sleep



HESI Question

What is the goal of treatment for a newborn with clubfoot?

- Correction of the deformity



ATI Question

Q1: ... baby with clubfoot who has had a cast applied. The nurse should provide additional teaching to the parents if they state:

- "I should use a pillow to elevate my child's foot as she sleeps"

Q2: ... care instructions to the parents of an infant with talipes equinovarus (clubfoot) who is having the cast removed. Which instructions should the nurse provide concerning exercise of the affected foot?

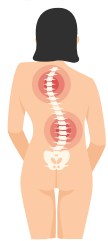
- Exercise with each diaper change

Kaplan Question

... major difference between clubfoot and positional deformity... Which statement is appropriate?

- "A clubfoot is corrected with surgery and casting, but a positional deformity can be passively corrected."

Scoliosis - Pathophysiology



- **S** - Scoliosis
- **S** - "S" shaped Spine

"lateral curvature" **NCLEX TIP**

Signs & Symptoms

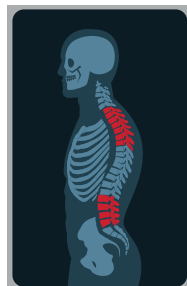
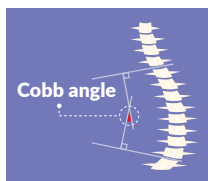
NCLEX TIP

First noticed during **periods of rapid growth** especially in **adolescent females** ages 10-12

Mild to severe pain & the stiffened spine can make it hard to move. Severe cases can cause a deformity of the chest cavity.

Diagnostics

Measuring the Cobb angle can determine the extent of the deformity & X-rays can confirm this.



Treatment

- Social interaction
 - **Visit friends** **NCLEX TIP**
- Fixing braces: **Boston Brace**
 - Wear a **cotton shirt under the brace** at all times **NCLEX TIP**



ATI Question

... nursing instructions: 13 year old female with scoliosis who is discharged with a ... brace?

- Wear a **cotton t-shirt underneath the brace**

HESI Question

... a girl with scoliosis is prescribed a **Milwaukee brace** ... Which instruction should the nurse provide to this client?

- Remove the brace **1 hour each day for bathing only**

KAPLAN Question

A brace is ordered for the adolescent to correct a scoliosis deformity. Which parental statement indicates teaching is successful?

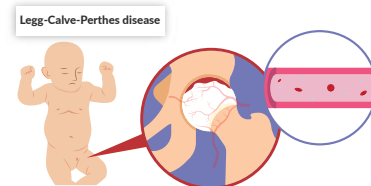
- "The brace should be worn **23 hours a day**"

Legg-Calve-Perthes Disease & Fractures + Cast Care

Pediatrics: Musculoskeletal

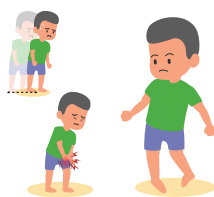
Legg-Calve-Perthes Disease - Pathophysiology

This **childhood hip disorder** occurs when there is **decreased blood flow to the femoral head** (the round ball part of the bone at the top of the femur). The limited blood flow causes the **bone to die from the lack of oxygen** & nutrients. Gradually, the head of the femur breaks apart and can lose its round shape, which is very serious, as this **ball and socket joint of the hip is needed for walking** & range of motion!



Signs & Symptoms

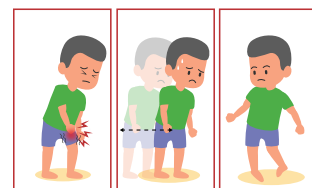
- **Limited** range of motion
- Hip pain & **stiffness**
- **Limp** when walking



ATI Question

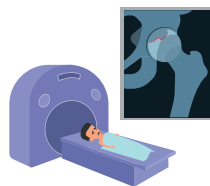
child who has Legg-Calve-Perthes disease... manifestations should the nurse expect? Select all that apply.

- Hip **stiffness**
- **Limited** range of motion
- **Limp** when walking



Diagnostics

- X-rays - of the hip can show deformity
- MRI - can show shape of the bone & new blood vessels formations



ATI Question

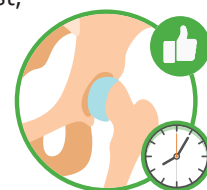
Legg-Calve Perthes disorder... diagnostic procedures?

- Radiographs

Treatment

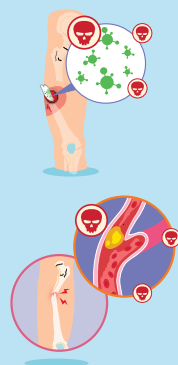
This condition **typically resolves on its own** over time, so treatment revolves around rest, pain control, & physical therapy.

A brace may be used to keep the legs abducted & the femoral head in line to promote healing. Also, surgery may be needed to provide more permanent placement if the femoral head is displaced.



Fractures & Cast Care - Pathophysiology

- Closed Fracture:
 - Does not break skin
- Open Fracture "Compound"
 - Skin surface broken
- Complete fracture
- Incomplete fracture "GreenStick"
- Spiral fracture
- Oblique fracture
- Compression fracture "Impact"
- Crush "Compression" fracture



Causes & Risk

- Bed rest
- Osteoporosis
- Steroids **"-sone"** **NCLEX TIP**
 - Prednisone
- Trauma



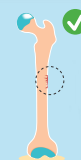
ATI Question

Q1: ... which of the following injuries in a 2 year old is most concerning for child abuse?

- Humerus fracture

Q2: ... 8 year old child who has a **greenstick fracture** after falling from his bicycle. Which of the following items represents **this type of fracture**?

- Greenstick fracture



Greenstick fracture

CAST CARE

- C** - Clean & Dry **NEVER WET**
 - Cover cast with a **plastic bag** for bathing **NCLEX TIP**
- A** - Above the heart (First 48 hours)
 - **Elevate** extremity **NCLEX TIP**
- S** - Scratch an itch?
 - Use the **hairdryer** on a **cool setting** **NCLEX TIP**
- T** - Take it easy
 - **NO bearing weight** on plaster casts
 - **NO finger indentations** or pressure
 - **NO hard surfaces**

New Cast Assessments

- **Notify HCP** immediately
 - **Assess** fingers & toes "**neuro checks**"
- P M S C**
- P** - Pulses - **NOT** pulseless
 - M** - Movement - grips
 - S** - Sensation
 - **NO** tingling, numbness
 - C** - Cap refill & Color
 - **NOT** over 3 seconds
 - **NOT** pale "**pallor**"
- Temperature
- **NOT** cold or cool

Complications

Key terms

- **HOT spots:** infection
- **Compartment syndrome:** decreased perfusion

PAIN

- **Unrelieved** with **morphine** **NCLEX TIP**
- **Not resolving** with medication
- Extreme pain with **passive movement**

Paresthesia

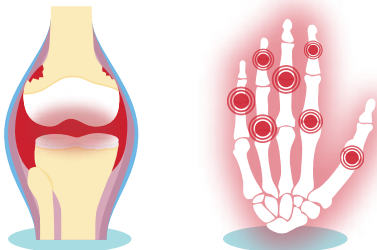
- "tingling" "burning" "numbness" **NCLEX TIP**
- **Problems moving or extending** fingers or toes.
- "Great difficulty"

Juvenile RA vs. IA

Pediatrics: Musculoskeletal

Juvenile RA - Pathophysiology

RA - Rheumatoid Arthritis



RA is an **autoimmune disorder** where the body attacks the **joints causing major inflammation & deformity**. Mainly seen in the hand joints, but can also involve other organs (skin, eyes, & lungs) with collateral damage as the body attacks itself.

HESI Question

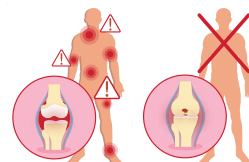
A patient with **rheumatoid arthritis** asks the nurse about her condition. On which knowledge does the nurse base **patient teaching**?

- **Rheumatoid arthritis** is thought to be an **autoimmune disorder**.

Kaplan Question

A client asks the nurse, "What is the **difference between rheumatoid arthritis and osteoarthritis**?" Which response by the nurse is **best**?

- **Rheumatoid arthritis** is a **systemic disease** and osteoarthritis is not



Signs & Symptoms

Early Signs

- Fatigue, anorexia (weight loss) & **morning joint stiffness**

Symmetrical **pain and swelling** in the **small joints of the hands**

- Fingers: **swan-neck** and a **boutonniere deformity**

- Contractures of joints = **HIGH priority**

Joint pain **NCLEX TIP**

- Pain relief with **activity**
- **MORE** pain at rest

HESI Question

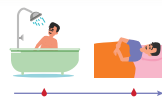
child experiencing an exacerbation of juvenile rheumatoid arthritis (JRA)... cause of the child's impaired mobility?

- **Joint inflammation**



Education

- Pain control - **Assess pain levels**
- **Do NOT elevate** the knees with pillows at night
- Exercise (low impact)
 - **Swimming** **NCLEX TIP**
 - **Heat & Cold** to affected joints
 - **Warm shower or bath before bed**



Kaplan Questions

Q1: A nurse is assessing a client who has a **diagnosis of rheumatoid arthritis**. Which of the following **nonpharmacological interventions** could the nurse suggest to help reduce pain?

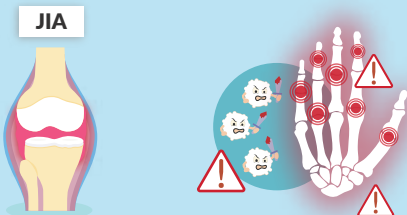
- **Alternate applying heat and cold** to the affected joints.

Q2: Which nursing **intervention** is most appropriate for a client diagnosed with **rheumatoid arthritis** and reporting **generalized pain**?

- **Assist the client with heat application and range of motion exercises.**



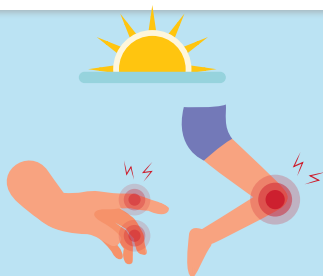
JIA - Pathophysiology



JIA - **Juvenile Idiopathic Arthritis** is also an **autoimmune disorder** where the **body attacks itself** causing joint inflammation! It is the **most common** type of arthritis in kids and teens.

Signs & Symptoms

- Joint pain that is **worse in the morning**
- Joint swelling & stiffness
- Fever & skin rash



Education

NCLEX TIPS

Physical activity: **LOW IMPACT**

- Swimming
- Yoga
- Exercise bicycle "stationary"



HESI Question

Q1: ... care plan of a 12 year old with **juvenile idiopathic arthritis**? **Select all that apply.**

- Apply **cold packs** to the affected joints
- Position the affected joints in a **neutral position**
- **Warm shower** or bath in the **morning** upon rising

Q2: ... **best diagnostic** evaluation tool to diagnose **juvenile idiopathic arthritis**?

- **Physical manifestations**



Pharmacology

Steroids "**-sone**"

- **Prednisone**

-sones -swelling



ATI Question

Q1: ... child who has **juvenile idiopathic arthritis (JIA)**. Which instructions should the nurse include?

- Administer **prednisone** on an alternate-day schedule

Q2: child with **juvenile idiopathic arthritis** and is returning to school... Which **instructions** should the nurse include? **Select all that apply.**

- Involve the **school nurse in medication management**
- Make arrangements to have a **set of books at school and a set at home**
- Request an **individualized education plan** for patients that requires extensive modification for school



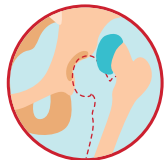
Hip Dysplasia

Pediatrics: Musculoskeletal

Pathophysiology

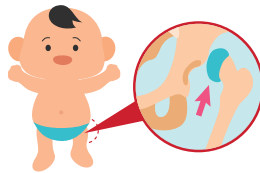
Hip dysplasia, or more commonly **DDH Developmental Dysplasia of the Hip**, is a condition where the ball & socket joint of the hip does not form properly. This leads to hip instability that can result in **FULL dislocation of the hip joint**, where the head of the femur pops out of the hip socket making the **affected leg shorter as the femur head gets displaced**. DDH typically presents at the time of birth or present in the first few years of age.

MEMORY TRICK



Hip **D**islocation
Hip **D**ysplasia

Developmental **D**ysplasia of the **H**ip



Normal



Causes

- **Breech birth** & large infant size
- Family history of hip dysplasia



HESI Question

Risk factor is most closely related to developmental hip dysplasia?

- Breech presentation



Signs & Symptoms

0 - 12 weeks old

- Extra gluteal folds **NCLEX TIP** (inguinal / thigh folds)
- Instability & "clicking sensation" when abducting thighs

After 12 weeks

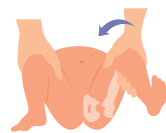
- **Limited** hip abduction
- **Shortened leg** on the affected side

Walking years

Pelvic **tilt** "**Trendelenburg sign**"



Ortolani test



Barlow test

HESI Questions

Q1: Newborn assessment ... A clicking sensation is noted when abducting the child's thigh and placing gentle pressure over the greater trochanter. How will the nurse document this finding?

- Positive Ortolani maneuver

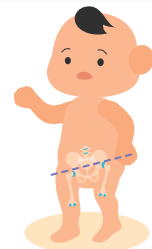
Q2:... an infant who **does not pull to a standing position by 11 to 12 months** of age?

- Developmental dysplasia of the hip

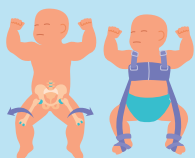
ATI Question

Developmental dysplasia of the hip in preschoolers... which assessments should the nurse include?

- Trendelenburg sign



Treatment



Parent Education

3 NCLEX TIPS

1. **NEVER** put legs straight & together!
2. Swaddle the infant with the hips abducted & flexed (bent upward)
3. Car seats / strollers with **wide bases**

Pavlik harness

- **BEFORE** 6 months of age

7 NCLEX TIPS

1. **NO** adjusting harness straps! = ONLY HCP
2. **NO** taking off. **Leave the harness on** 100% of the day
3. **Check skin 2 - 3 times** daily
4. **Massage under the straps** every day & check for redness
5. Dress the child with clothes **under the straps**
6. Put **diapers on under the straps** (only 1 at a time)
7. **AVOID:** powders & lotions

MEMORY TRICK

- **Abducted**
- **Abduction**

Kaplan Question

newborn ...with hip dysplasia. The nurse anticipates which treatment?

- Pavlik harness

HESI Questions

Q1: What complication .. infant with a Pavlik harness?

- Skin breakdown

Q2: A newborn infant, diagnosed with developmental dysplasia of the hip (DDH). Which nursing action should be included ...?

- **Observe the parents** reapply a pavlik harness

ATI Questions

Q1: plaster spica

- Check the temperature of the infant's toes **every hour** for at least the first 24 hours

Q2: spica cast... proper skin care? **Select all that apply.**

- Check exposed areas for signs of **redness or irritation**
- **Inspect the inside edges** of the cast to look for extra pieces of cast material
- Provide regular **sponge baths** for the client

Q3: placement of a spica

- A cast applied from the **chest to the thighs or knees**



Osteogenesis Imperfecta & Muscular Dystrophy

Pediatrics: Musculoskeletal

Osteogenesis Imperfecta - Pathophysiology

Memory Trick

Osteo**PO**Rosis
PORous bones

Brittle bone



Osteogenesis imperfecta (OI), also called **brittle bone disease**, is the **most common type of osteoporosis** in childhood resulting in frequent fractures.

OI is a group of inherited genetic disorders that **impairs the creation of collagen by osteoblasts** in the bone, caused by defective genes in the parents. The bones present like Swiss cheese, with small holes, **resulting in fractures often from mild pressure or no apparent cause**. For example, putting on a blood pressure cuff too tightly in the hospital!

HESI Questions

- Q1:** Which statement concerning **osteogenesis imperfecta (OI)** is true?
- OI is an inherited disorder
- Q2:** ... most **common osteoporosis** syndrome in childhood?
- Osteogenesis imperfecta
- Q3:** A 6-year-old patient has ... **fractures on 5 different occasions**. The nurse prepares to assist in the **screening for which condition?**
- Osteogenesis imperfecta



Interventions

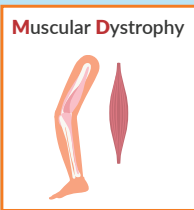
- Take blood pressure **manually to avoid over-tightening the cuff** **NCLEX TIP**
- **Reposition frequently** using supportive devices
- Lift the infant / child under the **broadest areas of the body**



Muscular Dystrophy - Pathophysiology

Memory Trick

MD



MD



MD is a **genetic disorder that causes muscle weakness**, due to the replacement of muscle fibers with connective tissue. **Mostly affecting boys between the ages of 2 & 5 years old.**

There is a **change in the DNA sequencing** resulting in a low production of the protein dystrophin, which is needed for muscle stabilization.

*MD is a progressive disease, meaning it worsens over time. As **more & more muscle cells die turning into fat & scar tissue**, the muscles can look big and strong, but in reality they are weak & frail.*

HESI Questions

- Q1:** How is **Becker muscular dystrophy** different from **Duchenne muscular dystrophy**?
- It progresses much slower
 - Its age of onset is over 7 years
- Q2:** **Duchenne muscular dystrophy (DMD)?**
- Muscle weakness, usually beginning around the age of 3 years

From 3 years old



Signs & Symptoms

4 NCLEX TIPS

1. Walks on **tiptoes**
2. Disproportionately **large calves**
3. Frequently **trips & falls**
4. Places **hands on thighs to stand up** (Gower sign)



Interventions

Education

- Remove throw rugs **NCLEX TIP**
- Diet: fluids & fiber
- Gentle exercise: swimming, yoga, walking
 - **NOT** weightlifting



Pharmacology

- **Steroids "-sone"**
 - **Prednisone**

Predni**SONE** **SSSS**welling



Neurological Brain

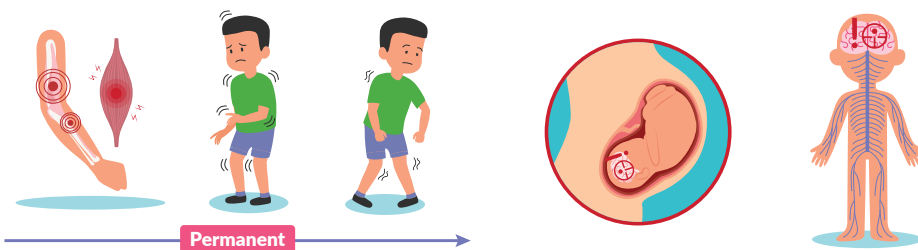
Cerebral Palsy

Pediatrics: Neurological Disorders

Pathophysiology & Causes

Cerebral palsy is a **permanent disorder of movement presenting with stiff muscle tone, tremors, and involuntary motions**. The client also has an abnormal posture, and lack of physical coordination as muscle spasms come & go.

CP stems from **abnormal brain development**, often before birth, which results in delayed development specially with walking, speaking and swallowing, as these require various muscles.



MEMORY TRICK

- Cerebral - Brain
- Palsy - **Pausing**

HESI Question

... Most common cause ... for the diagnosis of cerebral palsy (CP)?

- Prenatal **brain abnormalities**

Signs & Symptoms

- Poor head control
(Over 6 months)

NCLEX TIP

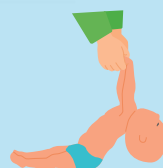
"Infant's head that falls back behind the shoulders"

- **Rigid** muscles
- **Positive Babinski** sign / reflex

Kaplan Question

The nurse identifies which finding as an early warning sign of cerebral palsy (CP)?

- The infant has **poor head control**



HESI Questions

Q1: What assessment findings will the nurse expect to see in a 9-month-old with cerebral palsy? Select all that apply.

- Positive **Babinski sign**
- Presence of the **tonic neck reflex**
- **Irritability** and excessive crying
- **Rigidity** of the arms and legs

Q2: Which drug prevents the risk of cerebral palsy in the fetus?

- Magnesium sulfate

Treatment

Long-term treatment includes physical therapy, speech therapy, pharmacology, & sometimes surgery.

Pharmacology

- Baclofen

Baclofen muscle relaxant to help ease those painful muscle spasms.

ATI Questions

Q1: ... Child who has cerebral palsy experiencing painful muscle spasms. Which of the following medications should the nurse administer?

- **Baclofen**

Q2: 4-year-old child with cerebral palsy.

- Referral to a **speech-language therapist**

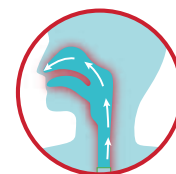


HESI Question

A 7-month-old male infant diagnosed with spastic cerebral palsy ... **immediate intervention** by the nurse?

- My son often **chokes while I am feeding him**

#1 PRIORITY



Notes

Meningitis & Increased ICP

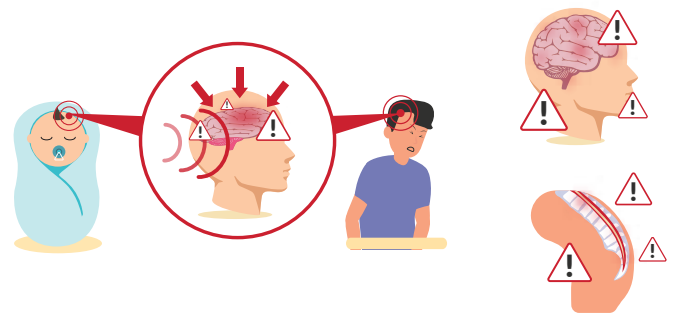
Pediatrics: Neurological Disorders

Pathophysiology & Causes

Meningitis is the inflammation of the **meninges** (the inner lining of the brain & spinal cord). Typically **caused infection (bacterial or viral)**, head trauma, & even auto-immune diseases like Lupus.

Disease progression:

Inflammation → massive brain swelling → deadly ↑ ICP → crushed brain stem → DEATH!



Signs & Symptoms

6 NCLEX TIPS

2 years or less

1. **High pitched** cry
2. **Bulging** fontanelles at REST (Report to HCP)
3. Irritability
4. Vomiting & **poor feeding**
5. Frequent **seizures**
6. Sunset eyes: "**sclera visible above the iris**"

Infant Complication = Hydrocephalus

Priority: Fontanel assessment



Complications

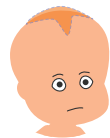
Hydrocephalus is a **deadly complication** that increases pressure within the baby's brain. It happens when fluid collects within the brain from the **obstructed flow of cerebrospinal fluid (CSF)**. If NOT corrected quickly the baby can die!

Bulging fontanelles at rest is the first sign of increased ICP! **NCLEX TIP**

MEMORY TRICK

B

Bulging Fontanelles at rest



B

Brain Damage!!!



ATI Questions

Q1: Infant born 3 days ago. Which finding should the nurse ... **report to the primary care provider?**

- The infant's anterior **fontanel is bulging**

Q2: **6-month-old infant** ... scheduled for a **lumbar puncture**. Which **actions** should the nurse take?

- **Hold the infant's chin to his chest and knees to his abdomen** during the procedure

Q3: **Lumbar puncture (LP)** ... Which **actions** should the nurse take?

- Instruct the parents to keep the **toddler in a flat position for 30 minutes** to one hour **after the procedure**

Top Missed NCLEX Questions

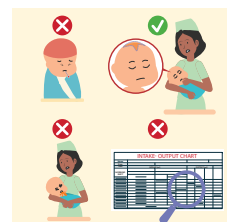
Q1: A **2-month-old** infant with viral **meningitis** ... the nurse knows to **assess** for which clinical manifestation?
Select all that apply

- 1. **Fever**
- 2. **High-pitched cry**
- 3. **Vomiting**
- 4. **Seizures**
- 5. **Poor feeding**
- 6. **Flattened fontanelles**

Top Missed NCLEX Questions

Q2: **3-month-old** infant with **meningitis** ... What is the **most important assessment** in the plan of care?

- 1. **Temperature**
- 2. **Fontanel assessment**
- 3. **Vomiting**
- 4. **Input & output**



Meningitis & Increased ICP II

Pediatrics: Neurological Disorders

Tests

- **CT scan (done first)**
 - **LP (Lumbar Puncture "spinal tap")**
 - Viral - Very clear
 - Bacterial - Bad cloudy
 - Both types will have elevated WBCs
 - AFTER LP: Monitor insertion site dressing for **clear fluid**

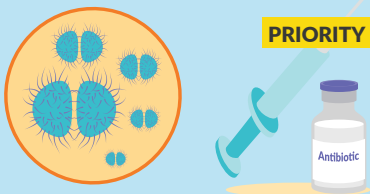
Interventions

Infants 0 - 12 months

Bacterial Meningitis **NCLEX TIP**

Giving antibiotics is the priority

OVER 35% got it WRONG!



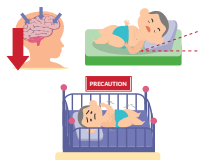
3 NCLEX TIPS

1. **Low** light & noise - dark quiet room
Minimize environmental stimuli
2. **Low** pressure
Elevate the HOB at 30-degrees
3. Implement **seizure precautions**



ATI Question

- 6-year-old child who has bacterial meningitis... interventions?
- Implement **seizure precautions**



Droplet

- P** - Pertussis
- I** - Influenza
- M** - Meningitis
- P** - Pneumonia



1. **Surgical Mask** & Goggles
2. Single room

ATI

Teach unlicensed personnel to **wear a mask**

Airborne



- M** - Measles
- T** - TB (Tuberculosis)
- V** - Varicella (shingles/chicken pox)

1. N95 mask - Staff
2. Neg. Pressure Room
3. Door closed
4. Transport - Patient wears **surgical mask**

Put ON "DON"

GMGG

1. Gown



2. Mask



3. Goggles



4. Gloves



Take OFF "DOFF"

GGGM

1. Gloves



2. Goggles



3. Gown



4. Mask



Top Missed NCLEX Question

A 4-month-old infant with bacterial meningitis received new orders ... which of the following should the nurse **prioritize first**?

- 01. Assess fontanels & high-pitched cry
- 02. Give ciprofloxacin IV immediately
- 03. Monitor level of consciousness
- 04. Implement seizure precautions



Notes

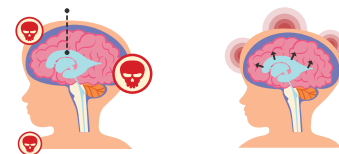
Hydrocephalus

Pediatrics: Neurological Disorders

Pathophysiology

Hydrocephalus is a deadly complication where brain collects **excess cerebrospinal fluid (CSF)** resulting in **deadly increased intracranial pressure (ICP)** progressing to brain damage & death.

CSF - Cerebrospinal Fluid



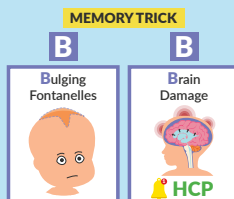
Signs & Symptoms

2 years or less 6 NCLEX TIPS

1. **High pitched** cry
2. **Bulging** fontanelles (Report to HCP)
3. Irritability & change in LOC **HESI**
4. Vomiting & **poor feeding**
5. Frequent **seizures**
6. Sunset eyes "**sclera visible above the iris**"

Priority:

- **Fontanel assessment**
- Increased head circumference bigger than chest



ATI Question

Infant born 3 days ago. Which finding should the nurse ... **report to the primary care provider**?

- The infant's anterior fontanel is **bulging**

KAPLAN Question

... The baby's "**soft spot**" bulges out when the baby cries.

- The anterior fontanel will **normally bulge out** when the baby **coughs or cries**

HESI Questions

Q1: Which clinical finding would the nurse interpret as a possible sign of **hydrocephalus**?

- **Head circumference** greater than chest circumference

Q2: **8-month-old** child ... assessment for **increased intracranial pressure**?

Select all that apply.

- **High-pitched** cry
- **Increased head circumference**
- **Poor suck-swallow** when **feeding**
- **Prominent sclera** over the iris

Q3: Which is a sign of **increased intracranial pressure** in infants?

- **Irritability**

Q4: An infant ... **hydrocephalus** suddenly awakens with a **high-pitched, shrill cry** and **cannot be comforted**. What is the next **nursing action**?

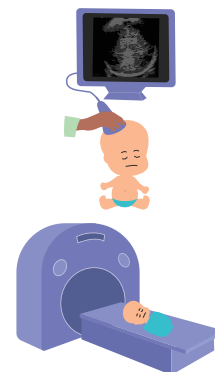
- **Contact the health care provider**

Causes

- **Infections: Meningitis**
- **Tumors**
- **Bleeding inside the brain**

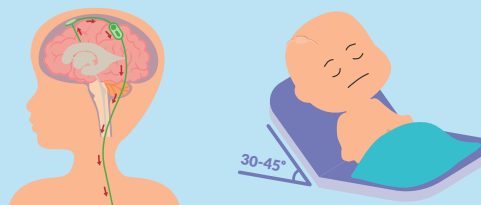
Diagnostics

- **Ultrasound**
- **Magnetic resonance imaging (MRI)**
- **Computed tomography (CT) scan**



Treatments

- **VP shunt** - Ventriculoperitoneal shunt
- Post-op care:
Measure head circumference



ATI

Q1: **2 ½-year-old** boy ... with a **ventriculoperitoneal shunt**. The nurse advises the parents to call the clinic if the child:

- Appears **irritable & vomits** after a nap

Q2: ... Following **ventriculoperitoneal (VP) shunt** placement. Which of the following positions should the nurse place the child?

- **Semi-Fowler's**

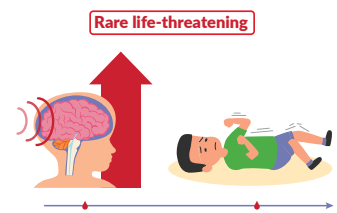
Notes

Reye Syndrome

Pediatrics: Neurological Disorders

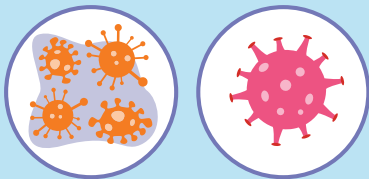
Pathophysiology & Causes

Reye syndrome is a rare **life-threatening condition** that causes massive brain swelling, which leads to seizures & liver damage.



Risk Factors

MOST tested



1. Recent **influenza** infection **NCLEX TIP**
2. **Aspirin** (salicylate acid)
DO NOT GIVE TO BABIES

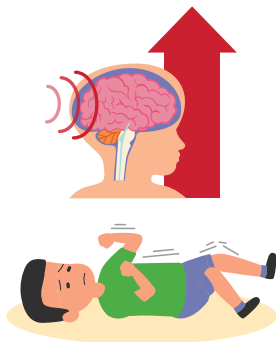
ATI Question

Child with **influenza** ... **increased risk** for development of **Reye syndrome**?
"I gave my child **aspirin** to reduce his fever"

MOST tested trigger



Signs & Symptoms



Brain Swelling

- **Seizures**
- **Bulging fontanelles**

Liver damage

- **Elevated ammonia** ↷
- **Encephalopathy** cloudy brain from ammonia
 - Confusion
 - "ALOC"
 - Mental status change
- **Elevated Liver labs:** AST, ALT
- **Elevated Coag. Time:** increased r/t bleeding!



Interventions

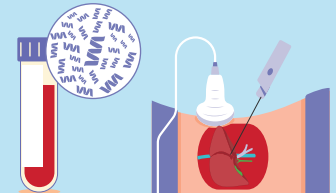
Monitor & decrease ICP

1. HOB elevated (over 30°)
2. **Mannitol** (diuretic)
3. Seizure precautions
4. Vit. K (to stop bleeding)



Diagnostics

- **Liver enzymes**
- **Liver biopsy**



Complications

Hepatic encephalopathy can result from the increased ammonia levels within the blood! Since the **liver is damaged**, it can't convert ammonia into urea, so all the ammonia sits in the blood causing hepatic encephalopathy.

Notes

Seizures

Pediatrics: Neurological Disorders

Pathophysiology

Sudden, uncontrolled electrical discharges in the brain. Epilepsy is lifelong episodes of seizures.

MEMORY TRICK

ePILEpsi - like a PILE of seizures that come & go over a lifetime



Causes

Anything that can cause brain swelling or hypoxia

- **Infection:** meningitis
- **Trauma:** TBI, Concussion
- **Brain mass:** BRAIN tumors
- Increased ICP
- Fever in infants = "febrile seizure"
- Withdrawal from drugs & alcohol



Types

6 months - 6 years of age

Febrile seizures

Key Points

- Give ibuprofen or acetaminophen every 6 hours
- Cool, damp compress on forehead
- **Call 911 = seizures lasting longer than 5 minutes**



Stages or Phases of Seizure

- **Prodromal phase** Warning signs before a seizure leading to Aura Phase
- **Aura phase** Visual, auditory clue that happens prior to a major seizure
- **Ictal phase = Seizure Phase** THINK ignition phase - the period of the active seizure.
- **Postictal Phase** Hangover phase after the seizure - think POST-ignition phase
 - Confused, disoriented, major headache, & typically feels tired or sleepy

Status Epilepticus

• Status Epilepticus- **MEDICAL emergency!! NCLEX TIP**

- 5 min. or longer - 1 seizure
- 30 min. - Repeated seizure activity
- **#1 Priority = STOP** the Seizure

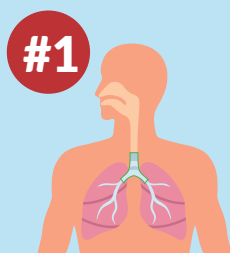
IV or Rectal benzodiazepine
Lorazepam (brand: Ativan)
Diazepam (brand: Valium)



Interventions during SZ

#1 - Airway

- Turn client to side **NCLEX TIP**
- Prepare for suctioning
NEVER insert anything in the mouth!
NEVER restrain or "Hold down arms"
- Call for help & Stay with Client
#1 Drug = STOP the Seizure
Lorazepam (brand: Ativan)
Diazepam (brand: Valium)
Rectal or IV
- Loosen restrictive clothing (Neck & chest)
- Safety
Protect - Clear area for any objects
Pad Side Rails
- **AFTER** seizure activity
Record Time
Assess LOC, Neuro, Vitals
Prepare for suctioning



Diagnostics

- MRI or CT - to look for abnormalities.
- **EEG** - electroencephalogram **NCLEX TIP**
Assesses electrical activity in the brain by placing sticky electrodes on the scalp
 - Wash hair (before/ after) to make sure it sticks
 - **NO** Caffeine (tea, coffee, soda) or **stimulants:**
12 - 24 hours before
 - **NO** Seizure meds
 - **NO** Sleep - Sleep deprivation is BEST
 - **YES** Eat before test - no need for NPO

MEMORY TRICK

- **EEG** think of EGG head - electrical activity of the EGGhead
- **ECG** - C think C - Cardiac rhythms

ATI Questions

- **Q1:** First priority for a client having a seizure?
Turn client to the side
- **Q2:** Tonic clonic seizure nursing interventions?
Loosen restrictive clothing
Prepare to suction the client's airway
- **Q3:** Client who is at risk for seizures:
Ensure a patent IV

Pharmacology

Anticonvulsants

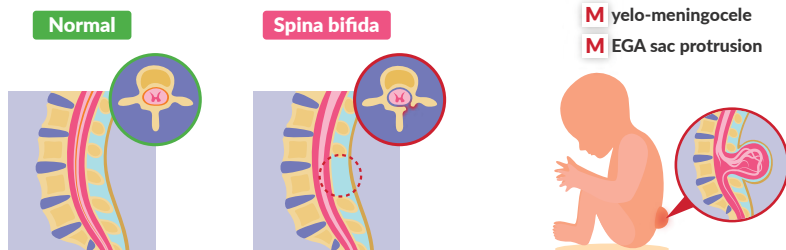
- Phenytoin: **Toxic Over 20** hold med
- Levetiracetam: **Driving permissions** from HCP

Spina Bifida

Pediatrics: Neurological Disorders

Pathophysiology

Spina bifida is a birth defect in which an **infant spinal cord fails to develop properly**. Specifically, the neural tube fails to fuse, or there is failure in formation of the vertebral neural arches.



2 main Neural Tube Defects

- Spina bifida **occulta**
- Myelomeningocele

Signs & Symptoms

Spina bifida occulta

■ 2 Key Signs

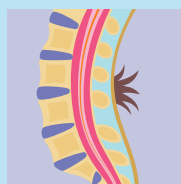
1. **Small tuft of hair** at the base of spine **NCLEX TIP**
2. Small dimple or birthmark (nevus birthmark)

Myelomeningocele:

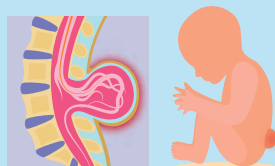
- Mega sac protrusion from the back area

Priority Interventions

1. Cover the area with a **moist sterile dressing**
2. **Asepsis** = most important **Kaplan HESI**
3. **Prone** position



Myelomeningocele



Kaplan Question

Myelomeningocele. Which action does the nurse perform?

- Applies moist, sterile dressing

ATI Question

... assessment should the nurse prioritize for follow-up?

- tuft of hair at the base of the lumbar spine

HESI Questions

- Q1:** Which neural tube defect is not visible externally?
- Spina bifida occulta
- Q2:** ... Findings to report to the HCP?
- A pigmented nevus with tuft of hair at the base of the lumbar spine
 - Sacral dimple
- Q3:** Why does a myelomeningocele require protection after birth? Select all that apply.
- Reduce the chance of infection
 - Improve the prognosis for ambulation
 - Prevent damage to the spinal cord and nerves
 - Prevent the leakage of cerebrospinal fluid

Diagnostics

An MRI or spinal ultrasound can be used, but the **MOST tested** was:

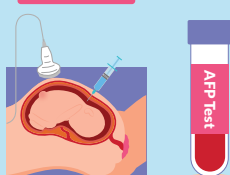
- Amniocentesis:
Alpha-Fetoprotein test

ATI Question

Alpha-fetoprotein test?

- To identify fetal neural tube defects

Amniocentesis



Causes

- Vitamin B-9: **Folate (Folic Acid) deficiency**
- **AVOID** Anti-seizure medications:
 - Valproic Acid
 - Carbamazepine

HESI Questions

- Q1:** Pregnant client ... taking carbamazepine. High risk for?
- Spina bifida
- Q2:** Vitamin ... to prevent neural tube defects in infants?
- 0.4 mg of folic acid

ATI Question

Folic acid is important before and during pregnancy:

- To prevent neural tube defects in the newborn

Education

During Pregnancy

- 400 mcg of Folic Acid per day **NCLEX TIP**
- **Green Leafy** vegetables
 - Spinach
 - Broccoli
 - Green peas
- Starch **NCLEX TIPS**
 - Black beans & rice
 - Fortified cereals & milk
 - Peanut butter
 - Enriched bread

Saunders's Questions

- Q1:** ... Pregnant client identifying the food items highest in folic acid.
- Leafy green vegetables
- Q2:** A good source of folic acid?
- Spinach

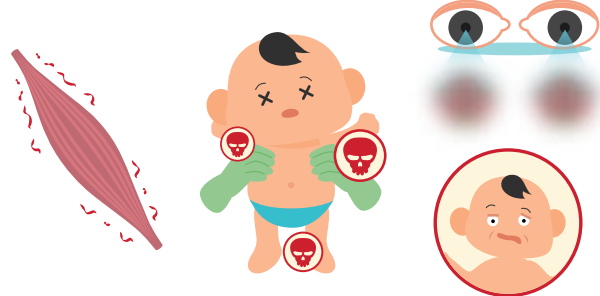
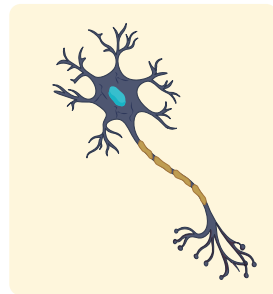
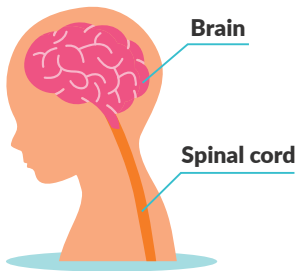


Tay-Sachs Disease

Pediatrics: Neurological Disorders

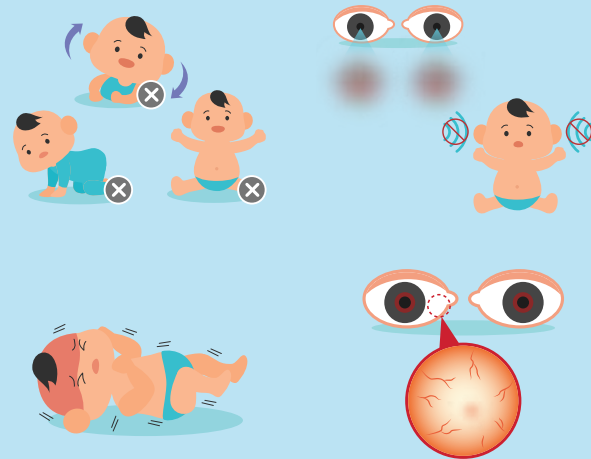
Pathophysiology & Causes

Tay-Sachs disease is a group of disorders that **destroy nerve cells in the brain & spinal cord**. Typically appearing around six months of age, it is **caused by the absence of an enzyme that helps break down fatty substances**. As the disease progresses, the child loses muscle control, vision loss, paralysis, and death.



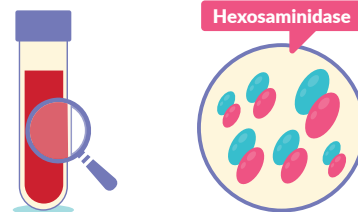
Signs & Symptoms

- Loss of motor skills, including
 - Turning over
 - Crawling
 - Sitting up
- Seizures
- Vision & hearing loss
- "Cherry-red" spots in the eyes



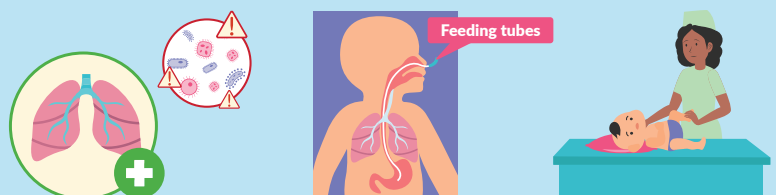
Diagnostics

Blood test checks the levels of an enzyme called hexosaminidase in the child's blood.



Treatment

- Respiratory care (high risk of lung infections)
- Feeding tubes (trouble swallowing & aspiration)
- Physical therapy



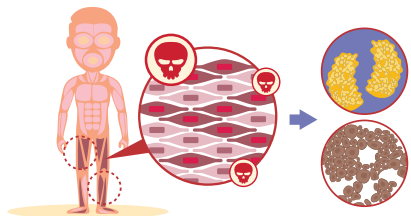
Notes

MD: Muscular Dystrophy

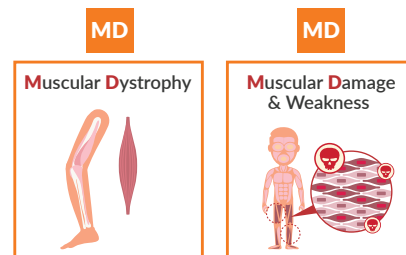
Pathophysiology Course

Pathophysiology

Muscular dystrophy (MD) is a **genetic disorder that causes muscle weakness**, due to the replacement of muscle fibers with connective tissue. There is a change in DNA sequencing resulting in a **low production of the protein dystrophin**, which is needed for muscle stabilization.

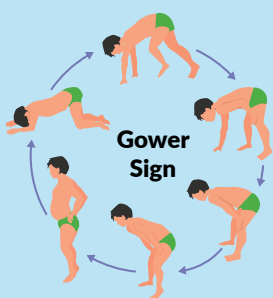


Memory Trick



MD mostly affects **boys between the ages of 2 & 5 years old**, and is considered a progressive disease, meaning it gets worse over time.

Signs & Symptoms



4 EXAM TIPS

1. Walks on **tiptoes**
2. Disproportionately **large calves**
3. Frequently **trips & falls**
4. Places **hands on thighs to stand up** (Gower sign)

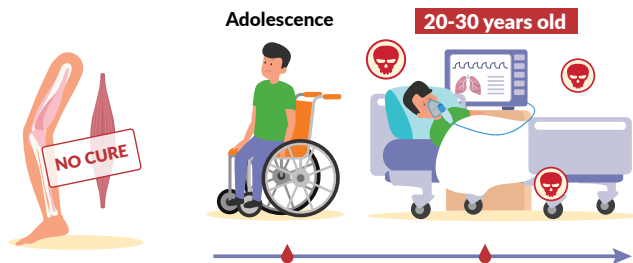
Patho Test Tips

- Motor weakness
- Waddling gait & **difficulty climbing stairs**
- Gower maneuver (Gower sign)
- Kyphoscoliosis
- Respiratory infections
- Cardiomyopathy



Treatment & Nursing Interventions

There is no cure for MD, so children in adolescence typically use a wheelchair & most **die due to respiratory failure in their 20s or 30s**.



- Remove throw rugs **NCLEX TIP**
- Diet: fluids & fiber
- Gentle exercise: swimming, yoga, walking
 - **NOT** weightlifting

Pharmacology

NOT muscle relaxants like baclofen - that's more for muscle spasm, which is not present in MD.

Predni**SONE** SSSSwelling



- Steroids **"-sone"**
 - Predni**sone**

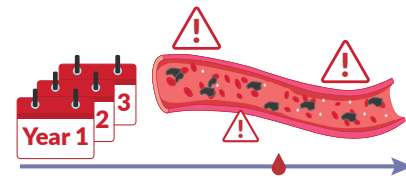
Poisoning

Lead Poisoning

Pediatrics: Poisoning

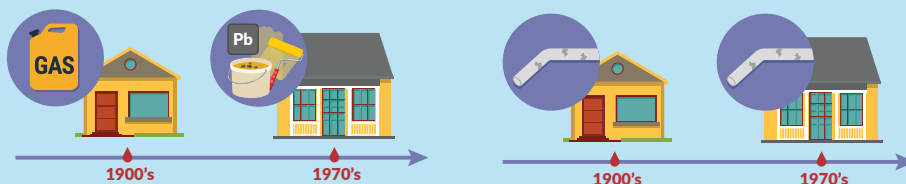
Pathophysiology

Lead poisoning occurs when **toxic levels of lead build up inside the bloodstream**. Children **younger than 6 years of age** are most at risk since small amounts of lead can cause serious health problems.



Causes & Risk Factors

- Lead-based paints found in houses built in & before the 1970s
- Drinking from lead piping in older homes



HESI Question

Q1: Which source is a common cause of lead poisoning in children?
 • Lead-based paint

Q2: Which metal is appropriate to test for in the child that lives in a house built in 1960?
 • Lead

Signs & Symptoms

Neurocognitive impairment

NCLEX TIP

Mild

- Hyperactivity
- Impulsive

Moderate

- Learning disabilities
- Vision & hearing

Severe

- Seizures
- Death

- Anemia **Kaplan** **HESI**
- Weight loss
- Sluggishness and fatigue

ATI Question

Which of the following is the **most serious concern** associated with an elevated blood lead level?

- Neurocognitive impairment

Kaplan Question

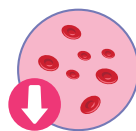
Chronic lead poisoning. Which symptoms does the nurse **expect to see**?

- Anemia, seizures, learning disabilities

HESI Question

Which effect does increased lead absorption have on a patient?

- Anemia



ATI Question

A child who has **severe lead toxicity**. Which of the following actions should the nurse plan to take?

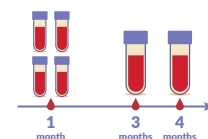
- Administer chelation therapy

HESI Question

Which nursing intervention is appropriate when the blood lead level (BLL) is **within 5 and 14 mcg/dL** in an adolescent client?

Select all that apply.

- Refer to **social services**
- Conduct **follow-up blood testing** within 1 month and then every 3 to 4 months



Education

3 NCLEX TIPS

1. Return for **follow-up blood tests** for lead level
2. Get the **home inspected** for the source of lead
3. **Wash the child's hands often** (especially before meals)

Most tested on

SATA questions



Treatment

Chelated therapy like activated charcoal & EDTA injection can be given depending on time & severity of exposure.

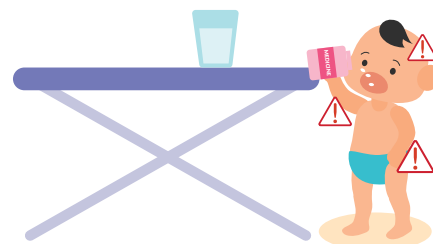


Drug Toxicity

Pediatrics: Poisoning

Causes

Drug toxicity is always a big concern with **toddlers learning how to walk & get around**, they are curious about everything, get into medicines, and love to put foreign objects into their mouths!



Treatment

- Ibuprofen (NSAID)
- Acetaminophen (tylenol)
- Aspirin (salicylate)

Priority Interventions

1. Emergency department
2. **Activated charcoal**
3. Full assessment w/ labs

ATI Questions

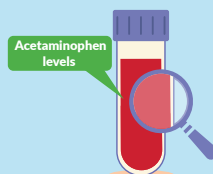
Q1: 3-year-old child ... father just found him holding an empty bottle of ibuprofen... initial action?

- Activated charcoal

Q2: An 8-year-old child has swallowed twelve 325 mg acetaminophen tablets. The mother brings the alert child to the emergency department.

Prioritize the nurse actions that should occur.

1. Ensure patent airway
2. Prepare to give **activated charcoal**
3. Complete a history & physical
4. Check **blood acetaminophen levels**



HESI Questions

Q1: "I think my baby swallowed a bottle of Tylenol." What is the nurse's next action?

- Take the **child's vital signs**

Q2: Acetaminophen overdose?

- **Acetylcysteine**

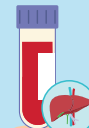
Kaplan Questions

Q1: Treatment of acetaminophen overdose?

- Acetylcysteine

Q2: Preschool-age client diagnosed with an acetaminophen overdose. Which laboratory test result is most important for the nurse to evaluate?

- **Liver function test**



Education

- Keep **medications locked & out of the sight** of children
- Have the **contact number for the poison control center** near the phone

HESI Question

Which nursing information is appropriate when teaching parents about poison prevention? SATA

- Keep **medications locked & out of the sight** of children
- Put the contact number for the **poison control center near the phone**

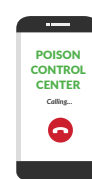


Kaplan Question

"I just found my 2-year-old in the kitchen surrounded by several bottles of cleaning solutions and the bottles are all open!"

Which action by the nurse is best?

- Call the **poison control center**



Notes

Respiratory

Asthma

Pediatrics: Respiratory

Pathophysiology

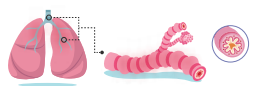
Asthma is a **chronic inflammatory disorder** in the major pathways of the lungs: **Bronchi & Bronchioles**. It comes & goes with flare-ups in the form of **asthma attacks that are reversible!**

MEMORY TRICK

A - Asthma
A - Acute Attacks that come & go

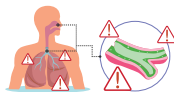
#1

Bronchoconstriction



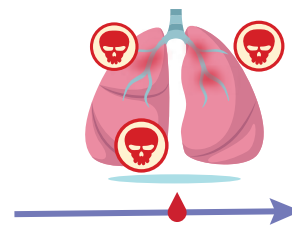
#2

wet & mucus filled



During an **asthma attack, 2 key things happen:**

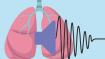
- Bronchoconstriction:**
Bronchi puff up with inflammation & get VERY tight.
- Wet, mucus filled lungs:**
Excessive mucus production from goblet cells that line the respiratory tract.



PRIORITY! Since the respiratory tract is so constricted that **oxygen cannot get in & CO2 cannot get out**, resulting in air trapping and making it hard to exhale.

Signs & Symptoms

A	Accessory muscle use Critical Sign: Paradoxical Breathing
S	SOB & dyspnea Critical Sign: Single word dyspnea
T	Tight CHEST & Tachypnea
H	High-pitched wheezing
M	Minimal "diminished breath sounds"
A	3 As Absent Breath Sounds (Silent Chest) PRIORITY Acidosis (CO ₂ retention) Air trapping - Prolonged exhalation



Top Missed NCLEX Question:



Which child in the pediatric unit should the nurse **see first**?

- 1. 8 year old with cystic fibrosis presenting with fever & green sputum
- 2. 10 year old with croup presenting with a barking cough & tachypnea
- 3. **6 year old with acute asthma exacerbation suddenly has no wheezing**
- 4. 11 year old with new tachycardia & anxiety after albuterol nebulizer treatment

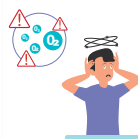
Critical Complications

Hypercapnic respiratory failure = **HIGH CO₂**

Hyper Capnic = **High Carbon** dioxide

ABG (Arterial Blood Gas)

- pH less than **7.35** = **Acidosis**
- PaCO₂ - **Over 45** = **Acidosis**
- PaO₂ - Less than 80! = Hypoxic



* 1st Sign of Hypoxia = **Mental Status Change**

- Agitation
- Restlessness **NCLEX TIP**
- Drowsiness

PRIORITY



Status Asthmaticus **NCLEX TIP**

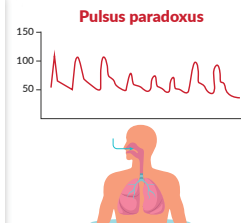
- Endotracheal Intubation

Key Sign of Status Asthmaticus **Test Tip**

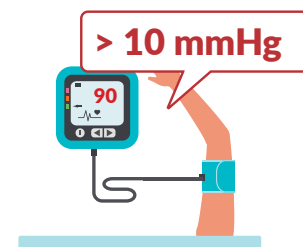
Pulsus paradoxus

Drop in systolic blood pressure **More than 10 mmHg**

- Decrease in stroke volume
- Decrease in systolic blood pressure (systolic squeeze)
- Pulse wave amplitude during inspiration



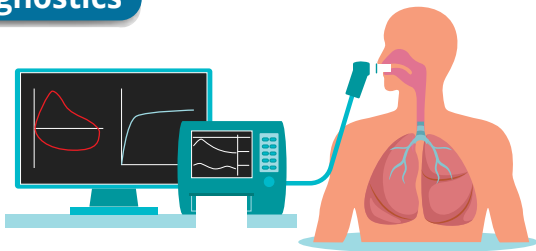
Patho: increased negative pressure within the lungs puts a lot of **added pressure on the left ventricle**, making it difficult for the heart to pump oxygen rich blood to the body.



Asthma II

Pediatrics: Respiratory

Diagnostics



PFT - Pulmonary Function Test

This diagnostic test shows how well the lungs are working. It measures total lung capacity, volume, gas exchange & rates of flow. This data helps the healthcare provider (HCP) diagnose & treat lung disorders

Peak Expiratory Flow Rate

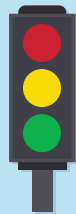
- Sort of like a weather forecast - we want to anticipate a Severe asthma attack - before it happens!

Green zone

- Green means go.
- Asthma is around 80 - 100% under control.

Yellow zone

- Yellow means mellow.
- Asthma is **NOT** under control here! So there is a HUGE need for additional medication
 - Rescue drug **every 4 hours for 1-2 days**
 - Call HCP (provider)
NEED additional meds or change in treatment

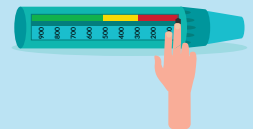


Red zone

- Red** means **Really** bad!
- Emergency treatment is needed immediately if the level does not return to yellow **RIGHT** after taking rescue drugs!

Correct Order - Peak Flow Meter

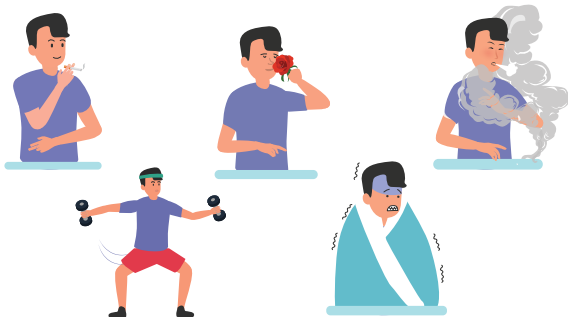
- Stand or **sit in upright** position
- Put the flow meter scale to **0 or lowest value**
- Inhale deeply
- Put the mouthpiece in mouth & create a seal with the lips
- Exhale as quickly & forcibly as possible** & record reading
- Repeat 2 more times, with a break of 5 -10 seconds between
- Record 1 score = the HIGHEST of the 3 attempts**



HESI

- Q1: ... understanding the peak expiratory flow rate test?
- Assesses the severity of asthma
- Q2: A child ... with a new diagnosis of asthma... discharge plan?
- Select all that apply.
- Teach the parents about peak expiratory flow rates
 - Home assessment for allergens

Triggers



HESI

- Q1: Which triggers tend to aggravate asthma in children? Select all that apply.
- Exercise
 - Tobacco smoke
- Q2: Which reason is appropriate when preventing respiratory tract infections in children with asthma?
- Can trigger an episode or aggravate an asthmatic state

Kaplan

- ... determining the cause of the acute asthma attack?
- "My child slept on a new pillow last night."

MEMORY TRICKS

A

Allergens (dander, dust, pollen)
Elevated **Eosinophils**

S

S - Smoking (second hand cigarette smoke)
S - Stress (emotional, physical)

Extrinsic (External)

- Type I hypersensitivity
Immediate allergic reaction

Intrinsic (Internal)

- Airway hyperresponsiveness (adult-onset) Asthma attacks brought on by:
 - S** - Sickness (Respiratory infection)
 - S** - Stress
 - S** - Severe weather (cold)
 - S** - Strenuous activity (exercise)
 - Drugs

Drugs to AVOID

- N - **NSAIDs** Naproxen, Aspirin, **ibuprofen**, indomethacin, & **ketorolac**
- N - Not good for Asthma



B - Beta blockers

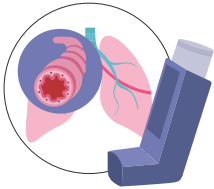
- B - Blocked HR & lungs
 - Propranolol (Inderal) = Nonselective
 - Atenolol = Selective (cardio "Beta 1" selective)



Asthma III

Pediatrics: Respiratory

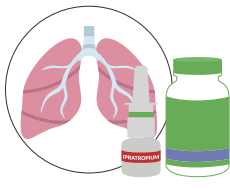
Pharmacology



BRONCHODILATORS

B	Beta 2 Agonist Albuterol
A	Anticholinergics Ipratropium
M	Methylxanthines Theophylline

NCLEX TIP



ANTI-INFLAMMATORY Agents

S	Steroids Beclomethasone
L	Leukotriene Inhibitor Montelukast
M	Mast Cell Stabilizers Cromolyn

Bronchodilator - BAM team

- **B - Beta 2 agonist - albuterol** - think buterols for brutal asthma attacks!
It's considered the one & only rescue drug for asthma attacks
- **A - Anticholinergics - Ipratropium** - dries out the body, decreasing secretions & dilating the airways - you cant pee - with a tro-pium
- **M - Methylxanthines - Theophylline** - very toxic & very fast HR!
10 - 20 therapeutic range

MEMORY TRICK Phyllines have you feeling toxic & tachycardic

ATI

... new prescription for levalbuterol solution via nebulizer. Which of the following statements ... indicates an understanding of the teaching?

- My child could have heart palpitations while taking this medication

MEMORY TRICK

AIM for Acute Asthma Attack

- A - Albuterol 1st**
- I - Ipratropium 2nd**
- M - Methyl-prednisolone**
(brand: Solumedrol)

Anti-inflammatory Agents - SLM Team

- **S - Steroids** "-sone" like Beclomethasone -
Top side effects - **3 Ss** for **Sone** Steroids
 - **S - Sores** in mouth (oral thrush "candida") so instruct the client to wash out their mouth after every use & inhalers go into the sink, twice per week.
 - **S - Sepsis & sickness** (increased risk for infection) & increases WBC count in the body
 - **S - Sugars increased** (elevated glucose levels)

Last 2 - are NOT highly tested here

- **L - Leukotriene inhibitors** ending in Lukast like Montelukast (Singular) - think Luke likes to sing
- **M - Mast cell stabilizers** - Cromolyn

S S S



Metered Dose Inhaler

Top Missed NCLEX Question:

Teaching a child proper use of a metered dose inhaler (MDI) with a spacer. Place the instructions in order.



Highly missed question

Ordered Response

3. Shake the MDI & then attach it to spacer
2. Exhale fully
4. Firmly place lips around the mouth piece
1. Deliver one push of the medication
6. Take a deep breath slowly & hold for 10 seconds
5. Wash mouth out with water



Top Missed NCLEX Question:



2nd



1st

The best indicator that treatment has been effective for a child with acute asthma.

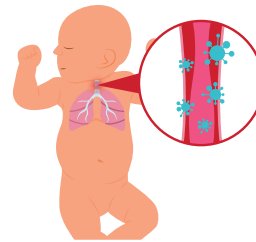
- 1. Less wheezing heard without stethoscope
- 2. No wheezing heard during auscultation of the chest
- ✓ 3. Oxygen saturation has increased from 85% to 92%
- 4. Peak expiratory flow rate that increases showing increased airflow

Croup

Pediatrics: Respiratory

Croup - Pathophysiology

Viral Infection of the upper airway.



Signs & Symptoms

6 months - 3 years old



- Barking cough
- Fever

Treatment / Education

1. **Assess** respiratory status
2. Discharge education:
stand in **front of the open freezer**



ATI Question

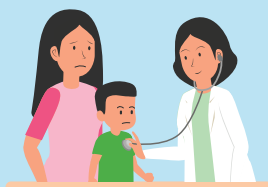
3 year old with **croup**. The **most important initial intervention** to perform is:

- Assess respiratory status

HESI Question

After a 3-day hospitalization for **croup** ... the nurse is working with the parents to discharge the child ... **best action?**

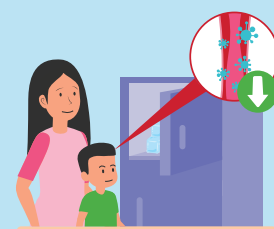
- Ask, "Do you have a **freezer** with your refrigerator?"



KAPLAN Question

The 3-year-old child is seen... for **croup**. The parent asks what to do for the child at home to **alleviate symptoms?**

- "Stand with your child in front of an **open freezer**."



Notes

Cystic Fibrosis

Pediatrics: Respiratory

Pathophysiology

Cystic fibrosis is **serious mucus all over the body**, which clogs & **damages** the lungs, digestive tract, & reproductive organs

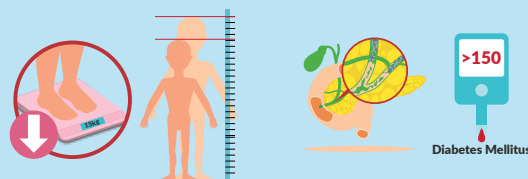


Signs & Symptoms



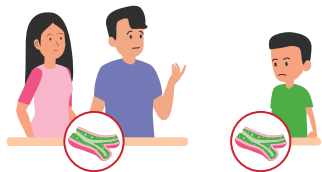
4 NCLEX TIPS

1. Chronic **hypoxemia** (low oxygen) & respiratory **infections**
2. Bowel obstruction "**Meconium ileus**" & **Vitamin deficiencies**
3. **Weight LOSS** & Failure to thrive
4. Diabetes **mellitus** (HIGH blood sugar)



Causes

Children inherit **1 copy of the gene** from each parent in order to have the disease.



Diagnostics

Blood sample or sweat test, once the infant is at least 2 weeks old.



ATI

... child who is suspected of having **cystic fibrosis (CF)**. Which of the following **diagnostic tests** will confirm the diagnosis?

- Sweat chloride test

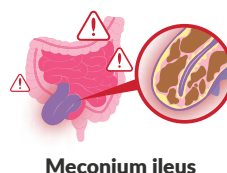
HESI

... child admitted to **rule out cystic fibrosis**. Which result should be reported to the HCP?

- Sweat chloride concentration of 80 mEq/L

Complications

- Bowel obstruction "**Meconium ileus**"
- Diabetes Mellitus (HIGH blood sugar)



HESI

Q1: ... **endocrine disorder** commonly found in children with **cystic fibrosis**?

- Diabetes mellitus

Q2: Which is the earliest **postnatal** manifestation of cystic fibrosis?

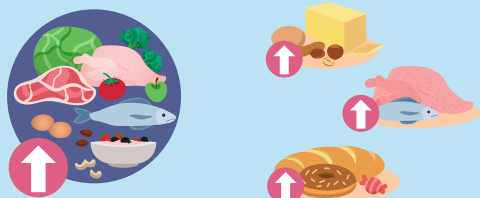
- Meconium ileus

Since the **pancreas is clogged with mucus** **IN**sulin cannot get out of the pancreas to put that sugar **IN**to the cell, resulting in diabetes.

Nursing Care

2 NCLEX TIPS

- **High** calories
- **High** fat, protein, carbohydrates



ATI

A **9 month old infant** diagnosed with **cystic fibrosis**. Which of the following strategies should the nurse explain when **instructing the parents**?

- Performing **chest physiotherapy**

KAPLAN

Q1: ... child diagnosed with **cystic fibrosis**. The nurse should intervene when:

- The child takes the pancreatic **enzymes one hour after eating**

Q2: The nurse instructs the parents of a 7-year-old child diagnosed with **cystic fibrosis** about required dietary modifications.

- Increase **protein & carbohydrates**



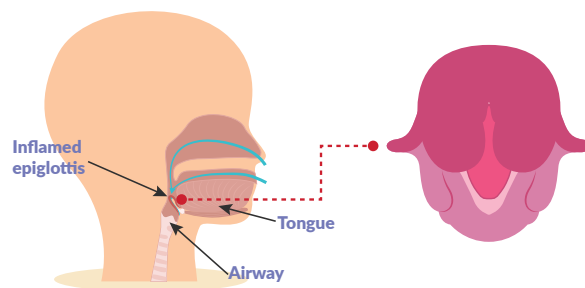
Epiglottitis

Pediatrics: Respiratory

Pathophysiology

Epiglottitis is a **DEADLY medical emergency**, where severe & sudden inflammation near the epiglottis **blocks the child's airway!**

The epiglottitis is the flap in the throat that prevents food entering the trachea. When it gets inflamed it **blocks the airway quickly!** Children can present with no symptoms, to having a **completely occluded airway within hours!**



Signs & Symptoms

- Anxious & restless behavior
- **Stridor** (squeak) **NCLEX TIP**
- Fever, drooling, & **tripod positioning** **NCLEX TIP**



HESI Question

Q1: Which clinical manifestations are appropriate for acute epiglottitis? Select all that apply.

- Pain
- Fever
- Drooling
- Tripod position

Q2: Which student action will the nurse need to correct when caring for a child with epiglottitis?

- Take an oral temperature



Kaplan Question

The 4 year old with... **acute epiglottitis**. Which assessment finding is **most significant**?

- Drooling of saliva

ATI Question

Q1: ... Which client should the nurse assess first?

- A school-age child who has acute epiglottitis, is drooling, and has an absence of spontaneous cough

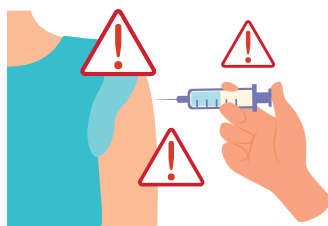
Q2: ... 4 year old child who has epiglottitis... action should the nurse take?

- Monitor oxygen saturation

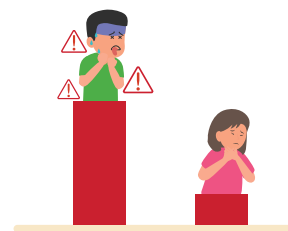
Causes & Risk Factors

- Haemophilus **influenza** type B (HiB)
- Missing standard vaccinations **NCLEX TIP**

A lot of students get this **wrong!**



Epiglottitis affects more males than females.

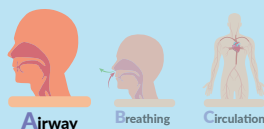


Interventions & Education

4 NCLEX TIPS

1. Priority = **AIRWAY!**
2. **NO** throat inspection & **NO** oral temp
 - Until endotracheal intubation & tracheostomy kit is ready
3. Tripod position
4. GET standard **immunizations**

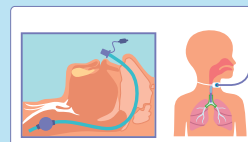
FIRST



HESI Question

Which treatment is appropriate for the child with epiglottitis and severe respiratory distress?

- Nasotracheal intubation or tracheostomy

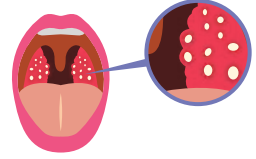


Tonsillitis & Tracheostomy Care

Pediatrics: Respiratory

Tonsillitis - Pathophysiology

Tonsillitis is the inflammation of tonsils, the little soft tissue masses located near the rear of the throat. When these guys get inflamed it can lead to a life-threatening airway obstruction!



Signs & Symptoms

- **Trismus:** inability to open mouth
Report to HCP! **NCLEX TIP**
- Muffled voice & pooling saliva

Trismus requires immediate attention, as it indicates a tonsillar abscess (collection of pus) that prevents the mouth from opening, **resulting in a blocked airway**. Very deadly!

Trismus

Treated



ATI Question

... findings of hemorrhage **following a tonsillectomy**:

- Frequent **swallowing**

HESI Question

A 9 year old child is recovering from a **tonsillectomy**. The nurse notes that the child is **swallowing frequently**. What is the nurse's **next action**?

- Place in a **side-lying position**

Tracheostomy Care - Teaching

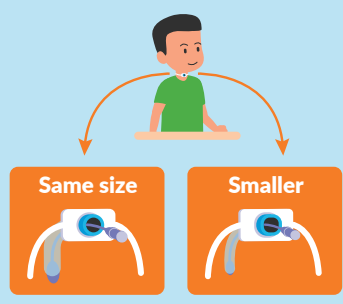
The big **key point is teaching the parents** about accidental decannulation (cannula popping out & getting dislodged). This is **very deadly**, as it means the child has **lost their airway & has no means to ventilate!**

MOST tested



Teaching for New Trach

- Always travel with: **NCLEX TIP**
- **2 spare tracheostomy tubes**
 - **1 same size & 1 smaller size**



HESI Question

... 7 year old child going to school for the first time... has a **permanent tracheostomy**. What **information** must the nurse **include** to the parents?

- Place **suctioning supplies** on the **back of the wheelchair** when transporting



Renal & urinary

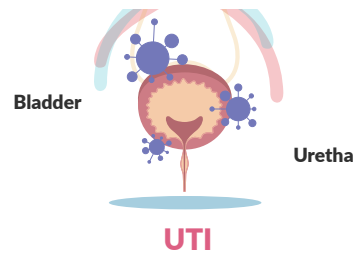
UTI & Pyelonephritis

Pediatrics: Urinary & Renal

UTI - Pathophysiology

- **UTI:** urinary tract infection - urethra, bladder
- **Cystitis:** Bladder infection

If that infection gets bad enough it can migrate & sort of climb up the Ureters to infect the kidneys.



Signs & Symptoms

Signs & Symptoms

- **Fever**
- **Dysuria**
"Burning during urination"
- **Urinary Frequency**
constant feeling of having to void

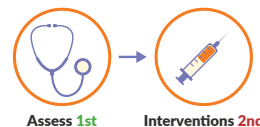


Diagnostics

Urinalysis

- Cloudy & smelly
- WBC
- Nitrites - Kidney infection
- Urine Culture & Sensitivity
Over 10,000 organisms/ml

NCLEX TIPS



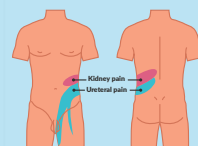
Pyelonephritis - Pathophysiology

Pyelonephritis: aka kidney infection
- more serious infection.



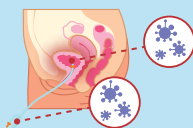
Signs & Symptoms

Dull **Flank** pain
Extending **toward Umbilicus**



Causes

- **Urinary retention**
 - BPH
 - Holding urine too long - nurse bladder
 - Kidney stones - renal calculi - can hold back urine
- **Foley catheters**
 - E Coli - MOST COMMON - bacteria in colon gets into urethra
 - Wiping back to front - scrapes ecoli into urethra



Complication

Confusion, UTI - quickly turns into urosepsis - infection in the blood that infects the brain.



Pharmacology

Treatment
Antibiotics: Sulfonamides & Levofloxacin
& Give analgesics for the pain



Diagnostics

First Action:
Obtain blood and urine cultures
and then begin ANTI-biotics

#1



Nursing Interventions

- Increase **Fluid Intake**
2000 mL water daily
- **Void** after sex
- Take cranberry supplements
- **Avoid:** Caffeine & Alcohol

- **NO** Douching
- **NO** Spermicidal contraceptive
- **NO** Perineal deodorants
- **NO** Synthetic fabrics "Nylon" "Spandex"
- **NO** Bubble Baths
- Wipe **FRONT** to back

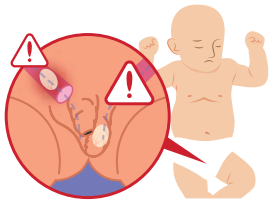


Cryptorchidism

This condition describes undescended testicles, when **a testicle that has not descended into the scrotum** before birth, which is very common in premature male babies. It's **not a priority**, since **most cases resolve on their own** 6 months after birth.

- **NOT priority descend spontaneously** by 6 months after birth

> 1 YEAR OLD



If **NOT corrected by the time the child is 1 year old** the male baby can become **sterile** later on in life meaning they will not be able to have children. Surgery can be used to fix this condition.

Don't let

NCLEX

TRICK YOU

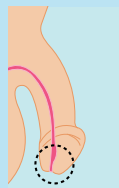


Epispadia

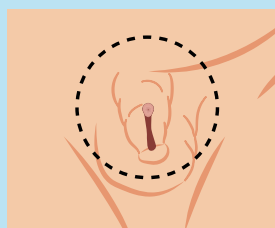
This is a **rare birth defect** where the opening of the **urethra presents on the top of the penis** (the dorsal surface) rather than the tip.



Epispadia



Normal



HESI Question

In what defect ... is the meatus opening located on the **dorsal surface of the penis**?

- Epispadias

Hypospadias

NCLEX Favorite

Hypospadias is a congenital birth defect in which the **urethral opening is on the underside of the penis rather than the tip**. Surgical correction typically takes place before 18 months of age.

After surgery, urinary output is very closely monitored due to a temporary stent or catheter placement.

NO Urinary Output = Priority!

This indicates that the urethra is blocked & must be **reported to the HCP immediately**.

Key Points

- Circumcision is delayed
- **NO Urinary output** = priority

NCLEX TIP

HESI Question

Hypospadias... Which parent statement indicates the nurse's teaching has been successful?

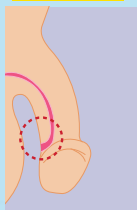
- A **circumcision will not be performed** before discharge

ATI Question

... A **urinary stent** after a procedure to repair **hypospadias**. Which of the following should the nurse advise the parents?

- **Avoid tub baths** until the stent is removed

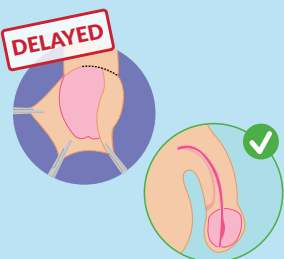
NCLEX



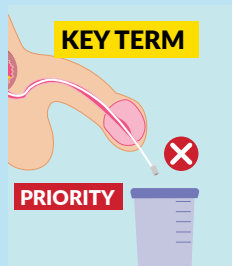
Hypospadias



Normal



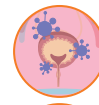
KEY TERM



Notes

Enuresis - Pathophysiology

Involuntary urination or bedwetting at night especially in younger children. It is thought to be caused by certain medical conditions like urinary tract infections, diabetes, & constipation, and some studies show mental health conditions like increased stress or even night terrors.



Treatment

Patient Education

4 NCLEX TIPS

- AVOID** punishment
- AVOID** disposable diapers/ training pants
- Teach positive reinforcement
 - Calendar to record wet & dry nights
 - Encourage child to help clean soiled sheets
- Void:
 - Wake the child at an expected time each night to use the toilet
 - Before bed
 - Restrict fluids **after dinner time**

HESI Question

Which **nursing actions** are appropriate to include in the plan of care for a child with **enuresis**?
Select all that apply.

- Implement a **calendar to record wet and dry nights**
- Teach **positive reinforcement** instead of punishment
- Limit the **amount of fluid intake after 1800**
- Teach parents to observe for **side effects of any medications** used



Pharmacology

We can use **Imipramine**, which is a tricyclic antidepressant, but it also helps to inhibit urination.

HESI Question

Which medication is appropriate for a child diagnosed with **enuresis**?

- Imipramine**



Vesicoureteral Reflux

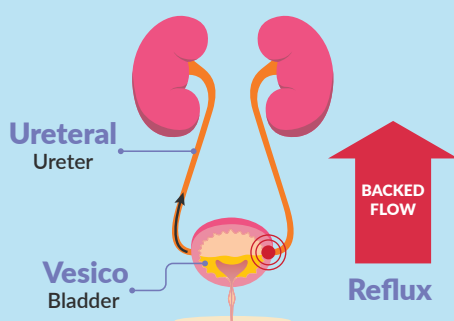
Vesicoureteral reflux

Vesico = bladder

Ureteral = Ureter

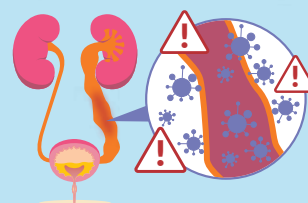
Reflux = backed flow

This describes **the backflow of urine into the kidney**, typically caused by a faulty valve within the bladder. This backup of urine remains in the body causing infection leading to **recurrent UTIs & kidney infections**.



Complications

Recurrent kidney infections



HESI Question

Vesicoureteral reflux is associated with which condition?

- Recurrent kidney infections**

Another complication is **Hydronephrosis** - where we see an overfilled distended kidney from this backup of urine, which could cause kidney damage!

Surgery

Clients recover from surgery with a **ureter tube draining from the kidney**. It is a priority to monitor urinary output!
NO Urinary Output = Priority!
Reported to the HCP immediately.



NO Urinary output
= priority **NCLEX TIP**

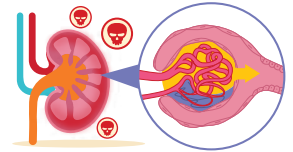
Glomerulonephritis vs. Nephrotic Syndrome

Pediatrics: Urinary & Renal

Glomerulonephritis - Pathophysiology

Glomerulonephritis is **inflammation & scarring** of the kidney, specifically in the **glomeruli**, the little washing machine bubble in the kidney. This inflammation destroys the little glomeruli causing **increased permeability**, like poking holes in a coffee filter, the **kidneys now leak small amounts of protein** instead of filtering it.

Glomerulo**NEPH**-ritis



Causes

Streptococcal infection like **strep throat** can travel down to the kidneys, causing glomerulonephritis. It typically **resolves by itself within 14 days** once the infection is gone.

HESI

Which condition is appropriate when considering common **post-infection renal diseases in childhood**?

- Acute glomerulonephritis

Signs & Symptoms

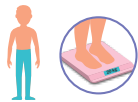
Glomerulonephritis

- UA: lower **Proteinuria**
- Recent Strep infection
- Fever
- Blood Labs: **WBC HIGH**

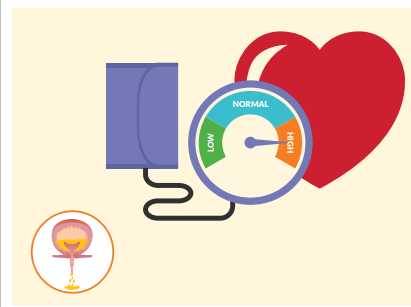
"Daily weight measurements"

NCLEX TIP

WG = **Weight** Gain
Water Gain



Top Missed NCLEX Question:



While caring for a 9-year-old with **acute glomerulonephritis**, the nurse knows which clinical assessment finding is **priority to monitor**?

- 1. Proteinuria
- 2. Urine output
- 3. **Blood pressure**
- 4. Daily weight measurements

ATI

10-year-old child who has **glomerulonephritis** ... **priority for the nurse to report to the provider**?

- Serum **creatinine 1.3 mg/dL**

HESI

Which **clinical manifestations** are appropriate with the diagnosis of ... **glomerulonephritis**?

- Edema, decreased urine volume, **hypertension**

Nephrotic Syndrome - Pathophysiology

Nephrotic Syndrome, also called nephrosis, is an **autoimmune disorder** where the body attacks its own kidneys, triggered by the 4 Ss: stress, sickness, smoking & sun exposure.

Key Point Nephrosis results in **HIGHER PROTEIN LOSS** when compared to glomerulonephritis.



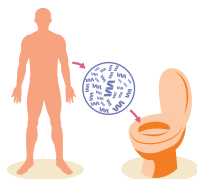
Signs & Symptoms

Top missed NCLEX Question

Exhibit	
Lab Results	
Serum Albumin:	2.5 g/dL
Total Cholesterol:	350 mg/dL
Urinalysis, protein:	2+
Urinalysis, glucose:	Negative
Urinalysis, blood:	Moderate

A 6-year-old male client is diagnosed with **nephrotic syndrome**. According to the **lab results**, what can be concluded about the **pathophysiology** of this disease? Click on exhibit.

Glomerular injury



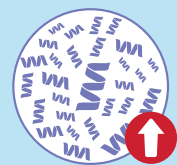
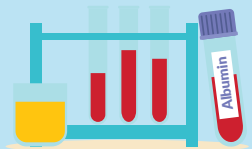
HIGHER protein loss when compared to glomerulonephritis.

UA: HIGH Proteinuria
Blood Labs: Low Albumin
"Hypoalbuminemia"

MEMORY TRICK

- Nephrotic Syndrome
- Nasty protein loss

Low Albumin



Deadly Complication

Renal Failure & HTN Crisis!

Report key signs:

- Headache & Mental Status Changes
- Nausea & Vomiting
- Oliguria - NO or low urine output
- New, Sudden, Rapid Weight Gain

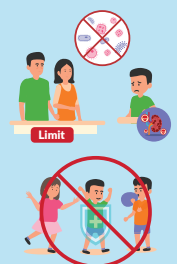
Oliguria
LOW urine output



Education

2 NCLEX TIPS

- Limit** visitors
- Do NOT organize playdates** with other children



Wilms Tumor (Nephroblastoma)

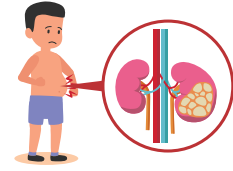
Pediatrics: Cancer

Pathophysiology & Causes

Nephroblastoma is the most common type of kidney cancer in children. When **kidney cells do not fully develop to maturity**, the cells overgrow resulting in a Wilms tumor.

MEMORY TRICK

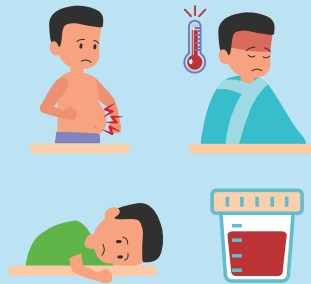
Nephro blastoma



Nephro - meaning kidney

Signs & Symptoms

- **One sided** abdominal mass “bulging” **NCLEX TIP**
- Fever
- Fatigue
- Hematuria



HESI

Q1: Which is the main difference between neuroblastoma and Wilms tumor?

- Wilms tumor is confined to one side of the abdomen

Q2: Which are the clinical manifestations of Wilms tumor? **Select all that apply.**

- Fever
- Fatigue
- Hematuria
- Abdominal swelling or mass

Intervention

- **DO NOT PALPATE** the abdomen **NCLEX TIP**

Place a **BIG SIGN** over the client's bed stating **DO NOT PALPATE Abdomen**.

*Palpating the abdomen increases the risk of rupturing the encapsulated tumor, which **could cause cancer cells to spread all over the body.***



HESI

Wilms tumor: What is the most important safety precaution for a child?

- Place a “do not palpate abdomen” sign on head of bed

ATI

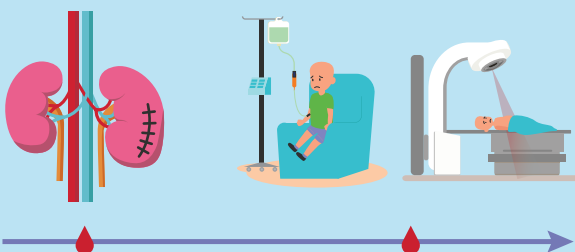
Wilms tumor: Which of the following signs should the nurse place over the child's bed?

- Do not palpate abdomen

Treatment

Nephrectomy surgery is done to remove either the whole kidney or only part of the kidney & surrounding tissues.

After surgery, chemotherapy & radiation therapy is used to ensure the elimination of cancer cells.



HESI

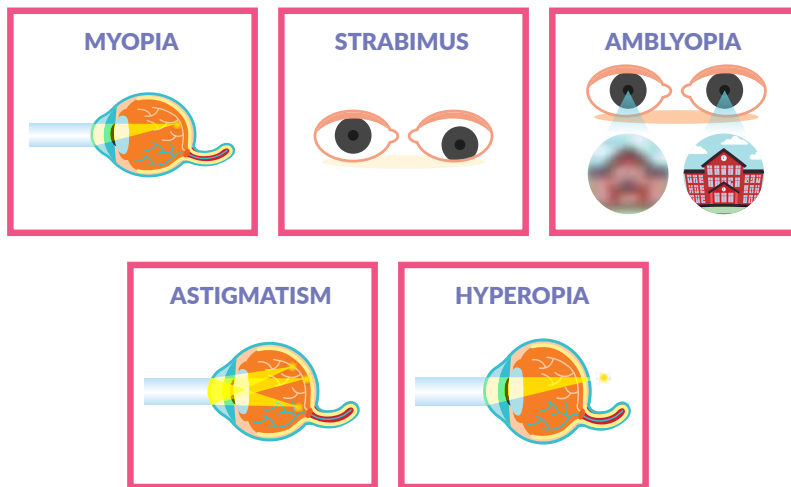
A 3 year old child is scheduled for **surgery to remove a Wilms tumor** ... What treatments ... will be necessary after surgery?

- **Chemotherapy** with or without radiotherapy is indicated

Eye & Ear

5 Eye Disorders

Pediatrics: Visual & Audio



1. Myopia **TOP TESTED**
2. Strabismus
3. Amblyopia
4. Astigmatism
5. Hyperopia

Myopia - Pathophysiology

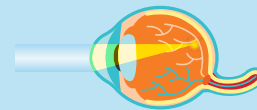
Myopia, also called **nearsighted**, clients have trouble seeing at a distance, meaning clients can see better when objects are near!

In a normal eye, images are focused & dialed in on the retina, but in myopia the eye structures focus images in **FRONT** of the retina causing far images to be blurred.

MEMORY TRICK

MYopia

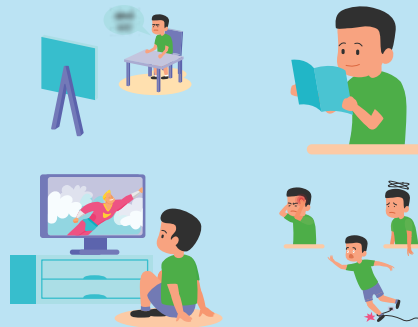
MY or mine
(bring objects closer)



Signs & Symptoms

4 NCLEX TIPS

1. **Squinting** to read word far away
2. Holding books **close to the face to read**
3. **Sitting too close** to the TV
4. Headaches, dizziness, & clumsiness **HESI**



HESI Questions

- Q1:** ... **difficulty reading the board at school** and complains of frequent **headaches**?
- Myopia
- Q2:** ... **clinical manifestations** appropriate for **myopia** in children?
Select all that apply.
- Dizziness
 - Clumsiness
 - Headaches
 - Eye rubbing

Strabismus - Patho & Signs

This is a disorder where the eyes appear **crossed (crossed eyes)** & **don't look in the same direction at the same time.**

MEMORY TRICK

CROSSED EYES

Strabismus
Stray-bismus



Complication

- Untreated by **age 5 or 6**
Amblyopia: Permanent loss of visual acuity

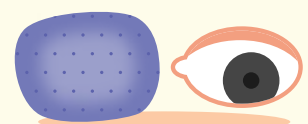
HESI Questions

- ... importance of detecting **strabismus** in young children?
- **Amblyopia** (a type of blindness)

Treatment

- Patch over the **stronger eye** **NCLEX TIP**

Over 30%
of student got this **WRONG**

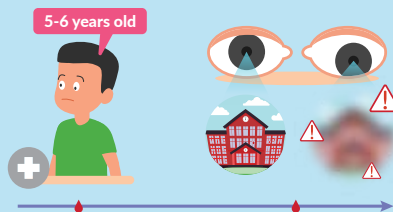


5 Eye Disorders II

Pediatrics: Visual & Audio

Amblyopia - Patho & Causes

Also called a **lazy eye**, is a type of blindness or reduced visual acuity that **can occur if strabismus is untreated by age 5 or 6**. It is caused by a dysfunctional nerve pathway between the brain & eye resulting in the brain favoring one eye.



HESI Questions

... **reduced visual acuity** in one eye despite appropriate optical correction?

- Amblyopia

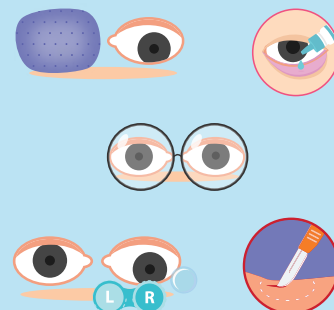
Signs & Symptoms

One or both wandering eye(s) that wander inward or outward. Vision is impaired with **poor depth perception resulting in the client squinting or shutting an eye** in order to see.



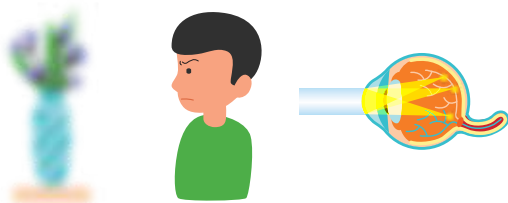
Treatment

- Eye patches,
- Drops,
- Glasses, or contact lenses,
- Surgery (sometimes).



Astigmatism - Patho & Causes

Refractive error in which the eye does not evenly focus light on the retina. This results in distorted or blurred vision at any distance.



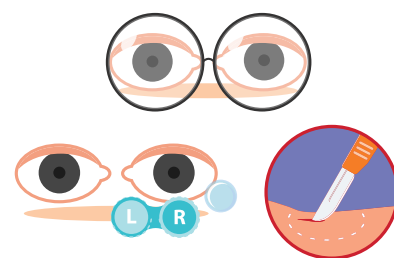
Symptoms

Symptoms naturally include eyestraining, squinting, headaches, and trouble driving at night.



Treatment

- Glasses,
- Contact lenses
- Surgery



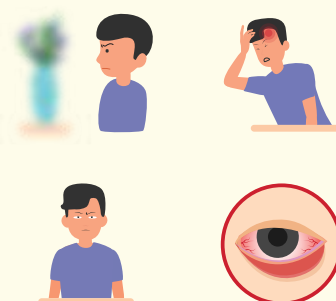
Hyperopia - Patho & Causes

Also called **farsightedness**, patients can only see FAR objects, distant objects look somewhat clear, but **close objects appear blurry**.

It is caused by a **refractive error** where images **focus in the BACK of the retina** making close images blurry.

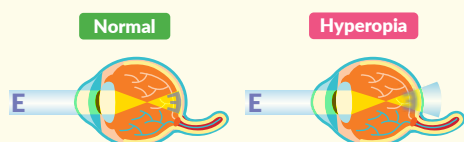
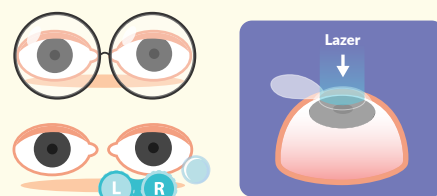
Signs & Symptoms

Nearby objects = blurry
Squinting, headaches, & burning eyes with eye aches too.



Treatment

- Corrective lenses - contacts or glasses
- Refractive surgery



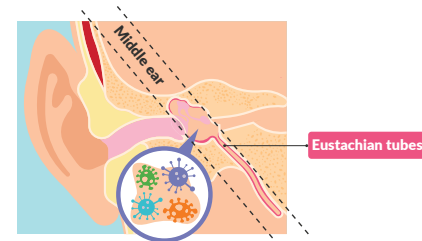
Otitis Media

Pediatrics: Visual & Audio

Pathophysiology & Causes

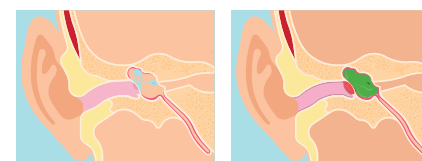
Otitis Media (OM) is an **infection within the eustachian tubes**, the air-filled space behind the eardrum. The infection leads to major inflammation & purulent fluid inside the middle of the ear.

Since **eustachian tubes are shorter in younger clients**, children less than 2-years-old tend to get these infections frequently.



Normal ear

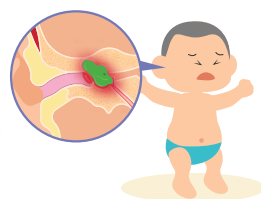
Otitis Media



Memory trick

Otitis **M**edia = **M**iddle ear

Less than 2 years old



KAPLAN Question

Frequent acute otitis media infections ... which explanation?

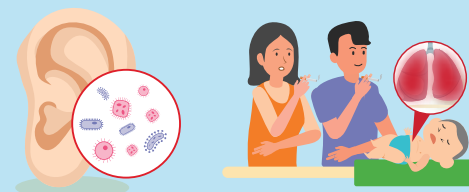
- Children have shorter eustachian tubes

Risk Factors



Key Points:

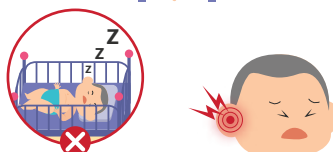
- Pacifiers & attending **daycare**
- NO** routine **vaccinations**
- History of **chronic ear infections**
- Parents that **smoke** (cigarettes / cigars) **NCLEX TIP**



Signs & Symptoms

5 NCLEX TIPS

- High **fever**
- Refusing to **eat**
- Restless** and irritable "crying more"
- Not sleeping**
- Ear pain - **Frequently tugging on the affected ear**



ATI Question

Q1: ... which finding indicates a **tympanic membrane rupture**?

- Sudden relief of pain** in a child with otitis media with effusion

Q2: ... infant who has **acute otitis media**. Which of the following statements should the nurse expect the parents to make? **Select all that apply.**

- My baby has been **pulling at her ears**
- My baby has **not been drinking her bottles** lately
- My baby is **not sleeping** at night
- My baby has been **very irritable and crying** more lately

Complication

- Sudden relief** of pain

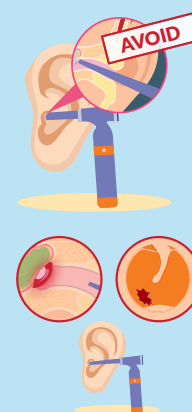
Nursing Care



- Encourage **routine vaccinations** (influenza & pneumonia)

Otosopic examination

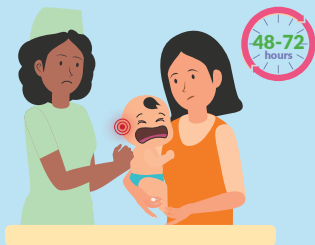
- Examine the ear at the **very end of assessment**
- AVOID** inserting too far into the ear!
Only to the **bony interior part of the ear canal**
- Inspect the tympanic membrane for **redness, bulging, and perforation**



Otitis Media II

Pediatrics: Visual & Audio

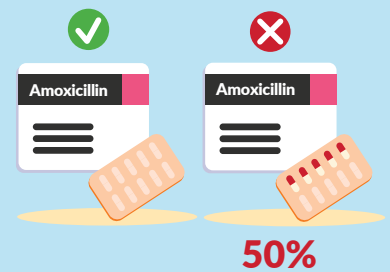
Pharmacology



Antibiotics: Amoxicillin

2 NCLEX TIPS

1. Return to the clinic if s/s do not improve within 48 - 72 hours
2. **Finish all antibiotics** - DO NOT stop halfway through!



Education

3 NCLEX TIPS

1. **Smoking cessation** by caretakers
2. Routine **vaccinations** (influenza & pneumonia)
3. **Stop pacifier use** after 6 months old

Over 50% got it **WRONG!**

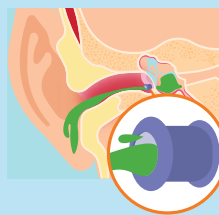


Surgical

- Tympanostomy tubes
- Myringotomy

Education Post-Op:

- **Earplugs** before going swimming
- **DO NOT** immerse child's head in water



ATI Question

- ... **tympanostomy tubes inserted**: understanding of the teaching?
- I should insert **earplugs** before my child swims in a lake or ocean

HESI Question

- ... 2-year-old who just underwent a myringotomy. What instructions will the nurse include? Select all that apply.
- Do not immerse the child's head in water when bathing
 - Administer the Tylenol as prescribed
 - Do not substitute aspirin for the prescribed Tylenol
 - Purchase earplugs and place them during bath time

Notes

Hearing Deficit & Visual Screening

Pediatrics: Visual & Audio

Hearing Deficit Pathophysiology & Causes

With hearing deficit there is a **blockage in the middle ear that prevents sound waves** from reaching the **middle ear**, resulting in the client only hearing **muffled sounds**.

Key Point:

Infants with hearing impairment can have **delayed speech development** if not corrected early! As the child grows, the speech will become more & more distorted.

Caused from **repeated ear infections**, the use of certain medications, or certain congenital disorders.



Conductive hearing loss (middle ear problem)

HESI Questions

- Q1: Which type of hearing loss is characterized by interference with the loudness of sound?
 - Conductive
- Q2: Which complication is appropriate for prolonged middle ear disorders?
 - Loss of hearing

Signs & Symptoms

Infants

- No babbling sound "mama, dada"

Toddlers

3 NCLEX TIPS

- Speech that is **monotone**
- Uses **LOUD** voice
- Shy **withdrawn** behavior & Lack of attention

MOST tested



Interventions

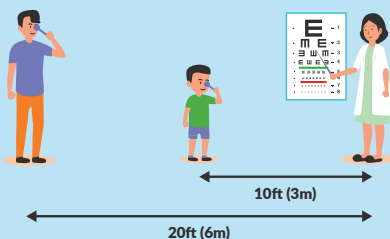
Use sign language and hearing aids.



Visual Screening

Visual assessment begins with the use of a **Snellen chart or Tumbling E chart**, clients are asked to read the letters from top to bottom. **Children stand 10 feet away** & adults stand 20 feet away from the chart.

An **ophthalmologist referral** is made if a child is **unable to identify at least 4 letters on the 10/15 line** (equivalent to 20/30 vision).



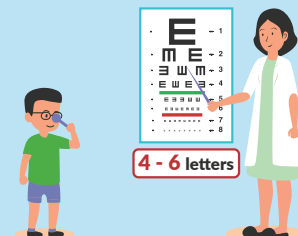
Snellen chart or Tumbling E chart

- **Children:** 10 ft away (3m) **NCLEX TIP**
- **Adults:** 20 ft away (6m)

HESI

Which tests are used to assess visual acuity in children ages 3 to 5 years?
Select all that apply.

- Tumbling E
- Snellen letters



Infant Assessment

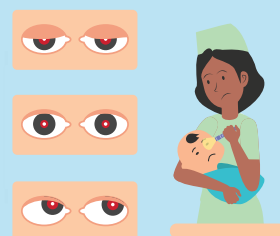
To assess vision in newborns & infants:

Infants: use **light reflex tests** to observe blink response, alertness, & following the light.

HESI

Which is a sign of visual impairment in an infant?

- No reaction to light



Retinoblastoma

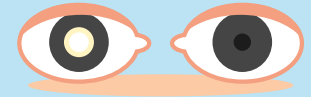
Pediatrics: Visual & Audio

Pathophysiology

Retinoblastoma is the **most common eye cancer in childhood**, typically diagnosed in children less than 2 years of age.



≤ 2 year-old



Retinoblastoma

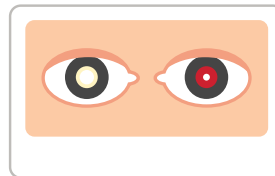
Signs & Symptoms

NCLEX TIPS

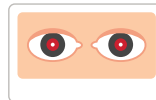
1. **White pupil** (Leukocoria)
2. Absent **red reflex**

MEMORY TRICK

RED-inoblastoma



Normal



Late sign



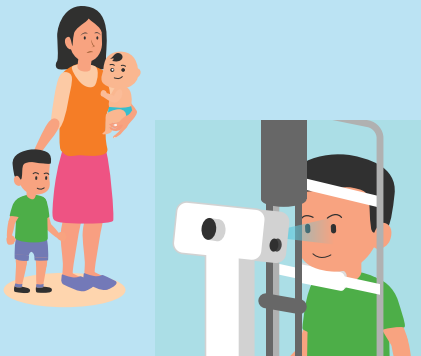
First recognized when parent report a **white pupil**.

This may be first seen while taking a photograph using a flash.

Another sign is a **Strabismus**, or wandering misaligned eye, but that is a late sign.

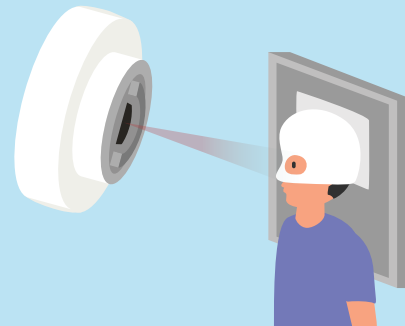
Interventions

Siblings should undergo ocular screening **NCLEX TIP**



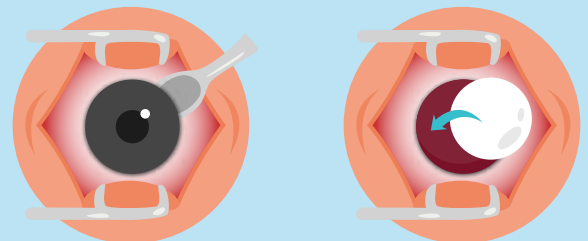
Siblings should undergo ocular screening as some forms of retinoblastoma are hereditary.

Retinoblastoma interventions - Radiation



Enucleation

(removal of the eye & placing a prosthesis)



Notes

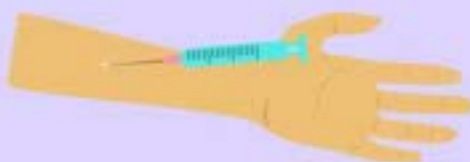
Clinical Skills

Injections: Intradermal

Purpose: To administer medications more rapidly than the oral route of administration

Nursing considerations

- Can be delegated the LVN but not UAP.
- **Locations:** Forearm
- **Considerations:** Consider age, medication type, medication volume. Tell the client that there will be a small wheel when injected that should go down over time. Ensure the client knows to come back 48 hrs after injection to assess induration. Assess the client's risk for TB.



Needle sizes

- Tuberculin syringe calculated in hundredths and tenths
- 25 - 27 gauge, 1/4"-1/2."



Equipment

- Gloves.
- PPE.
- Medication.
- Sterile syringe and needle of appropriate size and gauge .
- Antimicrobial swab.
- Small gauze square.
- MAR.

Rights of medication administration

1. Right patient
2. Right dose
3. Right route
4. Right medication
5. Right time
6. Right documentation



Documentation

- Record the medications given.
- Record date.
- Time.
- Site.
- If the client refused.
- If you held or omitted.
- Ongoing assessments and evaluations after admin.



Complications

- Pain and swelling at the injection site
- Hypersensitivity - reactions to medications.
- Slight fever.
- Monitor client for reactions.

Procedure

1. Gather equipment and check MAR (1st check).
2. Know the actions, indications and considerations of the medication to be administered.
3. Perform hand hygiene.
4. Gather medications from the med room and prepare meds for one client at a time.
5. Check the medication with the MAR (2nd check) and check expiration dates, perform calculations and scan the barcode.
6. Lock the medication prior to leaving it
7. Transport medications, keeping them in sight at all times
8. Perform hand hygiene, provide privacy, check client ID, check medications with client name and DOB on the MAR (3rd check) have another nurse check accuracy of dose when giving insulin.
9. Put on clean gloves.
10. Select administration site, forearm.
11. Position the client, only exposing areas needed to perform the procedure.
12. Cleanse the area around the site with an anti-microbial swab and allow the area to dry.
13. Remove the needle cap.
14. The needle into the tissue at a 5-15 degree angle.
15. As soon as the needle is in place use the thumb and forefinger of your non-dominant hand to inject the solution. Monitor for wheel to appear.
16. Wait 10 seconds before withdrawing the needle, withdraw smoothly and steadily.
17. Apply gentle pressure to the site, do not massage the area.
18. Engage the safety shield and do not recap the needle.
19. Discard equipment in the appropriate biohazard container.
20. Remove gloves and ppe.
21. Perform hand hygiene.
22. Document.
23. Evaluate

Injections: Intramuscular

Purpose: To administer tuberculin skin test solution.

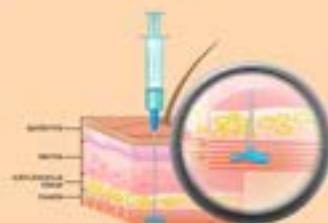
Nursing considerations

- Can be delegated to the LVN but not UAP.
- **Locations:** Ventrogluteal, vastus lateralis, deltoid, dorsogluteal.
- **Considerations:** Consider age, medication type, medication volume. Patients who are obese may require a longer needle. Emaciated clients may need a shorter needle.
- The needle should be inserted at a 90° angle



Needle sizes

- Vastus lateralis: $\frac{5}{8}$ " - 1"
- Deltoid (child): $\frac{5}{8}$ " - 1 $\frac{1}{4}$ "
- Deltoid (adults): $\frac{5}{8}$ " - 1 $\frac{1}{2}$ "
- Ventrogluteal (adult) : 1 $\frac{1}{2}$ "



Equipment

- Gloves.
- PPE.
- Medication.
- Sterile syringe and needle of appropriate size and gauge .
- Antimicrobial swab.
- Small gauze square.
- MAR.

Procedure

1. Gather equipment and check MAR (1st check).
2. Know the actions, indications and considerations of the medication to be administered.
3. Perform hand hygiene.
4. Gather medications from the med room and prepare meds for one client at a time.
5. Check the medication with the MAR (2nd check) and check expiration dates, perform calculations and scan the barcode.
6. Lock the medication prior to leaving it
7. Transport medications, keeping them in sight at all times
8. Perform hand hygiene, provide privacy, check client ID, check medications with client name and DOB on the MAR (3rd check).
9. Put on clean gloves.
10. Select administration site.
11. Position the client, only exposing areas needed to perform the procedure.
12. Cleanse the area around the site with an anti-microbial swab and allow the area to dry.
13. Remove the needle cap.
14. Displace the skin in a z-track technique.
15. Dart the needle into the tissue perpendicular to the client body.
16. As soon as the needle is in place use the thumb and forefinger of your non-dominant hand to inject the solution.
17. Wait 10 seconds before withdrawing the needle, withdraw smoothly and steadily.
18. Apply gentle pressure to the site, do not massage the area.
19. Engage the safety shield and do not recap the needle.
20. Discard equipment in the appropriate biohazard container.
21. Remove gloves and ppe.
22. Perform hand hygiene.
23. Document.
24. Evaluate

Rights of medication administration

1. Right patient
2. Right dose
3. Right route
4. Right medication
5. Right time
6. Right documentation



Documentation

- Record the medications.
- Record date.
- Time.
- Site.
- If the client refused.
- If you held or omitted.
- Ongoing assessments and evaluations after admin.



Complications

- Pain and swelling at the injection site
- Hypersensitivity - reactions to medications.
- Slight fever.
- Monitor client for reactions.



Injections: Subcutaneous

Purpose: To administer medications more rapidly than the oral route of administration

Nursing considerations

- Can be delegated the LVN but not UAP.
- **Locations:** Abdomen, Thigh, Lower back, Upper Arm.
- **Considerations:** Consider age, medication type, medication volume. Tell the client to rotate injections to avoid hardening of the area. Ask the client which site they would prefer.



Needle sizes

- 25 to 27 gauge needle 3/8 to 5/8"
- Byetta for diabetes recommends using 30 or 31 gauge 1/3 inch needles which are ultra fine.



Equipment

- Gloves.
- PPE.
- Medication.
- Sterile syringe and needle of appropriate size and gauge.
- Antimicrobial swab.
- Small gauze square.
- MAR.

Procedure

1. Gather equipment and check MAR (1st check).
2. Know the actions, indications and considerations of the medication to be administered.
3. Perform hand hygiene.
4. Gather medications from the med room and prepare meds for one client at a time.
5. Check the medication with the MAR (2nd check) and check expiration dates, perform calculations and scan the barcode.
6. Lock the medication prior to leaving it.
7. Transport medications, keeping them in sight at all times.
8. Perform hand hygiene, provide privacy, check client ID, check medications with client name and DOB on the MAR (3rd check) have another nurse check accuracy of dose when giving insulin.
9. Put on clean gloves.
10. Select administration site.
11. Position the client, only exposing areas needed to perform the procedure.
12. Cleanse the area around the site with an anti- microbial swab and allow the area to dry.
13. Remove the needle cap.
14. Inject needle into the tissue at a 90 or 45 degree angle.
15. As soon as the needle is in place use the thumb and forefinger of your non-dominant hand to inject the solution.
16. Wait 10 seconds before withdrawing the needle, withdraw smoothly and steadily.
17. Apply gentle pressure to the site, do not massage the area.
18. Engage the safety shield and do not recap the needle.
19. Discard equipment in the appropriate biohazard container.
20. Remove gloves and PPE.
21. Perform hand hygiene.
22. Document.
23. Evaluate



Rights of medication administration

1. Right patient
2. Right dose
3. Right route
4. Right medication
5. Right time
6. Right documentation



Documentation

- Record the medications given.
- Record date.
- Time.
- Site.
- If the client refused.
- If you held or omitted.
- Ongoing assessments and evaluations after admin.



Complications

- Pain and swelling at the injection site
- Hypersensitivity - reactions to medications.
- Slight fever.
- Monitor client for reactions.

IV drip rates

- When calculating how many hours or how long the infusion will run there is no need for a drop factor.
- When calculating gtt/ min you will need the drop factor.

mL/hr

Total amount to be infused

How many hours should the infusion run?

Example

Infuse 500mL over the next 120 minutes by infusion pump.

500mL

----- = 250 mL/ Hr
120min / 60
(2hr)



mL/ min

Total to be infused

-----x gtt factor

Hours x 60

Example

Calculate the IV flow rate for 1500 mL of NS to be infused in 7 hours. The infusion set is calibrated for a drop factor of 20 gtt/mL.

1500mL

----- x 20 gtt/MI = 71.4 gtt/ min Rounded to
71
gtt/min
7 x 60 min
(420)



Iv rate in Hr/ volume amount/Hr

----- x volume

On hand

Example

Give patient 400 mg of vancomycin in 300 mL of D5W to infuse at 10 mg/hr. Calculate the flow rate in mL/hr.

10 mg/hr

-----x300mL = 7.5 mL/ hr
400mg

Basic formula for Tablets / Capsules

Dose

----- x supply

Have



Example : HCP orders lorazepam 50 mg / day po. The pharmacy has it available in 100 mg tablets. How many tabs would you administer?

50mg

----- X Tablets = 0.5 tablets or ½ of a tablet.

Pediatric doses

- Pediatric doses are based on body weight in kg.
- To convert pounds to kg divide by 2.2

Weight per kg x dose per kg = amount to be administered.

You use this same formula for safe dose range.

Example:

The HCP orders 250 mg of meropenem to be taken by a infant weighing 15.7 pounds, every 8 hours. The medication label shows that 75-150 mg/kg per day is the appropriate dosage range. Is this order within the safe dose range for this medication?

15.7/2.2= 7.13 kg.

150mg x 7.13 = 1,069.5 safe per day

75 mg x 7.13 = 534.75 safe per day

24 hrs/8= 3 doses / day

250mg x 3 doses = 750 mg/ day

This is within safe dose range.





Purpose

Red blood cells may be administered to treat hemorrhage, symptomatic anemia, or sickle cell crisis, and will improve oxygen delivery to the tissues. Fresh frozen plasma can help reverse the effect of anticoagulants. Platelet transfusions may prevent bleeding with thrombocytopenia. Compatibility must be checked by two qualified personnel before a blood product is administered to prevent a life threatening transfusion reaction. Ask if patient has received a transfusion or organ or tissue transplant in the past and whether they had any reaction. Note the type of reaction. Check if the patient requires irradiated blood products due to immunosuppression.

Assessment

- Assess cultural and religious beliefs (Jehovah's witness).
- Ensure you obtain informed consent.
- Assess vital signs, including, renal, circulatory, respiratory status and lab work.
- Assess the client's ability to tolerate the procedure.
- Assess client's temperature. If there is a fever present the HCP may have you hold off on administering the blood product.
- Continually monitor vitals every 15 minutes for the first hour.

Risks

- Risk for infections.
- Risk for hemolytic reaction.
- Risk for sepsis.
- Risk for iron overload.
- Risk for disease transmission.
- Risk for circulatory overload.
- Risk for electrolyte imbalances.



Supplies

- 0.9% normal saline, 250 mL bag
- Blood administration set with in-line filter and a Y set for saline administration
- Clean gloves
- Blood product
- IV pump (most facilities), Blood warmer, if indicated

Patient Teaching

- Explain procedure.
- Instruct patient to report a sensation of flushing, itching, shortness of breath, or back/flank pain immediately, as these may be signs of a transfusion reaction.
- Explain feelings the client will feel. Explain you will maintain privacy.
- Be supportive.

Documentation

- Date and Time of procedure.
- Why you performed the procedure.
- How many attempts, gauge of the catheter.
- Insertion site, solution infused.
- Any signs of a hemolytic reaction.
- Rate infused, client's response to the procedure.

Note !

- Only isotonic electrolyte solutions are approved for blood administration. Dextrose will hemolyze RBCs and the calcium in Lactated Ringers will cause clotting.
- Do not heat blood in hot water or a microwave.

Central Venous Catheters

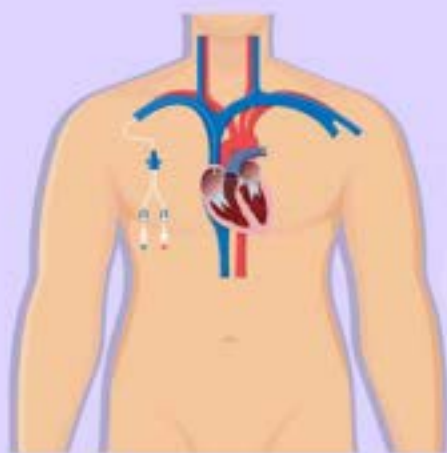
Purpose

To deliver hyperosmolar solutions, to measure central venous pressure, infuse TPN, or to administer multiple IV solutions.

- Catheter position is determined by X-Ray after procedure.
- Catheter may be single, double, or triple lumen.
- Catheter is inserted peripherally into either the basilic or cephalic vein, into the superior vena cava, inserted centrally into the internal jugular vein, or subclavian vein. They may also be surgically inserted through Subcutaneous tissue.
- With multi-lumen catheters more than one medication is able to be administered at a time.

Tunneled central venous catheter

- More permanent and used for long-term IV therapy.
- May be single or multilumen.
- Inserted in the OR.
- Fitted with an intermittent infusion device. This allows access as needed and the system remains closed when unused.
- Patency is maintained by flushing the catheter with diluted heparin.



Vascular access ports (implants)

- Surgically implanted under the skin.
- Used for long-term IV therapy.
- Access requires palpation.
- Accessed with a non coring needle.
- Patency is maintained with periodic flushing with heparin.

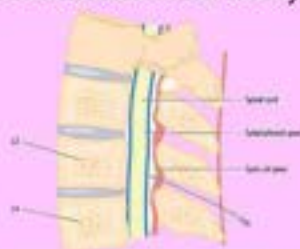
PICC Line

- Used for long-term IV therapy frequently in home.
- The basilic vein is most commonly used.
- The catheter is inserted so that the tip is terminated in the subclavian vein or superior vena cava.
- Small amounts of bleeding during insertion are common, if bleeding continues after 24 hours call the HCP.
- Phlebitis is common.



Epidural catheter

- Non-central.
- Placed in the epidural space of the spinal column.
- Used to administer analgesia.
- Assess the client's vitals and respiratory status.
- Monitor the insertion site for infection.
- Monitor infusion device for proper rate and flow.
- Aspiration is performed before injection. If more than 1 mL of clear fluid or blood is aspirated do not inject the medication and notify the HCP.



NCLEX HINT !

For central line insertion, tubing change, and line removal, the client should be placed in the Trendelenburg's position or supine. Also instruct the client to perform the valsalva maneuver to increase the pressure in the central veins when the system is open.





Medication Administration

Purpose: Administration of medications whether oral, IV, injection, or transdermal is indicated to bring the client's affected body system back to homeostasis.

Nursing considerations

- Can be delegated the LVN but not UAP, depending on medication and considerations
- **Routes of administration:** IV, IM, sub q, intradermal, PO, transdermal, intrathecal, vaginal, ophthalmic, otic, nasal, sublingual
- **Considerations:** consider age, medication type, medication volume. Assess allergies, know the indications, nursing actions,

Needle sizes & Gauges

- Vastus lateralis: $\frac{5}{8}$ " - 1"
- Deltoid (child): $\frac{5}{8}$ " - 1 $\frac{1}{4}$ "
- Deltoid (adults) : $\frac{5}{8}$ " - 1 $\frac{1}{2}$ "
- Ventrogluteal (adult) : 1 $\frac{1}{2}$ "
- 16-26 gauge.



Equipment

- Gloves
- PPE
- Medication
- Sterile syringe and needle of appropriate size and gauge.
- Antimicrobial swab.
- Small gauze square.
- MAR.

Procedure

- Check the client's current labs
 - Do not forget to do your 3 checks.
1. Gather equipment and check MAR (1st check).
 2. Know the actions, indications and considerations of the medication to be administered.
 3. Perform hand hygiene.
 4. Gather medications from the med room and prepare meds for one client at a time.
 5. Check the medication with the MAR (2nd check) and check expiration dates, perform calculations and scan the barcode.
 6. Lock the medication prior to leaving it.
 7. Transport medications, keeping them in sight at all times.
 8. Perform hand hygiene, provide privacy, check client ID, check medications with client name and DOB on the MAR (3rd check).
 9. Put on clean gloves.
 10. Select administration site.
 11. Position the client, only exposing areas needed to perform the procedure.
 12. Discard equipment in the appropriate biohazard container.
 13. Remove gloves and PPE.
 14. Perform hand hygiene.
 15. Document.
 16. Evaluate.
- For IV push drugs, see each individual drug for indications, considerations and times. Each IV push drug varies according to manufacturer and hospital policy.
 - Potassium will never be an IV push.



Rights of medication administration

1. Right patient
2. Right dose
3. Right route
4. Right medication
5. Right time
6. Right documentation



Documentation

- Record the medications given on the MAR.
- Record date.
- Time.
- Site.
- If the client refused.
- If you held or omitted the medication.
- Ongoing assessments and evaluations after admin.



Complications

- Pain and swelling at the injection site.
- Hypersensitivity - reactions to medications.
- Slight fever.
- Monitor client for reactions.

NG tube insertion

Purpose: Decompress the stomach by removing fluids or gas. This promotes abdominal comfort. To allow surgical anastomosis to heal without distention, decrease risk of aspiration, provide nutrition as a feeding tube, to irrigate and remove toxic substances in the stomach.

Assessment

- Determine indication for NG tube insertion.
- Assess for previous insertions.
- Assess for latex.
- Assess for adhesive allergies.
- Assess respiratory status.

Risks

- Risk for placement into the airway.
- Risk for infection from not using aseptic technique.
- Risk for injury from insertion or removal.

Patient Teaching

- Explain procedure and indications.
- Explain feelings the client will feel (they may gag).
- Explain you will maintain privacy.
- Be supportive.

Supplies (NG Tube Kit)

- Clean gloves
- Feeding tube
- Sterile water
- Lubricant
- Tape or marking pen
- Syringe
- pH tape
- Feeding solution



Procedure

1. Confirm HCP order, obtain consent.
2. Confirm client ID and DOB.
3. Provide privacy and introduce yourself.
4. Perform hand hygiene.
5. Explain procedure to family and client.
6. Position the client in Semi Fowler's position with pillows behind the shoulders.
7. Determine the most patent nostril.
8. Measure the length of the tube from the bridge of the nose to the earlobe then the xiphoid process and mark this spot.
9. Don clean gloves.
10. Give the client a drink of water, lubricate the tip of the catheter.
11. When the tube nears the back of the throat, have the client swallow. If resistance is met aim the tip downward.
12. Immediately remove tube if O₂ sats drops.
13. Following insertion obtain an X-ray to confirm placement.
14. Connect the tube to suction as ordered.
15. Secure the tube to the client's nose.
16. Aspirate stomach contents and check PH to confirm placement before feeding.
17. Wash hands.
18. Document.

Documentation

- Date and Time of procedure.
- Type and size of tube.
- Verify method of placement and patency.
- Type and amount of contents.
- PH of contents.
- Type and amount of feeding given.
- Client's response and tolerance.
- Position of the client post procedure.

Tip

- Check residual and stomach contents prior to administration of meds or feedings. To avoid electrolyte and fluid imbalances replace aspirated contents. Stomach contents pH should be around four.
- Most hospital policies require a KUB before administering meds/TF.
- Check residual every 4 hours if getting TF.

Ostomy care

Purpose: Performed to prevent infection related to stoma surgery. To monitor output, and assess client's nutritional status, and hydration status.

Assessment

- Determine indication for stoma care.
- Assess stoma for color, drainage or excoriation.
- Assess for latex allergies.
- Assess for adhesive allergies.
- Ensure you have the proper appliance.

Risks

- Risk for infections.
- Risk for impaired skin integrity.
- Risk for injury from insertion or removal of appliance.

Patient Teaching

- Explain procedure.
- Explain the stoma should be a juicy red color not pale.
- Explain you will maintain privacy.
- Be supportive.
- Ask if they have brought their own appliance
- Encourage self care.

Supplies (Ostomy Supplies)

- Bedpan, graduated cylinder, toilet access.
- Clean gloves, toilet tissue.
- Washcloth, towel, waterproof pad.
- Wash basin with warm water.
- Gauze, skin barrier cream.
- Stoma measuring guide.
- Ostomy tools and bag.
- Clamp, trash bag.



Procedure

1. Confirm HCP order, obtain consent.
2. Confirm client ID and DOB.
3. Provide privacy and introduce yourself.
4. Perform hand hygiene.
5. Help the client to a sitting position.
6. Place graduated cylinder under bag for measurement.
7. Remove the clamp and uncuff the bag and allow contents to empty into the measuring device.
8. Wipe the end of the cuff with toilet tissue.
9. To remove the appliance start at the top and move around pushing skin away from the appliance.
10. Discard the appliance unless reusable.
11. Gently clean the surrounding skin with a washcloth and warm water.
12. Pat the skin dry and apply barrier cream no closer than 2 in from the stoma. Let dry completely.
13. Remove gauze and assess and measure stoma.
14. Cut a hole in the appliance to $\frac{1}{8}$ inch larger than the stoma.
15. Carefully peel the backing off the appliance and lay over the stoma.
16. Smooth out air and hold even pressure for 5 minutes.
17. Apply the clamp to the bottom of the new pouch.
18. Wash hands.
19. Document.



Documentation

- Date and Time of procedure.
- Why you performed the procedure or if the client did themselves.
- Size of the stoma.
- Characteristics of the stoma, color, odor, drainage, redness, excoriation.
- Characteristics of feces, amount, color, odor.
- How the client tolerated the procedure.

Tip

- Some clients have their own routine when it comes to stoma care and appliance care. Allow them to maintain their own home routine if possible.

Peripheral IV Access Insertion

Purpose: IV therapy is used to administer fluids and medications to clients who are unable to take these substances orally. It replaces water, electrolytes, and nutrients more rapidly than the oral route. It provides immediate access to the vascular system for rapid administration of medications, blood products, and TPN.

Assessment

- Determine indication for IV insertion.
- Assess for sites prior to insertion.
- Assess for latex allergies.
- Assess for allergies to the medications or substances to be infused.
- Assess for adhesive allergies.
- Avoid sites that are edematous, a weak, traumatized or paralyzed extremity. An arm that has an AV shunt for dialysis or an area that is infected.



Risks

- Risk for infections,
- Risk for phlebitis,
- Risk infiltration, and extravasation.

Supplies (IV Start kit)

- Clean gloves
- IV start kit.
- Tegaderm
- Tourniquet
- Alcohol wipes
- Chlorhexidine
- Tape



Patient Teaching

- Explain procedure.
- Explain feelings the client will feel (pinch, slight pain)
- Explain you will maintain privacy.
- Be supportive.

Documentation

- Date and Time of procedure.
- Why you performed the procedure.
- How many attempts.
- Gauge of the catheter.
- Insertion site.
- Solution infused.
- Rate infused.
- Client's response to the procedure.
- If the infusion is infusing with or without difficulty.



Procedure

1. Confirm HCP order, obtain consent.
2. Confirm client ID and DOB.
3. Provide privacy and introduce yourself.
4. Perform hand hygiene.
5. Select vein for insertion and apply tourniquet
6. Palpate vein for resilience.
7. Cleanse the skin with the provided alcohol wipe.
8. Stabilize the vein below the puncture site and insert the catheter into the bifurcation at at 10 degree angle.
9. Advance the catheter until you see a flash of blood, once you see the flash continue advancing the catheter into the vein and remove the tourniquet.
10. Apply pressure above the insertion site with the middle finger of the non-dominant hand and retract the needle.
11. Connect the IV tubing to the catheter tubing.
12. Tape and secure catheter tubing to the clients skin with tegaderm and begin IV flow.
13. Label the tubing, primary tubing is good for 72 hours, secondary tubing is only good for 24 hrs. DO NOT forget to label the solution bag.
14. Date, time, and initial the IV dressing.
15. Clean up area.
16. Wash hands.
17. Document.

Complications

- **Phlebitis:** Inflammation of the vein. Signs and symptoms include; pain, redness and warmth at the insertion site. If this occurs remove the catheter immediately and restart it in the opposite extremity. Notify the HCP if phlebitis is suspected and apply a warm, moist compress to the area.
- **Infiltration:** The leakage of IV fluid into the interstitial space. Evaluate the IV site by occluding the vein proximal to the site of insertion. If the infusion continues to flow the IV site has infiltrated. The site will be cool, pale, and swollen. If infiltration occurs remove the IV catheter immediately and apply a warm or cool compress to the site and elevate the extremity. Do not rub an infiltrated area as this can cause a hematoma.
- **Air embolism:** A bolus of air that enters the vein. Occurs from inadequately priming IV tubing. The client will experience tachycardia, chest pain, dyspnea, hypotension, cyanosis, and decreased LOC. If an air embolism is suspected clamp the tubing, turn the client to the left side and place the client in reverse Trendelenburg's position to trap the air into the right atrium. Notify the HCP.
- **Extravasation:** Tissue damage that occurs from infiltration of certain medications such as dopamine. Skin around the affected area will become discolored and slough. The client will feel discomfort. If extravasation is suspected contact the HCP.

Personal protective equipment

8-14

Purpose

To protect yourself and the client from infection and disease transmission.

Donning

- ★ Hand hygiene
- ★ Gown
- ★ Mask
- ★ Goggles
- ★ Gloves



Removing

- ★ Gloves
- ★ Goggles
- ★ Gown
- ★ Mask
- ★ Hand hygiene



Precautions



Contact

- M:** Multidrug resistant organisms
- R:** Respiratory infections
- S:** Skin infections

- W:** Wound infections
- E:** Enteric infections
- E:** Eye infections

- V:** Varicella
- C:** Cutaneous diphtheria
- H:** Herpes simplex
- I:** Impetigo
- P:** Pediculosis
- S:** Scabies

Airborne

- M:** Measles
- T:** TB
- V:** Varicella



Droplet

- S:** Sepsis, scarlet fever, strep
- P:** Parvovirus, pneumonia, pertussis
- I:** Influenza
- D:** Diphtheria
- E:** Epiglottitis
- R:** Rubella
- M:** Mumps, meningitis, mycoplasma, meningococcal pneumonia.
- A:** Adenovirus, AIDS
- N:** **Now repeat it twice!**

Standard precautions

- ★ Apply to all body fluids secretions, excretions and mucous membranes.
- ★ **Handwashing:** Before and after procedure, and when soiled, wash hands in warm water vigorously while singing happy birthday 2x.
- ★ Gloves.
- ★ Gown.
- ★ Mask.
- ★ Eye protection.

Trach care and suction

Purpose: Routine trach care is provided to aid in the healing process of the stoma and prevent skin breakdown. Frequent suction aids in clearing the clients secretions and decreases the risk of infection and oxygen deprivation.

Assessment

- Assess odor.
- Assess cannula type.
- Assess respiratory sounds before and after procedure.
- Assess for secretions.
- Assess skin integrity and for signs of infection.
- Assess type of tracheostomy and dressing.

Risks

- Risk for infection.
- Risk for decreased oxygenation.
- Risk for injury from insertion or removal.
- When performing tracheostomy care, emergency supplies should be available at all times in case the tube is inadvertently dislodged, and an ambu bag to administer breaths as needed for the client on a vent.

Patient Teaching

- Explain procedure and indications.
- Patients should verbalize understanding of proper care.
- Explain feelings the client will feel (they may gag).
- Explain you will maintain privacy.
- Be supportive.

Procedure

1. Confirm the patient's ID using two identifiers.
2. Explain procedure to patient.
3. Open trach tray and put on one sterile glove in order to set up two basins.
4. With an ungloved (non-sterile) hand, pour saline into each basin.
5. Don the second sterile glove - both hands are now sterile.
6. Remove inner cannula, if applicable: Secure outer cannula neck plate with index finger and thumb. Unlock inner cannula - usually by turning LEFT 90 degrees. Gently pull cannula up and out - it should withdraw easily.
7. Soak and clean the inner cannula in sterile normal saline or discard if disposable. Remove any secretions by cleansing and wiping the lumen with moistened brush.
8. Place cleaned inner cannula on sterile gauze and dry thoroughly.
9. Replace inner cannula with care, stabilizing outer flange with opposite hand. Lock into place (turn RIGHT).
10. Cleanse skin around stoma with gauze or applicator soaked in sterile saline from the clean basin (the basin that was not used to clean inner cannula). Use a separate gauze/applicator to clean the outer cannula.
11. Apply new dressing: Apply presplit non-fraying gauze/split drain sponge around ostomy/trach tube with flaps pointing up. (See picture of how to make folded 4x4 dressing if a presplit is not available.)
12. Change trach ties/tube holder if needed. (See: Changing tracheostomy tube ties)
13. Ask the pt if they need anything. Lock bed, put it in lowest position with call bell in reach.



Supplies for trach care

- Trach cleaning tray (includes sterile gloves, sterile basins, pipe cleaners, brush, cotton-tipped applicators, gauze).
- Presplit non-fraying 4x4 or split drain sponge.
- Replacement inner cannula, if applicable.
- Sterile normal saline.
- Clean cotton trach ties or Velcro tube holder.
- Two sterile containers for cleaning solution and extra sterile gloves.



Documentation

- Date and Time of procedure.
- Any drainage, color, odor and amount on dressing.
- Client's response and tolerance.
- Position of the client post procedure.
- If suctioned, color, type and amount of secretions.



Urinary catheter insertion

Purpose: Used to remove urine from the bladder when there is an obstruction, a need for strict measurement, retention or nerve damage. These are also used to monitor I&Os.

Assessment

- Determine indication for foley insertion.
- Assess for previous catheterizations.
- Assess for latex and iodine allergies.
- Assess for adhesive allergies.

Risks

- Risk for urinary tract infections.
- Risk for renal inflammation, pyelonephritis.
- Risk for injury from insertion or removal.

Patient Teaching

- Explain procedure.
- Explain feelings the client will feel (pressure then relief).
- Explain you will maintain privacy.
- Be supportive.

Procedure

1. Confirm HCP order, obtain consent.
2. Confirm client ID and DOB.
3. Provide privacy and introduce yourself.
4. Perform hand hygiene.
5. Perform peri-care.
6. Have the client lay on their back knees flexed legs abducted.
7. Open the sterile kit between the client's legs.
8. Place the sterile drape under them.
9. Don sterile gloves.
10. Open all sterile supplies, remove sheath from catheter. Squirt the lubricant into the tray. Pour the iodine over the cotton balls.
11. Attach syringe to the lumen of the catheter and test the balloon (see hospital for protocol).
12. Clean the labia and urinary meatus, using your non dominant hand (look for the "WINK")
13. With three strokes downward (outer inner outer for females and circular motions around the glans penis for males) front to back. Using the forceps and cotton balls with your dominant hand. Dispose of each cotton ball after each use and cleanse from top to bottom.
14. With your sterile dominant hand pick up the catheter a few inches from the tip and dip it in the lubricant.
15. Insert foley into the urethra until you see urine, then continue advancing it another 2-3 in.
16. Inflate the balloon with the entire syringe of NS, check placement.
17. Velcro catheter to the client's leg, initial and date the dressing.
18. Attach bag to bed frame, clean up supplies.
19. Wash hands.
20. Document.



Supplies (Sterile Catheter Kit)

- Clean gloves
- 2 pairs of sterile gloves in case of contamination
- Wash cloth and warm water
- Waterproof pad
- Sterile foley Kit



Documentation

- Date and Time of procedure.
- Why you performed the procedure.
- Size of catheter inserted.
- How many attempts if applicable.
- Characteristics of urine, amount, color, odor.
- How the client tolerated the procedure.

Tip

- Catheters come in a variety of sizes from 12 french to 48 french. Be sure to check hospital policy on sizes.
- Most texts say to clamp if client has 1000 mL or more of urine out following insertion to prevent hypovolemia

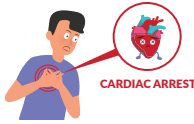
Critical Care

BLS & CPR

BLS & CPR

Pathophysiology

Done for clients who go into cardiac arrest meaning the heart has stopped pumping!

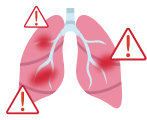


Causes

Caused by a variety of factors from Hypoxia, respiratory failure, toxins, blood clots, electrolyte imbalances & others. They are commonly described as Hs & Ts.



Hypoxia



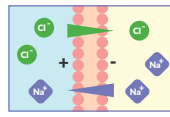
Respiratory failure



Toxins



Blood clots

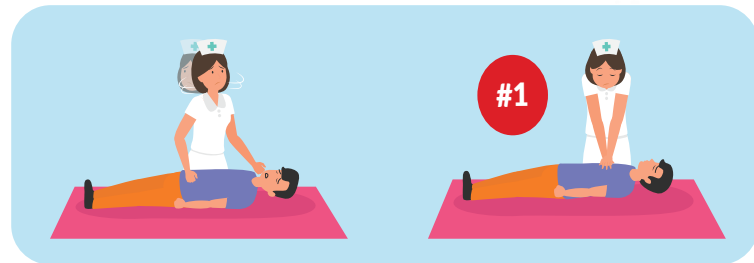


Electrolyte imbalances

Instruction

If NO caregivers are around to help, you must initiate immediate CPR with high quality compressions. Start chest compressions BEFORE calling for help if you are the only caregiver! (Most students get this wrong on exams)

Immediate CPR with high quality **compressions**



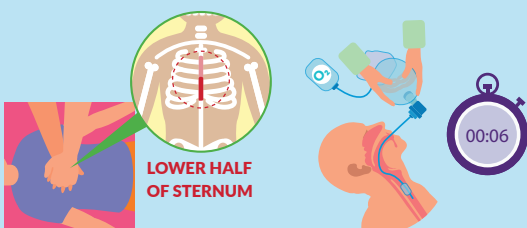
Immediate CPR with chest compressions helps to provide IMMEDIATE oxygen or perfusion to the brain & vital organs in order to prevent damage & even DEATH!

Adult CPR

Chest compressions Immediately

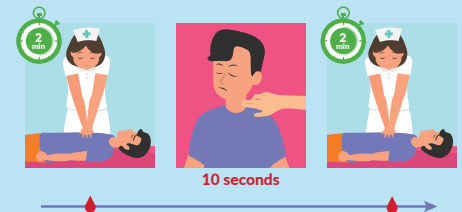
KEY Numbers

- Rate is **100 - 120/min** **NCLEX TIP**
- Depth of at least **2 - 2.4 inches (5 - 6 cm)** **NCLEX TIP**
- Hands in center of chest **lower half of sternum**
- Breaths:
 - **Manual: 30 compressions** & 2 rescue breaths
 - Intubation: Every **6 seconds** without interruption



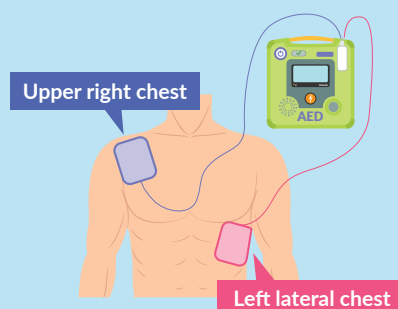
LOWER HALF OF STERNUM

During CPR, compressions are paused every 2 mins to assess pulse.



AED pads (8 years & older)

- **Upper right chest** near the shoulder
- **Left lateral chest** near the anterior axillary line below the nipple



Upper right chest

Left lateral chest

How to SHOCK an Adult

1. Defibrillator pads are placed
2. **Call out & look** to make sure everyone is clear
3. Continue **chest compressions immediately** after the shock



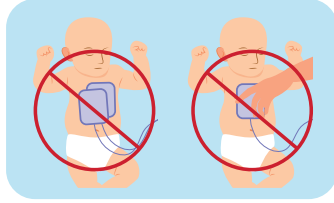
NO IV sedation needed.
NO synchronized button.
That is for cardioversion

BLS & CPR II

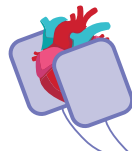
Pediatric AED

How to SHOCK a Child

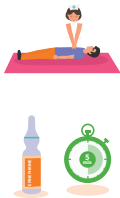
- 1 AED pad on the chest & 1 on the back
- DO NOT** overlap or touch pads



MEMORY TRICK



PRIORITY



Asystole Treatment

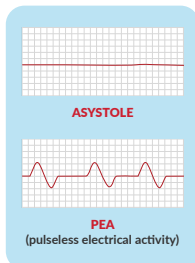
- High Quality CPR **Priority**
- Epinephrine every 3 - 5 minutes
- Intubate & Ventilate
- Treat the causes



Side Note

NO shocking

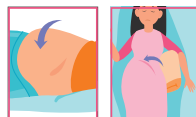
- Asystole** (flat line) **NCLEX TIP**
- PEA (pulseless electrical activity)



CPR with Pregnancy

NCLEX TIP

- Chest compressions **slightly higher on the sternum**
- Uterus: manually displaced to left side or place a rolled blanket under right side
- NOT SUPINE**



Priority, if circulation does not return after 4 minutes then an immediate C-section must take place typically within 5 minutes of starting CPR

PRIORITY



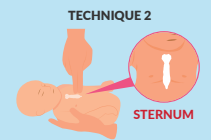
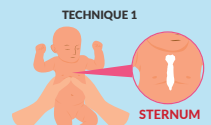
5 mins

Infant CPR

- Brachial pulse** for 10 seconds or less **NCLEX TIP**
- Call for help to **activate an emergency response**
- 2 Minutes** of CPR
 - 100 - 120** compressions per minute
 - Single Rescuer **30:2** **NCLEX TIP**
 - Two Rescuers **15:2**
- Retrieve an AED after **2 minutes** of CPR (**single rescuer**)

Key terms

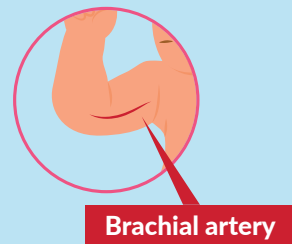
- Place a **roll** under the shoulders
- Slightly extended neck**



Kaplan Question

Which artery does the nurse use to assess the pulse rate of an **infant client** during cardio-pulmonary resuscitation?

- Brachial artery



Post-resuscitation Care

Key terms

- Comatose/** not following commands
- Priority intervention:** - Cold fluids for **therapeutic hypothermia**



NCLEX TIP

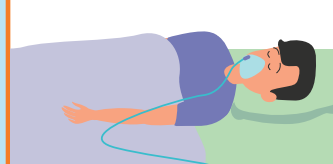
C

#1

PRIORITY

C

COMATOSE not following Commands



COLD FLUIDS therapeutic hypothermia



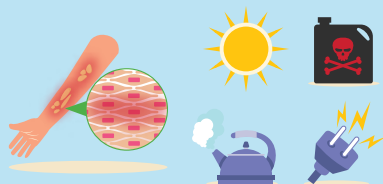
Burns

Burns

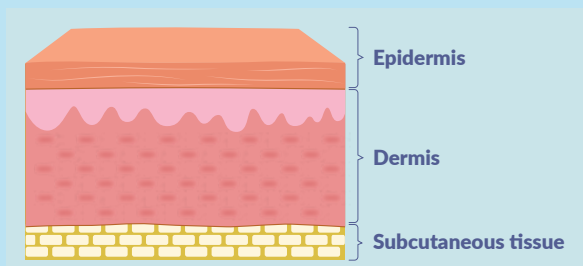
Types & Causes

Burn injuries caused by direct tissue damage from exposure to:

- Sun
- Chemicals
- Thermal (boiling liquids)
- Electricity





As you know the skin is made of 3 layers - epidermis, dermis, & subcutaneous tissue (that fatty bubble looking tissue) under the skin we find fascia, muscle, & bone.



First-degree (superficial)

- Dry with blanchable redness

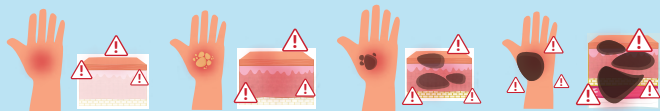
Second-degree (partial thickness)

- **Painful Blisters** **NCLEX TIP**  
- "Red, moist, shiny fluid filled vesicles"

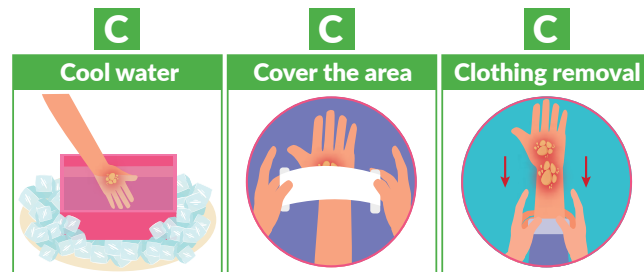
Third-degree (full-thickness)

- Dry waxy white, leathery, or charred black color, **non**-blanchable

Fourth-degree (full-thickness)



Care for Minor Burns



Prehospital Care

- C** - Cool water
 - Briefly soak area
 - **NO** ice, creams, antibiotic ointment **to open skin**
- C** - Cover area "Clean dry cloth"
- C** - Clothing & Jewelry removal
 - **Not adhered**



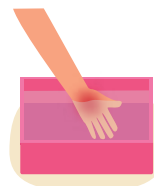
Saunders

The nurse **instructs** firefighters that in the event of a **tar burn**, which is the **immediate** action?

- **Cooling** the injury with **water**

Chemical burn injury... The nurse instructs the employees that what is the **first** consideration in **immediate** care?

- **Removing all clothing**, including gloves, shoes, and any undergarments



REMOVING ALL



Kaplan Question

The nurse is caring for a client with **full thickness burns covering 20% of their body**. What is the **priority** of care after ensuring a patent airway:

- **IV fluids**

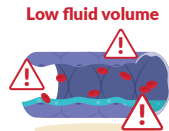


Notes

Major Burns

Pathophysiology

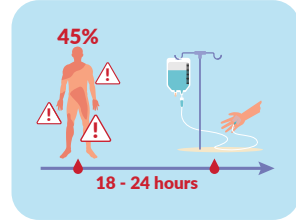
Massive tissue damage & cellular destruction leads to widespread systemic inflammation that increases vascular permeability (leaky blood vessels that fill up the body like a water balloon). This results in **low fluid volume** within the blood vessels leading to **Hypovolemic Shock & then death!**



Saunders

Extensive burn injury ... 45% of total body surface area... planning for **fluid resuscitation**, the nurse should consider that **fluid shifting** to the interstitial spaces is **greatest during which time period?**

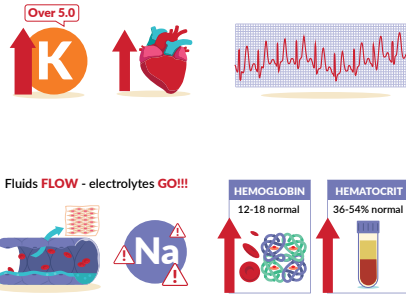
- Between **18 and 24 hours** after the injury



Signs & Symptoms

First 24-hours

- High Potassium (Hyperkalemia) **Over 5.0**
 - Potassium **P**riority **P**umps heart
 - HIGH Potassium = HIGH Pumps
 - **Tall, Peaked T Waves** on ECG **NCLEX TIP**
- Low Sodium (hyponatremia) **Below 135 NCLEX TIP**
- **Elevated H/H**
 - Hemoglobin: 12 - 18 normal
 - Hematocrit: 36 - 54% normal



Saunders

Severe burn injury that covers 35% of the total body surface area (TBSA). The nurse is **most likely** to note which finding on the laboratory report?

- **Hematocrit 60% (0.60)**

HEMATOCRIT

60% (0.60)



Treatments

KEY Term

#1 Intervention first 24-hours

- IV **Lactated Ringer's** (LR) solution
- IV **Normal Saline**



PRIORITY

IV Lactated Ringer's (LR) solution

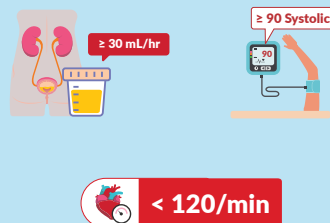


IV Normal Saline (0.9% sodium Chloride)



Assessment of Fluid Resuscitation

1. Urine output **30 mL/hr** or **MORE NCLEX TIP**
2. Blood pressure (**90/systolic** **Or MORE**)
3. Heart rate less than 120/min.



Saunders

A client is undergoing fluid replacement after being burned on 20% of her body 12-hours ago... blood pressure is **90/50**, a pulse rate of **110**, and a urine output of **20 mL** over the past hour. The nurse ... **anticipates which prescription?**

- Increasing **IV Lactated Ringer's** solution



Administer enteral feedings
Once **bowel sounds** return



Kaplan Question

Patient with burns who is **immunocompromised**... What precautions should be taken to **prevent ... infection?**

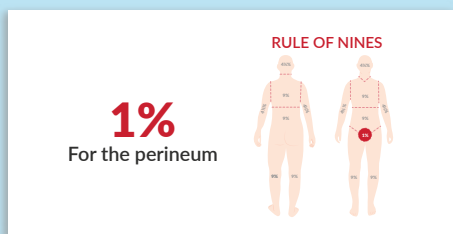
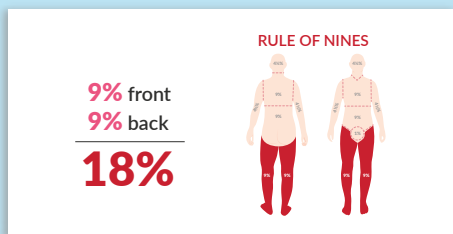
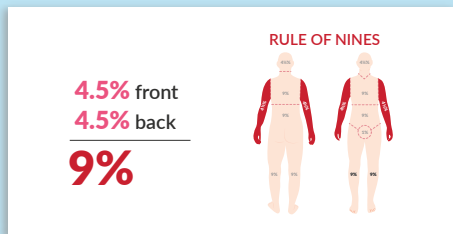
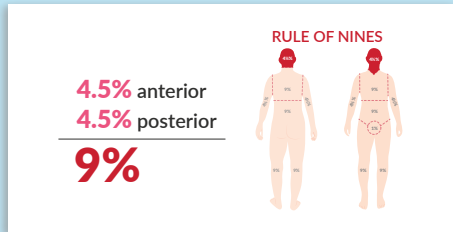
- **Avoid** placing **fresh flowers** or **plants** in or near the client's room



Burns - Rule of 9s & Rehabilitation Phase

Rule of 9s

The Rule of 9s is used to quickly estimate the percentage of the body affected by a burn, called Total Body Surface Area (TBSA). Used in order to calculate the necessary fluid resuscitation needed.



Once the total body surface area is calculated then the volume needed for emergency fluid resuscitation within the FIRST 24 hours can be calculated using the Parkland Formula

Parkland Formula
4 mL x kg of body weight x TBSA %

Rehabilitation Phase

Happens after the wounds fully heal & typically takes around 12 months or so depending on the severity of the burn.



Key point

Infection is **NOT** a big risk



Patient Education **NCLEX TIPS**

- **W** - Water-based lotion helps
- **W** - Wear pressure garments
- **E** - Exercise daily (Range-of-motion)



Burns

Top Missed Questions

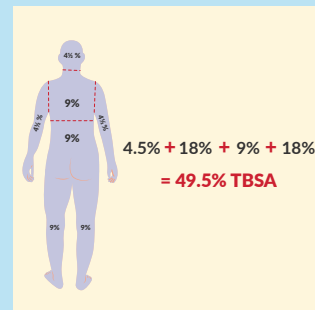
Top MISSED Questions

Client has full thickness burns to all **posterior** body surfaces. Using the **rule of nines**, calculate the % of total body surface area affected.

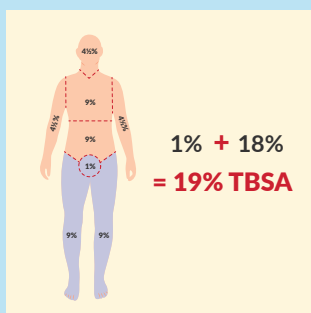
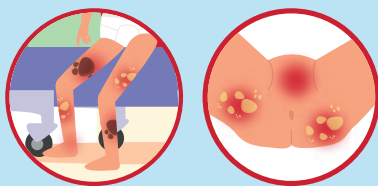
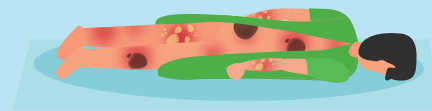
Posterior body surfaces:

- Head = 4.5%
- Back = 18%
- Right & left arm = 9%
- Right & left leg = 18%

✔️ **Answer = 49.5% TBSA**



50% of the body



Client has partial thickness burns to the anterior legs & perineum.

Using the **rule of nines**, calculate the % of total body surface area affected.

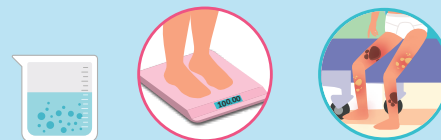
- 1% peri-area
- 18% right & left leg

✔️ **Answer = 19% TBSA**

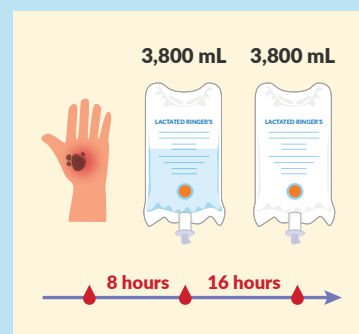
Client weighed 100 kg with **19% TBSA**... calculate the **lactated Ringer's** fluid resuscitation needed?

4 mL x 100 kg x 19 TBSA

✔️ **Answer = 7,600 ml**
(within the first 24 hours)



4 mL × 100 kg × 19% TBSA



Cardiac Care

Antidysrhythmics I

Cardiac Pharmacology

Class	Drug Name	Mainly for	Image of ECG Strip
Class 1 Sodium-channel blockers	Procainamide & Lidocaine	V Tach & V Fib	
Class 2 Beta blockers	Propranolol	Atrial Fibrillation Atrial Flutter HTN (hypertension)	
Class 3 Potassium-channel blockers	Amiodarone	V Tach & V Fib	
Class 4 Calcium-channel blockers	Verapamil Diltiazem Nifedipine	Atrial Fibrillation Atrial Flutter HTN (hypertension)	
Others	Adenosine	SVT	
	Digoxin (cardiac glycoside)	A Fib	
	Atropine (anticholinergic)	Symptomatic Bradycardia	

Key Points

- Dizziness
- Teach SLOW position changes



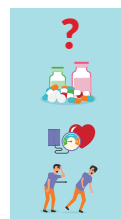
Hypotension - must reassess the BP every hour
When BP is LOW - we got to go SLOW!



Top Missed Question

Which drugs do we teach slow position changes due to orthostatic hypotension? Select all that apply.

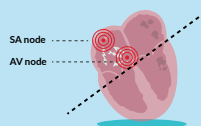
- 1. **Atenolol**
- 2. Atropine
- 3. **Amiodarone**
- 4. **Amlodipine**
- 5. Digoxin
- 6. **Diltiazem**
- 7. **Furosemide**



MEMORY TRICK

Think **ABCD** start on TOP of the heart affecting atrial rhythms.
Think **LAP** like in your lap, since these drugs affect ventricular rhythms.

	Drug Name	Indication & Key Terms:
A	Atropine Adenosine	Symptomatic Bradycardia SVT (supraventricular tachycardia)
B	Beta Blockers "Propranolol"	Hypertension , SVT, Tachycardia, A fib & A flutter SE: LoL = Low BP, Low HR, bronchospasm
C	Ca Channel Blockers "Verapamil" "Diltiazem"	Hypertension , SVT, Tachycardia, A fib & A flutter SE: Low BP, Low HR, dizziness
D	Digoxin	A fib & Heart Failure SE: Toxicity (NV, Vision changes)



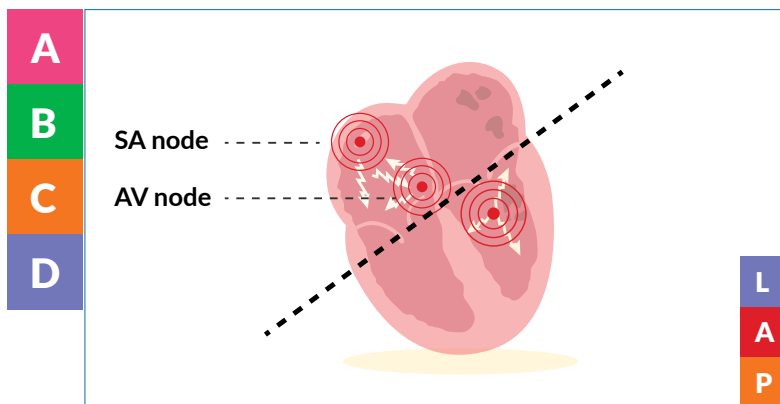
	Drug Name	Indication & Key Terms:
L	Lidocaine	V Tach & V Fib SE: Low BP, Low Platelets
A	Amiodarone	V Tach & V Fib SE: Low BP, Low HR, Pulmonary TOXICITY!!!
P	Procainamide	V Tach SE: Low BP, Low Platelets

Antidysrhythmics II

ABCDs - Atrial Rhythm drugs

Cardiac Pharmacology

MEMORY TRICK



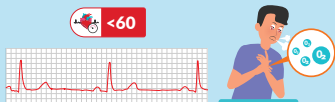
Think **ABCD**, start on the TOP of the heart affecting atrial rhythms affecting the SA or AV node

Notes

A	Drug Name	Indication & Key Terms:
	Atropine	Symptomatic Bradycardia

Puts the heart rate really HIGH like on TOP of "a PINE" tree for atropINE.

Given for: "**Symptomatic Bradycardia**" below 60 BPM with **signs of low oxygenation** like mental status changes (confusion, altered, agitation) or pale blue skin signs. Goal is to get back to **NORMAL sinus rhythm!**



TOP MISSED Test Question

Atropine for a client with a heart rate of 38, bp of 88/65, reports confusion and dizziness. Which ECG strip would show medication effectiveness?

- 1.
- 2.
- 3.
- 4. **CORRECT**

60-100

8 x 10 = 80

Evenly Spaced

A	Drug Name	Indication & Key Terms:
	Adenosine	SVT (supraventricular tachycardia)

DEcreases the heart rate, like putting it into a **DEN** (for foxes) or **Downstairs**.

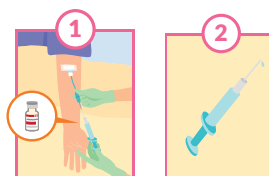
Given for:

SVT - Supraventricular Tachycardia

*** Key points:**

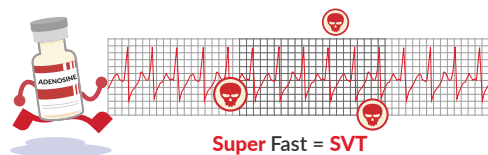
Know how this rhythm looks! SVT = Super Fast!

Give it FAST = IV push in 2 seconds followed by flush



KEY Points

- Give it FAST = **IV push in 1-2 seconds** **NCLEX TIP**
- Saline Flush immediately **AFTER**



B	Drug Name	Indication & Key Terms:
	Beta Blockers "Propranolol"	Hypertension , SVT, Tachycardia, A fib & A flutter SE: LoL = Low BP, Low HR

Beta blockers end in "-LOL"

Memory trick: Lower the 2 L's - Low HR & Low BP

Given for:

Hypertension & to put the brakes on fast rhythms like SVT, tachycardia, A fib, & A flutter.

Side Effects:

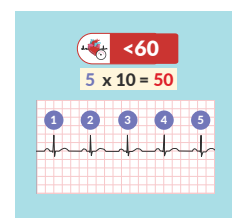
- **B** - Bradycardia (HR below 60 BPM) & low BP
- **B** - Bronchospasm (avoid asthma & COPD)
- **B** - Blood glucose masking s/s of low sugar
- **B** - Bad for clients in end stage heart failure

* Orthostatic hypotension (dizziness upon standing) - **teach slow position changes!**

Common Question

What drug is causing this rhythm?

Propranolol



Antidysrhythmics III

ABCDs - Atrial Rhythm Drugs

Cardiac Pharmacology

C	Drug Name	Indication & Key Terms:
	Ca Channel Blockers "Verapamil" "Diltiazem"	Hypertension , SVT, Tachycardia, A fib & A flutter

Since calcium contracts the muscles, when calcium is blocked with CCBs, it **calms the heart**


Memory Trick: CCBs lower the Couple heart vitals: HR & BP

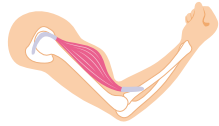
Given for:

Hypertension, tachycardia, SVT, A Fib, & A Flutter

Side Effects:

Orthostatic hypotension (dizziness upon standing) - **teach slow position changes**

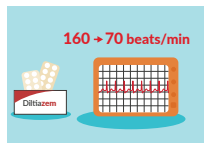
C
Calcium


C
Contracts the muscles


3 Common Questions

Q1: Intended EFFECT for Diltiazem?

- ✔️ **Ventricular rate decreased from 160 to 70s**



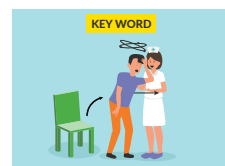
Q2: Priority adverse effect to watch for when giving Amlodipine?

- ✔️ **Dizziness**



Q3: Most important patient teaching when giving Verapamil?

- ✔️ **Slow position changes**




D	Drug Name	Indication & Key Terms:
	Digoxin	A fib & Heart Failure SE: Toxicity (NV, Vision changes)


Digoxin

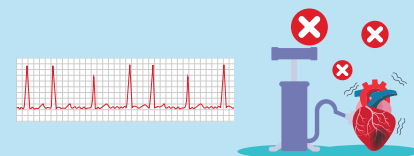
Is a **TOXIN** so monitor levels - under 2.0 is SAFE.

It **DIGs** for a **deeper** heart contraction to help the heart contract more forcefully & **decreases** the heart rate (NOT Blood pressure), so no need for slow position changes

D is for **DEEP** Contraction

DIGOXIN


DEEP contraction




Main Side Effect = Toxicity

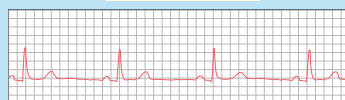
- Max Range **2.0**
- 1st signs of toxicity:
 - Anorexia
 - Nausea / Vomiting
 - **Vision changes** (difficulty reading)



Key Sign

Report "dizziness & lightheaded"

Bradycardia



Common NCLEX Question

Q1: A client on digoxin is having difficulty reading a book or some type of vision problem

- ✔️ **TOXICITY for vision changes**

Q2: Client on digoxin with a history of renal failure...what is the key lab value to monitor?

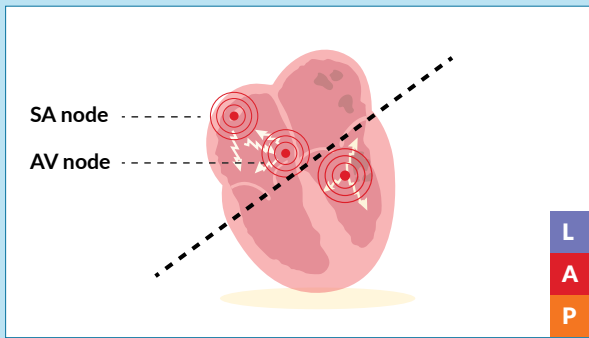
- ✔️ **Creatinine! Over 1.3 = bad kidney**

Antidysrhythmics IV

LAP - Ventricular Rhythm Drugs

Cardiac Pharmacology

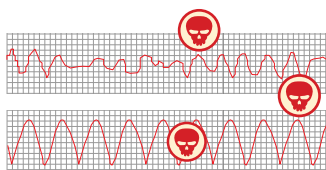
L	Lidocaine
A	Amiodarone
P	Procainamide



Think **LAP** like in your lap, since these drugs affect ventricular rhythms

Mainly give for those **deadly ventricular rhythms**:

- Ventricular Fibrillation (V Fib)
- Ventricular Tachycardia (V Tach)



Vfib

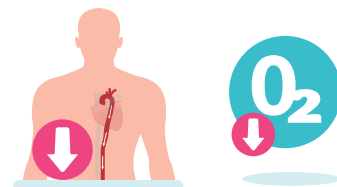
Vtach

LOW cardiac **OUT**put
LOW oxygen **OUT** to the body

Memory Trick:

Any rhythm starting with a **V = VERRRY** deadly.

Since the ventricles are responsible for all the Cardiac **OUTPUT** meaning **OXYGEN** rich blood **OUT TO the body**, so low Cardiac **OUT**put means Low oxygen **OUT** to the body.



Lidocaine

“Cain” Calms the ventricles.

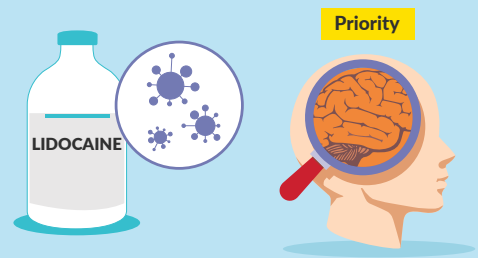
Given for:

V tach, & V fib mainly, but also can work for SVT, A fib, & A flutter.

GLASGOW COMA SCALE

EYE OPENING	VERBAL RESPONSE	MOTOR RESPONSE

1st



L Lidocaine

Key Point

- **HYPO**tension
- Lidocaine Toxicity
 - Neuro checks are a **PRIORITY**

Amiodarone

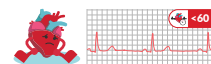
Typically given 2nd if Lidocaine does not work. This is because of its **life-threatening TOXIC effects!**

Memory trick



Side Effects

Neg. **Chronotropic** = Less beats



Neg. **Dromo** = Less Electrical impulse



A Amiodarone

Key Point

Pulmonary toxicity

- “dry cough & dyspnea”
- “difficulty breathing while ambulating”
- “shortness of breath”

P Procainamide

“Cain” calms those ventricles just like Lidocaine but this drug is becoming less & less popular in the hospital setting & therefore not commonly tested.



Atropine

Symptomatic Bradycardia

Drug name:

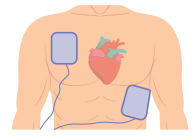
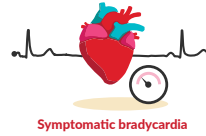
Atro**PINE**



Memory tricks



Side Note

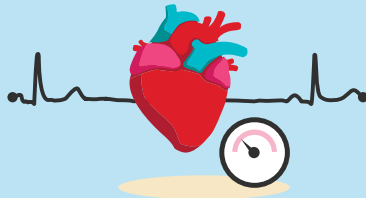


Indication:

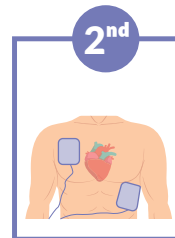
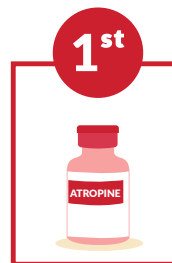
Given to speed up a slow heart rate with

Key word

Symptomatic bradycardia



If drugs do not work to fix the problem, then we have to put the patient on external pacing:



- Correct sequence:
1. Atropine
 2. External pacing

Signs: Symptomatic bradycardia

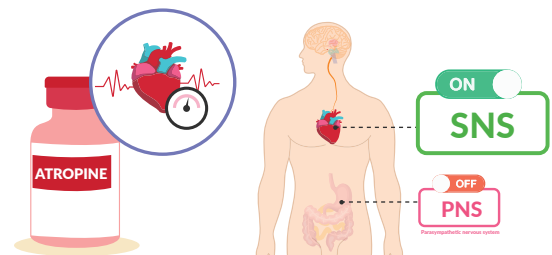
Mental status changes

1. Confusion
2. Irritability
3. Agitation



MOA:

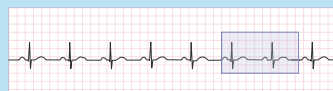
Atropine acts to increase the heart rate by blocking the action of the vagus nerve to block the PNS (parasympathetic nervous system) REST & DIGEST, and turns ON the SNS (fight & flight) in the heart like flicking a light switch.



Key points

Atropine is effective when we see normal sinus rhythm and reversal of the symptoms. They will show you normal sinus rhythm like this & no more hypoxic symptoms, like confusion, agitation, hypotension or syncope.

Normal Sinus rhythm and reversal of the symptoms



Common NCLEX Question

Atropine for a client with a heart rate of 38, bp of 88/65, reports confusion and dizziness. Which ECG strip would show medication effectiveness?

- 1.
- 2.
- 3.
- 4. **CORRECT**

60-100

R peak x 10
8 x 10 = 80

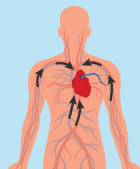
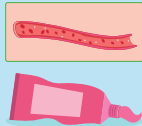
Vasopressors

Alpha & Beta Physiology

Cardiac Pharmacology

Vaso**PRESS**ors - **PRESS** on the vessels

Goes back to the heart



Main Vasopressors

- **E**pinephrine
- **N**orepinephrine
- **V**asopressin
- **D**obutamine
- **D**opamine

Vaso**PRESS**ors - **PRESS** on the blood vessels, **increasing blood pressure** in order to squeeze oxygen rich blood back to the **CORE** of the body to perfuse the vital organs (sort of like squeezing a toothpaste bottle).

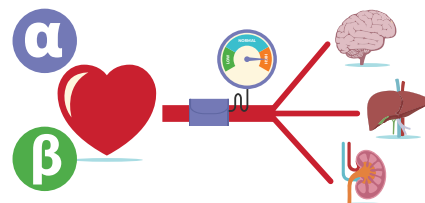
Indication

Increase BP	Cardiac Arrest	Shock

Mode of Action

They work by activating **Alpha & Beta receptors** inside the heart & blood vessels

Key Receptors: **Alpha & Betas**



Alpha 1 - Constriction of Vessels

Alpha 1 - Anaconda (memory trick)

- Squeezing down the blood vessels so blood is pushed back to the heart.

Alpha Agonist

- Think **AG**onists **ADD** to the BP to increase it (example: vasopressors)

Alpha Antagonists

- Are **ANTI** constriction - less constriction = less pressure to lower BP (example: clonidine)



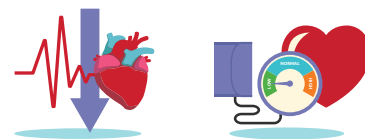
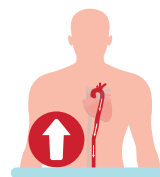
Beta 1 = 1 Heart

Beta Agonists - think **AG**onists **ADD** - Faster heart rate. (example: Vasopressors)

- Positive **Chronotropic** (chronos = time) more beats per minute.
- Positive **Inotropic** = more **FORCEFUL** beats, which increased Cardiac **OUTPUT** (increased blood coming **OUT** of the heart to perfuse the body)

Beta Antagonists - are **ANTI** heart, used to decrease the HR & BP (example: beta blockers)

- Negative **Chronotropic** - Less Beats
- Negative **Inotropic** - Less force



Beta 2 = 2 Lungs

Beta 2 Agonist

- Think they **ADD** to the lungs - dilating both the vessels & bronchi - like a big balloon or beach ball (example: Vasopressors & Albuterol)



	Indication	Alpha 1	Beta 1	Beta 2
		Anaconda Constriction	1 heart • Chrono - High HR • Inotropic - C.O.	2 Lungs & Dilation Big Lungs & Vessels
Epinephrine	Septic shock & Cardiac arrest	BIG	Medium	Small
Norepinephrine	Septic shock	BIG	Medium	Small
Vasopressin Desmopressin	Hypovolemic shock	-	-	-
Dopamine	Cardiogenic shock	Med.	BIG	Small
Dobutamine	Cardiogenic shock	Small	BIG	Medium

Adenosine

Drug name:

Adeno**SINE**

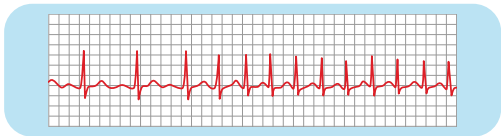
MEMORY TRICK



Puts the HR Down
in a **DE**N with a **DE**Nosine

MOA:

It works by slowing impulse conduction through the AV node to slow down the heart rate. Therefore can work too well & stop the heart all together - so SAFETY is the main concern.



Common TEST Question

Which **drug** does the nurse anticipate the provider will order?

✔️ Adenosine



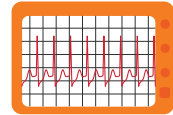
Indication:

1st line drug to treat
- **supraventricular tachycardia**



SUPRAventricular tachycardia
SUPER tachy heart rate

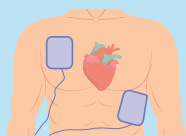
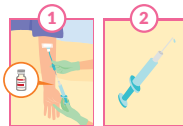
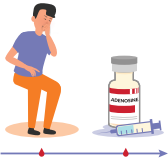
150 beats/min



KEY Points

SVT ORDER of treatment

1. Vasovagal maneuver **FIRST!**
BEFORE adenosine (bearing down like having a **BOWEL MOVEMENT**)
2. Adenosine **IV push "rapidly over 1-2 seconds"** followed by a saline flush
3. Cardioversion to Convert the heart rhythm - "Push the **SYNCHRO-NIZE BUTTON**" for Cardioversion



CARDIOVERSION



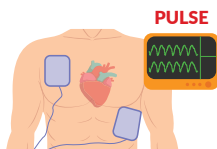
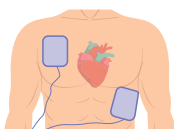
Don't let
THE NCLEX TRICK YOU



DEFIBRILLATION

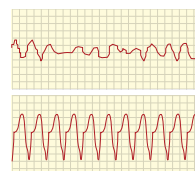
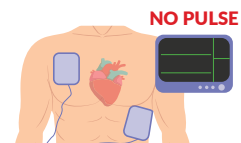
Cardioversion

- C** - Cardioversion
 - C** - Count a pulse
 - C** - Controlled Rhythms
- Synchronized button & sedation



Defibrillation

- D** - Defibrillation - if you
- D** - Don't have a pulse
- D** - Deadly rhythms (VFib & Vtach no pulse)
- D** - Don't Synch (shock away!)



Vasopressors

Top Tested Drugs

Cardiac Pharmacology

Epinephrine & Norepinephrine

Epinephrine

(Brand: Adrenaline)

Norepinephrine

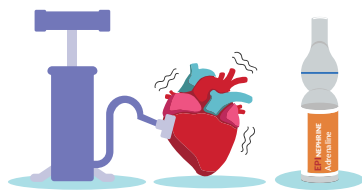
(Brand: Levophed)

Key difference

Epinephrine

- Cardiac Arrest
 - Asystole
 - PEA (pulseless electrical Activity)

1st line drug



HESI Question

Epinephrine

Initiates heart contraction during **cardiac arrest**

Kaplan Question

Epinephrine

treatment is effective if ...

Answer: BP 130/67, Apical HR 99, Cap refill less than 2 seconds



Vasopressin & Desmopressin (ADH)

Vasopressin

Vasopressin - synthetic ADH (AntiDiuretic Hormone)

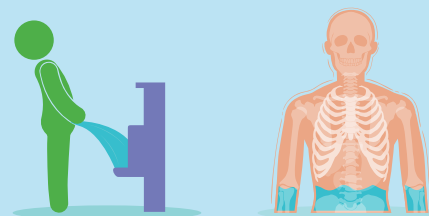
- **ADH - Adds Da H₂O**

Indication

Given for **Diabetes Insipidus (DI)** where clients **Drain** a lot of fluid! ADH is given to "Add Da H₂O" to the body, adding fluid volume & not affecting the constriction of vessels.

DI - Diabetes Insipidus

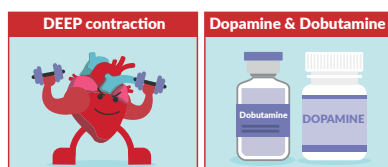
DI - end up **DI**uresing or **Drain**ing a lot of fluid



Pressin - PRESSes that BP UP

Dobutamine & Dopamine

D's for DEEP Contraction



Indication

Given to treat **cardiogenic shock** - where the heart **FAILS** to pump! These guys give a **DEEPER** heart contraction, to increase that blood out of the heart & to the body (increasing cardiac output & BP)

INOtropic

"**IN**creased cardiac contractility"

"**IN**creased forceful contraction"



HESI Question

Dopamine

- Activates **alpha 1** and **beta 1** receptors
- Therapeutic Effects:
 - Low doses act on **dopamine receptors**
 - Moderate doses acts on **beta 1 receptors**
 - High doses acts on **alpha 1 and beta 1 receptors**
- Assess IV site **hourly** for s/s infiltration



Kaplan Question

Dopamine

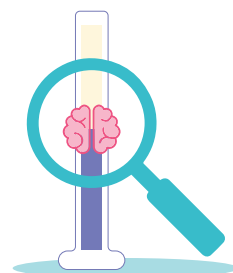
Given for a patient with hypotension, what indicates effectiveness?

Answer: **Increased cardiac output**

ATI Question

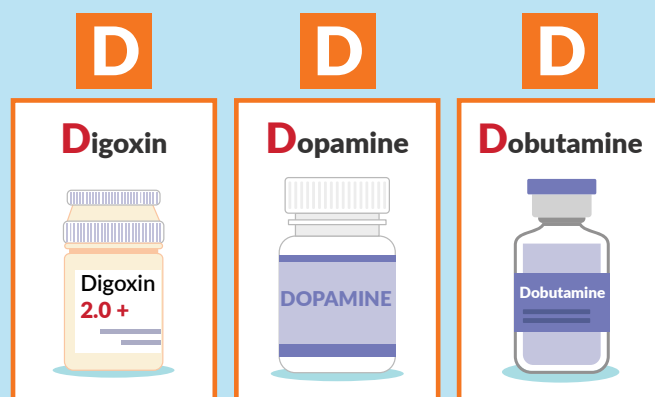
Dobutamine, Dopamine

- Assess BP hourly
- Monitor vital signs



Notes

Inotropic, Chronotropic, Dromotropic

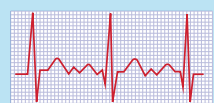
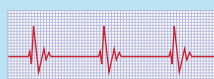


INOtropic

“**IN**creased cardiac contractility”
“**IN**creased forceful contraction”

3 Ds for DEEP contraction

- D - Digoxin
- D - Dopamine
- D - Dobutamine



Chronos

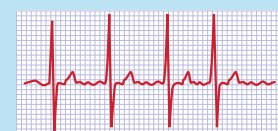
Clock

- Neg. Chronos - Neg time
- Positive Chronos - Positive time
- Faster HR - Positive Chronotropic
- Lower HR - Negative Chronotropic

Dromo

Drums

- Neg. Dromotropic - stable heart rhythm



Drug	Inotropic Force of Heartbeat	Chronotropic Rate of Heartbeat	Dromotropic Rhythm of Heartbeat
A amiodarone	+ Pos.	- Neg.	- Neg.
B beta blockers Atenolol	- Neg.	- Neg.	- Neg.
C calcium CB	- Neg.	- Neg.	- Neg.
C cardiac glycosides Digoxin	+ Pos.	- Neg.	- Neg.
D dobutamine	+ Pos.	X	X
D dopamine	+ Pos.	+ Pos.	X
E epinephrine	+ Pos.	+ Pos.	X

5 Step EKG INTERPRETATION

Heart rate	Rhythm	P wave	PR interval (in seconds)	QRS (in seconds)
60 -100/min	Regular	Present before each QRS, identical P/QRS ratio 1:1	0.10 - 0.20 (<5 small squares)	Normal shape < 0.12

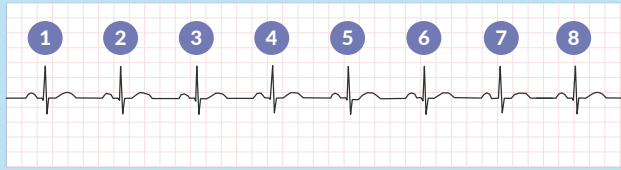
Heart Rate

$8 \times 10 = 80$



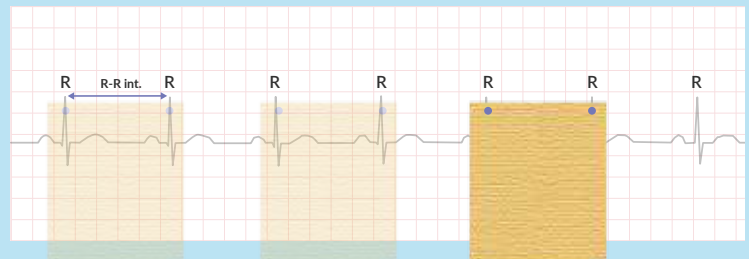
1. Normal Sinus Rhythm

Rate - 60 -100
count the peaks - we have 8 here
multiply by 10 = 80 beats!



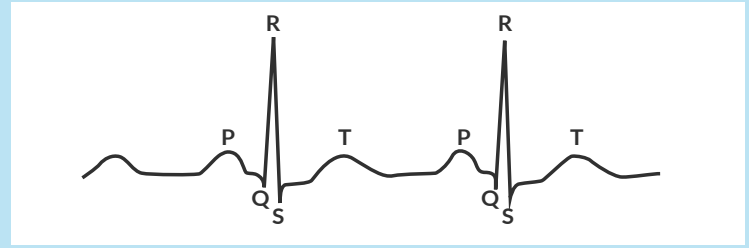
Rhythm

2. **Rhythm** - R peaks are evenly spaced apart.
To quickly measure this simply grab some paper & mark 2 R peaks then just march it out.
The R peaks should be even every time.



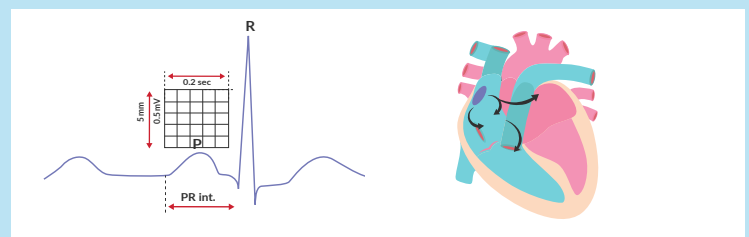
P Wave

3. **P wave** - which is our atria contracting - is it present? & does it have its buddy QRS? we need a P with QRS every time



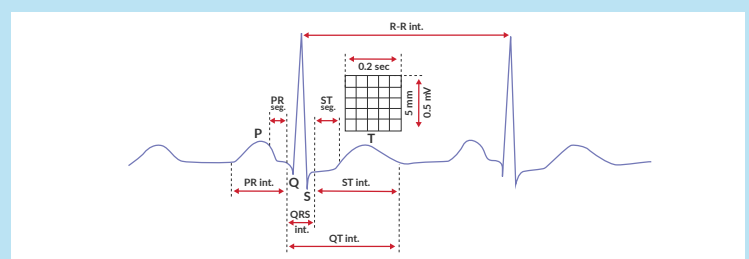
PR interval (in seconds)

4. **PR interval** - basically measures the time it takes between atrial contractions & ventricular contractions should be 5 mini boxes or less - or .10 - 2.0 seconds here.



QRS (in seconds)

5. **QRS** - Ventricles contracting
Is it present, upright & TIGHT?
Should NOT be wide, should only be 3 boxes - .12 seconds here.



9 ECG Strips on the NCLEX

1. Normal sinus rhythm



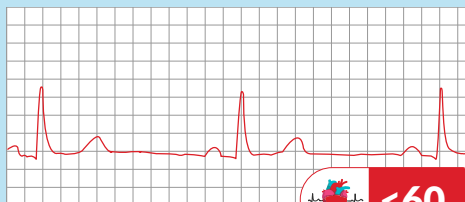
Memory tricks

Normal beat - evenly spaced

- **Treatment:**
None - continue to monitor
- **Causes:**
Being healthy



2. Bradycardia



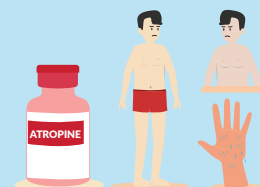
BRADY Bunch
old TV show (slow times)



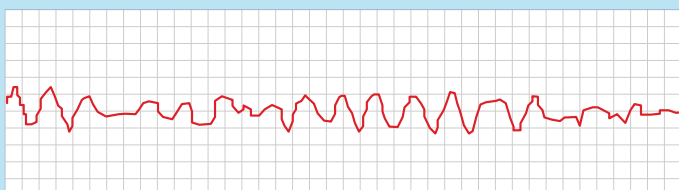
Memory tricks

BRADYcardia
Below 60/min

- **Treatment:**
Atropine **ONLY** if symptomatic showing low perfusion (pale, cool, clammy)
- **Causes:**
Vagal maneuver (bearing down), meds (CCB, Beta Blockers)



3. Ventricular Fibrillation (V Fib)



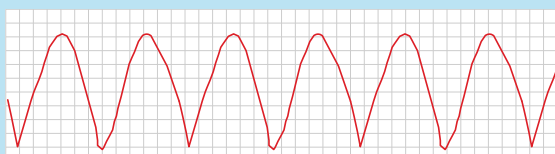
Memory tricks

Fib is flopping- squiggly line

- **Treatment:**
 1. **V Fib - Defib #1** Defibrillation immediately Stop CPR to do it & before drugs!
***NO** synchronization needed
 2. Drugs: LAP - Lidocaine, Amiodarone, Procainamide
- **Causes:**
Untreated V Tach, Post MI, E+ imbalance, proarrhythmic meds

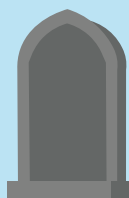


4. Ventricular Tachycardia (V Tach)



Memory tricks

V Tach Tombstone pattern



- **Causes:**
Post MI, Hypoxia, Low potassium, Low magnesium
- **Treatment:**
 1. **Early Defibrillation!** **NCLEX TIP**
 - Apply defibrillator pads
 - Call out & look for everyone to be CLEAR!
 - Shock & IMMEDIATELY continue chest compressions
 2. When to Shock? **NCLEX TIP**
 - V Tach with **No pulse** = Defibrillation
 - V Tach with **Pulse** = Cardioversion

Memory tricks

C

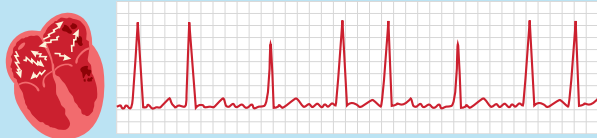
C - Count a pulse
C - Cardiovert
*Synchronize **First** & Sedation

D

D - Dead - NO PULSE
D - DEFIB!!
***NO** Synchronize
D - Don't wait

9 ECG Strips on the NCLEX II

5. Atrial Fibrillation (A Fib)

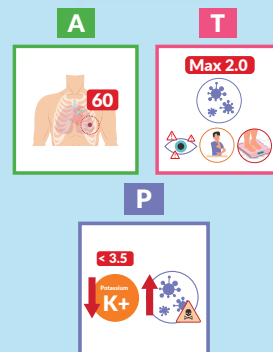


Memory tricks

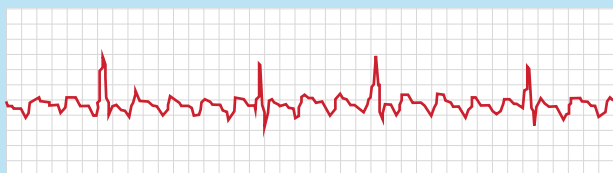
No **P** wave = Fibrillation Flo**PP**ing

- **Causes:**
Valvular disease, Heart failure, Pulm. HTN, COPD, after heart surg.
- **Treatment:**
 1. Cardioversion (after TTE to rule out clots) *Push Synch
 2. Digoxin - Deep Contraction
Check **ATP** Before giving:
A - Apical pulse 60
T - Toxicity (Max 2.0 range) visual disturbances, N/V, Anorexia
P - Potassium below 3.5 - HIGHER risk for toxicity
 3. Anticoagulants: Warfarin (monitor INR, Vit. K antidote, moderate green leafy veggies)

Digoxin



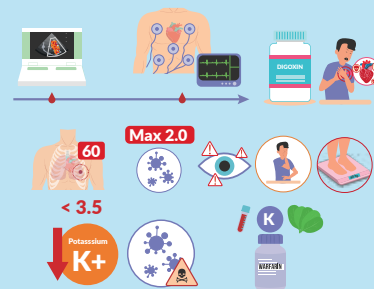
6. Atrial Flutter (A Flutter)



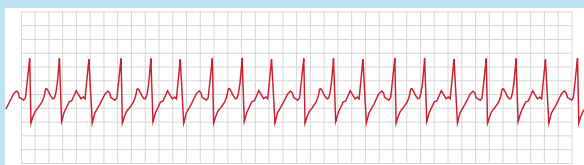
Memory tricks

A Flu**TT**er = saw**T**oo**T**h

- **Causes:**
Valvular disease, Heart failure, Pulm. HTN, COPD, after heart surg.
- **Treatment:**
 1. Cardioversion (after TTE to rule out clots) *Push Synch
 2. Digoxin - Deep Contraction
Check **ATP** Before giving:
A - Apical pulse 60
T - Toxicity (Max 2.0 range) visual disturbances, N/V, Anorexia
P - Potassium below 3.5 - HIGHER risk for toxicity
 3. Anticoagulants: Warfarin (monitor INR, Vit. K antidote, moderate green leafy veggies)



7. SVT - Supraventricular Tachycardia



Memory tricks

Super Fast = **Supra**ventricular

- **Causes:**
Stimulants, Strenuous exercise, hypoxia, heart disease
- **Treatment:**
 1. Vagal Maneuver (bear down like having a bowel movement, ice cold stimulation)
 2. Adenosine - **RAPID PUSH** & flush with NS - HR may stop
 3. Cardioversion - *Push Synch

KAPLAN

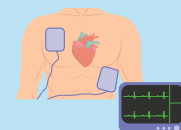
Which medication should be held 48-hours prior to an elective cardioversion for SVT?

- Digoxin due to increased ventricular irritability

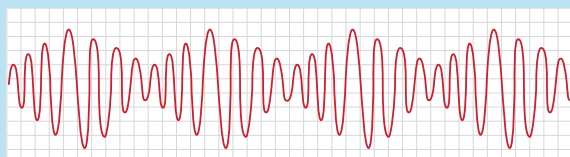
Client with SVT has the following assessment data: HR 200, BP 78/40, RR 30

- Priority action: Synchronized cardioversion

PRIORITY



8. Torsades de Pointes



Memory tricks

Tornado Pointes

- **Causes:**
Post MI, Hypoxia, **Low magnesium**
- **Treatment:**
Magnesium Sulfate **NCLEX TIP**

Memory tricks

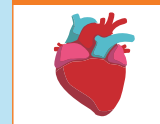
M

Magnesium



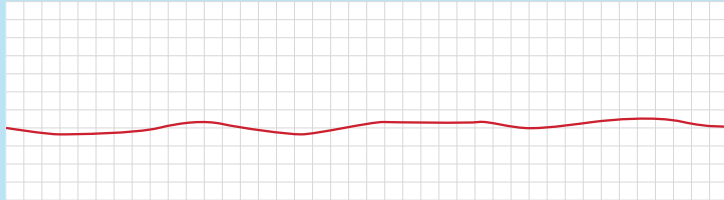
M

Mellows out the heart



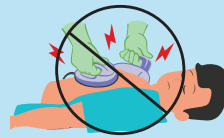
9 ECG Strips on the NCLEX III

9. Asystole - Flatline



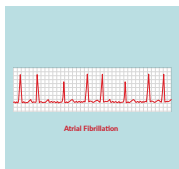
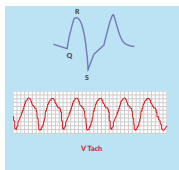
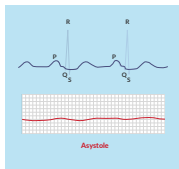
Epinephrine, Atropine & CPR

***NO Defibrillation**
(NO shock) **NCLEX TIP**



Memory tricks

Assist Fully! ... patient is flatlined



NCLEX Key Terms

1. **P wave** = Atrial rhythm

2. **QRS wave** - Ventricular rhythm

Question:

- "Lack of QRS complexes"
Answer: Asystole
- "Wide bizarre QRS complexes"
Answer: V Tach

3. **"Chaotic or unorganized"** - Fibrillation

Question:

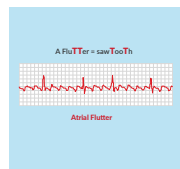
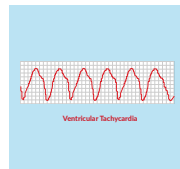
- "Chaotic rhythm with no P waves"
Answer: Atrial Fibrillation
- "CHAOTIC rhythm without QRS complexes"
Answer: Ventricular Fibrillation

4. **"Bizarre"** - Tachycardia

Question:

- "Bizarre rhythm with wide QRS complex"
Answer: Ventricular Tachycardia

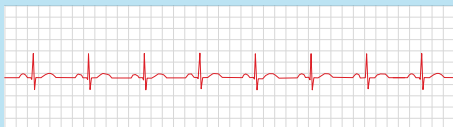
5. **"Sawtooth"** - Atrial Flutter



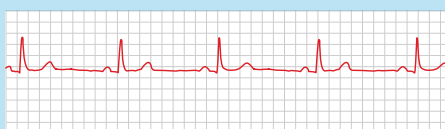
If you know these, you will pass the **NCLEX!**

NCLEX TIP

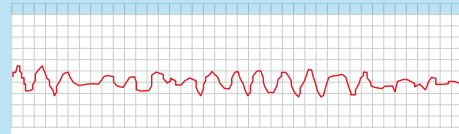
Normal sinus rhythm



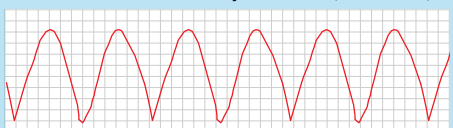
Bradycardia



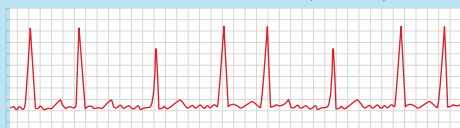
Ventricular Fibrillation (V Fib)



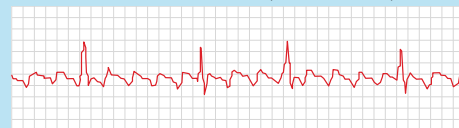
Ventricular Tachycardia (V Tach)



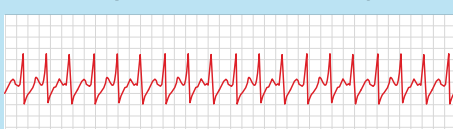
Atrial Fibrillation (A Fib)



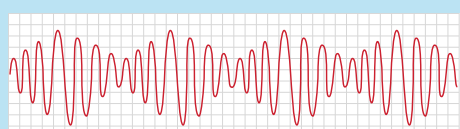
Atrial Flutter (A Flutter)



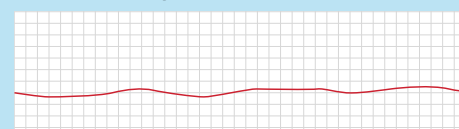
SVT - Supraventricular Tachycardia



Torsades de Pointes



Asystole - flatline

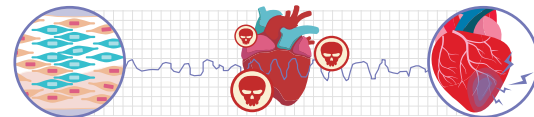


Hypothermia & Frostbite

Hypothermia

Pathophysiology

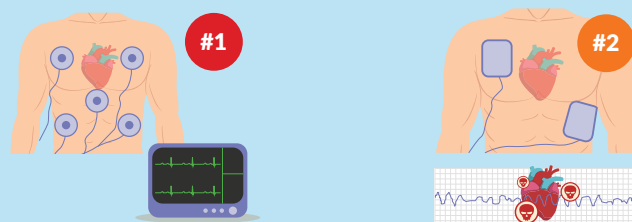
Occurs when core body temp is **less than 95°F (35°C)**. The body basically becomes like a popsicle with all the organs freezing over & shutting down being unable to compensate for heat loss! The nearly frozen heart muscles (myocardium) become very irritated leading to DEADLY cardiac arrhythmias like Ventricular Fibrillation (V Fib).



Ventricular Fibrillation (V Fib)

Priority action: **NCLEX TIP**

1. Attach **cardiac monitor**
2. Anticipate defibrillation



Signs & Symptoms

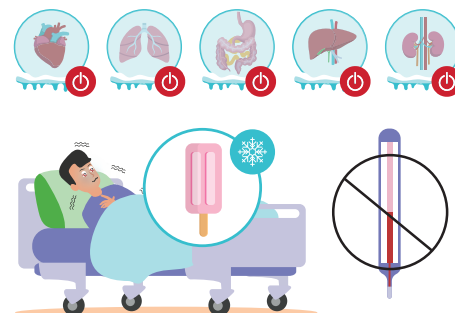
Everything is super cold & nearly frozen here!

Heart:

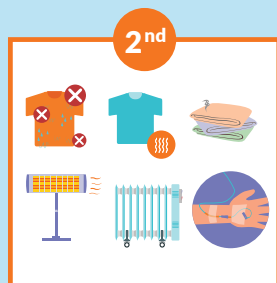
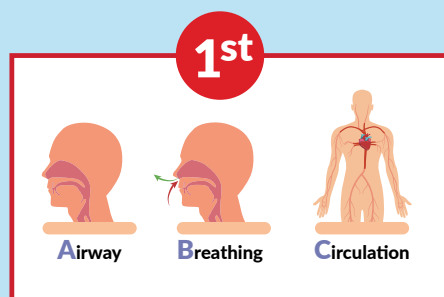
- Pulses are weak and thready from the cold heart muscles

Lungs:

- **Wheezing** may be heard indicating bronchospasms
- **Crackles at bases of lungs** indicating pulmonary edema from fluid buildup!



Interventions



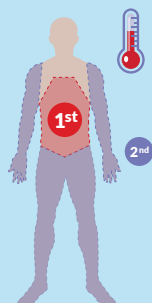
NCLEX TIP

Airway: **Anticipate Mechanical Ventilation**

Circulation: Attach the **cardiac monitor** (anticipate defibrillation)

Rewarming Process:

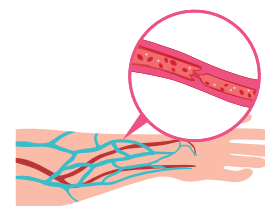
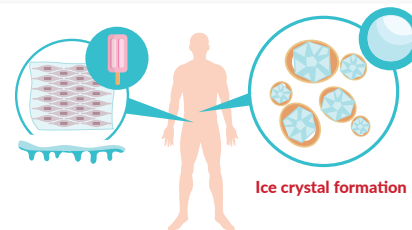
- Passive methods
- Active **internal** warming
 - **Warmed IV fluids** via 2 large bore IVs
 - Cover with **warm blankets** (head & trunk)



Frostbite

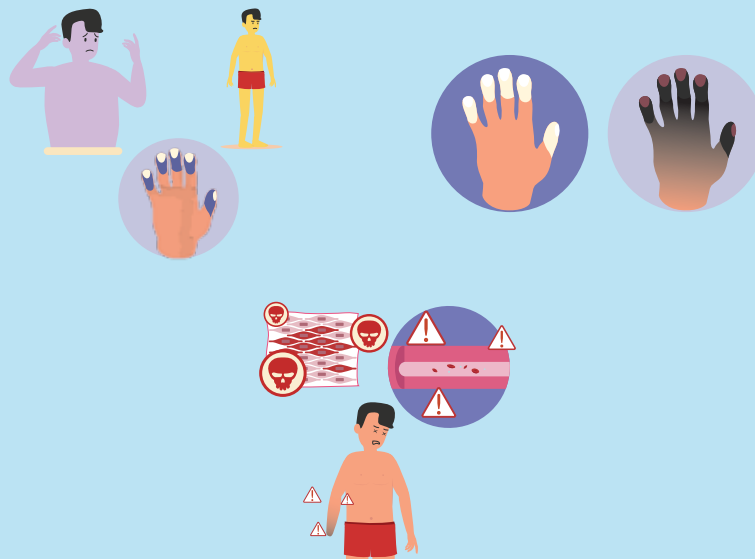
Pathophysiology

Tissue in the body basically freezes like a popsicle resulting in ice crystal formation within the cells of the body! It's like every cell becomes a little snowball. There will be Vasoconstriction as the vessels contract from the cold, leading to decreased blood flow - vascular stasis.

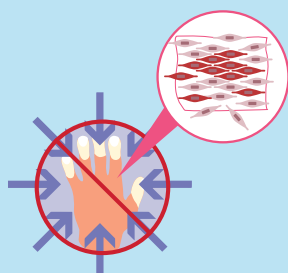


Signs & Symptoms

- **Superficial** frostbite:
Skin **blue, mottled**, or waxy yellow
- **Deep** frostbite:
Skin white, hard → **Gangrene**



Treatment



Rewarming **PRIORITY** **NCLEX TIP**

- **Warm water soaks** (whirlpool)
- **Elevate affected extremity** after rewarming
- Provide **analgesic** pain meds

NO pressure to the site

- **NO** heavy clothing, blankets
- **NO** massaging, rubbing
- **NO occlusive dressings** on wounds

NCLEX TIP

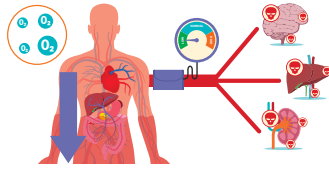


Shock

Shock

Pathophysiology

Shock is a critical condition where the body has decreased tissue perfusion eventually leading to organ failure and death



Memory trick

S Shock

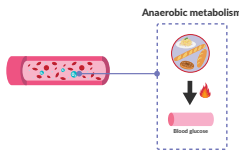
S Severely low blood pressure

4 Stages of Shock



I. Initial

There is too little oxygen in the blood to feed the organs, resulting in anaerobic metabolism, meaning metabolism without oxygen - BUT s/s are absent in this stage

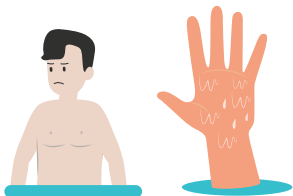


II. Compensatory

The body is trying to compensate for the LOW oxygen, So the heart will pump faster (tachycardia) & RR increases to get more oxygen (tachypnea) body compensates with the sympathetic nervous system to speed up the vital signs & renin-angiotensin activation to maintain BP and oxygenation to keep the organs perfused

III. Progressive

Key sign



■ Cold and clammy skin
PRIORITY NCLEX TIP

IV. Irreversible

Death is imminent



5 TYPES OF SHOCK

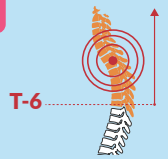
1. Septic shock

Septic shock caused by widespread bloodborne infection - think Sepsis infection causes Septic shock



2. Neurogenic shock

Neurogenic shock caused by spinal cord injury T-6 or higher.



3. Hypovolemic shock (hemorrhagic)

Hypovolemic shock (hemorrhagic) caused by blood loss like from a trauma or a gunshot wound or even from surgery or burns



4. Cardiogenic shock

Cardiogenic shock where the heart fails to pump like in heart failure exacerbation or an MI heart attack heart muscles are weak & fail to pump



5. Anaphylactic shock

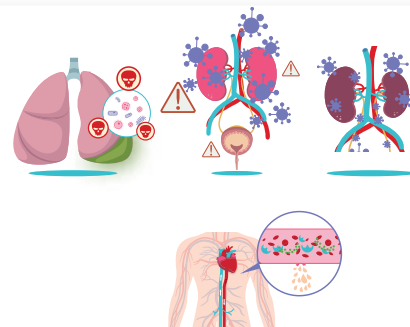
Anaphylactic shock from a severe allergic reaction like from a bee sting, eating seafood or something you have an allergy to



Septic Shock

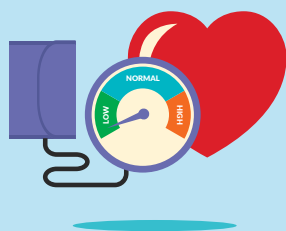
Pathophysiology

Septic shock Pathophysiology results from a septic widespread bloodborne infection that overwhelms the body typically caused by a bacterial infection like Pneumonia - infection in the lungs or even UTI or kidney infection that gets worse. A systemic cytokine release inside the bloodstream causes extreme vasodilation & fluid leakage from capillaries



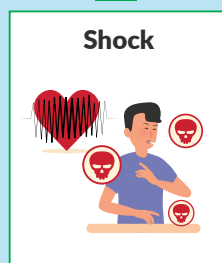
Signs & Symptoms

Severely low blood pressure

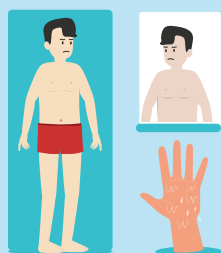
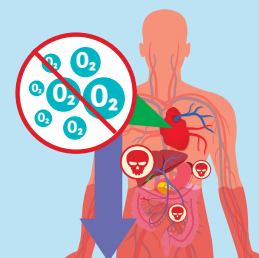
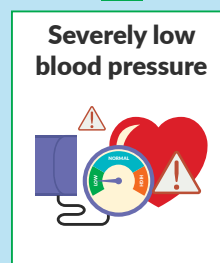


Memory trick

S



S



- Low blood pressure (Less than 80/systolic)
- **Cold, clammy skin** (pale & cool extremities)
 - **Delayed capillary refill**
- Mental Status change **NCLEX TIP**
 - **Confusion**
 - **Disorientation**
- High WBC (over 10,000)
- Temp. High or **very low (96°F)**



>10,000

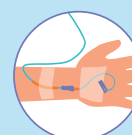


<96°F



Treatment

Emergency treatment may include supplemental oxygen, intravenous fluids, antibiotics, and other medications.

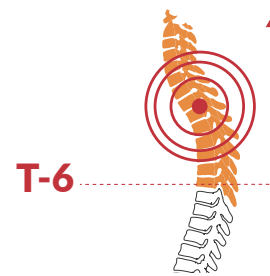


Neurogenic Shock

Pathophysiology

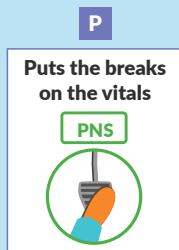
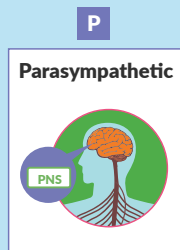
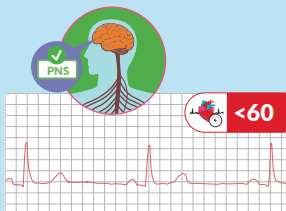
The Autonomic nervous system is damaged resulting in the blockage of the sympathetic nervous system which is supposed to speed up the vitals & vasoconstriction. Only the parasympathetic system is intact - which puts the breaks on the vitals causing widespread vasodilation & hypotension naturally, we see low & slow vital signs like low heart rate & low BP as Vasodilation occurs making it difficult for blood to return BACK to the heart. This decreased blood flow BACK to the heart leads to decreased blood flow OUT of the heart basically decreased cardiac output - meaning less oxygenated blood OUT of the heart to the body & this leads to poor tissue perfusion from the lack of oxygen & impaired cell metabolism resulting in organ failure & death.

- Spinal Cord Injury (T-6 or higher) **NCLEX TIP**



Signs & Symptoms

- Bradycardia **NCLEX TIP**



Interventions

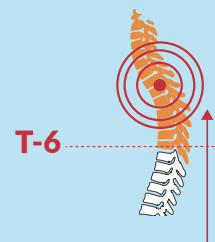
PRIORITY

- IV Normal Saline (0.9% sodium chloride) Increases the blood pressure



SIDE NOTE

- Spinal cord injury ABOVE T-6 Autonomic dysreflexia



Saunders

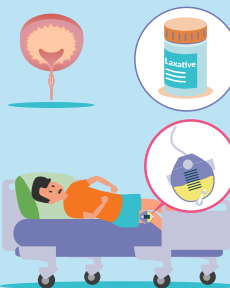
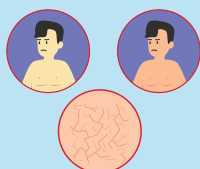
A client is admitted to the hospital with a diagnosis of **neurogenic shock** after a traumatic motor vehicle collision. Which manifestation **best** characterizes this diagnosis?

- Bradycardia



NCLEX TIPS

- Low HR (bradycardia) Less than 60
- Low BP (hypotension) Less than 80/systolic
- Skin: Warm, Pink, & Dry

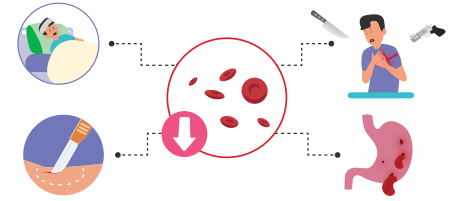


Triggered by a full bladder, constipation, or tight fitting clothes - anything with constriction thus place Foley in spinal trauma patients to keep the bladder empty and offer laxatives & loose clothes can save a client with a spinal cord injury ABOVE T-6

Hypovolemic Shock

Pathophysiology

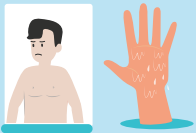
Caused by anything that can lower blood volume - Think HYPO - LOW blood or fluid volume from excessive fluid volume loss through diarrhea, vomiting, or fluid shifts as in burn patients & from bleeding (hemorrhage) from trauma like a gunshot or knife injury, or even surgery & GI bleed.



HYPOvolemic shock
LOW blood volume

Signs & Symptoms

Key Point



- Cold and clammy skin
PRIORITY NCLEX TIP

III. Progressive

Hypovolemic shock - As mentioned before - this is often seen in the progressive stage & is an indication that the client is **GETTING WORSE!** So you must notify the healthcare provider immediately & get some IV normal saline started quickly!

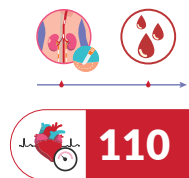
1. Hypotension (less than 80/systolic)
2. Tachycardia
3. **Low** central venous **pressure** (normal 2-6 mmHg)



KAPLAN

Which vital sign would alert the nurse to **potential hemorrhage** following a nephrectomy:

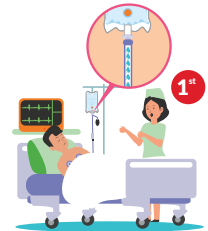
- HR 110



Saunders

A client in shock develops a **central venous pressure (CVP)** of less than 2 mm Hg. Which prescribed intervention should the nurse implement first?

- Increase the **rate of intravenous IV fluids**



Interventions



PRIORITY = Hemodynamic stability

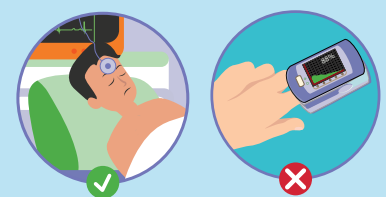
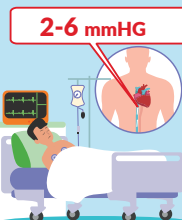
1. **LOWER** head of bed right away **NCLEX TIP**
NEVER place the HOB in **High Fowler's position**
2. IV Normal Saline (0.9% sodium chloride)
3. **IV norepinephrine** / dopamine

Memory trick

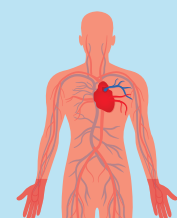
Put the Head **LOW** in **HYPO**volemic (hypotension)



- **CRITICAL!** DO NOT delay a new bag of norepinephrine **NCLEX TIP**
- **MAP** (mean arterial pressure) Over **65 mmHg**
- **CVP** (central venous pressure) **2 - 6 mm Hg**



- SpO2 = the sensor should be **placed on the forehead instead** of extremities

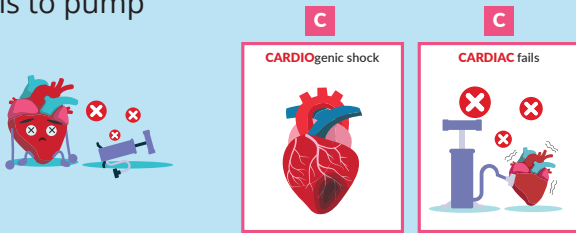


Cardiogenic & Anaphylactic Shock

Pathophysiology

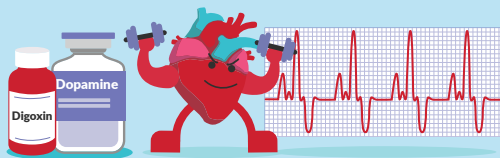
Cardiogenic shock

The heart fails to pump blood out of the heart & to the body like in a heart attack where heart muscles die or heart failure exacerbation - where the heart fails to pump



Treatment

Positive INOtroptic = more FORCEFUL beats



Dopamine & Digoxin both have INOtroptic properties meaning they help the heart to pump more forcefully.

D - Dopamine (vasopressor)

Caution:

- Tachycardia (over 100/min) **NCLEX TIP**
- Arrhythmias

D - Digoxin

Signs & Symptoms

Saunders

A client having a... **myocardial infarction** based on elevated **troponin** levels ... the nurse should **alert the primary** health care provider because the **vital sign changes** ... are **most** consistent with which complication? **Refer to the exhibit.**

- Cardiogenic shock

Cardiogenic shock - Cardiac problem - Heart attack - MI heart tissue DIES - heart FAILS to pump adequately. So just look at the BLOOD Pressure here, when clicking on the exhibit the low blood pressure goes lower & lower!

Client's Chart

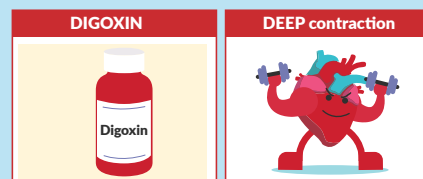
Time	11:00 a.m.	11:15 a.m.	11:30 a.m.	11:45 a.m.
Pulse	92 beats/min	96 beats/min	104 beats/min	118 beats/min
Resp. rate	24 breaths/min	26 breaths/min	28 breaths/min	32 breaths/min
BP	140/88 mm Hg	128/82 mm Hg	104/68 mm Hg	88/58 mm Hg

Saunders

Client with heart failure **exacerbation...** and suspected **state of shock**. The nurse knows which intervention is the **priority** for this client?

- Administration of **Digoxin**

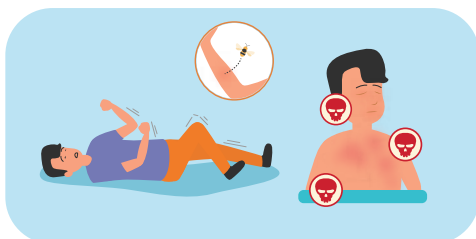
Ds is for **DEEP** Contraction



Anaphylactic Shock

Severe allergic reaction - like from a bee sting or peanut allergy.

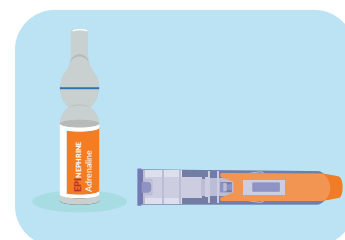
Anaphylactic shock - severe **ALLERGIC** reaction



Treatment

NCLEX TIP

Epinephrine
EpiPen Auto Injector



Perioritization & Delegation

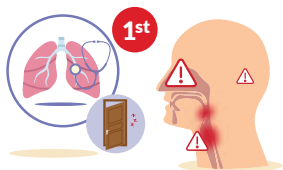
Prioritization Beyond ABCs

ABC's

Highest PRIORITY

Airway = blockage

- **Stridor** "squeak" - Postoperative Thyroid / Parathyroid
- **Anaphylaxis:** throat swelling - EpiPen 1st!
- **Ruptured** esophageal varices - Turn to side lying position



Breathing = RR & Oxygenation

Low PaO₂ (Norm: 80 - 100)

- **60 or less** = HypOXemic Respiratory failure

High CO₂

- **50 or MORE** = HyperCapnic Respiratory failure

Hypoxia

- **Change LOC:** Level of consciousness
- **Mental changes:** Restless, agitation
- **Skin:** Pale, dusky, cool & clammy

SpO₂% (Norm: 95 - 100%)

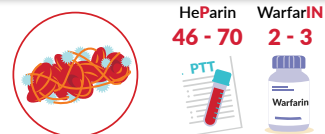
- **COPD** - Low 90% is normal



Circulation

Bleeding:

- Internal:
 - Hypotension "Low BP"
 - Hard stiff "board-like" abdomen
 - **Skin:** Pale, dusky, cool & clammy
- Coagulation:
 - Platelets (norm: 150k - 400k)
 - Less than 150k - **Thrombocytopenia**
 - Less than 50k - VERY RISKY!
 - **Heparin:** PTT 46 - 70
 - **Warfarin:** INR 2 - 3
 - **3 x MAX** range



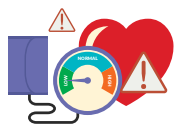
S

Shock



S

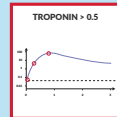
Severely low blood pressure



Circulation

- **Shock** - Severe low BP
 - Urine output **30ml/hr or less**
 - **Skin:** Pale, dusky, cool & clammy
- **Chest pain** (any kind)
 - Troponin **Over 0.5**
- HTN crisis (over **180 systolic**)

T



> 180 sys



Infection

Infection After any surgery!

- Red, warm, smelly drainage at surgical site
- WBC over 10,000
- **Priority:** Neutropenia (Less than 1,500 WBC)
 - Chemotherapy, Immunosuppressants
 - **Low grade fever** will KILL!

Neutropenia

Low Grade FEVER <100.4 F



Labs

Low Glucose

- Less than 70 "Hypoglycemia"
- Hypogly = Brain will DIE!

Kidney problem

- Creatinine **OVER 1.3** = Bad kidney!
- Urine output **30 ml/hr or less** = Kidneys in distress

Side note Kidney Killers

- CT contrast
- Antibiotics: Vancomycin & Gentamicin

Toxic lab levels

- Lithium **1.5 +**
- Digoxin **2.0 +**
- Theophylline **20 +**
- Phenytoin **20 +** (brand: Dilantin)

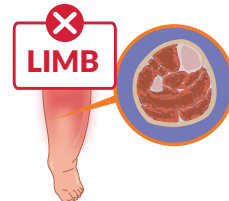
Creatinine > 1.3

Urine Output < 30ml/hr



Pain

- **Lose life or limb**
 - Chest Pain = #1 priority
 - **Cast** / broken limb pain = Pain **Unrelieved with pain meds**



Compartment Syndrome

Notes

Delegation

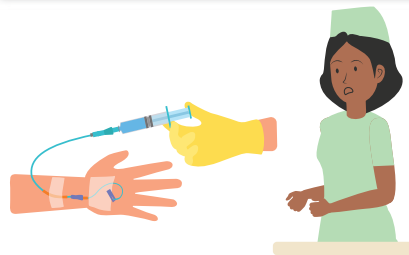
RN's do NOT Delegate below

U	Unstable clients	<ul style="list-style-type: none"> • New admission • Returning to floor after procedure • "Post-Operative" after surgery • Unstable blood sugar, vitals, Lab values • Sudden change RR, neuro status.
E	Evaluation	Trending / Interpreting data • Lab Values, Pain, Vital Signs
A	Assessments	Initial, First , Primary assessments • New admission, "Post-Operative"
T	Teaching	Initial, First , Primary education



NO Delegating: RN ONLY

- **IV PUSH** (IV piggy back varies state to state)
- **Blood** transfusion & blood products
- **Central line** drugs: Chemo, TPN



RN's
Can **NOT** Delegate
Key terms

Never delegate
U E A T

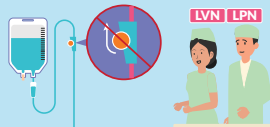
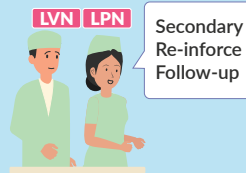
LVN / LPN

Assess, Teach, Monitor

- **Secondary, Re-inforce**, Follow-up
- **NOT** initial, first or primary

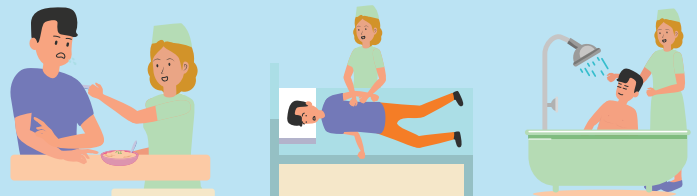
Meds:

- **NO IV push!**
 - Yes: Monitor blood transfusion
 - Yes: Administer **IVPB** meds, but **NO titrating** (changing) rate
 - Yes: Maintain IVs
 - Yes: Calc. & monitor IV flow rates
- **Yes** - PO, SQ, IM



CNA, UAP NCLEX

- V** - Vitals
- A** - Ambulation
- P** - Position changes / Bathing
- E** - Eating
- R** - Recording I & O
- NO** Teaching
- NO** Assessment
- NO** Meds



Yes

- Long-term patient
- Going to be discharged

No

- **NO newly** admitted
- **NO new** post-op
- **NO** evaluation (labs, vitals)
- **Initial** assessment
- **First** teaching

Top Missed NCLEX Questions

Which of the following should the registered nurse delegate to the LPN (LVN)?
Select all that apply.

- 1. Administering subcutaneous insulin
- 2. Assessment of client returning after a ERCP procedure
- 3. Initiating a primary IV medication
- 4. Reinforce teaching for a client recovering from surgery
- 5. Urinary catheterization
- 6. Secondary assessment of clients chest pain

Secondary assessment

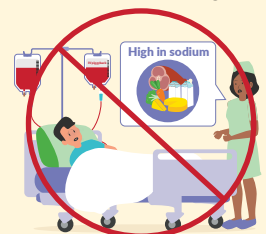


Top Missed NCLEX Questions

A client newly admitted for a myocardial infarction. **Appropriate** activities to assign to **unlicensed assistive personnel (UAP)** would include all the following **except**:

- 1. **Teaching about what foods are high in sodium**
- 2. Recording input & output
- 3. Assisting with **ambulation** to the restroom
- 4. Reporting to the nurse that the patient complained of chest pain

NEVER teaching



Pharmacology

لینک کانال تلگرام: [کلیک کنید](#)

NCLEX Drugs Quick View

Pharm Quick Glance

Medication Classifications

- **Antacids** - reduces hydrochloric acid in the stomach.
- **Antianemics** - increases blood cell production.
- **Anticholinergics** - decreases oral secretions.
- **Anticoagulants** - prevents clot formation,
- **Anticonvulsants** - used for management of seizures and/or bipolar disorders.
- **Antidiarrheals** - decreases gastric motility and reduce water in bowel.
- **Antihistamines** - block the release of histamine.
- **Antihypertensives** - lower blood pressure and increases blood flow.
- **Anti-infectives** - used for the treatment of infections
- **Bronchodilators** - dilates large air passages in asthma or lung diseases (e.g., COPD).
- **Diuretics** - decreases water/sodium from the Loop of Henle.
- **Laxatives** - promotes the passage of stool.
- **Miotics** - constricts the pupils.
- **Mydriatics** - dilates the pupils.
- **Narcotics/analgesics** - relieves moderate to severe pain.

Drug Schedules

Drug Schedules

- **Schedule I** - no currently accepted medical use and for research use only (e.g., heroin, LSD, MDMA).
- **Schedule II** - drugs with high potential for abuse and requires written prescription (e.g., Ritalin, hydromorphone (Dilaudid), meperidine (Demerol), and fentanyl).
- **Schedule III** - requires new prescription after six months or five refills (e.g., codeine, testosterone, ketamine).
- **Schedule IV** - requires new prescription after six months (e.g., Darvon, Xanax, Soma, and Valium).
- **Schedule V** - dispensed as any other prescription or without prescription (e.g., cough preparations, Lomotil, Motofen)

Pregnancy Categories

- Category A—No risk in controlled human studies
- Category B—No risk in other studies.
Examples: Amoxicillin, Cefotaxime.
- Category C—Risk not ruled out.
Examples: Rifampicin (Rifampin), Theophylline (Theolair).
- Category D—Positive evidence of risk.
Examples: Phenytoin, Tetracycline.
- Category X—Contraindicated in Pregnancy.
Examples: Isotretinoin (Accutane), Thalidomide (Immunoprin), etc.
- Pregnancy Category N—Not yet classified

Nursing Considerations

- **Digoxin (Lanoxin)** - Assess pulses for a full minute, if less than 60 bpm hold dose. Check digitalis and potassium levels.
- **Aluminum Hydroxide (Amphojel)** - Treatment of GERD and kidney stones. Monitor constipation.
- **Hydroxyzine (Vistaril)** - Treatment of anxiety and itching. WOF dry mouth.
- **Midazolam (Versed)** - given for conscious sedation. Watch out for respiratory depression and hypotension.
- **Amiodarone (Cordarone)** - diaphoresis, dyspnea, lethargy. Take missed dose any time in the day or to skip it entirely. Do not take double dose.
- **Warfarin (Coumadin)** - Watch for signs of bleeding, diarrhea, fever, or rash. Stress importance of complying with prescribed dosage and follow-up appointments.
- **Methylphenidate (Ritalin)** - Treatment of ADHD. Assess for heart related side-effects and reported immediately. Child may need a drug holiday because the drug stunts growth.
- **Dopamine** - Treatment of hypotension, shock, and low cardiac output. Monitor ECG for arrhythmias and blood pressure.
- **Rifampicin** - causes red-orange tears and urine.
- **Ethambutol** - causes problems with vision, liver problem.
- **Isoniazid** - can cause peripheral neuritis, take vitamin B6 to counter.

Common Drug Antidotes & Therapeutic Ranges

Drug	Antidote
Opioid Analgesics	Nalaxone
Heparin	Protamine sulfate
Coumadin	Vitamin K
Benzodiazepines	Fluzmazenil
Acetaminophen	Acetylcysteine
Magnesium sulfate	Calcium gluconate
Cholinergics	Atropine
Digoxin	Digiband
Beta blockers	Glucagon
Aspirin	Sodium bicarbonate
Cyanide	Sodium thiosulfate

Drug	Therapeutic range
Digoxin	0.5-2.0 mg/ml
Lithium	0.8-1.5 mEq/ L
Dilantin	10-20 mcg/ dL
Theophylline	10-20 mcg/dL
Gentamycin	5—10 mcg/ml (peak), <2.0 mcg/ml (valley)
Vancomycin	20—40 mcg/ml (peak), 5 to 15 mcg/ml (trough)
Carbamazepine	4—10 mcg/ml
Phenobarbital	15—40 mcg/mL
Phenytoin	10—20 mcg/dL
Tobramycin	5—10 mcg/mL (peak), 0.5—2.0 mcg/mL (valley)
Valproic Acid	50—100 mcg/ml

Common Drug Suffixes

CNS Neuromuscular

Family	Drug	Example
-chol	Muscarinic agonist	carbachol
-trop scop-	Muscarinic blocker	Atropine Scopolamine
-stigmine	Achase inhibitor	Neostigmine
-curium -curonium	Nondepolarizing neuromuscular blocker	Atracurium Mivacurium Pancuronium
-ane	Inhaled anesthetic	Halothane
-caine	Local anaesthetic	Lidocaine
-pam -lam	Benzodiazepine	Diapam Lorazepam
-tal	Barbiturate	Phenobarbital
-zine	Typical antipsychotic or antihistamine	Chlorpromazine Thoridazine
-apine -idone	Atypical antipsychotic	Clozapine Risperidone
-capone	COMT inhibitor for parkinson's disease	Tolcapone Entacapone

Cardiovascular

Family	Drug	Example
-olol	Beta blocker	metoprolol
-alol -ilol	Alpha-Beta blockers	Sotalol cardiolol
-dipine	Vascular Calcium channel blocker	Nifedipine
-zosin	Alpha -1 blocker	Terazosin Doxazosin
-pril	Ace inhibitor	Lisinopril
-sartan	ARB	Losartan
-darone	Antiarrhythmic	Amiodarone
-statin	Anti hyperlipidemic Hmg coa reductase inhibitor	Rosuvastatin
-zolamide	Carbonic anhydrase inhibitor	Acetazolamide
-semide	Loop diuretic	Furosemide
-parin	Low molecular weight heparin	Enoxaparin
-rudin	Direct thrombin inhibitor	Lepirudin

Infectious Disease

Family	Drug	Example
-penam	Cell wall inhibitor "Broad spectrum"	Imipenem Meropenem
-floxacin	Fluoroquinolone	Ciprofloxacin Levofloxacin
-conazole "Azole"	Antifungal	Ketoconazole Fluconazole
-quine	Antimalarial	Chloroquine Primaquine
-ovir	Antiviral "DNA polymerase inhibitors" treats herpes	Acyclovir Ganciclovir Valacyclovir
-ivir	Neuraminidase inhibitor "treats influenza"	Zanamivir
-avir	Antiviral protease inhibitor "treats HIV/AIDS"	Indinavir Ritonavir

GI

Family	Drug	Example
-tidine	H2 blocker	Cimetidine
-prazole	PPI	Pantoprazole
-setron	5HT3 blocker "Anti Emetic"	Ondansetron

Oncology

Family	Drug	Example
vin-	Microtubule inhibitor	Vincristine Vinblastine
-rubicin	Cancer drug	Doxorubicin
-mab	Monoclonal antibody drug	Rituximab
-tinib	Tyrosine kinase inhibitor	Imatinib

Drug Activity in the body

Pharmaceutic Phase

During this phase the drug is dissolved in the body. Liquid medications and IV medications are already dissolved therefore they absorb much faster in the body. A tablet or capsule must pass through the GI tract to become dissolved. Enteric coated medications are time released capsules or tablets that must meet the alkaline environment of the small intestine before it dissolves.

Pharmacokinetic Phase

This phase refers to how the drug is transported and distributed. The drug can be distributed or transported via absorption, distribution, metabolism, and excretion.

- **Absorption:** moves the drug from the point of administration to the body fluids via active transport, passive transport, pinocytosis.
- **Distribution:** The systemic circulation distributes drugs to various body tissues. Distribution depends on protein binding, blood flow, and solubility. The drug comes into contact with albumin or remain free, only free circulating particles can produce a therapeutic effect.
- **Metabolism:** Or biotransformation, the body changes the drug to be more or less active and excretable. Most are metabolized by the liver or kidneys, lungs, plasma, and intestinal mucosa.
- **Excretion:** Elimination of the drug from the body after the liver renders it inactive it is then excreted by the kidneys via urine.

Pharmacodynamic Phase

Deals with the drugs action and effect on the body.

- **Primary effect:** The desired therapeutic effect.
- **Secondary effect:** Any other effect the drug has on the body. For example, sildenafil was made for treatment of hypertension. It was also found to help with Erectile dysfunction which is its secondary effect. A drug exerts its action by two main mechanisms.
- **Alteration in cellular function**
- **Alteration in cellular environment**

Phases Of Activity

- Pharmaceutic phase
- Pharmacokinetic phase
- Pharmacodynamic phase.

Influences On Absorption

- Route: IV/IM are the fastest to be absorbed.
- Solubility
- Condition of body tissues

Influence On Metabolism

- Age
- Weight
- Sex
- Disease
- Route

Interactions

- **Additive drug interaction:** The combined effect of two drugs has an equal effect if the drug was given alone.
- **Synergistic interaction:** When drugs interact and create an increased effect example: Hypnotics and alcohol when taken together will cause increased CNS depression.
- **Antagonistic interaction:** One drug interferes with the action of another for example : Naloxone reverses the effects of opioids.
- **Food interaction:** Some food and decrease or increase the metabolism of a drug.

Effects On The Nervous System

- **Sympathomimetic:** physiological effects characteristic of the sympathetic nervous system by promoting the stimulation of sympathetic nerves.
- **Sympatholytic:** antagonistic to or inhibiting the transmission of nerve impulses in the sympathetic nervous system.
- **Parasympathomimetic:** stimulates the parasympathetic nervous system (PSNS). These chemicals are also called cholinergic drugs because acetylcholine. (ACh) is the neurotransmitter used by the PSNS.
- **Parasympatholytic:** reduces the activity of the parasympathetic nervous system.

Key Terms

- **First pass effect:** The concentration of a drug is greatly reduced before it reaches the systemic circulation
- **Half life:** Time it takes for the body to eliminate 50% of the drug.
- **Onset of action:** Time it takes for the drug reach therapeutic effect after administration.
- **Peak concentration:** When the absorption rate equals the elimination rate.
- **Duration:** How long the drug produces a therapeutic effect.
- **Pharmacogenomics:** People's response to medication are variable. Genetic makeup can alter how a drug works.
- **Teratogen:** Any substance that causes abnormal development of a fetus.
- **Idiosyncrasy:** unusual or abnormal reaction to a drug.
- **Drug tolerance:** Decreased response to a drug that requires an increase in dosage.
- **Cumulative drug effect:** Seen in people with liver or kidney disease, the body is unable to excrete one dose of the drug before the next dose is given causing an accumulation of the drug in the system.

Reactions

- **Adverse drug reactions:** Undesirable drug effects. They may be mild, severe or life threatening. May occur at the first dose or after subsequent doses.
- **Allergic drug reactions:** Immediate hypersensitivity reaction. Occurs because the individual's immune system responds to the drug as a foreign substance. Some reactions occur immediately or they can take time. They can be mild, severe or life threatening.
- **Anaphylactic shock:** Extremely serious reaction that usually occurs immediately after drug administration. This requires immediate medical intervention to raise the BP and improve breathing. Can be fatal if not treated immediately.
- **Angioedema:** Allergic reaction manifested by collection of fluid in the subcutaneous tissue. Most commonly affects the eyes, lips, mouth and throat.
- **Toxic reaction:** Toxic levels build up in the body when the body cannot excrete the drug.

Need to know medications for NCLEX I

ANALGESICS

- Opioids
- ↑ pain threshold by altering pain perception

Common Brand Names	Generic Names
Demerol	Meperidine HCL
Dilaudid	Hydromorphone
Duragesic, Sublimaze	Fentanyl
Morphine Sulfate	Morphine Sulfate
Vicodin, Norco	Hydrocodone

BENZODIAZEPINES (Pam & Lam)

- Enhance/facilitate GABA, an inhibitory neurotransmitter

Common Brand Name	Generic Name
Xanax	Alprazolam
Valium	Diazepam
Ativan	Lorazepam
Versed	Midazolam

ANXIOLYTICS

- Azaspirodecanedione derivatives
- ↓ anxiety. Action unknown, thought to act by ↓ the amount/action of serotonin in certain parts of the brain.

Common Brand Names	Generic Names
Buspar	Buspirone Hydrochloride

ANTICONVULSANTS

↑ interval between seizures

Common Brand Name	Generic Name
Dilantin	Phenytoin
Neurontin	Gabapentin
Tegretol	Carbamazepine
Depakote	Valproic Acid

*Neurontin is sometimes prescribed for chronic pain neuropathy

*Monitor blood levels: Dilantin, Tegretol, and Depakote

ANTIDEPRESSANTS

- SSRIs
- Act by inhibiting serotonin reuptake in CNS

Common Brand Names	Generic Names
Celexa	Citalopram
Effexor	Venlafaxine
Lexapro	Escitalopram Oxalate
Paxil	Paroxetine
Prozac	Fluoxetine
Zoloft	Sertraline

TRICYCLICS

- Act by blocking reuptake of norepinephrine and serotonin at nerve endings

Common Brand Names	Generic Names
Elavil	Amitriptyline

Need to know medications for NCLEX II

SEDATIVES/HYPNOTICS

Common Brand Names	Generic Name
Ambien	Zolpidem Tartrate
Lunesta	Eszopiclone

ANTICOAGULANTS

- Interferes with blood clotting processes. Used to prevent thrombus and embolus

Common Brand Names	Generic Name
Coumadin	Warfarin
Lovenox	Enoxaparin
Heparin	Heparin Sodium-from beef/pork

ANTIPLATELETS

- Interferes with the 1ST step in the clotting process: platelet aggregation

Common Brand Names	Generic Name
ASA - aspirin	Acetylsalicylic Acid
Plavix	Clopidogrel

- *Pepto-Bismol contains aspirin

DIURETICS

- ↓ fluid volume in the body
- **NI= monitor daily weight under standard conditions, assess BP, I&O, presence of edema

LOOP DIURETICS

- Inhibit reabsorption of Na⁺, Cl⁻, K⁺ and H₂O (in loop of Henle), but also in proximal and distal renal tubules

Common Brand Names	Generic Name
Bumex	Bumetanide
Demadex	Torsemide
Lasix	Furosemide

Thiazide Diuretics

- ↑ excretion of Na⁺, Cl⁻, K⁺, H₂O in distal tube and ascending loop of Henle

Common Brand Names	Generic Name
Diuril	Chlorothiazide Sodium
Hydrodiuril, HCTZ	Hydrochlorothiazide
Zaroxolyn	Metolazone

POTASSIUM-SPARING DIURETICS

- Contains aldosterone at receptor sites in distal tubule; excrete Na⁺, Cl⁻, H₂O, not K⁺

Common Brand Names	Generic Name
Aldactone	Triamterene
Dyrenium	Spiroinolactone

Need to know medications for NCLEX III

ANTIHYPERTENSIVES -(PRIL)

- ACE Inhibitors
- Block the conversion of angiotensin I to angiotensin II (potent vasoconstrictor)-Causing vasodilation and PVR (peripheral vascular resistance) without ↓ cardiac output/rate/contractility-Aldosterone is also blocked, causing a ↓ in Na⁺ and H₂O retention. Side effect: Nagging, nonproductive cough, angioedema

Common Brand Name	Generic Name
Altace	Ramipril
Capoten	Captopril
Prinivil, Zestril	Lisinopril
Vasotec	Enalapril

*check potassium level

ALPHA 2 ANTAGONISTS

- centrally-acting anti-hypes causing ↓ amounts of norepinephrine to be released, ↓ sympathetic activity

Common Brand Names	Generic Names
Catapres	Clonidine

BETA BLOCKERS-(LOL)

- Prevent sympathetic stimulation of the heart, thus ↓ HR and contractility.
- ↓ myocardial irritability, depress automaticity of SA node, ↓ speed of AV & intraventricular conduction
- suppress release of renin from the kidneys.

Common Brand Name	Generic Name
Inderal	Propranolol
Lopressor	Metoprolol Tartrate
Toprol-XL	Metoprolol Succinate
Tenormin	Atenolol

• *May cause bronchoconstriction.

ALPHA 1 ADRENERGIC BLOCKERS-(ZOSYN)

- Dilate blood vessels and ↓ (PVR)

Common Brand Names	Generic Name
Hytrin	Terazosin
Minipress	Prazosin

ALPHA & BETA ADRENERGIC BLOCKERS-(LOL)

- Alpha blockers-block alpha 1 receptors → vasodilation. Beta blockers-block beta 1 & beta 2 receptors:
- → reduce HR, myocardial irritability, force of contraction
- → depress automaticity of SA node, ↓ speed of AV & intraventricular conduction → suppress release of renin from the kidneys

Common Brand Names	Generic Name
Coreg	Carvedilol
Trandate, Normodyne	Labetalol

CALCIUM CHANNEL BLOCKERS

- Block Na⁺ influx into the beta-receptors
- ↓ force of myocardial contraction/conductivity
- ↓ HR, ↓ PVR.
- Produce relaxation of coronary & vascular smooth muscle; dilates coronary arteries; ↑ myocardial O₂ delivery, ↓ O₂ demand.
- Side effect: edema, dysrhythmias

Common Brand Name	Generic Name
Cardizem	Diltiazem
Norvasc	Amlodipine
Procardia	Nifedipine
Verelan, Isoptin, Calan	Verapamil

Need to know medications for NCLEX IV

ARBS-(SARTAN)

- Block binding of angiotensin II at the receptor site, preventing vasoconstriction & aldosterone secreting effect usually caused by angiotensin II

Brand Names	Generic Name
Atacand	Candesartan
Cozaar	Losartan
Diovan	Valsartan

CARDIAC GLYCOSIDES

- Positive inotropes (improve contractility and cardiac output)
- Negative dromotropic slow AV conduction rate.
- Negative chronotropes ↓ HR & improve cardiac output.
- Act as antiarrhythmic via tropic effect.
- **NI=Monitor K⁺ level, S/S toxicity

Brand Names	Generic Names
Lanoxin	Digoxin

- *Monitor Dig & K⁺ level, S/S toxicity

BIGUANIDES

- ↓ hepatic glucose production & intestinal absorption of glucose
- improves insulin sensitivity (tissue response to insulin)

Brand Names	Generic Names
Glucophage	Metformin

- *Initial drug therapy for newly DX T2DM.
- *Most common side effect: GI.
- *Rare side effect: Lactic acidosis

Brand Names	Generic Names
Januvia	Sitagliptin

GLIPTINS (DPP-4 Enzyme Inhibitors)

- ↑ levels of incretins-naturally occurring substances control blood sugar by ↑ insulin release, especially after a meal.

NITRATES

- Peripheral and coronary vasodilators.
- Treat/prevent angina, ↓ BP ↓, preload/afterload, ↓ myocardial O₂ demand.
- **NI=rotate transdermal patches/remove after 12-14 hours =(“patch free” interval of 10-12 hours daily)

Common Brand Names	Generic Name
Nitro BID Tridil Transderm Nitro Nitrostat	Nitroglycerin
Imdur	Isosorbide Mononitrate
Isorbid Isordil Sorbitrate	Isosorbide Dinitrate

- *Check Potassium Level

ANTI-DIABETICS

- Sulfonylureas
- Promotes insulin secretion by the pancreas; ↑ tissue response to insulin

Brand Names	Generic Name
Amaryl	Glimepiride
Diabeta Glynase Micronase	Glyburide
Glucotrol (XL)	Glipizide

GLITAZONES-(GLITAZONE)

- Decrease insulin resistance

Common Brand Names	Generic Name
Actos	Pioglitazone
Avandia	Rosiglitazone

- *Edema; HF secondary to renal retention of fluid

Need to know medications for NCLEX V

PROTON PUMP INHIBITORS (PPI)

- Block final step of gastric acid production
- Ulcer-reducing

Brand Names	Generic Name
Nexium	Esomeprazole
Prilosec	Omeprazole
Protonix	Pantoprazole

ANTIEMETICS

- Act by ↓/preventing nausea & vomiting

Brand Names	Generic Name
Phenergan	Promethazine
Zofran	Ondansetron

MISCELLANEOUS ANTILIPIDEMICS

Brand Name	Generic Name
Zetia Selective cholesterol absorption inhibitor	Ezetimibe Inhibits absorption of cholesterol by small intestine
TriCor Fibric Acid Derivative	Fenofibrate ↓ triglyceride synthesis in liver
Lopid Fibric Acid Derivative	Gemfibrozil ↓ triglyceride synthesis in liver
Questran Bile acid sequestrant (food additive improving quality)	Cholestyramine Binds bile acids, impeding absorption (elimination in feces)

H2-HISTAMINE RECEPTOR ANTAGONISTS

- Inhibit histamine at histamine H2-receptor sites, gastric acid secretion

Brand Names	Generic Name
Pepcid	Famotidine
Zantac	Ranitidine

ANTILIPIDEMICS

- STATINS (HMG-COA REDUCTASE INHIBITORS)
- Inhibits HMG-CoA reductase, an early step in cholesterol production

Brand Names	Generic Name
Crestor	Rosuvastatin
Lipitor	Atorvastatin
Zocor	Simvastatin

- *Rhabdomyolysis, Hepatotoxicity

GI MEDS

- Non-absorbable medications used prophylactically to treat/prevent ulcers and GERD
- GI Protectant
- Mixes with gastric acid to form a protective coating of gastric mucosa

Brand Names	Generic Names
Carafate	Sucralfate

GI STIMULANT

- Act by ↑ resting tone of esophageal sphincter
- Promotes gastric emptying/intestinal transit

Brand Names	Generic Names
Reglan	Metoclopramide

- *Sometimes used with diabetic gastroparesis

Need to know medications for NCLEX VI

STOOL SOFTENERS

- surface tension of interfacing liquid contents of the bowel-promoting additional liquid into stools=softer mass.

Brand Names	Generic Name
Colace	Docusate Sodium
Surfak	Docusate Calcium

ANTI-INFECTIVES

- Aminoglycosides

Brand Names	Generic Name
Gentamicin	Gentamicin Sulfate
Streptomycin	Streptomycin Sulfate
Tobramycin	Tobramycin Sulfate

RESPIRATORY MEDICATIONS

- Bronchodilators
- Relax bronchial smooth muscle

Brand Names	Generic Names
Proventil, Ventolin	Albuterol Sulfate
Brovana	Arformoterol Tartrate
Foradil	Formoterol Fumarate
Xopenex	Levalbuterol
Spiriva	Tiotropium
Advair Advair Diskus	Fluticasone/Salmeterol • *combo drug (flut-potent anti-inflam effects/Salm-bronchodilator)

CORTICOSTEROIDS

- inflammation, produce intentional immunosuppression, and treat adrenocortical insufficiency

Brand Names	Generic Names
Celestone	Betamethasone
Decadron	Dexamethasone
Deltasone	Prednisone
Solu-Cortef	Hydrocortisone
Solu-Medrol	Methylprednisolone

- *Monitor WBC and Blood Glucose levels

ANTIPROTOZOAL

Brand Names	Generic Names
Flagyl	Metronidazole

- *No alcohol products, including mouthwash, aftershave, deodorant, bath splashes.
- Disulfiram- type reaction may occur (flushing, nausea, vomiting, palpitations).
 - β -LACTAMS
 - β -Lactam antibiotics include: PCNs, cephalosporins, monobactams, carbapenems
- *Assess for allergies to any β -Lactam antibiotic

CEPHALOSPORINS

Brand Name	Generic Name
Rocephin	Ceftriaxone
Maxipime	Cefepime
Mefoxin	Cefoxitin
Ancef	Cefazolin

Need to know medications for NCLEX VII

PENICILLINS

Brand Names	Generic Names
Amoxil	Amoxicillin
Omnipen	Ampicillin
Unipen	Nafcillin
Pipracil	Piperacillin
Zosyn	Piperacillin/Tazobactam

SULFONAMIDES

Brand Names	Generic Names
Bactrim Bactrim DS Septra	SMZ-TMP Trimethoprim-Sulfa methoxazole

*Avoid or use with extreme caution if allergic to sulfa: Erythromycin-Sulfisoxazole, Sulfasalazine, Dapsone, Sulfonamides, Celebrex, Imitrex, Lasix, Hydrochlorothiazide HCTZ

VANCOMYCIN

Brand Names	Generic Names
Vancocin	Vancomycin Hydrochloride

- *Nephrotoxicity, Ototoxicity, Red-Man Syndrome
- *Peak: 30 minutes to 1 hour after administration.
- *Trough: 30 minutes before the next dose.

CARBAPENEMS

Brand Names	Generic Name
Invanz	ErtapenemSulfate
Merrem	MeropenemSulfate
Primaxin	ImipenemSulfate

FLUOROQUINOLONES (oxacin)

Brand Names	Generic Name
Cipro	Ciprofloxacin
Levaquin	Levofloxacin

- *Tendon rupture.
- *Adjust dosage for renal patients.

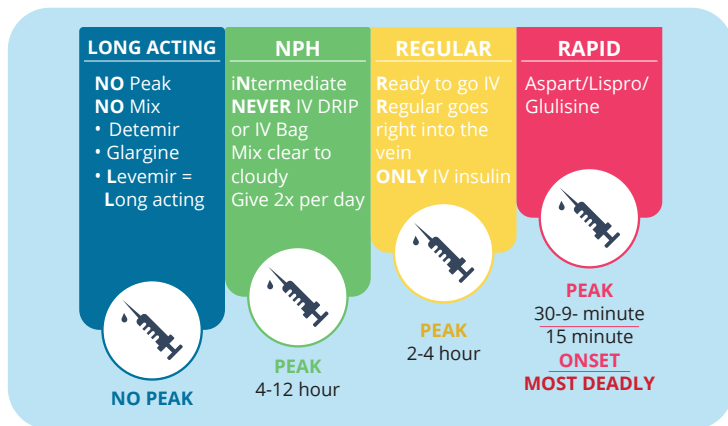
TETRACYCLINES

Brand Names	Generic Name
Tetracycline	Tetracycline
Vibramycin	Doxycycline

Need to know medications for NCLEX VIII

INSULINS

- blood glucose by transporting glucose into cells
- promoting conversion of glucose to glycogen
- inhibiting the liver from changing glycogen to glucose



Types of Insulins	Names
Rapid-Acting	Insulin Lispro-Humalog Insulin Aspart-Novolog
Short-Acting	Regular Insulin-Humulin R • Regular insulin is the only one given IV • Concentrated insulin-Insulin U-500
Intermediate-Acting	NPH-Humulin N, Novolin R
Long-Acting	Insulin Glargine-Lantus • Cannot mix with others Insulin Detemir-Levemir
Premixed	NPH/REG • Humulin 50/50 • Humulin 70/30 • Novolin 70/30 Aspart protamine/aspart • Novolog Mix 70/30 Lispro protamine/lispro • Humalog Mix 75/25

Names	Onset	Peak	Duration
Lispro (Humalog)	5m	60-90min	4-6h
Aspart (Novolog)	10-20m	1-3h	3-5h
Regular (Humulin R)	SQ: 30-60m IV: 10-30m	SQ: 2-4h IV: 15-30m	SQ: 5-7h IV: 30-60m
U-500	2-3h	5-7h	
NPH (Humulin N, Novolin R)	8-12h	18-24h	
Glargine (Lantus)	None	24h	
Detemir (Levemir)	3-14h	24h	
NPH (Humulin 50/50, Humulin 70/30, Novolin 70/30)	4-8h	24h	
Aspart Protamine/aspart (Novolog mix 70/30)	1-4h	24h	
Lispro Protamine/lispro (Humalog mix 75/25)	2.8h	24h	

Antibiotics

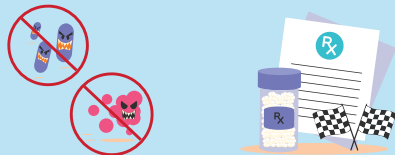
Antibiotics: 6 TEST TIPS OF ABX

1. Finish med

To prevent SUPER infection!

Key Words

- Take until **all med is finished**
- DO NOT** stop when feeling better



2. Accidental pregnancy

C - Child Care
C - "-Cillins" - Penicillin, Amoxicillin
C - "-Cycline" - Doxycycline, Tetracycline

Key Words

- Oral contraceptives ineffective
- Use additional contraception like IUD.



3. NO alcohol

ABX are hard on liver



4. NO FOOD

MTF "Move The Food"

- M** - Macrolides - Azithromycin
- T** - Tetracycline - Doxycycline
- F** - Fluoroquinolones - Levofloxacin

Key Words

- Take on **EMPTY** stomach
- Full glass of water



5. NO sun

AVOID "Fun The Sun"

- F** - Fluoroquinolones - Levofloxacin
- T** - Tetracycline - Doxycycline
- S** - Sulfa drugs = SUN burns

Trimethoprim - sulfa methoxazole
(Brand: Bactrim)



5. NO sun

Others

- Sulfonylureas (Glyburide)
- Diuretics (thiazide/loops)

Key Words

- Photosensitivity
- Avoid "direct sun exposure"
- Sun Burns (Wear Sun Block & Avoid Sun)



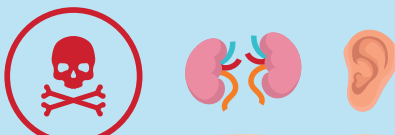
6. SUPER Toxic (Kidney + Ears)

Vancomycin
Gentamicin
Neomycin

Key Words

PEAK & Trough

- Too HIGH = Kidneys DIE**
- Too Low = Infections Grows**



6. SUPER Toxic (Kidney + Ears)

Key Words

REPORT: Signs of Toxicity

- Ear Damage "Ototoxicity"
 - Vertigo (loss of balance)
 - Tinnitus (ringing of the ears)
- Kidney Damage "Nephrotoxic"
 - REPORT IMMEDIATELY!!**
 - Creatinine **OVER 1.3** = Bad Kidney
 - BUN **Over 20**
 - Urine output **30ml/hr or LESS** = Kidney Distress



Don't let
NCLEX TRICK YOU



Mycins

"- Thromycin" like Azi**THRO**mycin
"-floxacin" like Cipro-flox-acin



Penicillin & Cephalosporins

Drug name:

Penicillin
Amoxicillin
Ampicillin
Piperacillin Tazobactam

Cephalosporins

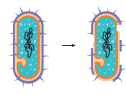
- **Cephalexin** (brand: Keflex) **NCLEX TIP**
- **Cefazolin**
- **Ceftriaxone** (brand: Rocephin)

Penicillin end in **CILLIN**

Cephalosporins start with **CEPH**

MOA:

Weakens bacteria cell wall



Patient teaching:

Key Words

- Oral contraceptives are ineffective
- Use additional contraception

Penicillin cause accidental pregnancy since it BUMPS the PILL



Both are **PREGNANCY SAFE** and **BREASTFEEDING SAFE**

Administration

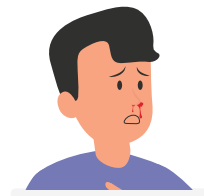
- **"-Cillin"**
- **KEY Terms:**
 - **Take with food** if GI upset (nausea/ vomiting/diarrhea)
 - **Shake well** before use

COMMON SIDE EFFECTS

-Ceph = Diarrhea



-Cillins = Bleeding
 (monitor platelet count)



KEY POINT & MEMORY TRICK

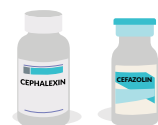
C

CROSS SENSITIVITY
 (ALLERGY)



C

CEPH / CEF
 (CEPHALEXIN, CEFAZOLIN)



C

CILLIN
 (AMOXACILLIN)

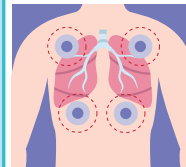


DURING A REACTION

STOP
 ("HOLD") MEDICATION



ASSESS
 the type of reaction
 • Auscultate Lungs



EPINEPHRINE
 (prepare to admin)



Anaphylaxis allergy:
 "-Cillins" & "Ceph"
 Nurse should **CLARIFY PRESCRIPTION**



Common NCLEX Question

What is the best action for the nurse to take before administering amoxicillin to a patient with allergies to levofloxacin & ceftriaxone.

- 1. Clarify the order with pharmacy
- ✓ 2. Ask the patient about the type of reaction they have to ceftriaxone.
- 3. Notify the HCP of the allergy to ceftriaxone.
- 4. Administer meds separately with normal saline in between.

Notes

Vancomycin

GLYCOPEPTIDES CLASS & AMINOGLYCOSIDE CLASS

Glycopeptides Class

Vancomycin

Indication:



Given for serious infections like: MRSA & C Diff in the gut

MOA:

Inhibits cell wall synthesis

KEY Words:

PEAK & Trough

- Check 15 – 30 minutes BEFORE “next dose” or “administration”
Draw & review levels
- REPORT and HOLD Over 20 = Vancomycin
- Draw & Review levels



Red mans Syndrome

Rapid infusion

Sudden onset of severe:

- Hypotension
- Flushing & pruritis “itching”
- Red rash on face, neck, chest & extremities



ANAPHYLAXIS

- Hive
- Wheezing
- IMMEDIATELY STOP infusion & administer Epinephrine!
E – Edema “Angioedema”
P – Pruritis & Hives
I – Insp. / Exp. “Wheezes”



Key NCLEX Tips:

KEY Words:

REPORT Signs of Toxicity

- Ear Damage “Ototoxicity”
NCLEX TIP - Vertigo (loss of balance)
NCLEX TIP - Tinnitus (ringing of the ears)

Kidney Damage “Nephrotoxic”

REPORT / NOTIFY HCP

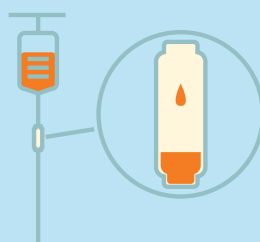
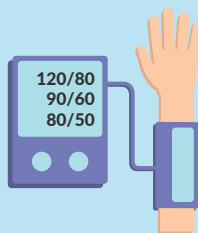
- Creatinine OVER 1.3 = Bad Kidney
- BUN Over 20
- Urine output 30ml/hr or LESS = Kidney Distress

KEY POINT:

- Assess site every 30 minutes for: pain, redness & swelling

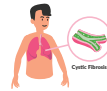
KEY Words:

- Monitor BP
- Infuse SLOWLY at least over 60 minutes (<10mg/min)



Aminoglycosides Class

- Tobramycin
- Gentamicin
- Neomycin



Indication:

Treat infections in cystic fibrosis

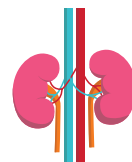
MOA:

Blocks protein synthesis of the bacteria to STOP bacterial growth but the NCLEX does not focus on this, but rather on the way this drug can HARM THE PATIENT

NCLEX

KEY POINT:

- Very Toxic in combo with Vancomycin
- ***Notify HCP of Increasing BUN/Creatinine!



Common NCLEX Question

A patient in sepsis is prescribed several antibiotics during their hospital stay. What patient teaching should be included? (see exhibit for list of meds)

- Levofloxacin
- Doxycycline
- Vancomycin
- Azithromycin

- 1. Avoid direct sun exposure
- 2. Oral birth control ineffective
- 3. Take until symptoms subside
- 4. Monitor QT interval
- 5. Supplement with vitamin B6
- 6. Monitor creatinine and BUN

Notes

Macrolides

Azithromycin

Drug name:

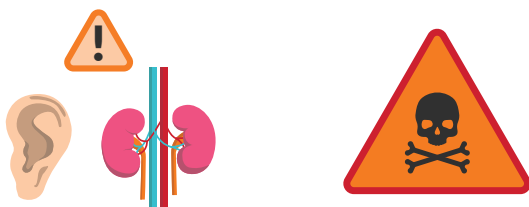
Macrolides end in "**-thromycin**"

- **Azythromycin**
- **Erythromycin**

YES it's TRUE, they sound a lot like our other **mysins**, but these are **THRO**mycin.

THROmycin
"mysin"

They are not too hard on RENALS or EARS but they are **DANGEROUS** in their own way.



Key Words:

KEY POINT:

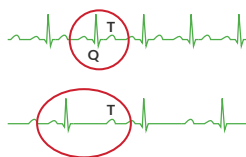
- Prolonged QT
- **MONITOR ECG** and report changes to Dr. or HCP!!!!



MEMORY TRICKS

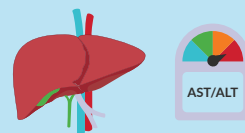
Thromycin

Throws ECG waves
"Prolonged **QT** intervals"



Key NCLEX Tips:

They are also: Hepatotoxic or **LIVER TOXIC**.
So monitor Liver Labs (ALT/AST):
Report increase to HCP

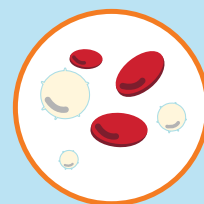


Be careful with acetaminophen for Fever during infection. Tylenol is liver **TOXIC**



Side Effects:

Common SIDE EFFECTS - Now don't be tricked!
Common test questions ask If you stop giving during for Nausea, vomiting, fever & decreasing WBC's



- ✓ Nausea and vomiting is common since it's taken on empty stomach
- ✓ Fever is expected during an infection, so keep on giving
- ✓ Decreasing WBC means infection is improving so **DON'T BE TRICKED!**

Notes

Tetracyclines

Drug name:

Tetracyclines
Doxycycline

KEY Points:

- NOT Pregnancy Safe
- Tooth Discoloration
- Sun Burns – Wear Sun

Memory Trick:

- Cycling is DANGEROUS - Not safe for a pregnant mothers!



- You can get BUGS in your teeth while cycling on a bike leading to tooth discoloration



- Use SUN BLOCK - when out for cycling around



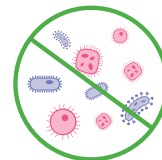
Indication:

Mainly used for SKIN ACNE



MOA:

It blocks protein synthesis to **STOP** bacterial growth.



Patient Teaching:



Key Terms:

- Use additional contraception
- Take on empty stomach
- **Sit Up 30 minutes** after taking...
DO NOT LAY DOWN!!!
- **AVOID - Calcium products:**
 1. **NO Dairy** (milk, cheese)
 2. **NO Antacids** (tums, Milk of Mg)
 3. **NO Iron**



Notes

Metronidazole

Indication:

Metronidazole (brand: Flagyl)

- #1 Drug to treat C-diff infection
- STI (Trichomoniasis) **HESI TIP**



KEY POINT:

- Avoid **ETOH** (alcohol) During & 3 days after treatment
- Patients will have violent **vomiting & cramping** if alcohol is consumed during and after treatment



Normal Side effect

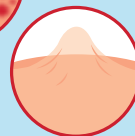
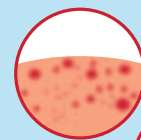
NO need to report!

- Dark urine "Discoloration" (brown & rusty)
- Metallic taste (Metro-Metallic Taste)



DEADLY Side effect

- Report any new rash or skin peeling!
- Stevens-Johnson Syndrome, which is **NECROSIS** of skin and mucous membranes! Always **TEACH** patients to **REPORT** immediately



Stevens-Johnson Syndrome

Memory Trick:

M

E

T

R

O

METALLIC

Taste & Dark Urine



NORMAL

ETOH

Avoid



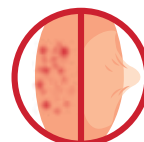
TREATS

C Diff & STI
(Trichomoniasis)



RASH

or Skin Peeling



REPORT

OH NOT

"Dazole"ing



Notes

Sulfonamides & Fluoroquinolones

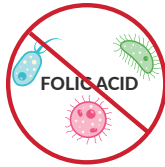
Sulfonamides

Trimethoprim
sulfamethoxazole
(Brand: Bactrim)



MOA:

Stops bacteria folic acid synthesis



KEY POINT

Rash while on Glyburide?
Potential allergy to sulfa drugs!!!!



NOT Pregnancy Safe



Memory Trick:

S

U

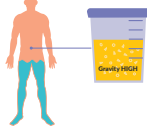
L

F

SUNBURN
(sunblock & avoid sun)



URINE
Crystals & Specific Gravity
HIGH = DRY!



LOVE
water!! 2-3L per day



FOLIC ACID
(take daily)



Key NCLEX Tips:

Contraindications:
Hypersensitivity to sulfa drugs
Assess for allergies to sulfonylureas like Glyburide - An oral diabetic drug

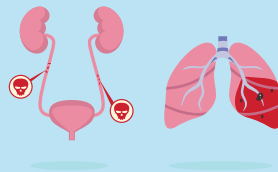


Fluoroquinolones

- Levofloxacin (Brand: Levaquin)
- Ciprofloxacin

Indication:

Given for Pneumonia & UTIs



KEY POINTS:

- Avoid Sun "direct sun exposure"
- Achilles** tendon **RUPTURE!!** **TEST TIP**
- REPORT NEW MUSCLE PAIN!
- Contraindication: Tendonitis

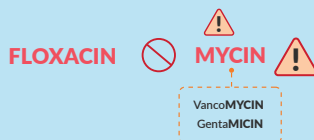


Key NCLEX Tips:

Many students want to avoid **FLOXACIN** when creatinine & BUN is elevated.

Floxacin sounds very similar to **MYCIN** (antibiotics that kill the kidneys)
Look at the entire suffix so you don't end tricked.

DON'T GET TRICKED



Memory Trick:



Notes

Phenazopyridine

Drug name:

Phenazopyridine
(Brand: Pyridium))

NOT an Antibiotic

Indication:

UTI Analgesic given for Pain relief during the burning & irritation of UTIs



Memory Trick:

Since its used to ease the firey burn from UTI's & It turns body fluids **RED** & **ORANGE** Like a FIRE

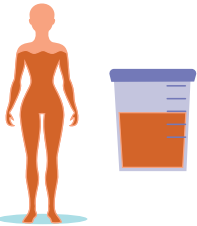
PYROdine



KEY POINT

HESI Question

Normal - No need to Report **Red + Orange** urine & body fluids



REPORT:
Yellow SKIN / Sclera = Jaundice



Since it pyro-dine, **STAINS** underwear, clothing & bedding

Patient Teaching:

- Wear **sanitary pads**
- Wear **glasses** instead of contacts while taking medicine
- **NEVER STOP** antibiotic therapy!
NOT EVEN when starting to feel better



Commonly patients FEEL better with this med & think the infection is GONE So they STOP their Antibiotic, that's a **BIG NO NO!**



Always teach clients to **FINISH THE ENTIRE COURSE OF ABX!**



Notes

Anti Infeetives

- Aminoglycosides

How do they work? "Action"

The aminoglycosides exert their bactericidal effect by blocking the ribosome from reading the mRNA, a step in protein synthesis necessary for bacterial multiplication.

Indications

- Infections caused by gram negative organisms
- Before abdominal surgery to reduce normal flora in the bowel

Adverse Reactions

- Nausea
- Vomiting
- Anorexia
- Rash
- Urticaria
- Nephrotoxicity
- Ototoxicity
- Neurotoxicity

Contraindications & Caution

- Hypersensitivity
- Pre existing Hearing loss
- Myasthenia gravis
- Parkinsonism
- Pregnancy & lactation

Nursing management

- Before administering any antibiotic be sure to evaluate the results of the culture and sensitivity test.
- Take the drug at the prescribed time intervals. These time intervals are important because a certain amount of the drug must be in the body at all times for the infection to be controlled..
- Always report serious adverse reactions, such as a severe hypersensitivity reaction, respiratory difficulty, severe diarrhea, or a decided drop in blood pressure, to the primary health care provider immediately, because a serious adverse reaction may require emergency intervention.
- Monitor temperature and evaluate the effectiveness of the treatment via labs and vitals.
- Neuromuscular blockade or respiratory paralysis may occur with the administration of aminoglycosides. It is imperative to monitor respiratory status and report any respiratory difficulty immediately.
- To detect ototoxicity, carefully evaluate the patient's complaints or comments related to hearing, such as a ringing or buzzing in the ears.

Interactions:

- Cephalosporins: Increased risk of nephrotoxicity
- Loop diuretics (water pills): Increased risk of ototoxicity
- Pavulon or Anectine (general anesthetics): Increased risk of neuromuscular blockade

Favorable Outcomes

- Patient reports comfort without fever.
- Orientation and mentation remain intact.
- Patient has adequate renal tissue perfusion.
- No evidence of injury is seen due to visual or auditory disturbances.
- Patient does not experience diarrhea. (Ford 91)

Generic	Trade	Use	Dose
Gentamicin	N/A	Treatment of serious infections caused by susceptible strains of microorganisms	3 mg/kg/day in 3 divided doses IM or IV For life-threatening infection: 5 mg/kg/day in divided doses
Streptomycin	N/A	Treatment of serious infections caused by susceptible strains of microorganisms	15 mg/kg/day IM or 25-30 mg/kg IM 2-3 times per week
Tobramycin	N/A	Treatment of serious infections caused by susceptible strains of microorganisms PLUS TREATMENT OF TB	3-5 mg/kg/day IM, IV in 3 equal doses

Anti Infeetives

Drugs that interfere with protein synthesis

How do they work? "Action"

- Daptomycin is a member of a new category of antibacterial agents called cyclic lipopeptides.
- Linezolid (Zyvox) is the first drug in a new drug class, the oxazolidinones
- Spectinomycin (Trobicin) is chemically related to but different from the aminoglycosides.
- Quinupristin/dalfopristin has bactericidal action against both methicillin-susceptible and methicillin-resistant staphylococci.

Indications

- Daptomycin is used to treat complicated skin and skin structure bacterial infections as well as Staphylococcus aureus infections of the blood.
- Linezolid is used in the treatment of vancomycin resistant Enterococcus faecium (VREF), health care- and community-acquired pneumonias, and skin and skin structure infections.
- Spectinomycin is used for treating gonorrhea in patients who are allergic to penicillins, cephalosporins, or probenecid
- Quinupristin/dalfopristin is a bacteriostatic agent also used in the treatment of VREF.

Contraindications

- Linezolid: Known hypersensitivity, PKU, pregnancy.
- Daptomycin, spectinomycin, and quinupristin/dalfopristin: known hypersensitivity to the drug, and it should not be used during pregnancy (pregnancy category B) or lactation.

Nursing Alert

Quinupristin/dalfopristin is irritating to the vein. After peripheral infusion, the vein should be flushed with 5% dextrose in water (D5W), because the drug is incompatible with saline or heparin flush solutions. (Ford 88)

Nursing management

- Before administering any antibiotic be sure to evaluate the results of the culture and sensitivity test.
- Complete the entire course of treatment. Do not stop the drug, except on the advice of a primary health care provider, before the course of treatment is completed, even if symptoms improve or disappear. Failure to complete the prescribed course of treatment may result in a return of the infection.

Interactions:

- **Antiplatelet drugs** (aspirin or the nonsteroidal anti-inflammatory drugs [NSAIDs])-increased risk of bleeding and thrombocytopenia
- **Monoamine oxidase inhibitor (MAOI)** antidepressants-decreased effectiveness
- **Large amounts of food containing tyramine** (e.g., aged cheese, caffeinated beverages, yogurt, chocolate, red wine, beer, pepperoni) -risk of severe hypertension

Adverse Reactions

- Nausea
- Vomiting
- Diarrhea or constipation
- Headache and dizziness
- Insomnia
- Rash
- Chills
- Fatigue
- Depression
- Nervousness
- Photosensitivity
- Pseudomembranous colitis and thrombocytopenia are the most serious adverse reactions caused by linezolid.

Generic	Trade	Use	Dose
Daptomycin	Cubicin C	Complicated skin and skin structure infections, Staphylococcus aureus blood infections	4 mg/kg IV daily for 7-14 days
Linezolid	Zyvox	Infections with VREF; pneumonia from Staphylococcus aureus and penicillin-susceptible Streptococcus pneumoniae; skin and skin structure infections	600 mg orally or IV q 12 hr
Quinupristin-dalfopristin S	Synercid	VREF	7.5 mg/kg IV q 8 hr

Anti Infectives

- Cephalosporins

How do they work? "Action"

Cephalosporins have a β -lactam ring and target the bacterial cell wall, making it defective and unstable. This action is similar to the action of penicillin. The cephalosporins are usually bactericidal. (Ford 73)

Indications

- Respiratory infections
- Otitis media (ear infection)
- Bone/joint infections
- Genitourinary tract and other infections caused by bacteria

Adverse Reactions

- **Nephrotoxicity**
- **Malaise**
- **Steven johnson syndrome**
- Nausea
- Vomiting
- Diarrhea
- Headache
- Dizziness
- Heartburn
- Fever
- Aplastic anemia (deficient red blood cell production)
- Toxic epidermal necrolysis (death of the epidermal layer of the skin)

Contraindications & Caution

- Do not administer cephalosporins if the patient has a history of allergies to cephalosporins.
- Cephalosporins should be used cautiously in patients with renal disease, hepatic impairment, bleeding disorder, pregnancy (pregnancy category B), and known penicillin allergy. (Ford 73)

Interactions:

- Aminoglycosides: Increased risk for nephrotoxicity
- Oral anticoagulants: Increased risk for bleeding
- Loop diuretics: Increased cephalosporin blood level

Nursing management

- Before administering any antibiotic be sure to evaluate the results of the culture and sensitivity test.
- Be sure to question the patient about allergy to penicillin or cephalosporins before administering the first dose, even when an accurate drug history has been taken
- After administering penicillin IM in the outpatient setting, ask the patient to wait in the area for at least 30 minutes. Anaphylactic reactions are most likely to occur within 30 minutes after injection.
- Take the drug at the prescribed time intervals.
- Complete the entire course of treatment. Do not stop the drug, except on the advice of a primary health care provider, before the course of treatment is completed, even if symptoms improve or disappear. Failure to complete the prescribed course of treatment may result in a return of the infection.
- Take drugs that must be taken on an empty stomach 1 hour before or 2 hours after a meal.
- Distinguish between immediate- and extended-release medications. Do not break, chew, or crush extended-release medications.

Nursing Alert

- A patient who is allergic to penicillin also may be allergic to the cephalosporins.
- A disulfiram-like (Antabuse) reaction may occur if alcohol is consumed within 72 hours after administration of certain cephalosporins
- **Symptoms of a disulfiram-like reaction:** include flushing, throbbing in the head and neck, respiratory difficulty, vomiting, sweating, chest pain, and hypotension. Severe reactions may cause dysrhythmias and unconsciousness.
- People with phenylketonuria (PKU) need to be aware that the oral suspension cefprozil (Cefzil) contains phenylalanine, a substance that people with PKU cannot process.

Generations Of Cephalosporins

- First generation—cephalexin (Keflex), cefazolin (Ancef)
- Second generation—cefaclor (Raniclor), cefoxitin (Mefoxin), cefuroxime (Zinacef)
- Third generation—cefoperazone (Cefobid), cefotaxime (Claforan), ceftriaxone (Rocephin)
- Fourth generation—cefepime (Maxipime)

Generic	Trade	Use	Dose
Cefadroxil	n/a	Infections due to susceptible microorganisms,	1–2 g/day orally in divided doses
Cefoxitin	Mefoxin	Infections due to susceptible microorganisms, perioperative prophylaxis	250 mg orally q 8 hr

Drugs that disrupt the cell wall:

Penicillins

How do they work? "Action"

Penicillin is a widely used antibiotic prescribed to treat staphylococci and streptococci bacterial infections. Penicillin belongs to the beta-lactam family of antibiotics, the members of which use a similar mechanism of action to inhibit bacterial cell growth that eventually kills the bacteria

Indications

- Urinary tract infections (UTIs)
- Septicemia
- Meningitis
- Intra-abdominal infections
- Sexually transmitted infections (syphilis)
- Pneumonia and other respiratory infections
- Prophylaxis for anticipated bacterial infections

Adverse Reactions

- Glossitis (inflammation of the tongue) when given orally
- Stomatitis (inflammation of the mouth), dry mouth
- Gastritis
- Nausea, vomiting
- Diarrhea, abdominal pain
- An anaphylactic reaction
- Anemia (low red blood cell count)
- Thrombocytopenia (low platelet count)
- Leukopenia (low white blood cell count)
- Bone marrow depression

Contraindications & Caution

- Hypersensitivity to penicillin or cephalosporins

Interactions:

- Oral contraceptives (with estrogen): Decreased effectiveness of contraceptive agent (with ampicillin, penicillin V).
- Tetracyclines: Decreased effectiveness of penicillins
- Anticoagulants: Increased bleeding risks (with large doses of penicillins)
- β -adrenergic blocking drugs: May increase the risk for an anaphylactic reaction

Contraindications & Caution

- **Augmentin** - combination of amoxicillin and clavulanic acid
- **Timentin** - combination of ticarcillin and clavulanic acid
- **Unasyn** - combination of ampicillin and sulbactam
- **Zosyn** - combination of piperacillin and tazobactam (Ford 71)

Nursing management

- View the culture and sensitivity results
- Monitor symptoms of hypersensitivity or anaphylaxis
- Prophylaxis—Take the drug as prescribed until the primary health care provider discontinues therapy.
- Infection—Complete the full course of therapy. Do not stop taking the drug, even if the symptoms have disappeared.
- Take the drug at the prescribed times of day because it is important to keep an adequate amount of drug in the body throughout the entire 24 hours of each day.
- Penicillin (oral)—Take the drug on an empty stomach either 1 hour before or 2 hours after meals (exceptions: penicillin V and amoxicillin).
- Take each dose with a full 8-ounce glass of water.
- Avoid drinking alcoholic beverages when taking the cephalosporins and for 3 days after completing the course of therapy, because severe reactions may occur.
- To reduce the risk of superinfection during antibiotic therapy, take yogurt, buttermilk, or Acidophilus capsules.
- If you are a woman who has been prescribed ampicillin and penicillin V and who takes birth control pills containing estrogen, use additional contraception measures.
- Notify the primary health care provider immediately should one or more of the following occur: skin rash; hives (urticaria); severe diarrhea; vaginal or anal itching; black, furry tongue; sores in the mouth; swelling around the mouth or eyes; breathing difficulty; or GI disturbances such as nausea, vomiting, and diarrhea. Do not take the next dose of the drug until the problem has been discussed with the primary health care provider.
- Never give this drug to another individual even though his or her symptoms appear to be the same as yours.
- Never skip doses or stop therapy unless told to do so by the primary health care provider (see Patient Teaching for Improved Patient Outcomes: Preventing Anti-Infective Resistance). When a penicillin is to be taken for a long time for prophylaxis, you may feel well despite the need for long-term antibiotic therapy. There may be a tendency to omit one or more doses or even neglect to take the drug for an extended time. (Ford 77)

Herbal Considerations

Goldenseal (*Hydrastis canadensis*) is an herb found growing in certain areas of the northeastern United States, particularly the Ohio River valley. Goldenseal has been used to wash inflamed or infected eyes and in making yellow dye. There are many more traditional uses of the herb, including as an antiseptic for the skin, as a mouthwash for canker sores, and in the treatment of sinus infections and digestive problems such as peptic ulcers and gastritis. In the 19th century, goldenseal was touted as an "herbal antibiotic" for treating gonorrhea and UTIs. Though used over time by American Indian tribes as an insect repellent, stimulant, and diuretic, there is no scientific evidence to support its benefit for these purposes. Another myth surrounding goldenseal use is that taking the herb masks the presence of illicit drugs in the urine. Evidence does support the use of goldenseal to treat diarrhea caused by bacteria or intestinal parasites, such as Giardia. The herb is contraindicated during pregnancy and in patients with hypertension. Adverse reactions are rare when the herb is used as directed. However, this herb Anaphylaxis should not be taken for more than 1 week. (Ford 72)

Generic	Trade	Use	Dose
penicillin G (aqueous)	Pfizerpen	Infections due to susceptible microorganisms; meningococcal meningitis, septicemia	Up to 20–30 million Units/day IV or IM; dosage may also be based on weight
penicillin V	Veetids	Infections due to susceptible organisms	125–500 mg orally q 6 hr or q 8 hr

Anti Infectives

- Fluoroquinolones

How do they work? "Action"

The fluoroquinolones exert their bactericidal effect by interfering with the synthesis of bacterial DNA. This interference prevents cell reproduction, causing death of the bacterial cell (Ford 96)

Indications

- Lower respiratory infections
- Bone and joint infections
- Urinary tract infections
- Infections of the skin
- Sexually transmitted infections

Adverse Reactions

- Nausea
- Diarrhea
- Headache
- Abdominal pain or discomfort
- Dizziness
- Photosensitivity

Contraindications & Caution

- Hypersensitivity
- Children younger than 12 or adults older than 60 who are on corticosteroids because of the risk of achilles tendonitis

Interactions:

- **Theophylline:** Increased serum theophylline level
- **Cimetidine:** Interferes with elimination of the antibiotic
- **Oral anticoagulants:** Increased risk of bleeding
- **Antacids, iron salts, or zinc:** Decreased absorption of the antibiotic
- **Nonsteroidal anti-inflammatory drugs (NSAIDs):** Risk of seizure.

Nursing management

- Before administering any antibiotic be sure to evaluate the results of the culture and sensitivity test.
- Monitor labs and evaluate the effectiveness of the treatment
- Monitor vitals and temperature
- Complete the entire course of treatment. Do not stop the drug, except on the advice of a primary health care provider, before the course of treatment is completed, even if symptoms improve or disappear. Failure to complete the prescribed course of treatment may result in a return of the infection.
- There is a risk with all fluoroquinolone drugs of causing pain, inflammation, or rupture of a tendon. The Achilles tendon is particularly vulnerable. Those 60 years of age and older who take corticosteroids are at greatest risk for tendon rupture.

Favorable Outcomes

- A superinfection can develop rapidly and is potentially serious and even life-threatening. Antibiotics can disrupt the normal flora (nonpathogenic bacteria in the bowel), causing a secondary infection or superinfection. This new infection is "superimposed" on the original infection. The destruction of large numbers of nonpathogenic bacteria (normal flora) by the antibiotic alters the chemical environment. This allows uncontrolled growth of bacteria or fungal microorganisms that are not affected by the antibiotic being administered. A superinfection may occur with the use of any antibiotic, especially when these drugs are given for a long time or when repeated courses of therapy are necessary. (Ford 96)

Generic	Trade	Use	Dose
Ciprofloxacin	Cipro	Treatment of infections due to susceptible microorganisms	250-750 mg orally q 12 hr; 200-400 mg IV q 12 hr
Gemifloxacin	Factive	Bronchitis and community-acquired pneumonia	320 mg/day orally
Levofloxacin	Levaquin	Treatment of infections due to susceptible microorganisms	250-750 mg/day orally

Anti Infectives

- Lincosamides

How do they work? "Action"

They act by inhibiting protein synthesis in susceptible bacteria, causing cell death. They disrupt the functional ability of the ribosomes (which assemble amino acids in the cell), causing cell death.

Indications

Treatment of infections caused by a range of gram-negative and gram-positive microorganisms. Lincosamides are used for the more serious infections and may be used in conjunction with other antibiotics. (Ford 87)

Adverse Reactions

- Abdominal pain
- Esophagitis
- Nausea
- Vomiting
- Diarrhea
- Skin rash
- Blood dyscrasias
- Pseudomembranous colitis

Contraindications & Caution

- Hypersensitive to the lincosamides
- Taking cisapride (Propulsid) or the antipsychotic drug pimozide (Orap)
- With minor bacterial or viral infections

Nursing management

- Before administering any antibiotic be sure to evaluate the results of the culture and sensitivity test.
- Complete the entire course of treatment. Do not stop the drug, except on the advice of a primary health care provider, before the course of treatment is completed, even if symptoms improve or disappear. Failure to complete the prescribed course of treatment may result in a return of the infection.
- Evaluate the effectiveness of the treatment by monitoring temperature and vital signs.
- Evaluate lab results for decreasing WBC counts to ensure the drug regamein is working.

Interactions:

- **Kaolin- or aluminum-based antacids:** Decreased absorption of the lincosamides
- **Neuromuscular blocking drugs:** Increased action of neuro muscular blocking drug, possibly leading to severe and profound respiratory depression

Nursing Alert

- Food impairs the absorption of lincomycin. The patient should take nothing by mouth (except water) for 1 to 2 hours before and after taking lincomycin. Clindamycin may be taken with food or a full glass of water.

Generic	Trade	Use	Dose
Clindamycin	Cleocin	Treatment of infections due to susceptible microorganism	Serious infection: 150–450 mg orally q 6 hr; severe infection: 600–2700 mg/day in 2–4 equal doses; life-threatening infection: up to 4.8 g/day IV, IM
Lincomycin	Lincocin	Treatment of infections due to susceptible microorganism	500 mg orally q 6–8 hr; 600 mg IM q 12–24 hr; up to 8 g/day IV in life-threatening situations

Anti Infectives

- Macrolides

How do they work? "Action"

The macrolides are bacteriostatic or bactericidal in susceptible bacteria. The drugs act by causing changes in protein function and synthesis.

Indications

- A wide range of gram-negative and gram-positive infections
- Acne vulgaris and skin infections
- Upper respiratory infections caused by Haemophilus influenzae (with sulfonamides) (Ford 86)

Adverse Reactions

- Nausea
- Vomiting
- Diarrhea
- Abdominal pain or cramping
- Visual disturbances (associated with telithromycin) may also occur.

Education

- Take the drug at the prescribed time intervals. These intervals are important because a certain amount of the drug must be in the body at all times for the infection to be controlled.
- Do not increase or omit the dose unless advised to do so by the primary health care provider.
- Complete the entire course of treatment. Never stop the drug, except on the advice of a primary health care provider, before the course of treatment is completed even if symptoms improve or disappear. Failure to complete the prescribed course of treatment may result in a return of the infection.
- Take each dose with a full (8-ounce) glass of water. Follow the directions given by the clinical pharmacist regarding taking the drug on an empty stomach or with food (see Patient Teaching for Improved Patient Outcomes: Avoiding Drug-Food Interactions).

Nursing management

- Before administering any antibiotic be sure to evaluate the results of the culture and sensitivity test.
- Take the drug at the prescribed time intervals. These time intervals are important because a certain amount of the drug must be in the body at all times for the infection to be controlled..
- Do not increase or omit the dose unless advised to do so by the primary health care provider.
- Complete the entire course of treatment. Do not stop the drug, except on the advice of a primary health care provider, before the course of treatment is completed, even if symptoms improve or disappear. Failure to complete the prescribed course of treatment may result in a return of the infection.

Interactions:

- **Antacids (kaolin, aluminum salts, or magaldrate):** Decreased absorption and effectiveness of the macrolides
- **Digoxin:** Increased serum levels
- **Anticoagulants:** Increased risk of bleeding
- **Clindamycin, lincomycin, or chloramphenicol:** Decreased therapeutic activity of the macrolides
- **Theophylline:** Increased serum theophylline

Contraindications & Caution

These drugs are contraindicated in patients with hypersensitivity to the macrolides and in patients with pre-existing liver disease. Telithromycin (Ketek) should not be ordered if a patient is taking cisapride (Propulsid) or pimozide (Orap). (Ford 86)

Generic	Trade	Use	Dose
Azithromycin	Zithromax, Zmax	Treatment of infections due to susceptible microorganism	500 mg orally first day then 250 mg/day orally
Clarithromycin	Biaxin	Helicobacter pylori therapy, Treatment of infections due to susceptible microorganism	250-500 mg orally q 12 hr
Erythromycin	E-Glades, Eryc, Ery-Ped, E.E.S.	Treatment of infections due to susceptible microorganism	250 mg orally q 6 hr or 333 mg q 8 hr up to 4 g/day

Anti Infectives

- Sulfonamides

How do they work? "Action"

Bacteriostatic agents that are used to halt the growth of bacteria. Their ability to inhibit the activity of folic acid in bacterial cell metabolism. They are often used to control infections caused by both gram-positive and gram-negative bacteria, such as *Escherichia coli*, *Staphylococcus aureus*, and *Klebsiella* and *Enterobacter* species. (Ford 62)

Indications

- Urinary tract infections (UTIs) and acute otitis media
- Ulcerative colitis
- Mafenide (Sulfamylon) and silver sulfadiazine (Silvadene) are topical sulfonamides used in the treatment and prevention of infections in second- and third-degree burns.

Adverse Reactions

- Nausea, vomiting, anorexia
- Diarrhea, abdominal pain
- Stomatitis (inflammation of the mouth)
- Chills, fever
- Crystalluria (crystals in the urine)
- Photosensitivity
- Steven johnson syndrome
- TEN
- **Leukopenia** - decrease in the number of white blood cells
- **Thrombocytopenia** - decrease in the number of platelets
- **Aplastic anemia** - deficient red blood cell production in the bone marrow

Contraindications & Caution

- Hypersensitivity to sulfonamides
- During lactation
- In children younger than 2

Nursing Alert

- If sulfonamides are given near the end of pregnancy, significantly high blood levels of the drug may occur, causing jaundice or hemolytic anemia in the neonate. In addition, the sulfonamides are not used for infections caused by group A beta (β)-hemolytic streptococci because the sulfonamides have not been shown to be effective in preventing the complications of rheumatic fever or glomerulonephritis. (Ford 63)
- When diabetic patients are prescribed sulfonamides, assess for a possible hypoglycemic reaction. Sulfonamides may inhibit the (hepatic) metabolism of the oral hypoglycemic drugs tolbutamide and chlorpropamide (Diabinese). (Ford 63)

Nursing management

- Before administering any antibiotic be sure to evaluate the results of the culture and sensitivity test.
- Take the drug at the prescribed time intervals. These time intervals are important because a certain amount of the drug must be in the body at all times for the infection to be controlled..
- Do not increase or omit the dose unless advised to do so by the primary health care provider.
- Complete the entire course of treatment. Do not stop the drug, except on the advice of a primary health care provider, before the course of treatment is completed, even if symptoms improve or disappear. Failure to complete the prescribed course of treatment may result in a return of the infection.
- Take drugs that must be taken on an empty stomach 1 hour before or 2 hours after a meal.
- Distinguish between immediate- and extended-release medications. Do not break, chew, or crush extended-release medications.
- Notify the primary health care provider if symptoms of the infection become worse or if original symptoms do not improve after 5 to 7 days of drug therapy.
- Avoid any exposure to sunlight or ultraviolet light (tanning beds, sunlamps) while taking these drugs and for several weeks after completing the course of therapy. Wear sunblock, sunglasses, and protective clothing when exposed to sunlight.
- Specific Instructions Regarding Sulfonamides
- Take sulfasalazine (Azulfidine) with food or immediately after a meal.
- When taking sulfasalazine, the skin or urine may turn orange-yellow; this is normal. Soft contact lenses may acquire a permanent yellow stain. It is a good idea to seek the advice of an ophthalmologist

Interactions:

- **Oral anticoagulants:** Increased action of the anticoagulant
- **Methotrexate:** Increased bone marrow suppression
- **Hydantoins:** Increased serum hydantoin level

Herbal Considerations

Cranberries and cranberry juice are commonly used folk remedies for preventing and relieving symptoms of UTIs. The use of cranberries in combination with antibiotics has been recommended by physicians for the long-term suppression of UTIs. Cranberries are thought to prevent bacteria from attaching to the walls of the urinary tract. The suggested dose is 6 ounces of juice twice daily. Cranberry capsules are not recommended because the fluid for hydration may be as helpful as the berries (Brown, 2012). Extremely large doses can produce GI disturbances, such as diarrhea or abdominal cramping. Although cranberries may relieve symptoms or prevent the occurrence of a UTI, their use will not cure a UTI. If an individual suspects a UTI, medical attention is necessary. (Ford 63)

Generic	Trade	Use	Dose
Sulfadiazine	Pfizerpen	UTIs, chancroid, acute otitis media, <i>Haemophilus influenzae</i> and meningococcal meningitis, rheumatic fever	Loading dose: 2-4 g orally; maintenance dose: 2-4 g/day orally in 4-6 divided doses
Sulfasalazine	Azulfidine, Azulfidine EN-tabs	UTI, acute otitis media, <i>Haemophilus influenzae</i> , meningococcal meningitis	Initial therapy: 1-4 g/day orally in divided doses; maintenance dose: 2 g/day orally in evenly spaced doses (500 mg QID)

Anti Infeetives

- Tetracycline

How do they work? "Action"

Tetracyclines interfere with protein synthesis and are composed of natural and semisynthetic compounds. They are used in lieu of penicillin when there is an allergy present to penicillin or cephalosporins

Indications

- Rickettsial diseases (Rocky Mountain spotted fever, typhus fever, and tick fevers)
- Intestinal amebiasis
- Some skin and soft tissue infections
- Uncomplicated urethral, endocervical, or rectal infections caused by *Chlamydia trachomatis*
- Severe acne as an adjunctive treatment
- Infection with *Helicobacter pylori* in combination with metronidazole and bismuth subsalicylate

Adverse Reactions

- Nausea or vomiting
- Diarrhea
- Epigastric distress
- Stomatitis
- Sore throat
- Skin rashes
- Photosensitivity reaction (demeclocycline seems to cause the most serious photosensitivity reaction, whereas minocycline is least likely to cause this type of reaction)

Contraindications & Caution

- Hypersensitivity to sulfonamides
- During lactation & pregnancy
- In children younger than 9 because it can discolor the teeth

Nursing Alert

- Women of childbearing age should be assessed for oral contraception use whenever tetracyclines are prescribed.
- Do not give tetracyclines along with dairy products (milk or cheese), antacids, laxatives, or products containing iron.
- When the aforementioned drugs are prescribed, make sure they are given 2 hours before or after the administration of a tetracycline. Food or drugs containing calcium, magnesium, aluminum, or iron prevent the absorption of the tetracyclines if ingested concurrently. (Ford 89)

Nursing management

- Before administering any antibiotic be sure to evaluate the results of the culture and sensitivity test.
- Take the drug at the prescribed time intervals. These time intervals are important because a certain amount of the drug must be in the body at all times for the infection to be controlled..
- Always report serious adverse reactions, such as a severe hypersensitivity reaction, respiratory difficulty, severe diarrhea, or a decided drop in blood pressure, to the primary health care provider immediately, because a serious adverse reaction may require emergency intervention.
- When a tetracycline has been prescribed, avoid exposure to the sun or any type of tanning lamp or bed. When exposure to direct sunlight is unavoidable, completely cover the arms and legs and wear a wide-brimmed hat to protect the face and neck. Application of a sunscreen may or may not be effective. Therefore, consult the primary health care provider before using a sunscreen to prevent a photosensitivity reaction.

Interactions:

- **Antacids containing aluminum, zinc, magnesium, or bismuth salts:** Decreased effectiveness of tetracycline
- **Oral anticoagulants:** Increased risk for bleeding
- **Oral contraceptives:** Decreased effectiveness of contraceptive agent (breakthrough bleeding or pregnancy)
- **Digoxin:** Increased risk for digitalis toxicity

Education

Diarrhea may be an indication of a superinfection or pseudomembranous colitis, both of which can be serious. Inspect all stools for blood or mucus. If diarrhea is dark or there is mucus in the stool, save a sample and test for occult blood using a test such as Hemoccult. If the stool tests positive for blood, save a sample of the stool for possible further laboratory analysis.

Teach the patient to avoid the following dairy products before or after taking tetracycline:

- Milk (whole, low fat, skim, condensed, or evaporated) and milkshakes
- Cream (half-and-half, heavy, light), sour cream, coffee creamers, and creamy salad dressings
- Eggnog
- Cheese (natural and processed) and cottage cheese
- Yogurt and frozen yogurt
- Ice cream, ice milk, and frozen custard (Ford 91)

Generic	Trade	Use	Dose
Doxycycline	Atridox, Doryx, Monodox, Periostat, Oracea, Vibra-Tabs, Vibramycin	Treatment of infections due to susceptible microorganisms	150 mg orally QID or 300 mg orally BID; gonorrhea: 600 mg orally initially then 300 mg orally q 12 hr for 4 days
Tetracycline	n/a	Treatment of infections due to susceptible microorganisms	1-2 g/day orally in 2-4 divided doses

Antifungal & Antiviral

Anthelmintic

How do they work? "Action"

- **Albendazole (Albenza)** interferes with the synthesis of the parasite's microtubules, resulting in death of susceptible larvae. This drug is used to treat larval forms of pork tapeworm and to treat liver, lung, and peritoneum disease caused by the dog tapeworm.
- **Mebendazole** blocks the uptake of glucose by the helminth, resulting in depletion of the helminth's own glycogen. This drug is used to treat whipworm, pinworm, roundworm, American hookworm, and the common hookworm.
- **The activity of pyrantel (Antiminth)** is probably due to its ability to paralyze the helminth (Ford 129)

Indications

Roundworms, pinworms, whipworms, hookworms, and tapeworms are examples of helminths. These drugs are used to eradicate helminths out of the body.

Adverse reactions

- Drowsiness, dizziness
- Nausea, vomiting
- Abdominal pain and cramps, diarrhea (Ford 129)

Contraindications & Caution

- The anthelmintic drugs are contraindicated in patients with known hypersensitivity to the drugs and during pregnancy (pregnancy category C).
- They should be used cautiously in lactating patients, patients with hepatic or renal impairment, and patients with malnutrition or anemia.

Nursing management

- Follow the dosage schedule exactly as printed on the prescription container. It is absolutely necessary to follow the directions for taking the drug to eradicate the parasite.
- Follow-up stool specimens will be necessary because this is the only way to determine the success of drug therapy.
- When an infection is diagnosed, multiple members of the family may be infected, and all household members may need to be treated. Playmates of the infected child may also need to be treated.
- It is important to wash all bedding and bed clothes once treatment has started.
- Daily bathing (showering is best) is recommended. Disinfect toilet facilities daily, and disinfect the bathtub or shower stall immediately after bathing. Use the disinfectant recommended by the primary health care provider or use chlorine bleach. Scrub the surfaces thoroughly and allow the disinfectant to remain in contact with the surfaces for several minutes.
- During treatment for a ringworm infection, keep towels and facecloths for bathing separate from those of other family members to avoid the spread of the infection. It is important to keep the affected area clean and dry.
- Wash the hands thoroughly after urinating or defecating and before preparing and eating food. Clean under the fingernails daily and avoid putting fingers in the mouth or biting the nails.
- Food handlers should not resume work until a full course of treatment is completed and stools do not contain the parasite.
- Child care workers should be especially careful of diaper disposal and proper hand washing to prevent the spread of infections.
- Report any symptoms of infection (low-grade fever or sore throat) or thrombocytopenia (easy bruising or bleeding).
- Albendazole can cause serious harm to a developing fetus. Inform women of childbearing age of this. Explain that a barrier contraceptive is recommended during the course of therapy and for 1 month after discontinuing the therapy. (Ford 132-133)

Interactions

Albendazole (Albenza)

- **Dexamethasone:** Increased effectiveness of albendazole
- **Cimetidine:** Increased effectiveness of albendazole (Ford 129)

Mebendazole

- **Hydantoins and carbamazepine:** Lower levels of mebendazole

Generic	Trade	Use	Dose
albendazole	Albenza	Parenchymal neurocysticercosis due to pork tapeworms, hydatid disease (caused by the larval form of the dog tapeworm)	Weight greater than or equal to 60 kg: 400 mg Weight less than 60 kg: 15 mg/kg/day
mebendazole	N/A	Treatment of whipworm, pinworm, roundworm, common and American hookworm	100 mg orally morning and evening for 3 consecutive days Pinworm: 100 mg orally as a single dose
pyrantel	Antiminth, Reese's Pinworm	Treatment of pinworm and roundworm	11 mg/kg orally as a single dose; maximum dose, 1000 mg

Antiretrovirals

How do they work? "Action"

Protease inhibitors, which block the protease enzyme so the new viral particles cannot mature Reverse transcriptase inhibitors, which block the reverse transcriptase enzyme so the HIV material cannot change into DNA in the new cell, preventing new HIV copies from being created Non Nucleoside reverse transcriptase inhibitors, which latch on to the reverse transcriptase molecule to block the ability to make viral DNA Entry inhibitors, which prevent the attachment or fusion of HIV to a host cell for initial entry Integrase inhibitors, which prevent enzymes from inserting HIV genetic material into the cell's DNA (Ford 115)

Indications

Antiretroviral drugs are used in the treatment of HIV infection and AIDS.

Adverse reactions

- Nausea, vomiting
- Diarrhea
- Altered taste
- Rash
- Numbness and tingling in the circumoral area (around the mouth) or peripherally, or both

HERBAL CONSIDERATIONS

- Individuals have tried St. John's wort for both the antidepressive and antiviral effects of the supplement. Researchers have found that in patients with HIV infection who receive prescribed protease inhibitors, the effectiveness of drug therapy is reduced if the patient also takes St. John's wort. Patients need to be instructed to disclose the use of all over-the-counter medications and supplements to their primary health care provider to prevent potentially harmful interactions. (Ford 116)

Nursing management

- Antiviral drugs are not a cure for viral infections, but they will shorten the course of disease outbreaks and promote healing of the lesions. The drugs will not prevent the spread of the disease to others. Topical drugs should not be applied more frequently than prescribed but should be applied with a finger cot or gloves. All lesions should be covered. There should be no sexual contact while lesions are present. Notify the primary health care provider if burning, stinging, itching, or rash worsens or becomes pronounced.
- Some drugs cause photosensitivity, so precautions should be taken when going outdoors, such as wearing sunscreen, head coverings, and protective clothing. Patients should also refrain from using tanning beds.
- Some patients have experienced an acute exacerbation of the disease when medications used to treat hepatitis B are stopped. Hepatic function should be closely monitored in these patients.

Nursing alert

Patients receiving antiretroviral drugs for HIV infection may continue to contract opportunistic infections and other complications of HIV disease. Monitor all patients closely for signs of infection such as fever (even low-grade fever), malaise, sore throat, or lethargy. All caregivers are reminded to use good hand hygiene technique. (Ford 118)

Interactions

- Antifungals: increased serum level of the antiretroviral
- Clarithromycin: Increased serum level of both drugs
- Sildenafil: Increased adverse reactions of sildenafil
- Opioid analgesics: Risk of toxicity with ritonavir
- Anticoagulant, anticonvulsant, antiparasitic agents: Decreased effectiveness when taking ritonavir
- Oral contraceptives: decreased birth control effectiveness

Contraindications & Caution

Do not administer antiretrovirals if the patient has a history of allergies to the drug or other antiretrovirals. Women who are lactating should not use antiretroviral drugs. Antiretrovirals should not be prescribed to the patient who is using cisapride, pimozide, triazolam, midazolam, or an ergot derivative. Ritonavir is contraindicated if the patient is taking bupropion (Wellbutrin), zolpidem (Ambien), or an antiarrhythmic drug. (Ford 116)

Generic	Trade	Use	Dose
zidovudine	Retrovir	HIV infection, prevention of maternal-fetal HIV transmission	600 mg/day orally in divided doses; 1 mg/kg IV q 4 hr
lamivudine (3TC)	Epivir, Epivir-HB	HIV infection, chronic hepatitis B infection	HIV: 150 mg orally BID HBV: 100 mg/day orally daily

Antifungals

How do they work? "Action"

- Antifungal drugs may be fungicidal (able to destroy fungi) or fungistatic (able to slow or retard the multiplication of fungi).
- Amphotericin B (Fungizone IV), miconazole (Monistat), nystatin, voriconazole (Vfend), micafungin (Mycamine), and ketoconazole (Nizoral) are thought to have an effect on the cell membrane of the fungus.
 - Fluconazole (Diflucan) has fungistatic activity that appears to result from the depletion of sterols (a group of substances related to fats) in the fungus cells. (Ford 125)
 - Griseofulvin (Grisactin) exerts its effect by being deposited in keratin precursor cells, which are then gradually lost (because of the constant shedding of top skin cells) and replaced by new, non infected cells.
 - Flucytosine (Ancobon) inhibits DNA and RNA synthesis in the fungus.
 - Clotrimazole (Lotrimin, Mycelex) binds with phospholipids in the fungal cell membrane, increasing permeability of the cell and resulting in loss of intracellular components. (Ford 125)

Indications

- Superficial and deep fungal infections
- Systemic infections such as aspergillosis, candidiasis, and cryptococcal meningitis
- Superficial infections of nail beds and oral, anal, and vaginal areas (Ford 125)

Contraindications & Caution

- Known hypersensitivity
- Pregnancy
- Both voriconazole and itraconazole are contraindicated in patients taking cisapride, pimozide, or quinidine. The systemic agent itraconazole should not be used to treat fungal nail infections in patients with a history of heart failure. (Ford 127)

Herbal Considerations

Researchers have identified several antifungal herbs that are effective against skin infections, such as tea tree oil (*Melaleuca alternifolia*) and garlic (*Allium sativum*). Tea tree oil comes from an evergreen tree native to Australia. The herb has been used as a non irritating antimicrobial for cuts, stings, wounds, burns, and acne. It can be found in shampoos, soaps, and lotions. Tea tree oil should not be ingested orally but is effective when used topically for minor cuts and stings.

Nursing management

Renal damage is the most serious adverse reaction to the use of amphotericin B. Renal impairment usually improves with a modification of the dosage regimen (reduced dosage or increased time between doses). Serum creatinine levels and blood urea nitrogen (BUN) levels are checked frequently during the course of therapy to monitor kidney function. If the BUN exceeds 40 mg/dL or the serum creatinine level exceeds 3 mg/dL, the primary health care provider may discontinue the drug or reduce the dosage until renal function improves. (Ford 128) Before administering fluconazole to an older adult or a patient with renal impairment, the primary health care provider may order a creatinine clearance test. Watch for and report the laboratory results to the primary health care provider because the dosage may be adjusted based on the test results. (Ford 128)

- Clean the involved area and apply the ointment or cream to the skin as directed by the primary health care provider.
- Do not increase or decrease the amount used or the number of times the ointment or cream should be applied unless directed to do so by the primary health care provider.
- Griseofulvin—Beneficial effects may not be noticed for some time; therefore, take the drug for the full course of therapy. Avoid exposure to sunlight and sun lamps because an exaggerated skin reaction (which is similar to severe sunburn) may occur even after a brief exposure to ultraviolet light. Notify the primary health care provider if fever, sore throat, or skin rash occurs. (Ford 128)
- Ketoconazole—Complete the full course of therapy as prescribed by the primary health care provider. Do not take this drug with an antacid. In addition, avoid the use of nonprescription drugs unless use of a specific drug is approved by the primary health care provider. (Ford 128)
- Itraconazole—The drug is taken with food. Therapy continues for at least 3 months until infection is controlled. Report unusual fatigue, yellow skin, darkened urine, anorexia, nausea, and vomiting. (Ford 128)

Interactions

Amphotericin B

- **Corticosteroids:** Risk for severe hypokalemia
- **Digoxin:** increased risk of digitalis toxicity
- **Aminoglycosides & Cephalosporins:** increased risk of nephrotoxicity

Fluconazole

- **Oral hypoglycemics:** increased hypoglycemic effects
- **Phenytoin:** decreased effects of phenytoin

Griseofulvin

- **Barbiturates:** decrease sedative effect
- **Oral contraceptives:** decreased effects of birth control

Adverse reactions

- Headache
- Rash
- Anorexia and malaise
- Abdominal, joint, or muscle pain
- Nausea, vomiting, diarrhea (Ford 127)

Generic	Trade	Use	Dose
amphotericin B	Abelcet, AmBisome, Amphotec, Fungizone	Systemic fungal infections, cryptococcal meningitis in patients with HIV infection	Desoxycholate: 1–1.5 mg/kg/day IV Lipid-based: 3–6 mg/kg/day IV
caspofungin	Cancidas	Invasive aspergillosis, hepatic insufficiency	70-mg loading dose IV, followed by 50 mg/day IV for at least 14 days

Antivirals

How do they work? "Action"

Antiviral drugs work by interfering with the virus's ability to reproduce in a cell. Antiviral drugs can be toxic to human cells, and viruses can develop resistance to antiviral drugs

Indications

- Cytomegalovirus (CMV) in transplant recipients
- Herpes simplex virus (HSV) 1 and 2 (genital) and herpes zoster
- Human immunodeficiency virus (HIV)
- Influenza A and B (respiratory tract illness)
- Respiratory syncytial virus (RSV; severe lower respiratory tract infection primarily affecting children)
- Hepatitis B and C

Adverse reactions

- Nausea, vomiting
- Diarrhea
- Headache
- Rash
- Fever
- Insomnia

Contraindications & Caution

Do not administer antivirals if the patient has a history of allergies to the drug or other antivirals. Cidofovir (Vistide) should not be given to patients who have renal impairment or in combination with medications that are nephrotoxic, such as aminoglycosides. Ribavirin should not be used in patients with unstable cardiac disease. These drugs should be used during pregnancy (pregnancy categories B and C) and lactation only when the benefit outweighs the risk to the fetus or child (ribavirin is a pregnancy category X).

Nursing alert

- Zanamivir (Relenza) is taken every 12 hours for 5 days using a "Diskhaler" delivery system. If a bronchodilator is also prescribed for use at the same time, the bronchodilator is used before the zanamivir. The drug may cause dizziness. The patient should use caution when driving an automobile or operating dangerous machinery. Treatment with this drug does not decrease the risk of transmission of influenza to others.

Nursing management

- Antiviral drugs are not a cure for viral infections, but they will shorten the course of disease outbreaks and promote healing of the lesions. The drugs will not prevent the spread of the disease to others. Topical drugs should not be applied more frequently than prescribed but should be applied with a finger cot or gloves. All lesions should be covered. There should be no sexual contact while lesions are present. Notify the primary health care provider if burning, stinging, itching, or rash worsens or becomes pronounced.
- Some drugs cause photosensitivity, so precautions should be taken when going outdoors, such as wearing sunscreen, head coverings, and protective clothing. Patients should also refrain from using tanning beds.
- Some patients have experienced an acute exacerbation of the disease when medications used to treat hepatitis B are stopped. Hepatic function should be closely monitored in these patients.
- Those taking antiretrovirals should be cautioned that there is an increased risk of adverse reactions (hypotension, visual disturbances, prolonged penile erection) when the drug sildenafil (Viagra) is used. Symptoms should be reported promptly to the primary health care provider.
- Some drugs affect mental status. Activities requiring mental alertness, such as driving a car, should be delayed until the effect of the drug is apparent because vision and coordination can be affected. Patients should rise slowly from a prone to a sitting position to decrease the possibility of lightheadedness caused by orthostatic hypotension. Changes such as nervousness, tremors, slurred speech, or depression should be reported.
- Some patients are on an alternate-dosage schedule. In this case, it is important to designate the days the drug is to be taken; calendars are helpful aids to track schedules.
- Zanamivir (Relenza) is taken every 12 hours for 5 days using a "Diskhaler" delivery system. If a bronchodilator is also prescribed for use at the same time, the bronchodilator is used before the zanamivir. The drug may cause dizziness. The patient should use caution when driving an automobile or operating dangerous machinery. Treatment with this drug does not decrease the risk of transmission of influenza to others.

Interactions

- Probenecid: Increased serum levels of the antivirals
- Cimetidine: Increased serum level of the antiviral valacyclovir
- Ibuprofen: Increased serum level of the antiviral adefovir
- Imipenem-cilastatin: With ganciclovir only, increased risk of seizures
- Anticholinergic agents: With amantadine only, increased adverse reactions of anticholinergic agent
- Theophylline: With acyclovir only, increased serum level of theophylline

Generic

Trade

Use

Dose

acyclovir

Zovirax

HSV, herpes zoster, varicella zoster

Oral: 200–800 mg q 4 hr for 5 doses per day, treat for 5–10 days; IV: 5–10 mg/kg q 8 hr; Topical: apply to lesions q 3 hr

oseltamivir

Tamiflu

Prevention and treatment of influenza A and B

75 mg orally BID for 5 days

Antiprotozoal

How do they work? "Action"

Antiprotozoal drugs interfere with, or are active against, the life cycle of the protozoan.

Indications

- Malaria
- Giardiasis
- Toxoplasmosis
- Intestinal amebiasis
- Sexually transmitted infections (trichomoniasis)
- Pneumocystis pneumonia
- Antimalarial drugs are used for suppressing (i.e., preventing) malaria

Adverse reactions

- Anorexia
- Nausea, vomiting
 - Abdominal cramping and diarrhea
 - Headache and dizziness
 - Visual disturbances or tinnitus
 - Hypotension or changes detected on an electrocardiogram (ECG; associated with chloroquine)
 - Cinchonism —a group of symptoms associated with quinine administration, including tinnitus, dizziness, headache, GI disturbances, and visual disturbances. These symptoms usually disappear when the dosage is reduced.
 - Peripheral neuropathy (numbness and tingling of the extremities), with metronidazole
 - Nephrotoxicity and ototoxicity, with paromomycin

Contraindications & Caution

Quinine should not be prescribed for patients with myasthenia gravis, because it may cause respiratory distress and dysphagia.

Nursing management

- Follow the dosage schedule exactly as printed on the prescription container. It is absolutely necessary to follow the directions for taking the drug to eradicate the parasite.
- Follow-up stool specimens will be necessary because this is the only way to determine the success of drug therapy.
- When an infection is diagnosed, multiple members of the family may be infected, and all household members may need to be treated. Playmates of the infected child may also need to be treated.
- It is important to wash all bedding and bed clothes once treatment has started.
- Daily bathing (showering is best) is recommended. Disinfect toilet facilities daily, and disinfect the bathtub or shower stall immediately after bathing. Use the disinfectant recommended by the primary health care provider or use chlorine bleach. Scrub the surfaces thoroughly and allow the disinfectant to remain in contact with the surfaces for several minutes.
- During treatment for a ringworm infection, keep towels and facecloths for bathing separate from those of other family members to avoid the spread of the infection. It is important to keep the affected area clean and dry.
- Wash the hands thoroughly after urinating or defecating and before preparing and eating food. Clean under the fingernails daily and avoid putting fingers in the mouth or biting the nails.
- Food handlers should not resume work until a full course of treatment is completed and stools do not contain the parasite.
- Child care workers should be especially careful of diaper disposal and proper hand washing to prevent the spread of infections.
- Report any symptoms of infection (low-grade fever or sore throat) or thrombocytopenia (easy bruising or bleeding).
- Albendazole can cause serious harm to a developing fetus. Inform women of childbearing age of this. Explain that a barrier contraceptive is recommended during the course of therapy and for 1 month after discontinuing the therapy. (Ford 132-133)

Interactions

- **Antacids:** Decrease absorption of the antimalarial
- **Iron:** Decreased absorption of the antimalarial
- **Digoxin:** Increased risk of digoxin toxicity
- **Cimetidine:** Decreased metabolism of metronidazole
- **Phenobarbital:** Increased metabolism of metronidazole

Quinine

- Warfarin: Increased risk of bleeding

Generic	Trade	Use	Dose
chloroquine	Aralen	Treatment and prevention of malaria, extraintestinal amebiasis	Treatment: 160–200 mg IM and repeat in 6 hr if necessary Prevention: 300 mg orally weekly; begin 1–2 wk before travel and continue for 4 wk after return from endemic area
doxycycline	Monodox, Vibramycin, Vibra-Tabs	Short-term prevention of malaria	100 mg orally daily, 1–2 days before travel and for 4 wk after return from endemic area (Ford 135)
quinine	Qualaquin	Treatment of malaria	260–650 mg TID for 6–12 days

Antifungal & Anti-viral

Drug names:

First up end in
"-Nazole"

Fluconazole
Ketocozazole



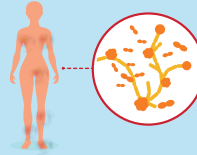
Indication:

Mainly used to Treat Candida FUNGAL infections. So think NAZOLE treats NAIL fungus!!! Taken for 2-6 weeks & very Liver toxic like most Anti-fungal



Drug name:

Amphotericin B



Indication:

For serious fungus & causes **SERIOUS TERROR** on the body! Lots of side effects!

KEY POINT

Does NOT TREAT C-Diff



"-Nazole" Nail Fungus



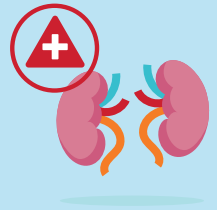
"-Dazole" Da Gut (C Diff bacteria)



ADVERSE EFFECT

RENAL INJURY

- Creatinine **OVER 1.3 = Bad Kidney**
- Urine **30 ml/hr or Less = Kidney Distress**
- Oliguria: Low Urine



Drug name:

Nystatin



Indication:

Given to treat candida infections Of the mouth, GI, skin, even vagina.



KEY POINTS

- Treats oral candidiasis
- Shake well - Liquid suspension
- Inspect mucus membranes for irritation
- Remove and soak client's dentures
- Teach to swish in mouth for several minutes then swallow
- Continue AFTER S/S subside



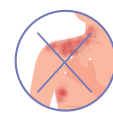
Anti-Viral

"-Cyclovir" Acyclovir
Valacyclovir

- herpes (genital & cold sores)
- herpes zoster (shingles)

KEY Points:

- Taken daily
- NO Cure! (Only slows the Virus)
- AVOID sex while lesions are present
- Drink extra fluids
- Effective: Less frequent eruption of lesions



Notes

TB Drugs

TB Drugs: Ethambutol

How do they work? "Action"

Many antitubercular drugs are bacteriostatic against the *M. tuberculosis* bacillus. These drugs usually act to inhibit bacterial cell wall synthesis, which slows the multiplication rate of the bacteria. Isoniazid is bactericidal, with rifampin and streptomycin having some bactericidal activity.

Indications

- Treatment of TB in a protocol

Adverse reactions

- Anaphylactoid reactions (unusual or exaggerated allergic reactions)
- Optic neuritis
- Dermatitis and pruritus (itching)
- Joint pain
- Anorexia
- Nausea and vomiting

Contraindications & Caution

Ethambutol is not recommended for patients with a history of hypersensitivity to the drug or children younger than 13 years. The drug is used with caution during pregnancy (category B), in patients with hepatic or renal impairment, and in patients with diabetic retinopathy or cataracts. (Ford 105)

Interactions

- **Antacids containing aluminum salts:** Reduced absorption of isoniazid
- **Anticoagulants:** Increased risk for bleeding
- **Phenytoin:** Increased serum levels of phenytoin
- **Alcohol:** Higher incidence of drug-related hepatitis

Nursing alert

Older adults are particularly susceptible to a potentially fatal hepatitis when taking isoniazid, especially if they consume alcohol on a regular basis. Two other antitubercular drugs, rifampin and pyrazinamide, can cause liver dysfunction in the older adult as well. Careful observation and monitoring for signs of liver impairment are necessary (e.g., increased serum aspartate aminotransferase [AST], alanine aminotransferase [ALT], and bilirubin levels, and jaundice). (Ford 107)

Nursing management

- Ask the patient what he or she thinks causes the symptoms; promote health literacy by integrating the patient's beliefs and fears into how the bacteria invades the body and how the drugs work to kill it.
- Discuss tuberculosis, its causes and communicability, and the need for long-term therapy for disease control using simple, non medical terms.
- Review the drug therapy regimen, including the prescribed drugs, doses, and frequency of administration.
- Reassure the patient that various combinations of drugs are effective in treating tuberculosis.
- Urge the patient to take the drugs exactly as prescribed and not to omit, increase, or decrease the dosage unless directed to do so by the health care provider.
- Instruct the patient about possible adverse reactions and the need to notify the prescriber should any occur.
- Arrange for direct observation therapy with the patient and family.
- Instruct the patient in measures to minimize gastrointestinal upset.
- Advise the patient to avoid alcohol and the use of nonprescription drugs, especially those containing aspirin, unless use is approved by the health care provider.
- Reassure the patient and family that the results of therapy will be monitored by periodic laboratory and diagnostic tests and follow-up visits with the health care provider.

Phases of treatment

- The recommended treatment regimen is for the administration of the primary drugs—rifampin (Rifadin), isoniazid (INH), pyrazinamide, and ethambutol (Myambutol)—for a minimum of 2 months
- The second or continuation phase includes only the drugs rifampin and isoniazid. The CDC recommends this phase for 4 months or up to 7 months in special populations.

Special populations

- Positive sputum culture after completion of initial treatment
- Cavitory (hole or pocket of) disease and positive sputum culture after initial treatment
- When pyrazinamide was not included in the initial treatment
- Positive sputum culture after initial treatment in a patient with previously diagnosed HIV infection

Generic

Trade

Use

Dose

Ethambutol
Primary drug

Myambutol

Pulmonary TB

15–25 mg/kg/day orally

TB Drugs:

Isoniazid

How do they work? "Action"

Many antitubercular drugs are bacteriostatic against the *M. tuberculosis* bacillus. These drugs usually act to inhibit bacterial cell wall synthesis, which slows the multiplication rate of the bacteria. Isoniazid is bactericidal, with rifampin and streptomycin having some bactericidal activity.

Indications

- Treatment of TB in a protocol

Adverse reactions

- Peripheral neuropathy With toxicity
- Severe hepatitis
- Nausea and vomiting
- Epigastric distress
- Fever
- Skin eruptions
- Hematologic changes
- Jaundice
- Hypersensitivity

Contraindications & Caution

Isoniazid is contraindicated in patients with a history of hypersensitivity to the drug. The drug is used with caution during pregnancy (category C) or lactation and in patients with hepatic and renal impairment. (Ford 105)

Nursing alert

- Isoniazid is taken with foods containing tyramine, such as aged cheese and meats, bananas, yeast products, and alcohol, an exaggerated sympathetic-type response can occur (i.e., hypertension, increased heart rate, and palpitations). (Ford 105)
- Older adults are particularly susceptible to a potentially fatal hepatitis when taking isoniazid, especially if they consume alcohol on a regular basis.

Nursing management

- Ask the patient what he or she thinks causes the symptoms; promote health literacy by integrating the patient's beliefs and fears into how the bacteria invades the body and how the drugs work to kill it.
- Discuss tuberculosis, its causes and communicability, and the need for long-term therapy for disease control using simple, non medical terms.
- Review the drug therapy regimen, including the prescribed drugs, doses, and frequency of administration.
- Reassure the patient that various combinations of drugs are effective in treating tuberculosis.
- Urge the patient to take the drugs exactly as prescribed and not to omit, increase, or decrease the dosage unless directed to do so by the health care provider.
- Instruct the patient about possible adverse reactions and the need to notify the prescriber should any occur.
- Arrange for direct observation therapy with the patient and family.
- Instruct the patient in measures to minimize gastrointestinal upset.
- Advise the patient to avoid alcohol and the use of nonprescription drugs, especially those containing aspirin, unless use is approved by the health care provider.
- Reassure the patient and family that the results of therapy will be monitored by periodic laboratory and diagnostic tests and follow-up visits with the health care provider.

Interactions

- **Antacids containing aluminum salts:** Reduced absorption of isoniazid
- **Anticoagulants:** Increased risk for bleeding
- **Phenytoin:** Increased serum levels of phenytoin
- **Alcohol (in beverages):** Higher incidence of drug-related hepatitis

Generic

Isoniazid
Primary
treatment

Trade

NA

Use

Active TB; prophylaxis for TB

Dose

Active TB: 5 mg/kg (up to 300 mg/day) orally or 15 mg/kg 2-3 times weekly

TB Drugs:

Pyrazinamide

How do they work? "Action"

Many antitubercular drugs are bacteriostatic against the *M. tuberculosis* bacillus. These drugs usually act to inhibit bacterial cell wall synthesis, which slows the multiplication rate of the bacteria. Isoniazid is bactericidal, with rifampin and streptomycin having some bactericidal activity.

Indications

- Treatment of TB in a protocol

Adverse reactions

- Hepatotoxicity
- Nausea
- Vomiting
- Diarrhea
- Myalgia
- Rash

Contraindications & Caution

- Hypersensitivity
- Gout
- Severe hepatic damage

Nursing alert

- Pyrazinamide should be used cautiously in patients during pregnancy (category C) and lactation and in patients with hepatic and renal impairment, HIV infection, and diabetes mellitus. (Ford 106)

Nursing management

- Ask the patient what he or she thinks causes the symptoms; promote health literacy by integrating the patient's beliefs and fears into how the bacteria invades the body and how the drugs work to kill it.
- Discuss tuberculosis, its causes and communicability, and the need for long-term therapy for disease control using simple, non medical terms.
- Review the drug therapy regimen, including the prescribed drugs, doses, and frequency of administration.
- Reassure the patient that various combinations of drugs are effective in treating tuberculosis.
- Urge the patient to take the drugs exactly as prescribed and not to omit, increase, or decrease the dosage unless directed to do so by the health care provider.
- Instruct the patient about possible adverse reactions and the need to notify the prescriber should any occur.
- Arrange for direct observation therapy with the patient and family.
- Instruct the patient in measures to minimize gastrointestinal upset.
- Advise the patient to avoid alcohol and the use of nonprescription drugs, especially those containing aspirin, unless use is approved by the health care provider.
- Reassure the patient and family that the results of therapy will be monitored by periodic laboratory and diagnostic tests and follow-up visits with the health care provider

Interactions

- When pyrazinamide is administered with the anti gout medications allopurinol (Zyloprim), colchicine, or probenecid, its effectiveness decreases.

Generic

Pyrazinamide
Primary treatment

Trade

n/a

Use

Active TB

Dose

15-30 mg/kg/day orally,
maximum 3 g/day orally; 50-70
mg/kg twice weekly orally

TB Drugs:

Rifampin

How do they work? "Action"

Many antitubercular drugs are bacteriostatic against the *M. tuberculosis bacillus*. These drugs usually act to inhibit bacterial cell wall synthesis, which slows the multiplication rate of the bacteria. Isoniazid is bactericidal, with rifampin and streptomycin having some bactericidal activity.

Indications

- Treatment of TB in a protocol

Adverse reactions

- Nausea and vomiting
- Epigastric distress, heartburn, fatigue
- Vertigo (dizziness)
- Rash
- Reddish-orange discoloration of body fluids (urine, tears, saliva, sweat, and sputum)
- Hematologic changes, renal insufficiency (Ford 106)

Contraindications & Caution

Rifampin is contraindicated in patients with a history of hypersensitivity to the drug. The drug is used with caution during pregnancy (category C) and lactation and in patients with hepatic or renal impairment. (Ford 106)

Nursing alert

- Leprosy, also referred to as Hansen's disease, is caused by the bacterium *Mycobacterium leprae*. Leprosy is a chronic, communicable disease that is not easily spread and has a long incubation period. Since 1985, the prevalence of leprosy has dropped by 90%. About 100 new cases are diagnosed yearly in the United States (primarily the southern states, Hawaii, and U.S. possessions).
- Peripheral nerves are affected, causing sensory loss and muscle weakness. The traditional fear of leprosy relates to skin involvement, which may present with lesions confined to a few isolated areas or may be fairly widespread over the entire body. Dapsone, clofazimine (Lamprene), rifampin (Rifadin), and ethionamide (Trecator) are drugs currently used to treat leprosy (Ford 106)

Nursing management

- Ask the patient what he or she thinks causes the symptoms; promote health literacy by integrating the patient's beliefs and fears into how the bacteria invades the body and how the drugs work to kill it.
- Discuss tuberculosis, its causes and communicability, and the need for long-term therapy for disease control using simple, non medical terms.
- Review the drug therapy regimen, including the prescribed drugs, doses, and frequency of administration.
- Reassure the patient that various combinations of drugs are effective in treating tuberculosis.
- Urge the patient to take the drugs exactly as prescribed and not to omit, increase, or decrease the dosage unless directed to do so by the health care provider.
- Instruct the patient about possible adverse reactions and the need to notify the prescriber should any occur.
- Arrange for direct observation therapy with the patient and family.
- Instruct the patient in measures to minimize gastrointestinal upset.
- Advise the patient to avoid alcohol and the use of nonprescription drugs, especially those containing aspirin, unless use is approved by the health care provider.
- Reassure the patient and family that the results of therapy will be monitored by periodic laboratory and diagnostic tests and follow-up visits with the health care provider.

Interactions

- **Antiretrovirals (efavirenz, nevirapine):** Decreased serum levels of antiretrovirals
- **Digoxin:** Decreased serum levels digoxin
- **Oral contraceptives:** Decreased contraceptive effectiveness
- **Isoniazid:** Higher risk of hepatotoxicity
- **Oral anticoagulants:** Increased risk for bleeding
- **Oral hypoglycemics:** Decreased effectiveness of oral hypoglycemic agent
- **Chloramphenicol:** Increased risk for seizures
- **Phenytoin:** Decreased effectiveness of phenytoin
- **Verapamil:** Decreased effects of verapamil

Generic

Trade

Use

Dose

Rifampin

Rifadin, Rimactane

Active TB, Hansen's disease (Ford 109)

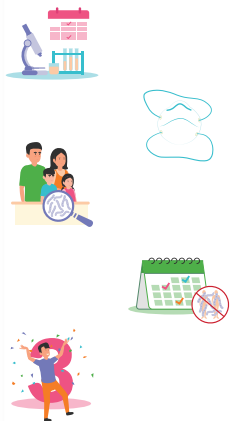
10 mg/kg (up to 600 mg/day) orally, IV (Ford 109)

TB DRUGS

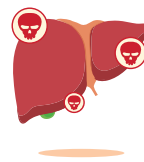
5 TB Tips

5 NCLEX TIPS

1. Meds Last **6 - 12 months**
2. N-95 mask worn all the time
3. Family tested for TB
4. Sputum samples every 2 - 4 Weeks
5. **3 Negative** cultures on **3 different days** = NO Longer infectious



Memory Trick



ALL are **LIVER TOXIC!!!!**
So some instructors just use the acronym:

R I P E

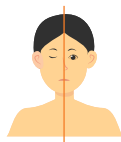
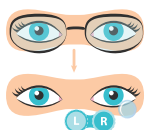
R

**RIFAMPIN
RED-FAMPIN**



KEY Points:

1. **NORMAL**
- Red, Orange: Tears, Urine, Sweat
Teach:
- Wear glasses instead of contacts due to discoloration of tears **NCLEX TIP**
2. Oral contraceptives ineffective
"Use **non-hormonal**
Back-up birth control"
3. Monitor for Jaundice



I

**INH
ISONIAZID**

**#1 TESTED
TB DRUG**

- I** - Interferes with absorption of B6 (pyridoxine)
 - Low **Vitamin B6** = Peripheral **Neuropathy**
 - Take **Vitamin B6** 25 - 50mg/day
- N** - Neuropathy
REPORT:
 - New Numbness
 - Tingling extremities
 - Ataxia
- H** - Hepatotoxicity
REPORT Immediately!!!
 - Jaundice (yellow) **Skin / Sclera**
 - Dark urine **NCLEX TIP**
 - Fatigue
 - Elevated liver enzymes (AST/ALT)
 - HOLD the Med**
 - Teach: NO ETOH!!

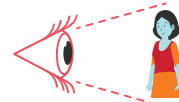
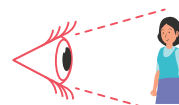


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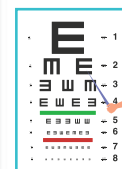
ETHAMBUTOL - Eye

**KEY POINT:
REPORT!**

- Blurred vision
- Color changes



This information has come up in multiple sections!
TEACH to have baseline eye exams and routine **EYE** appointments! For **EEEEthambutol**



P

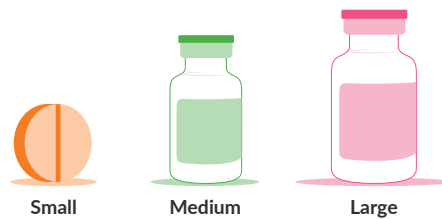
PYRAZINAMIDE

Did not come up 1 x in 10,000 questions.
it's a nice to know but NOT A NEED TO KNOW

Anti platelets

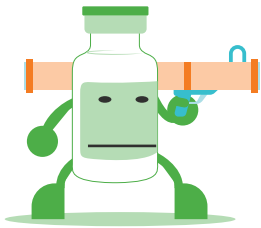
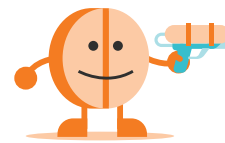
Blood Thinners

Generally comes in 3 sizes:
Small, Medium, LARGE



By comparison think of:

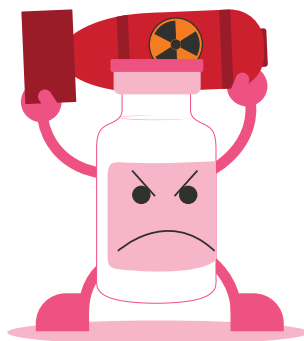
Antiplatelets like **Aspirin & Clopidogrel**
like a water gun - those are small ones



Anticoagulants - Heparin & Warfarin,
like bazooka - those are the medium

Thrombolytic Clot busters - TPA & Alteplase
like an ATOMIC BOMB.

Those are large ones and MOST deadly,
since THEY HAVE the **HIGHEST BLEED RISK!**



Notes

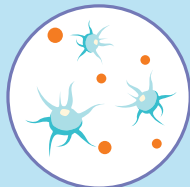
Antiplatelets

Abciximab

Drug name:

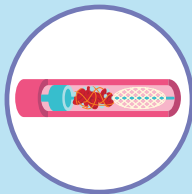
Glycoprotein (GP) receptor inhibitors

- Abciximab
- Eptifibatide
- Tirofiban



Indication:

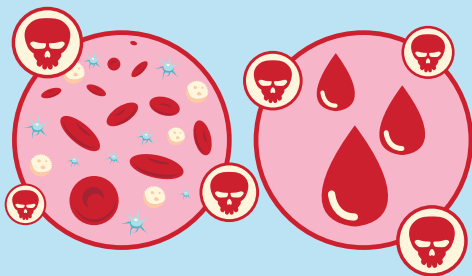
Mainly used after cardiac procedures like heart cath - Coronary Stent Placement to prevent reocclusion



Adverse Effects:

Adverse Effects

- Thrombocytopenia
- Bleeding



Nursing care:

KEY TERM:

1. Assess

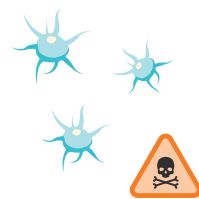
HEMOGLOBIN <7



PLATELETS <150,000



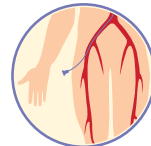
PLATELETS <50,000



2. Assess for bleeding

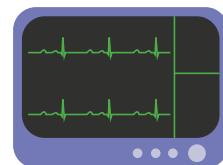
REPORT TO HCP!

- Red tinged urine "hematuria"
- "Dark" tarry stools / Black or bloody stools
- Monitor groin (insertion site) for s/s bleeding



3. Place client on cardiac monitor

ECG changes!



4. NO needles!

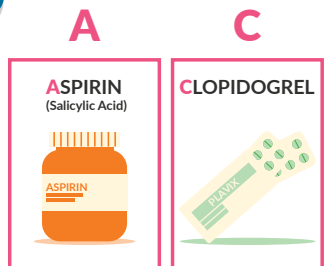
(no new IV or IM)



Notes

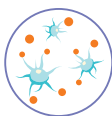
Antiplatelets Acetylsalicylic & Clopidogrel

Drug name:



MOA:

They prevent the platelets from aggregating together. Sort of Spreading platelets out from each other.



Memory Trick:

ANTI PLATELETS

They LOWER platelet aggregation, so we have less chances of them sticking together.

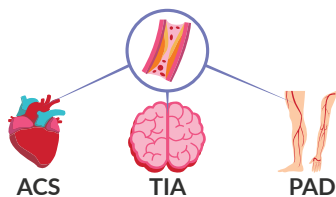
Anti **C**logging



Indication:

Mainly for Clot prophylaxis

- Heart: MI / CVA prevention
- Narrowed arteries
 - ACS (heart)
 - TIA (brain)
 - PAD (extremities)
- Prevention of stent/bypass re-occlusion



A C

ASPIRIN CLOPIDOGREL
ANTI CLOT

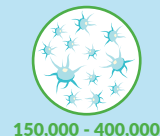


KEY Numbers

- **Hgb < 7** = HEAVEN
- **Platelets:** (normal 150 - 400K)
 - Less than 150,000 **NOTIFY HCP !!!**
 - Less than 50K **VERY RISKY!!**
- * These meds **SHOULD NOT** decrease plt levels

HESI KEY TERM:

Use for post - PCI
- percutaneous coronary intervention



COMMON QUESTION

Platelet count of **75,000 ... or 40,000** PRIORITY?

1. **HOLD** the DRUG
2. **Question** the prescription
3. **NOTIFY** the Health Care provider



Aspirin Toxicity:

HESI & ATI Exit Exams

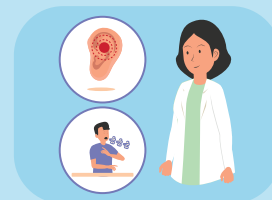
Treatment:
Activated Charcoal

KEY TERM:
Initial treatment of salicylate (Aspirin) toxicity



KEY SIGNS of Aspirin toxicity

- Tinnitus
- Hyperventilation
- Notify the HCP



ATI Question

- Long term aspirin
"Assess for tinnitus"



Notes

Anticoagulants

Anti-Coagulants Heparin

Key Numbers for NCLEX

- **PTT: 46 - 70**
- **Antidote: Protamine Sulfate**



Be careful, NCLEX, will yty & trick you!
NOT INR & NOT PTT OVER 70!



Memory Trick:

“HePTT” the FROG

- **H** - Heparin
- **P** - Protamine Sulfate **Antidote**
- **PTT** - **46 - 70** Max range

H - HaPTT



NCLEX MEMORY TRICK!



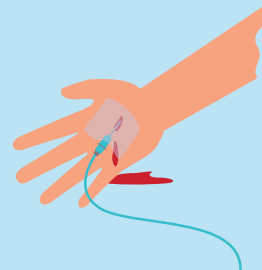
Heparin goes FAST!!



ATI Question

Patient on Heparin with Bleeding at IV SITE!!
Priority action:

“Blood Oozing at surgical incision”



Priority Action:

- 1 STOP** the Heparin - Notify HCP
- 2 Prepare Antidote:** Protamine Sulfate
- 3 Reassess labs (1 hour)**



HESI Question

“Heparin drip PTT 85 or 100”

PTT OVER 70 !!

Heparin drip
aPTT 85 or 100!



Priority Action

- 1 STOP** the Heparin - Notify HCP
- 2 Prepare Antidote:** Protamine Sulfate
- 3 Reassess labs (1 hour)**



Notes

Anti-Coagulants

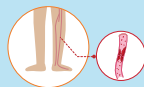
LMW Heparin

Heparin SQ

- parin
- Enoxaparin (Lovenox)
- Dalteparin

Less heavy and less chances of major bleeding

Indication:



Key term

Prevention of DVT after surgery

Common ATI question:

Enoxaparin
 "Which statements needs FURTHER TEACHING"
 I will inject the med into my thigh
 I will need Frequent Blood tests

HESI question:

"Client on ENOXAPARIN"
 Report to HCP:
 1. H & H decreased
 2. BP drops by 20 points

NCLEX Key Term:

Notify HCP and clarify order for enoxaparin if H/H Slightly low!
 Open fractures & H&H LOW - Enoxaparin is a **NO GO!**



KEY Numbers

Platelets should be **150k - 400k**

- HOLD MED** Plt less than 50,000

Another risk is HIT - Heparin Induced Thrombocytopenia!
 If Platelets decrease by HALF in 24 hours after starting heparin of any type, this typically indicates HIT and it's **VERY DEADLY!**

H



HIT is when

H



HALF platelets GONE in **24 hours!**

H



Heparin

PRIORITY ACTION

1. Alert the HCP!



Administration:

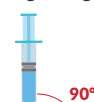
1

25 G Needle 1/2 inch



2

Inject at 90 degree angle



3

LOCATION

NCLEX KEY WORD

2 inches from Umbilicus



NOT thigh



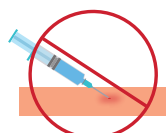
NOT IV route



4

NO NO'S

Never aspirate SQ



NEVER RUB site!



Normal to have mild "pain, bruising, irritation, redness at site"

Enoxaparin Labs:

30%

STUDENTS WRONG
 Most commonly chosen distractor!

Enoxaparin Labs

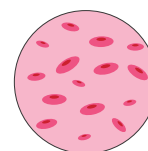
Low Platelets

NOT aPTT or INR

P - Parin (Enoxaparin)



P - Platelet FOCUSED

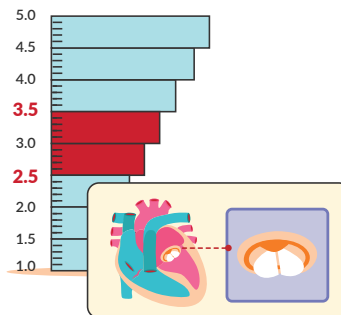


Anti-Coagulants

Warfarin

Key Numbers for NCLEX

- **INR**
2 - 3 Therapeutic Range
2.5 - 3.5 (heart valve replacements)
- **Antidote:** Vitamin K
"K = Kills Warfarin"
- **NCLEX KEY TERMS:**
Vitamin K
- **NOT!** given if **warfarin** within **therapeutic range**
- **NOT!** until **AT LEAST 5 days of warfarin** when switching from IV Hep!!!



*2.5-3.5 for heart valve replacements

Vitamin K Foods

- Liver
- Green leafy vegetables (Broccoli, Spinach)
- **Key Patient Teaching:**
 - Consistent & Moderation
 - Keep K - Consistent
 - **Key words:**
 - **NOT** increased
 - **NOT** decreased
 - **NOT** avoid TOTALLY

NCLEX MEMORY TRICK!

W - Warfarin

W - War**K**IN

W

Warfarin



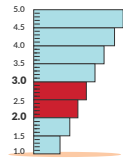
K

Vitamin K **Antidote**



IN

INR (2-3 range)



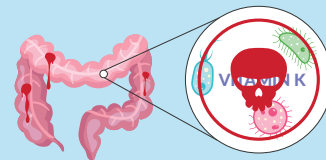
NICE to KNOW!!

WARFARIN

Antibiotics **INCREASE** risk for **Bleeding**

By **INCREASING INR**

Since the ABX **KILL** the intestinal bacteria that produce vitamin K...We have vitamin K deficiency & **INCREASED** risk for **bleeding**



ATI Question

Client on Warfarin
Which Statement
requires **intervention**:

"I will increase my
intake of dark green
leafy vegetables"

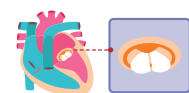
Common Question on EXIT EXAMS

- **INR of 4 or 5 !!!**
 - **Assess** for Bleeding.
 - Get Vitamin K antidote **READY!!**
- **INR of 2.0** in an **ischemic CVA client**
 - **GIVE** the Warfarin to get to 2.5!

PATIENT TEACHING

Key Term:

1. Life Long Therapy
2. Mechanical Valve Replacements
3. Frequent Blood Tests



Notes

Anti-Coagulants

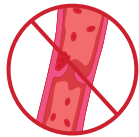
Heparin vs. Warfarin

Indication:

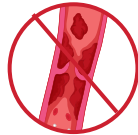
KEY WORD

NCLEX

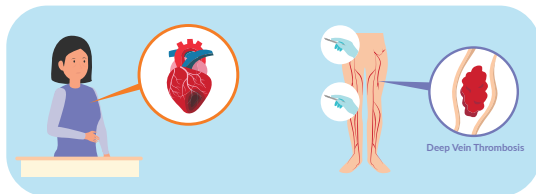
PREVENTION of **NEW** clots



PREVENTING **GROWTH** of existing clots



Specifically with patients recovering from An MI heart attack or those at RISK for DVT

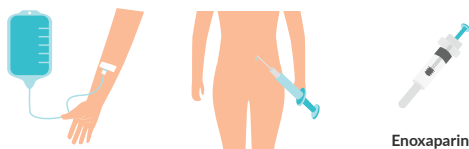


Heparin:

- Heparin works **QUICKLY**, or Heparin works Hella **FAST**, within 20 minutes



- Heparin starts in a hurry, but is gone in a hurry
- It can only be injected into the patient. IV or SQ like **Enoxaparin**, the lower lighter weight heparin



Warfarin:

- Warfarin has a weaker **START**, typically taking 5 days to reach **FULL** effect. So warfarin takes a **LONGER TIME** to kick in, but it last **LONGER** & can be taken longer



- So think of the **WAR** in Warfarin, like a **WAR** that lasts a **LONG TIME!**



Memory Trick:

Heparin

H Therapeutic Range **46 - 70 PTT**



Memory Trick: "HePTT" the FROG

- H** - Heparin
- P** - Protamine Sulfate (Antidote)
- PTT** - **46 - 70 Max range**

*FAST onset = Frogs are FAST

Warfarin

WAR Therapeutic Range **2 - 3 INR**



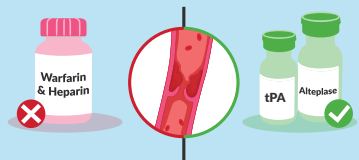
Memory Trick: "War-K-IN"

- W** - Warfarin
- K** - Vitamin K (Antidote)
- IN** - INR **2-3 range**

*Slow onset = "Is it even WARkin?"

Key Point:

Don't let **NCLEX TRICK YOU**



Anti-coags **DO NOT DISSOLVE CLOTS!** Only thrombolytics do that, like TPA or Alteplase

Key Words:

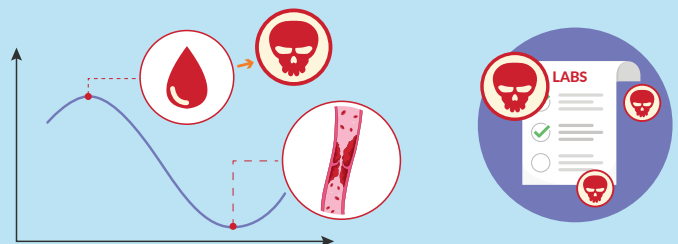
Both medications given **TOGETHER** for several days. This gives Warfarin some time to catch up.



LABS:

LABS - BY FAR the biggest TOPIC on Test Questions: **SINCE IT'S THE MOST DEADLY!!**

So just think if Labs:
TOO HIGH = pt will bleed out & **DIE**
TOO LOW = then **CLOTS** will **GROW**

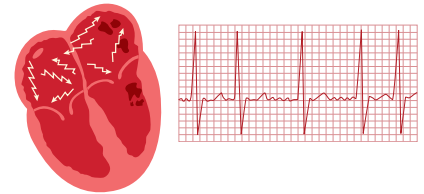


Notes

Dabigatran & Argatroban

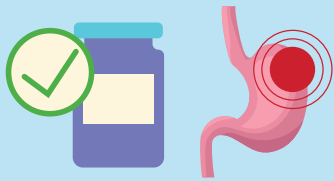
Indication:

Used to prevent clot in high risk **A Fib** patients



KEY POINTS

- **DO NOT STOP THE MED FOR GI ISSUES**
- **STOP med if black tarry STOOLS**
- **NOT** Stores IN PILL BOX ... in original container!!!
- **NOT** crushed, taken whole
 - **Memory Trick** = Take DA BIG pill whole!
 - HOLD clopidogrel
 - HOLD before surgery



ATI QUESTION

- Meds to Hold before Surgery → Dabigatran



HESI QUESTION

- Pt on Dabigatran → Do not take with **clopidogrel**



Notes

Factor XA Inhibitors

Drug name:

- Rivaroxaban (brand name Xarelto)
- Edoxaban
- Apixaban



Key Points:



- **AVOID ASPIRIN** while taking this med
- **AVOID** any & all over the counter meds that increase bleeding! Especially **NSAIDS!**

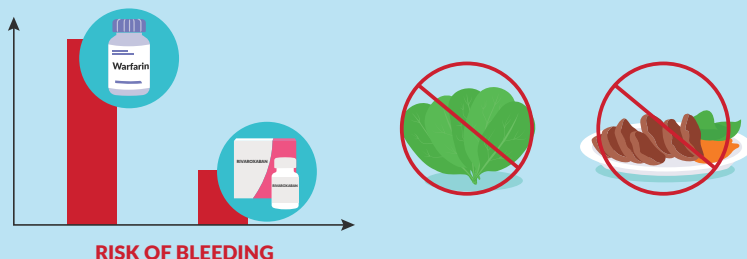
- The supplements - **EGGO**

- **E** - Vitamine E
- **G** - Garlic
- **G** - Ginger Ginkgo
- **O** - Omega 3's



Good News:

- There is a lower risk of bleeding compared to warfarin
- NO need for routine clotting studies
- NO need to avoid Vit K food such as leafy greens or liver. Eat up that liver & spinach



RIVER ROCK band! Blood flows like RIVER

Bad News:

- Risk for **neurological impairment**
Rock Band can cause brain **bleeding**, think too much head banging



HESI -Common Question

- **Rivaroxaban**
 - Teach client methods to reduce bleeding.



Notes

Anti-Coagulants

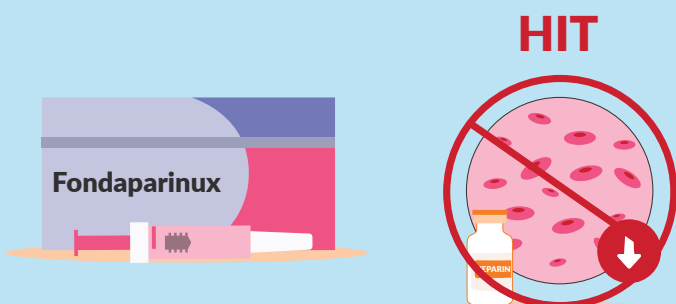
Fondaparinux

Drug name:

Fondaparinux
(related to low weight heparins)

Major Advantage:

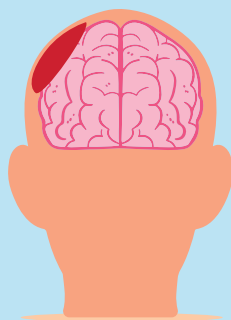
No risk for HIT



Major Disadvantage:

Key Term:

Fondaparinux can cause an **epidural bleed!**



Caution:

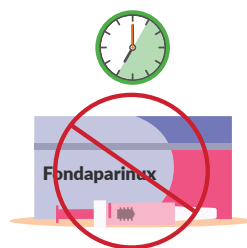
DON'T GIVE IT:

To patient who report severe back pain, decreased LOC or paralysis.
Always call the HCP and HOLD the med!

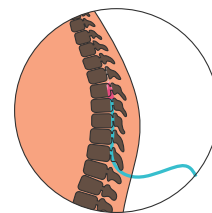


NCLEX KEY TERMS

NO Fondaparinux for
at least **6 hours after surgery**



NO Anticoagulants
with spinal **epidural catheter**



Notes

Patient Teaching Bleeding

Key Numbers:

Heparin



Therapeutic Range
46 - 70 PTT

Memory Trick:
"HePTT" the FROG

- H** - Heparin
- P** - Protamine Sulfate (Antidote)
- PTT** - 46 - 70 Max range

*FAST onset = Frogs are FAST

Warfarin



Therapeutic Range
2 - 3 INR

Memory Trick:
"War-K-IN"

- W** - Warfarin
- K** - Vitamin K (Antidote)
- IN** - INR 2-3 range

*Slow onset = "Is it even WARkin?"

Nursing Care:

BLEEDING PRECAUTIONS

- **NO** Active Bleed
- "peptic ulcer" **NCLEX TIP**

CHANT

- C** - Cirrhosis
- H** - Hepatitis
- A** - Alcohol **HESI EXAM**
- N** - NSAIDS **ATI EXAM**
- T** - Tylenol overdose - Liver damage

NO EGGGOS

- E** - Vitamin E
- G** - Ginseng
- G** - Ginkgo Biloba
- G** - Garlic
- O** - Omega 3
- S** - St Johns Wort

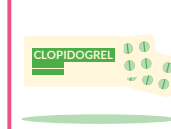
P

As**P**irin



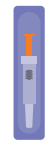
P

Clo**P**idogrel



P

Enoxa**P**arin



Platelets

- "Less than **50k** = Risky"
- Thrombocytopenia **HOLD** All he**P**arin
- **50,000**



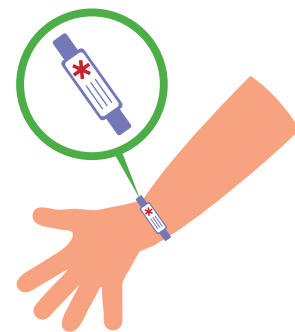
< 50,000



AVOID Trauma: **HESI KEY TERMS**

- NO** small rugs or dim halls = Well Light Halls
- NO** hard brushing = soft bristle tooth brush
- NO** flossing
- NO** alcohol based mouth wash
- NO** razors = electric shaver
- NO** constipation = Fiber + Fluids **NCLEX TIP**
- NO** contact sport

Medic Alert Braclet



SIGNS OF BLEEDING

NOTIFY the HCP ASAP!!



KEY WORDS

- Black Tarry Stools - GI bleed
- Hematuria (blood tinged urine)
- Epistaxis - nose bleed
- Petechiae on chest
- Easy Bruising

Notes

Thrombolytics

Thrombolytics tPA & Alteplase

Drug name:

tPA
“-Ase”

- Alteplase
- Reteplase
- Streptokinase



NCLEX Key Contraindications:

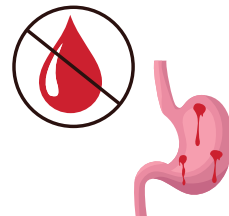
AVOID giving to:

1. Active bleeding
2. Uncontrolled HTN **180/110 +**
3. Recent surgery within 2 weeks

KEY TERM: Peptic ULCER

Clarify Prescription with Provider !

- A - Accidents “Recent Trauma” **NCLEX TIP**
- A - Aneurysm - Hx of hemorrhagic CVA **NCLEX TIP**
- A - AV malformation **NCLEX TIP**



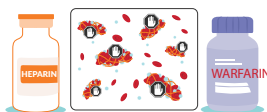
Key Point:

• Clot Busters - our **ATOMIC BOMB!**
The MOST powerful 1 time push drugs!



• These are the ONLY ones that **dissolve clots!**

• Aspirin & Clopidogrel - **NOT** clot busters, they are **Anti-Platelets**



• Heparin & Warfarin - **NOT** clot busters, they prevent new clots & existing clots from getting bigger.

• The big caution here is the **MASSIVE - BLEEDING RISK!** And it's the **MOST DEADLY!**



• **NO** injections at all!

• **NO NEW:**



NO IV'S



NO SUB Q



NO IMS



NO ABG

KEY TERMS

3 - 4.5 hour from ONSET of symptoms



KEY TERMS

THE BIG caution here is the **MASSIVE - BLEEDING RISK !!!!!**



KEY TERMS

These drugs can only be given in a compressible site like an peripheral IV.

- **Yes** “Existing” peripheral IV
- **NOT** Central Line



Notes

Thrombolytics

How do they work? "Action"

These drugs break down fibrin clots by converting plasminogen to plasmin. Plasmin is an enzyme that breaks down the fibrin of a blood clot. This reopens blood vessels after their occlusion and prevents tissue necrosis.

Why do we give it? "Reason"

- Acute stroke or MI by lysis (breaking up) of blood clots in the coronary arteries
- Blood clots causing pulmonary emboli and DVT
- Suspected occlusions in central venous catheters (Ford 394)

Adverse effects

- Bleeding

Contraindications

- Active bleeding
- History of stroke
- History of aneurysm
- Recent intracranial surgery

Nursing management

- **Must administer within 4-6 hours post thrombus formation**
- Assess the patient for bleeding every 15 minutes during the first 60 minutes of therapy, every 15 to 30 minutes for the next 8 hours, and at least every 4 hours until therapy is completed. Vital signs are monitored continuously. If pain is present, the primary health care provider may order an opioid analgesic. Once the clot dissolves and blood flows freely through the obstructed blood vessel, severe pain usually decreases. (Ford 396)
- **Lab Test Considerations:** Monitor activated partial thromboplastin time (aPTT) and hematocrit before and after and periodically. When intermittent IV therapy is used, draw aPTT levels 30 min before each dose during initial therapy and then periodically.
- **During continuous** administration, monitor aPTT levels every 4 hr during early therapy.

Interactions:

- When a thrombolytic is administered with medications that prevent blood clots, such as aspirin, dipyridamole, or an anticoagulant, the patient is at increased risk for bleeding.

Generic

Trade

Use

Dose

Alteplase

Activase, Cathflo Activase (for IV catheter occlusions only)

Acute MI, acute ischemic stroke, PE, IV catheter clearance

Total dose of 90–100 mg IV, given as a 2- to 3-hr infusion

Oncology

Chemotherapy

Drug names:

- Doxorubicin
- Cisplatin
- Cyclophosphamide



Adverse Effects:

All fast growing cells die

- Bone cells **DIE**
- Blood cells **DIE**
- **Low** immunity



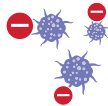
Key Points:

- **Low RBC & LOW CBC - "Anemia"**
 - Normal: 4.5 - 6 million RBC
- **Low Platelets**
 - Normal plt 150 - 400,000
 - Less than 100,000 = **Thrombocytopenia**
- **Low WBC - leukopenia < 4,000**
 - Normal: 5,000 - 10,000



Indication:

Slow & stop the growth of tumors



MOA:

Directly inhibiting growing cells in the body



KEY WORDS

- **"Immunodeficiency"**
- **"Immune compromised"**
- **FEVER is a priority OVER 100.3 F (38 C)!!!**



NCLEX TIP

KAPLAN

Doxorubicin- Temperature is highest priority Over 100.5 F (38 C)

Cisplatin:

KEY POINT

Renal toxicity

Monitor Urine- Input & Output

- Creatinine **OVER 1.3 = Bad kidney**
- BUN **OVER 20**
- Urine output **30ml/hr** or LESS = **Kidney Distress**

Creatinine > 1.3



BUN > 20



Urine Output < 30ml/hr



MEMORY TRICK

CISplatin



PISSplatin



Drug name:

Vincristine



Only chemo drug that does NOT cause bone marrow suppression!

Memory Trick:

Very Cool **CHRISTIAN**

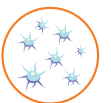


Just a gentle Sainly soul, does not harm the bone marrow

Common NCLEX Question

The nurse is caring for a client with ovarian cancer taking **doxorubicin**, which assessment finding should the nurse report to the health care provider? **Select All That Apply**

- 1. Partial thromboplastin time 55.
- 2. Platelet count of 48,000.
- 3. Red blood cell count 5×10^6 .
- 4. Temperature of 100.7 (38.2 C).
- 5. White blood cells 3,600.



< 50,000
Normal 150,000- 400,000



> 100.3 F / 38 C



< 4,000
Normal 5,000- 10,000

Notes

Breast Cancer & Immunotherapy

Drug name:

Tamoxifen



KEY WORDS

- **Clots Risk!**
- **E - Estrogen**
- **E - Emboli** (clot risk)

Contraindication:
History of **DVT** or **PE CLARIFY order with provider!**



NCLEX Question

When preparing to administer **tamoxifen** to a patient with breast cancer, the nurse is most concerned by which patient report?

- ✓ A. "I have been experiencing really heavy menstrual cycles recently."
- B. "My hot flashes seem to be decreasing in frequency."
- C. "I feel like I may be developing a sinus infection."
- D. "I just don't have the energy for sex the way that I used to."

MOA:

Blocks estrogen receptors in the breast to stop estrogen dependent cancer



HESI Question

Tamoxifen - Treats breast cancer



KAPLAN

Endometrial cancer
Report "**heavy periods**" "excessive **Bleeding**"



Drug names:

Filgrastim
Pegfilgrastim



Indication:

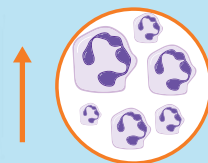
Stimulates WBC (neutrophil) production



WBC- neutrophil

Key Point:

Expected = **INCREASE** neutrophil count



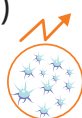
Drug name:

Oprelvekin



Indication:

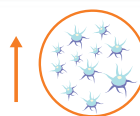
Increases platelet production, for patients in chemo who have high risk for thrombocytopenia (low platelet)



ATI

Patient Scenario:

- Stimulates growth of **hematopoietic** stem cells
- Oprelvekin effectiveness = **Increased platelets**



HESI

Adverse Effects

- **F**luid retention
- **A** fib
- **A**naphylaxis



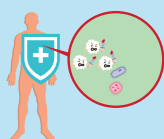
Drug name:

Interferon



Indication:

Stimulates the body's immune system to detect & kill cancer cells & viruses



Side Effects:

Flu like symptoms: Fever, muscles aches, chills are **NORMAL**

Memory Trick:

Inter**FLU**on



NORMAL

HESI

Interferon beta

- Apply warm compress **before** giving injection to reduce risk of pain at site
- Administer med late in the day so **flu like symptoms** occur during sleep

Notes

Cancer Treatment Radiation & Brachytherapy

Name:

Radiation (outside of the body)



Indication:

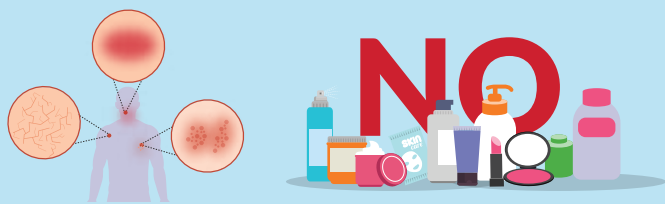
Typical radiation outside of the body is used in combo with chemotherapy to help shrink cancerous tumors before surgery



Side Effects:

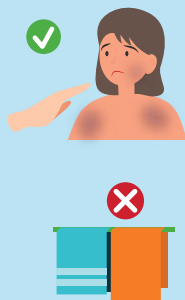
Very hard on the skin: red, dry & itchy

- **NO** hard scrubbing of skin
- **NO** tape or deodorants
- **NO** shaving
- **NO** lotions, creams, perfumes, powders, makeup cosmetics



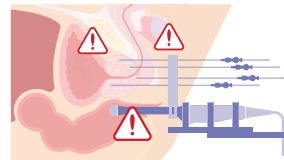
ATI

Client with cancer undergoing radiation therapy
I will **use my hands** rather than a washcloth to clean the radiation area



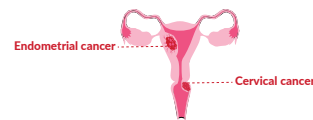
Name:

Brachytherapy (radiation inside the body)



Indication:

- Endometrial cancer
- Cervical cancer



NCLEX #1 goal is safety
A radioactive implant is placed directly inside the tumor for **24-72 hours - making this patient like a radioactive hazard!**



KEY POINTS

1. Time:

- Cluster care **30 minutes** per shift!
- Staff is to wear radiation **film badge** (dosimeter)

2. Distance:

- **TEACH all visitors** distance of at **least 6 feet**
- NO Pregnant Company
- NO one less than 18 years old
- **Private** room + toilet
- **Close door** to room at all times
- Sign on door "caution radioactive"

3. Shielding:

Use **Lead Apron** when in **DIRECT CONTACT** with patient



Notes

Diabetes Drugs

Diabetes Drugs

- Insulin

How it works? "Action"

Activates a process that allows glucose molecules to enter the cell
 "Thick of it like a Key opening a door, the cell is the door. The insulin is the key"

Onset, peak, and duration are three important properties of insulin:

- **Onset:** when insulin first begins to act in the body
- **Peak:** when the insulin is exerting maximum action
- **Duration:** the length of time the insulin remains in effect

Indications

Insulin is used to:

- Control type 1 diabetes
- Control type 2 diabetes when uncontrolled by diet, exercise, or weight reduction
- Treat severe diabetic ketoacidosis (DKA) or diabetic coma
- Treat hyperkalemia in combination with glucose

Adverse Reactions

Hypoglycemia

- The patient eats too little food.
- The insulin dose is incorrectly measured and is greater than that prescribed.
- The patient has drastically increased demands (activity or illness).

Hyperglycemia

- The patient eats too much food.
- Too little or no insulin is given.
- The patient experiences emotional stress, infection, surgery, pregnancy, or an acute illness.

Nursing management

- Obtain FSBS before administration of any insulin.
- Obtain FSBS 30 minutes post insulin administration.
- Educate the patient how to self administer insulin and signs of symptoms of hyper/hypoglycemia.
- Monitor for hypoglycemia
- Monitor for hyperglycemia
- Monitor potassium levels
- Regular insulin is clear, whereas intermediate- and long-acting insulins are cloudy. The clear insulin should be drawn up first. When insulin lispro is mixed with a longer-acting insulin, the insulin lispro is drawn up first. (Ford 456)

Contraindications & Caution

Specific insulin products are contraindicated when the patient is hypoglycemic. Insulin is used cautiously in patients with renal or hepatic impairment and during pregnancy and lactation. The insulins are grouped in pregnancy category B, except for insulin glargine and insulin aspart, which are in pregnancy category C. Insulin appears to inhibit milk production in lactating women and could interfere with breastfeeding. Lactating women may require adjustment in insulin dose and diet. (Ford 451)

Interactions:

Eucalyptus products: May cause decreased blood sugar.

Drugs That Increase the Effect (Less Insulin May Be Required)

- angiotensin-converting enzyme (ACE) inhibitors, alcohol
- anabolic steroids, antidiabetic drugs, oral, β -blocking drugs
- Calcium, clonidine, disopyramide, fluoxetine, fibrates, lithium
- MAOIs, mebendazole, pentamidine, pentoxifylline, Pyridoxine, salicylates, somatostatin analog, sulfonamides, tetracycline

Selected Drugs That Decrease the Effect (More Insulin May Be Required)

- Acetazolamide, albuterol, antipsychotics (atypical or second generation)
- Asparaginase, calcitonin, contraceptives, oral corticosteroids
- Cyclophosphamide, danazol, diltiazem, diuretics, dobutamine
- Epinephrine, estrogens, glucagon, human immunodeficiency virus (HIV) antivirals
- Isoniazid, lithium, morphine sulfate, niacin, nicotine, phenothiazines, phenytoin, progestogens, protease inhibitors, somatropin, terbutaline, thiazide diuretics, thyroid hormones

Types of Insulins

Names

Types of Insulins	Names
Rapid-Acting	insulin Lispro-Humalog Insulin Aspart-Novolog
Short-Acting	Regular Insulin-Humulin R • Regular insulin is the only one given IV • Concentrated insulin-Insulin U-500
Intermediate-Acting	NPH-Humulin N, Novolin R
Long-Acting	Insulin Glargine-Lantus • Cannot mix with others Insulin Detemir-Levemir
Premixed	NPH/REG • Humulin 50/50 • Humulin 70/30 • Novolin 70/30 Aspart protamine/aspart • Novolog Mix 70/30 Lispro protamine/lispro • Humalog Mix 75/25

Generic	Trade	Safe Dose	Route
Lispro (Humalog)	5m	60-90min	4-6h
Aspart (Novolog)	10-20m	1-3h	3-5h
Regular (Humulin R)	SQ: 30-60m IV: 10-30m	SQ: 2-4h IV: 15-30m	SQ: 5-7h IV: 30-60m
NPH (Humulin N, Novolin R)	8-12h	18-24h	None
Glargine (Lantus)	None	None	24h
Detemir (Levemir)	3-14h	None	24h

Diabetes Drugs

- Non Sulfonylureas

How do they work? "Action"

Metformin sensitizes the liver to circulating insulin levels and reduces hepatic glucose production.

alpha (α)-glucosidase inhibitors acarbose (Precose) and miglitol (Glyset) lower blood glucose levels by delaying the digestion of carbohydrates and absorption of carbohydrates in the intestine.

The thiazolidinediones, also called glitazones, decrease insulin resistance and increase insulin sensitivity by modifying several processes, resulting in decreased hepatic gluconeogenesis (formation of glucose from glycogen) and increased insulin-dependent muscle glucose uptake.

Examples of the thiazolidinediones are rosiglitazone (Avandia) and pioglitazone (Actos). (Ford 453)

Indications

Oral antidiabetic drugs are used in the treatment of patients with type 2 diabetes mellitus whose condition cannot be controlled by diet alone. (Ford 452)

Adverse Reactions

- GI upset (e.g., metallic taste, abdominal bloating, nausea, cramping, flatulence, and diarrhea).
- **Adverse effects of thiazolidinediones** include upper respiratory infections, sinusitis, headache, pharyngitis, myalgia, diarrhea, and back pain. Lactic acidosis (buildup of lactic acid in the blood) may also occur with the administration of metformin.
- Metformin can also cause weight loss

Contraindications & Caution

- Heart failure
- Renal disease
- Acute or chronic metabolic acidosis
- Ketoacidosis
- Those over 80
- Pregnancy

Interactions:

- Increased risk of lactic acidosis when metformin is given with corticosteroids.
- Digestive enzymes may reduce the effect of miglitol.

Nursing management

- Stop metformin 48 prior to and post radiologic studies.
- Temporarily discontinue metformin before surgical procedures.
- Take the drug exactly as directed on the container (e.g., with food, 30 minutes before a meal).
- An antidiabetic drug is not oral insulin and cannot be substituted for insulin.
- Never stop taking this drug or increase or decrease the dose unless told to do so by the primary health care provider.
- Take the drug at the same time or times each day.
- **Metformin**—there is a risk of lactic acidosis when using this drug. Discontinue the drug therapy and notify the primary health care provider immediately if any of the following occur: respiratory distress, muscular aches, unusual somnolence, unexplained malaise, or nonspecific abdominal distress.
- **When a hypoglycemic patient is taking an α-glucosidase inhibitor (e.g., acarbose or miglitol), give the patient an oral form of glucose, such as glucose tablets or dextrose, rather than juice, honey, or candy (sucrose). Absorption of sugar is blocked by acarbose or miglitol.** (Ford 458)

Lactic Acidosis

- **Very rare but can be fatal**
- **Occurs mainly in patients with kidney dysfunction**
- **Symptoms:** malaise (vague feeling of bodily discomfort), abdominal pain, rapid respirations, shortness of breath, and muscular pain. In some patients, vitamin B12 levels are decreased. (Ford 453)
- Reversible with administration of B12 or discontinuation of drug therapy.

Generic	Trade	Safe Dose	Route
Acarbose • a-Glucosidase inhibitor	Precose	Type 2 Diabetes as an adjunct to sulfonylurea to improve glycemic control	25-100 mg orally TID
Metformin • Biguanide	Glucophage, Riomet, Fortamet	Type 2 Diabetes as an adjunct to sulfonylurea to improve glycemic control	500-3000 mg/ day orally
Pioglitazone • thiazolidinediones	Actos	Type 2 diabetes in combination with metformin for glycemic control	5-15 mg orally TID

Diabetes Drugs

- Sulfonylureas

How do they work? "Action"

Sulfonylureas act to lower blood glucose by stimulating the β cells of the pancreas to release insulin. Sulfonylureas are not effective if the β cells of the pancreas cannot release a sufficient amount of insulin to meet the individual's needs. (Ford 452)

Indications

Oral antidiabetic drugs are used in the treatment of patients with type 2 diabetes mellitus whose condition cannot be controlled by diet alone. (Ford 452)

Adverse Reactions

- Hypoglycemia
- Anorexia
- nausea, vomiting
- epigastric discomfort, weight gain
- heartburn, and various vague neurological symptoms, such as weakness and numbness of the extremities.

Contraindications & Caution

- Known hypersensitivity
- DKA
- Severe infection
- The first-generation sulfonylureas (chlorpropamide, tolazamide, and tolbutamide) are contraindicated in patients with coronary artery disease or liver or renal dysfunction. (Ford 453)

Hypoglycemia

Methods of terminating a hypoglycemic reaction include the administration of one or more of the following:

- 4 ounces of orange juice or other fruit juice
- Hard candy or 1 tablespoon of honey
- Commercial glucose products such as glucose gel or glucose tablets
- Glucagon by the subcut, IM, or IV routes
- Glucose 10% or 50% IV (Ford 458)

Interactions:

Increased hypoglycemic effects:

- Anticoagulants
- Chloramphenicol
- Clofibrate
- Fluconazole
- histamine H2 antagonists
- Methyl dopa
- monoamine oxidase inhibitors (MAOIs)
- nonsteroidal anti-inflammatory drugs (NSAIDs),
- salicylates, sulfonamides, and tricyclic antidepressants.

Decreased Hypoglycemic effect

- β blockers, calcium channel blockers
- cholestyramine, corticosteroids
- estrogens, hydantoins, isoniazid
- oral contraceptives, phenothiazines, rifampin
- thiazide diuretics, and thyroid agents.

Nursing management

- Monitor blood glucose closely when starting or stopping therapy.
- Monitor HbA1c number is to be lower than 6%
- Chlorpropamide, tolazamide, and tolbutamide are given with food to prevent GI upset. However, because food delays absorption, glipizide should be given 30 minutes before a meal. Glyburide and glimepiride are administered with breakfast or with the first main meal of the day. Repaglinide can be taken immediately or up to 30 minutes before meals. Nateglinide is taken up to 30 minutes before meals.
- Take the drug exactly as directed on the container (e.g., with food, 30 minutes before a meal).
- An antidiabetic drug is not oral insulin and cannot be substituted for insulin.
- Never stop taking this drug or increase or decrease the dose unless told to do so by the primary health care provider.
- Take the drug at the same time or times each day. (Ford 460)

Generic	Trade	Safe Dose	Route
Chlorpropamide First Generation	Diabense	Type 2 Diabetes as an adjunct to diet and exercise. Diabetes insipidus	100-250 mg orally/ day
Glimepiride 2nd Generation	Amaryl	Type 2 Diabetes as an adjunct to diet and exercise. May be used with insulin	1-4 mg orally/day
Nateglinide Meglitinide	Starlix	Type 2 diabetes in combination with metformin for glycemic control	60-120 mg orally TID before meals

Diabetes Drugs

- Incretin Mimetics

How do they work? "Action"

Hormone mimetic agents help control blood glucose levels by maintaining β cell function of the pancreas, enhancing insulin secretion, and suppressing glucagon, which signals the liver to decrease release of glucose. Gastric emptying is also delayed, which slows carbohydrate absorption.

Sitagliptin (Januvia) lowers the blood glucose level of those with type 2 diabetes by enhancing the secretion of the endogenous incretin hormone.

Exenatide (Byetta) mimics the action of the incretin hormone. Pramlintide (Symlin) mimics the action of another secretion, amylin.

Indications

Oral antidiabetic drugs are used in the treatment of patients with type 2 diabetes mellitus whose condition cannot be controlled by diet alone. (Ford 452)

Adverse Reactions

- nausea
- vomiting
- upset stomach
- diarrhea
- constipation
- weight loss
- loss of appetite
- heartburn
- dizziness
- headache

Contraindications & Caution

- Type 1 diabetes mellitus
- Diabetic ketoacidosis
- Kidney disease
- Pregnancy

Interactions:

- May slightly increase serum digoxin levels. Monitoring recommended.
- Increased risk of hypoglycemia when used with insulin, glyburide, glipizide, or glimepiride (may need to increase dose of insulin or sulfonylurea).

Nursing management

- Observe patient for signs and symptoms of hypoglycemic reactions (abdominal pain, sweating, hunger, weakness, dizziness, headache, tremor, tachycardia, anxiety).
- Monitor for signs of pancreatitis (nausea, vomiting, anorexia, persistent severe abdominal pain, sometimes radiating to the back) during therapy. If pancreatitis occurs, discontinue sitagliptin and monitor serum and urine amylase, amylase/creatinine clearance ratio, electrolytes, serum calcium, glucose, and lipase.
- Assess for rash periodically during therapy.
- Advise patient to stop taking sitagliptin and notify health care professional promptly if symptoms of hypersensitivity reactions (rash; hives; swelling of face, lips, tongue, and throat; difficulty in breathing or swallowing) or pancreatitis occur.

Generic	Trade	Safe Dose	Route
Sitagliptin	Januvia	Type 2 Diabetes	100 mg orally daily
Exenatide	Byetta	Type 2 Diabetes	5-10 mcg sub q within one hour of a meal
Liraglutide	Victoza	Type 2 diabetes	0.6-1.2 mg subq daily

PATHOPHYSIOLOGY BASICS

INsulin = puts **IN** to the cell (sugar & K+)

GLycogen = Stored **GL**ucose in Liver



PATHO & CAUSES

Type **ONE**

DON't produce insulin (Born)
Autoimmune "body attacks itself"
SON-hereditary

Type **TWO**

FEW-insulin receptors work
"Insulin resistance" (Diet)
YOU-diet "high simple sugars"
& sedentary lifestyle



RISK FACTORS

Type **ONE** -None (born)

Type **TWO**

"Meta**BOLIC** Syndrome"-Increased risk for diabetes, heart disease, stroke

B-BP meds or HTN (over 130 sysolic)

B-Blood Sugar Meds (insulin, oral diabetics) or High Blood Sugar (over 100+)

O-Obese (waist size: 35+ Female 45+ Male)

L-Lipids HIGH Total Cholesterol/Triglyceride/LDL 200-150-100-HDL 40
(higher LDL and lower HDL are risk factors)

***3 or MORE** criteria*

DIABETES MELLITUS

TYPE 1 vs. TYPE 2

DIAGNOSTIC LABS

	RANDOM	FASTING	GTT "TOLERANCE"	HgB _{A1C}
NORMAL	70-115	UNDER 100	UNDER 140	UNDER 5.7
PRE-DM	X	100-125	140-199	5.7-6.4
DM	200+	126+	200+	6.5+



SIGNS & SYMPTOMS

HIGH sugar
hot and dry = sugar high
"Hyperglycemia"
(blood turns to mud)
3 P's: Polyuria
Polydipsia
Polyphagia

LOW sugar (**70** or LESS)
cold and clammy need some candy
Hypoglycemia
MORE SEVERE! "Hypogly Brain will Die!"
· Cool, pale "pallor", sweaty,
clammy = candy **NOT** hot or flushing
· Trembling, Nervous, Anxious
· HIWASH = Headache, Irritable, Weakness,
Anxious, Sweaty, Shaky, Hungry

CAUSES

HIGH sugar (115 or MORE)
Sepsis (infection #1 cause),
Stress (surgery, hospital stay),
Skip insulin
Steroids (prednisONE)
TREATMENT: Insulin



LOW sugar (**70** or LESS)
Exercise
Alcohol
Insulin PEAK times
MOST DEADLY! "Hypogly brain will DIE!"
1st TREATMENT:
Awake? Ask to eat:
Juice, Soda, Crackers, Low Fat Milk
NOT high fat milk or peanut butter
Sleep? Stab them (D50 given IV/IO)



TREATMENT—PATIENT EDUCATION

D-DIET -Low carbs

AVOID: Simple Sugars (soda, candy, white bread/rice, juices)
· Good High Fiber = **BROWN** (bean, rice, bead, peanut butter)
"whole wheat/grain/milk"
· Bad Low fiber = White (bread, rice, bread potatoes (fries), low fat milk)

D-DIABETIC FEET "Delicious Feast for bacteria"

GOAL: Clean, Dry, Injury Free

AVOID

F-Flip Flops, high heels, Nylon,
O-OOT corn removal
O-Overly **HOT** (baths, pads etc.)
T-Toe Injuries – cut nails **STRAIGHT**



NCLEX KEY WORDS:

Daily inspection – **NOT** weekly
Shoes fit properly – **NO** sandals
SOFT Cotton Socks – **NOT** nylon
Nails trimmed-cut straight – **NOT** curved angles
Non healing skin wounds – Report to HCP (Dr.)

NO callous removal
NO heavy Powder – light powder
NO rubbing feet hard "vigorously"
NO HOT baths or HOT pads – warm is ok

COMPLICATONS

KIDNEY-Nephropathy (High Creatinine OVER 1.3)

EYE-Retinopathy (blind)

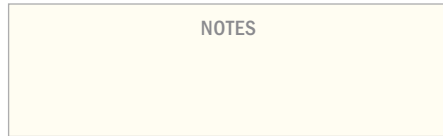
HEART-HTN & Atherosclerosis

BRAIN-CVA (strokes)






NERVES-Neuropathy (loss of feeling)

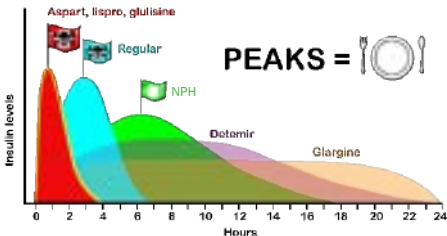


NOTES



INSULIN TYPES

LONG ACTING	NPH	REGULAR	RAPID
NO Peak NO Mix · Detemir · Glargine · Levemir= Long acting	Intermediate NEVER IV drip or IV bag Mix clear to cloudy Given 2x per day	Ready to go IV Regular goes right into the vein ONLY IV insulin	Aspart/Lispro/ Glulisine
 NO PEAK	 PEAK 4-12 hour	 PEAK 2-4 hour	 PEAK 30-90 minute <hr/> 15 minute ONSET <hr/> MOST DEADLY 



PEAK TIMES=Hypoglycemia risk **70 or Less**
 Hypogly brain will **DIE NCLEX TIP**

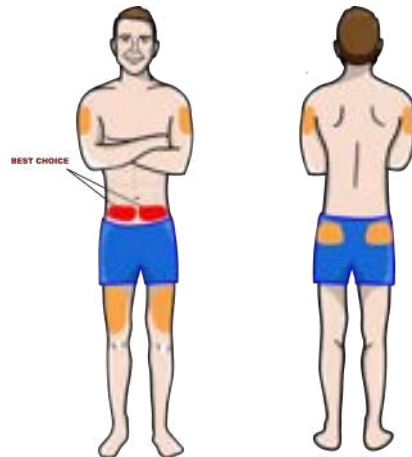
ORAL HYPOGLYCEMICS (Type 2 Only)

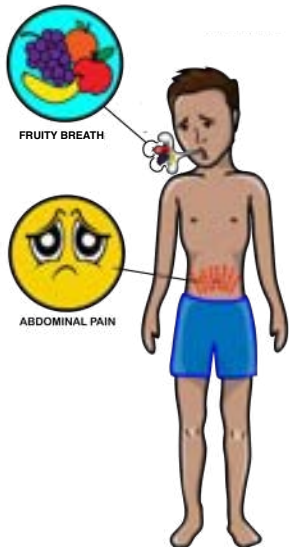
- DIET & EXERCISE** BEFORE oral meds and insulin
- METFORMIN**-Minimal chance of Low Sugar "hypoglycemia"
 - Weight **GAIN**
 - Lactic Acidosis: **NO** Alcohol + **STOP** 48 hours before and after cath
 IV Contrast = Kills Kidney
- GLIPIZIDE GLYBURIDE**-Heart can **DIE** (bad for CHF)
LOW blood sugar (Avoid alcohol "**ETOH**" = hypoglycemia)
TOXIC: Renal, Liver & elderly population
 Sun Burns = sunscreen & protective clothing
- THIAZOLIDINEDONE (TZD)** Pioglitazone (**ONE** heart)
NO Heart Failure patients-new pitting edema, crackles (lungs)
NO Liver failure patients "Cirrhosis" "Liver Failure"

NOTES

7 INSULIN TIPS

- Peaks + Plates** = Food during **PEAK** times (prevent **HYPO**gly=brain die)
- NO Peak NO Mix** = Long acting "old guys"-Detemir & Glargine
- IVP or IVPB ONLY** = Regular insulin "ready to go IV"
- Draw Up:** Clear to Cloudy "*you want CLEAR days before cloudy ones*"
- Rotate locations-Macarena-BEST** on abdomen
 (2 inches from: Umbilicus, Naval, "belly button")
- DKA** - Type 1-"sick days"-**YES INSULIN** without food!!!
- Hypoglycemia (70 or LESS)**
Awake = Ask them to Eat (soda, juice, low fat milk)
Sleeping = Stab with IV D50 (dextrose 50)
 "Unresponsive" "Responsive **ONLY** to pain"





DKA

PATHO & CAUSES:

TYPE 1—Faster & Younger “D comes 1st in alphabet”

- S-Sepsis (infection) **NCLEX TIP**
- S-Sickness “Stomach Virus & Flu” (most common)
- S-Stress (surgery)
- S-Skip insulin **Easier fix**

SIGNS & SYMPTOMS:

- D-Dry & High sugar **250–500+**
- K-Ketones & Kussmaul resp. (Deep/rapid/REGULAR respirations and fruity breath)
- A-Abdominal Pain
- A-Acidosis Metabolic **LESS than 7.35** (normal 7.35–7.45)
Hyperkalemia (Abnormally high K+)

TREATMENT:

- D-Dehydration **FIRST!** (0.9% normal saline)
- K-Kill the sugar (**SLOWLY**) prevent low sugar
 - *Hourly BS checks* “land the plane slow & smooth”
 - Over 250:** IV Regular insulin **ONLY** (bolus 1st)
 - Below 200** (or ketones resolve): SQ insulin + 1/2 NS with D5W IV
- A-Add Potassium K+ (Yes even if norm: 3.5 - 5.0)
 - During IV Insulin**
 - IN**-sulin = sugar & K+ IN the cell

HHNS

PATHO & CAUSES:

TYPE 2—slower & older “H comes 2nd in alphabet”

- Illness
- Infections
- Older age **Harder to fix**

SIGNS & SYMPTOMS:

- H-HIGHEST SUGAR **OVER—600+**
- H-HIGHER fluid loss & **Extreme dehydration NCLEX TIP**
- H-Head change—LOC, Confusion, Neurological Manifestations
- N-No ketones **No Acid**, (NO fruity breath/ketones)
- S—Slower Onset & Stable Potassium (3.5-5.0)

TREATMENT:

- H-Hydration—0.9% NS 1st, then HYPOTonic **NCLEX TIP**
- S-Stabilize Sugars (Insulin)
 - CAUTION:** Insulin IV = **ONLY Regular Insulin**
 - IV bolus
 - IV titration
 - SQ injection & IV
 - SQ only



DKA patients DIE from hypokalemia where
HHNS patients die from hypovolemia

COMMON NCLEX QUESTION

Q: Child is nauseous **NOT** eating—maybe vomiting—do you still give **INSULIN**?

A: Yes, we give sick day insulin to prevent DKA...because glucose is **HIGH** during times of illness.

RE-ASSESSMENT

Blood Glucose **Hourly**

Re-Hydration Signs:

- BP stable & Cap Refill (3 sec or less)
- Skin color & warm temp (NOT cool/pale)
- 30ml/hr + Urine Output
- Low spec gravity (1.005–1.030)

NOT Apical pulse **NOT** Lung sounds **NOT** Pupils

Potassium IV (Normal 3.5 - 5.0)

- First Action = Heart monitor
- Never push = **DEATH**
- 10–20 mg MAX per hour IV!! (IV Pump)
- Site (central) and Slow infusion

POTASSIUM PUMPS MUSCLES

High Potassium (5.0+)

High Pump

Peaked T waves, ST elevation

Low Potassium (Below 3.5)

Low Pump

Flat T wave, ST depression, U wave



NOTES

Steroids

Anabolic Steroids

How do they work? "Action"

Anabolic steroids are synthetic drugs chemically related to the androgens. Like the androgens, they promote tissue-building processes. Given in normal doses, they have a minimal effect on the accessory sex organs and secondary sex characteristics. (Ford 491)

Indications

Anabolic steroid use includes the following:

- Management of anemia of renal insufficiency
- Control of metastatic breast cancer in women
- Promotion of weight gain in those with weight loss after surgery, trauma, or infections (Ford 491-492)

It's not always about them gains!

The use of anabolic steroids to promote an increase in muscle mass and strength has become a serious problem. Anabolic steroids are not intended for this use. Unfortunately, deaths in young, healthy individuals have been directly attributed to the use of these drugs. Young men and women should be discouraged from the illegal use of anabolic steroids to increase muscle mass. (Ford 492)

Contraindications

- Known hypersensitivity
- Liver disorders
- Serious cardiac disease
- Prostate gland disorders
- Pregnancy category x do not give to pregnant or lactating women

Adverse Reactions

- Virilization in women
- Acne
- Nausea, vomiting, diarrhea, fluid and electrolyte imbalances
- testicular atrophy, jaundice, anorexia, and muscle cramps may also be seen.
- Blood-filled cysts of the liver and sometimes the spleen, malignant and benign liver tumors, an increased risk of atherosclerosis, and mental changes

Nursing management

- Assess and document the patient's physical and nutritional status before starting therapy
- Baseline laboratory studies may include a complete blood count, hepatic function tests, and serum electrolytes and serum lipid levels. Review these studies and note any abnormalities.
- Sodium and water retention may also occur with androgen or anabolic steroid administration, causing the patient to become edematous. In addition, other electrolyte imbalances, such as hypercalcemia, may occur. Monitor the patient for fluid and electrolyte disturbances.
- Anabolic steroids may cause nausea and GI upset. Take this drug with food or meals.
- Keep all primary health care provider or clinic visits, because close monitoring of therapy is essential.
- Female patients: Notify the primary health care provider if signs of virilization occur.

Interactions:

- **Oral anticoagulants:** Increased antidiuretic effect
- **Imipramine and androgen:** Increased risk of paranoid behavior
- **Sulfonylureas and anabolic steroids:** Risk of hypoglycemia

Generic	Trade	Use	Route
Nandrolone	n/a	Anemia of renal insufficiency, human immunodeficiency virus (HIV) wasting syndrome	50–200 mg/wk IM
Oxymetholone	Anadrol -50	Anemia	1–5 mg/kg/day orally
Oxandrolone	Oxandrin	Bone pain, weight gain, protein catabolism	2.5–20 mg/day orally in divided doses

Androgens

How do they work? "Action"

Testosterone and its derivatives are male hormones that cause the reproductive maturation in the adolescent male. From puberty onward, androgens continue to aid in the development and maintenance of secondary sex characteristics: facial hair, deep voice, body hair, body fat distribution, and muscle development. Testosterone also stimulates the growth in size of the sex organs (penis, testes, vas deferens, prostate) at the time of puberty. The androgens also promote tissue-building processes (anabolism) and reverse tissue-depleting processes (catabolism). (Ford 491)

Indications

Androgen therapy may be given as replacement to treat:

- Testosterone deficiency
- Hypogonadism (failure of the testes to develop)
- Delayed puberty
- Development of testosterone deficiency after puberty Androgens may given to females to treat
- Postmenopausal, metastatic breast carcinoma
- Premenopausal, hormone-dependent metastatic breast carcinoma

Transdermal testosterone system

- replacement therapy when endogenous (produced by the body) testosterone is deficient or absent.

Anabolic steroid use is indicated for

- Management of anemia of renal insufficiency
- Control of metastatic breast cancer in women
- Promotion of weight gain in those with weight loss after surgery, trauma, or infections (Ford 491-492)

Contraindications

- Known hypersensitivity
- Liver disorders
- Serious cardiac disease
- Prostate gland disorders
- Pregnancy category x do not give to pregnant or lactating women

Interactions:

- **Oral anticoagulants:** Increased antidiuretic effect
- **Imipramine and androgen:** Increased risk of paranoid behavior
- **Sulfonylureas and anabolic steroids:** Risk of hypo glycemia

Adverse Reactions

Electrolyte imbalances

- Hyponatremia
- Hypercalcemia

In males:

- Breast enlargement " gynecomastia"
- Testicular atrophy
- May inhibit testicular function
- Impotence
- Penile enlargement
- vomiting, jaundice, headache, anxiety,
- male-pattern baldness, acne, and depression.
- Fluid and electrolyte imbalances, which include sodium, water, chloride, potassium, calcium, and phosphate retention.

In females:

- Amenorrhea
- Virilization " male characteristics"
- Menstrual irregularities
- Male pattern baldness
- Acne

Nursing management

- Monitor vitals every 4 or 8 hrs
- Monitor weight for patients with advanced breast carcinoma. Contact the HCP if the patient gains or loses 5 pounds
- Monitor for edema
- Monitor for fluid and electrolyte imbalance
- Older adults with cardiac problems or kidney disease are at increased risk for sodium and water retention when taking androgens or anabolic steroids. (Ford 493)
- Anabolic steroids may cause nausea and GI upset. Take this drug with food or meals.
- Keep all primary health care provider or clinic visits, because close monitoring of therapy is essential.
- Female patients: Notify the primary health care provider if signs of virilization occur. (Ford 494)
- When the androgens are administered to a patient with diabetes, blood glucose levels should be measured frequently because glucose tolerance may be altered. Adjustments may need to be made in insulin dosage, oral antidiabetic drugs, or diet. (Ford 493)

Generic	Trade	Use	Route
Fluoxymesterone	n/a	Males: Hypogonadism, delayed puberty Females: Inoperable advanced breast cancer	Males: 5–20 mg/day orally Females: 10–40 mg/day orally
Methyltestosterone	Testered	Males: Hypogonadism, delayed puberty Females: Inoperable advanced breast cancer	Males: 10–50 mg/day orally Females: 50–200 mg/day orally
testosterone	Androgel, androderm, depo-testosterone	Primary or hypogonadotropic hypogonadism, delayed puberty	Buccal: 30 mg BID Gel: apply daily Injectable: 50–400 mg every 2–4 wk Transdermal: 6 mg/day, apply patch daily Spray: 30–120 mg daily

Glucocorticoids

How do they work? "Action"

Glucocorticoids influence or regulate functions such as the immune response; glucose, fat, and protein metabolism; and the anti-inflammatory response. Glucocorticoids enter target cells and bind to receptors, initiating many complex reactions in the body

Indications

- Adrenocortical insufficiency (replacement therapy)
- Allergic reactions
- Collagen diseases (e.g., systemic lupus erythematosus)
- Dermatologic conditions
- Rheumatic disorders
- Shock
- Multiple other conditions

Contraindications

- Tuberculosis
- fungal and antibiotic-resistant infections.

Glucocorticoids are administered with caution to patients with renal or hepatic disease, hypothyroidism, ulcerative colitis, diverticulitis, peptic ulcer disease, inflammatory bowel disease, hypertension, osteoporosis, convulsive disorders, or diabetes.

Patients taking ACTH should avoid any vaccinations with live virus. The live virus vaccines can potentiate virus replication with ACTH, increase any adverse reaction to the vaccine, and decrease the patient's antibody response to the vaccine.

Interactions:

- **Cholestyramine:** Effects of hydrocortisone may be decreased.
- **Oral contraceptives:** Effects of corticosteroid may be increased.
- **Estrogens:** Effects of corticosteroid may be increased.
- **Hydantoin:** Effects of corticosteroid may be decreased.
- **Ketoconazole:** Effects of corticosteroid may be increased.
- **Rifampin:** Effects of corticosteroid may be decreased.
- **Anticholinesterases:** Anticholinesterase effects may be antagonized in myasthenia gravis.
- **Oral anticoagulants:** Anticoagulant dose requirements may be reduced. Corticosteroids may decrease the anticoagulant action.
- **Digitalis glycosides:** Coadministration may enhance the possibility of digitalis toxicity associated with hypokalemia.
- **Isoniazid:** Isoniazid serum concentrations may be decreased.
- **Potassium-depleting diuretics:** Hypokalemia may occur.
- **Salicylates:** Corticosteroids will reduce serum salicylate levels and may decrease their effectiveness.
- **Theophyllines:** Alterations in the pharmacologic activity of either agent may occur.

Adverse Reactions

- **Fluid and electrolyte disturbances:** Sodium and fluid retention, potassium loss, hypokalemic alkalosis, hypertension, hypokalemia, hypotension or shock-like reactions
- **Musculoskeletal disturbances:** Muscle weakness, loss of muscle mass, tendon rupture, osteoporosis, aseptic necrosis of femoral and humeral heads, spontaneous fractures
- **Cardiovascular disturbances:** Thromboembolism or fat embolism; thrombophlebitis; necrotizing angitis; syncopal episodes; cardiac arrhythmias; aggravation of hypertension; fatal cardiac arrhythmias with rapid, high-dose IV methylprednisolone administration; HF in susceptible patients
- **GI disturbances:** Pancreatitis, abdominal distention, ulcerative esophagitis, nausea, vomiting, increased appetite and weight gain, possible peptic ulcer or bowel perforation, hemorrhage
- **Dermatologic disturbances:** Impaired wound healing; thin, fragile skin; petechiae; ecchymoses; erythema; increased sweating; suppression of skin test reactions; subcutaneous fat atrophy; purpura; striae; hirsutism; acneiform eruptions; urticaria; angioneurotic edema; perianal itch
- **Neurologic disturbances:** Convulsions, increased intracranial pressure with papilledema (usually after treatment is discontinued), vertigo, headache, neuritis or paresthesia, steroid psychosis, insomnia
- **Endocrine disturbances:** Amenorrhea, other menstrual irregularities, development of cushingoid state, suppression of growth in children, secondary adrenocortical and pituitary unresponsive (particularly in times of stress), decreased carbohydrate tolerance, manifestation of latent diabetes mellitus, increased requirements for insulin or oral hypoglycemic agents (in diabetic patients)
- **Ophthalmic disturbances:** Posterior subcapsular cataracts, increased intraocular pressure, glaucoma, exophthalmos
- **Metabolic disturbances:** Negative nitrogen balance (due to protein catabolism)
- **Other disturbances:** Anaphylactoid or hypersensitivity reactions, aggravation of existing infections, malaise, increase or decrease in sperm motility and number

Nursing management

- Never omit a dose of a glucocorticoid
- Patients with diabetes who are receiving a glucocorticoid may require frequent adjustment of their insulin or oral antidiabetic drug dosage. (Ford 476)
- Administration of the glucocorticoids poses the threat of adrenal gland insufficiency (Ford 476)
- Glucocorticoid therapy should never be discontinued suddenly (Ford 476)
- Take the drug exactly as directed in the prescription container. Do not increase, decrease, or omit a dose unless advised to do so by the primary health care provider.
- Take single daily doses before 9:00 a.m.
- Follow the instructions for tapering the dose, because they are extremely important.
- If the problem does not improve, contact the primary health care provider. (Ford 477)

Generic	Trade	Use	Route
Dexamethasone	Medrol, Depo-Medrol, Solu-Medrol	Endocrine disorders, rheumatoid disorders, collagen disease, dermatologic disorders, allergic state, ophthalmic disorders, respiratory disorders, hematologic disorders, neoplastic disease, edema, GI disease, Nervous system disorders	Individualize dosage based on severity of condition and response
Prednisone	None	Same as dexamethasone	Individualize dosage: initial dose usually between 5 and 60 mg/day orally

Mineralocorticoids

How do they work? "Action"

Natural mineralocorticoids consist of aldosterone and desoxycorticosterone and play an important role in conserving sodium and increasing potassium excretion. Because of these activities, mineralocorticoids are important in controlling salt and water balance. Aldosterone is the more potent of these two hormones. Deficiencies of mineralocorticoids result in a loss of sodium and water and a retention of potassium. (Ford 474)

Indications

Mineralocorticoids are important in controlling salt and water balance. Aldosterone is the more potent of these two hormones. Deficiencies of mineralocorticoids result in a loss of sodium and water and a retention of potassium. (Ford 474)

Adverse Reactions

Adverse reactions may occur if the dosage is too high or prolonged or if withdrawal is too rapid. Administration of fludrocortisone may cause:

- Edema
- Hypertension
- HF, enlargement of the heart
- Increased sweating, allergic skin rash
- Hypokalemia, muscle weakness, headache, hypersensitivity reactions (Ford 474)

Contraindications

Fludrocortisone is contraindicated in patients with hypersensitivity to fludrocortisone and those with systemic fungal infections.

Nursing management

- Take the drug as directed. Do not increase or decrease the dosage except as instructed to do so by the primary health care provider.
- Do not discontinue use of the drug abruptly.
- Inform the primary health care provider if the following adverse reactions occur: edema, muscle weakness, weight gain, anorexia, swelling of the extremities, dizziness, severe headache, or shortness of breath. (Ford 477)

Interactions:

- Fludrocortisone decreases the effects of hydantoins and rifampin. There is a decrease in serum levels of salicylates when those agents are administered with fludrocortisone. (Ford 474)

Generic	Trade	Use	Dose
Fludrocortisone	None	Partial replacement therapy for Addison's disease, salt-losing adrenogenital syndrome	0.1 mg 3 times a week to 0.2 mg/day orally

Steroids

Drug name:

S



S



S - **S**TERIODS
S - **S**tress & Swelling hormone

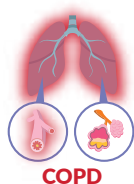
"-Sone"

- Predni**son**e
- Dexametha**son**e
- Hydrocorti**son**e
- Fludrocorti**son**e



Indication:

Given to help the body respond to inflammation & STRESS!
 Commonly for:



- Inflamed Lung like **COPD**
- Inflamed joints like **Rheumatoid Arthritis**
- Inflamed SKIN like **Psoriasis**
- Inflamed body - like **Lupus** where the body attacks itself
- **Allergic** reaction where EVERYTHING swells UP



ADDISON vs. CUSHING TREATMENTS:

7 S's STEROID PRECAUTIONS

"-sone" predni**son**e, hydrocorti**son**e, dexametha**son**e

S **SWOLLEN** (Water gain = Weight gain)

KEY TERMS: "Sudden" "excessive", "rapid"

REPORT: 1 Lb. in 1 day, or 2-3lbs in a few

S **SEPSIS** (Infections or Illness)

"Low WBC" Fever is **PRIORITY** **NCLEX TIP**

S **SUGAR INCREASED**

"Hyperglycemia" **NCLEX TIP**

S **SKINNY**

Muscle & Bones "Osteoporosis" (R/F Fx)

S **SIGHT**

(Cataracts risk) refer to Optometrist

PREVENT CRISIS:

S **SLOWLY** taper off

(**NEVER** abruptly stop) **NCLEX TIP**

S **STRESS** or Surgery

(increase dose)

TOP 3 MISSED Questions:

The nurse should be concerned when the client states: "I have a **sore on my leg that won't go away**". Which medication should be reviewed with HCP. **Select all that apply**

- 1. Naproxen
- 2. Dihydromorphanone
- 3. **Dexamethasone**
- 4. Hydrocodone
- 5. **Hydrocortisone**

Which priority teaching is required for a patient prescribed **prednisone** for Lupus?

- 1. Report slight increases in blood sugar to HCP immediately.
- 2. **Increase dose before surgery or during times of stress.**
- 3. Monitor weight weekly.
- 4. Take with full meal at breakfast.

Which of the follow is an indication that the client needs additional teaching, while taking fludrocortisone?

- 1. I will not discontinue this medication abruptly
- 2. **New bilateral pedal edema is normal**
- 3. The most important value to monitor is my weight.
- 4. I will report signs & symptoms of infection

Notes

Thyroid Drugs

Thyroid Drugs

How do they work? "Action"

These hormones increase the metabolic rate of tissues, which results in increases in the heart and respiratory rate, body temperature, cardiac output, oxygen consumption, and the metabolism of fats, proteins, and carbohydrates. (Ford 483)

Indications

Thyroid hormones are used in the treatment or prevention of hypothyroidism caused by the following:

- Subacute or chronic thyroiditis (Hashimoto's disease or viral thyroiditis)
- Hormone supplement after hyperthyroid treatment
- Euthyroid goiter (enlargement of a normal thyroid gland)
- Thyroid nodules and multinodular goiter
- Some types of depression
- Thyroid cancer (Ford 483)

Adverse effects of Levothyroxine

- Palpitations
- Tachycardia
- Headache
- Nervousness
- Insomnia
- Diarrhea
- Vomiting
- weight loss
- Fatigue
- Sweating
- flushing (Ford 488)

Adverse Reactions

The most common adverse reactions are signs of overdose and hyperthyroidism as titration of the drug is being attempted. Adverse reactions other than symptoms of hyperthyroidism are rare. (Ford 483)

Contraindications

- Hypersensitivity to the drug
- An uncorrected adrenal cortical insufficiency
- Thyrotoxicosis.
- These drugs should not be used as a treatment for obesity or infertility.
- Thyroid hormone should not be used after a recent myocardial infarction. (Ford 483)

Nursing management

- Monitor cardiac status
- Monitor thyroid labs
- Replacement therapy is for life, with the exception of transient hypothyroidism seen in those with thyroiditis.
- Do not increase, decrease, or skip a dose unless advised to do so by the primary health care provider.
- Take this drug in the morning, preferably before breakfast, unless advised by the primary health care provider to take it at a different time of day.
- Notify the primary health care provider if any of the following occur: headache, nervousness, palpitations, diarrhea, excessive sweating, heat intolerance, chest pain, increased pulse rate, or any unusual physical change or event.
- Do not change from one brand of this drug to another without consulting the primary health care provider. (Ford 486-487)

Interactions:

- **Digoxin, beta (β) blockers:** Decreased effectiveness of cardiac drug
- **Oral antidiabetics and insulin:** Increased risk of hypoglycemia
- **Oral anticoagulants:** Prolonged bleeding
- **Selective serotonin reuptake inhibitor (SSRI) antidepressants:** Decreased effectiveness of thyroid drug
- **All other antidepressant drug categories:** Increased effectiveness of thyroid drug (Ford 483)

Generic	Trade	Dose	Route
Levothyroxine	Levothroid, Levoxyl, Synthroid, Unithroid	Hypothyroidism, thyroid-stimulating hormone suppression, thyrotoxicosis, thyroid diagnostic testing	100–125 mcg/day orally

Antithyroid Drugs

How do they work? "Action"

Antithyroid drugs or thyroid antagonists are used to treat hyperthyroidism. In addition to the antithyroid drugs, hyperthyroidism may be treated by the use of radioactive iodine or by surgical removal of some or almost all of the thyroid gland (subtotal thyroidectomy). (Ford 484)
Antithyroid drugs inhibit the manufacture of thyroid hormones.

Indications

- **Methimazole (Tapazole) and propylthiouracil (PTU)** are used for the medical management of hyperthyroidism.
- **Potassium iodide** may be given orally with methimazole or propylthiouracil to prepare for thyroid surgery. (Ford 484)

Adverse Reactions

- Hay fever, sore throat, skin rash, fever, headache
- Nausea, vomiting, paresthesias
- Agranulocytosis (decrease in the number of white blood cells)
- Exfoliative dermatitis, granulocytopenia, hypoprothrombinemia
- Drug-induced hepatitis (Ford 485)

Contraindications

Mothers taking methimazole or propylthiouracil should not breastfeed their children. Radioactive iodine (pregnancy category X) is contraindicated during pregnancy and lactation. Methimazole and propylthiouracil are used with extreme caution during pregnancy (pregnancy category D) because they can cause hypothyroidism in the fetus. However, if an antithyroid drug is necessary during pregnancy, propylthiouracil is the preferred drug, because it does not cross the placenta. The potential for bleeding increases when these products are taken with oral anticoagulants. (Ford 485)

Adverse effects of PTU

- Numbness
- Headache
- loss of hair
- skin rash
- nausea, vomiting
- agranulocytosis

Nursing management

- Take these drugs at regular intervals around the clock (e.g., every 8 hours) unless directed otherwise by the primary health care provider.
- Do not take these drugs in larger doses or more frequently than as directed on the prescription container.
- Notify the primary health care provider promptly if any of the following occur: sore throat, fever, cough, easy bleeding or bruising, headache, or a general feeling of malaise.
- Record weight twice a week and notify the primary health care provider if there is any sudden weight gain or loss. (Note: the primary health care provider may also want the patient to monitor pulse rate. If this is recommended, the patient needs instruction in the proper technique and a recommendation to record the pulse rate and bring the record to the primary health care provider's office or clinic.)
- Avoid the use of nonprescription drugs unless the primary health care provider has approved the use of a specific drug. (Ford 486)

Interactions:

- **Digoxin, beta (β) blockers:** Decreased effectiveness of cardiac drug
- **Oral antidiabetics and insulin:** Increased risk of hypoglycemia
- **Oral anticoagulants:** Prolonged bleeding
- **Selective serotonin reuptake inhibitor (SSRI) antidepressants:** Decreased effectiveness of thyroid drug
- **All other antidepressant drug categories:** Increased effectiveness of thyroid drug (Ford 483)

Generic	Trade	Dose	Route
Propylthiouracil	None	Hyperthyroidism	5–40 mg/day orally, divided doses at 8-hr intervals



HYPERthyroidism

Graves = GAINS "HIGH"

EMERGENCY CONDITION:

Thyroid Storm "thyrotoxicosis"

VERY HIGH = "Agitation/Confusion" + HTN crisis!

PATHO & CAUSES

HIGH T3 & T4 Thyroid Hormones

Too much Iodine

Too much Thyroid Meds. (Levothyroxine)

Autoimmune: Graves = GAINS "HIGH"

AUTOIMMUNE: Graves = GAINS "HIGH"

SIGNS & SYMPTOMS

PRIORITY: EXTREME HIGH = Thyroid Storm
"Agitation & confusion" early sign

HIGH & HOT!

CLASSIC SIGNS-NCLEX KEY WORDS

G GRAPE EYE "Exophthalmos"

(Use Eye patch/Tape Eyelids down) **NCLEX TIP**

G GOLF BALLS in throat "Goiter" **NCLEX TIP**

HIGH BP-HTN Crisis **180/100+**

(MI, CVA, Aneurysms)

HIGH HR-Tachycardia **100+** (normal **60-100**)

HEART PALPITATIONS + Atrial Fibrillation

HIGH TEMP. = **NOT DRY!**

HOT & Sweaty Skin "diaphoresis"

Heat Intolerance **NCLEX TIP**

HIGH GI "Diarrhea"

LABS

HIGH T3 & T4 HYPER

Low-TSH

(look at T3 & T4 levels **FIRST**)

DIET

HIGH METABOLISM

HIGH calories (4,000-5,000 per day) **NCLEX TIP**

HIGH protein & Carbs (meals & snacks)

NOT high fiber = **LOW FIBER!** (unless constipated)

NO caffeine (coffee, soda, Tea)

NO spicy food



HYPOthyroidism

Hashimotos | **LOW & SLOW**

EMERGENCY CONDITION:

Myxedema Coma (Mini hypothyroid)

VERY Low/Slow:

Airway, Breathing, Low BP = **DEATH!**

PATHO & CAUSES

LOW T3 & T4 Thyroid hormones

Low Iodine, Antithyroid Treatments

Pituitary Tumor **NCLEX TIP**

AUTOIMMUNE: Hashimotos | **LOW & SLOW**

SIGNS & SYMPTOMS

PRIORITY: EXTREME LOW = Myxedema Coma
Low RR-Respiratory FAILURE

PRIORITY: Place "Tracheostom Kit" by bedside **NCLEX TIP**

KEY WORD: "Endotracheal Intubation set up"

Low BP & HR "hypotension" "bradycardia" (below 60)

Low Temp. "cold intolerance" **NO** electric blankets

LOW & SLOW = HYPO

CLASSIC SIGNS

LOW energy "fatigue, weakness, muscle pains, aches"

LOW metabolism-Weight GAIN/Water Gain (Edema eyes)

LOW digestion "Constipation" **NOT** diarrhea

LOW HAIR LOSS "alopecia" **NOT** hirsutism **NCLEX TIP**

LOW mental-forgetful, ALOC (altered)

LOW mood-depression, "apathy, confusion"

LOW Libido-Low sex drive, infertile

SLOW DRY skin turgor **NCLEX TIP**

LOW & SLOW-menstruation "irregular" **NCLEX TIP**

NO period "missed"-Amenorrhea "AMEN no period!"

SLOW heavy period-Hypermeneorrhea (Hyper Menstruation)

LABS

LOW T3 & T4 hypO

- HIGH TSH

"TSH always opposite of T3 & T4"

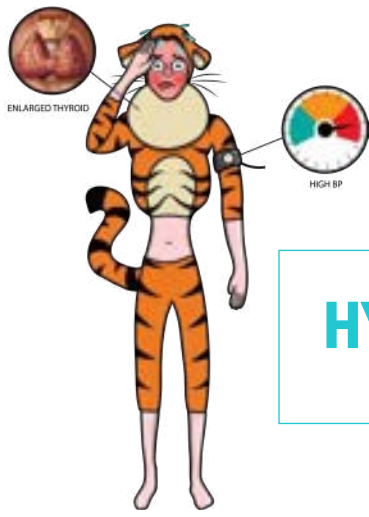
DIET

LOW Metabolism

LOW Calories

LOW energy "Frequent rest periods" **NCLEX TIP**

NOTES



HYPERthyroidism

Graves = GAINS "HIGH"

PHARMACOLOGY

SSKI (Potassium Iodide)

S-Shrinks the Thyroid

S-Stains Teeth (use straw + juice)

K-Keep 1 hour apart of other meds

METHIMAZOLE

NOT baby safe



PTU-Propylthiouracil

"Puts Thyroid Underground" **MEMORY TRICK**

Baby safe

REPORT: Fever/Sore Throat

BETA BLOCKERS "-lol" Propranolol

L-Low BP

L-Low HR

TREATMENTS

RAIU-Radioactive Iodine Uptake (Destroys the Thyroid)



BEFORE:

Pregnancy test before

REMOVE neck jewelry & dentures

5-7 days before Hold antithyroid Meds

AWAKE-NO anesthesia or Conscious Sedation

Diet: Before-NPO 2-4 hrs

After-NPO 1-2 hrs

AFTER: AVOID EVERYONE!

NO pregnant people

NO crowds

NOT same restroom (Flush 3 x)

NOT same food utensils

NOT same laundry as your family

PATIENT EDUCATION

E-Exophthalmos" (grape eyes)

Eye Exercise "full range of motion" (**YES MOVE EYES**)

Eye Drops "artificial tears in conjunctiva" (NO dry eye)

Dark Sunglasses (avoid irritation) **NO** Massaging

T-Tape the eyelids closed or use Eye Patch **NCLEX TIP**

AVOID 5 S's

Can Trigger **THYROID STORM!** **NCLEX TIP**

NO Sodium (eye swelling) + HOB Up (drain the eyes)

NO Stimulants (Cluster care/ Dim Lights)

NO Smoking, Stress, Sepsis "sickness" (infection)

Don't Touch Neck... release MORE T3 & T4

THYROIDECTOMY SURGERY

Risk for **THYROID STORM!** **NCLEX TIP**

Priority: Stridor/Noisy breathing **NCLEX TIP**



A-Airway-Endotracheal Tube bedside **#1 Priority**

Tracheostomy Set

B-Breathing-Laryngeal **Stridor** "Noisy breathing"

Keywords: "Monitor Voice strength & Quality"

C-Circulation-bleeding around pillow & Incision site

Neutral head & neck alignment **NCLEX TIP**

- **NOT SUPINE!** HOB 30-45 degree

- **NO FLEXING** or Extending Neck **NCLEX TIP**

C-Calcium **LOW below 8.6** (normal: **8.6-10.2**)

Chvostek (Cheek Twitch when touched)

Trousseau ("Twerk arm" with BP cuff x 3 min.)

Tingling around mouth/Muscle Twitching **NCLEX TIP**

MEMORY TRICK: "Remove the **T** (thyroid) Check the **C** (calcium)"



HYPOthyroidism

Hashimoto's | **LOW & SLOW**

PHARMACOLOGY

L-Levothyroxine (Lev **O** = HYP **O**)

"Leaves" T3 & T4 in the body **MEMORY TRICK**

L-Life Long + Long slow onset (3-4 weeks till relief)

E-Early morning /Empty stomach x 1 daily (**NOT** at night)

V-Very active (HIGH HR & BP) **Report** "agitation/confusion"

O-Oh the baby is fine! (pregnancy safe)

NO FOOD-take 1 hour **BEFORE** breakfast

NO Cure-med will **NOT** cure, only treat

NO Doubling doses (missed dose? Take it!)

NEVER "abruptly" **STOP** = Myxedema Coma

NOTES

HGH & Hormones

Posterior Pituitary Hormones

How do they work? "Action"

Vasopressin and its derivative, desmopressin (DDAVP), regulate the reabsorption of water by the kidneys. Vasopressin is secreted by the pituitary when body fluids must be conserved.

Patho

This mechanism may be activated when, for example, an individual has severe vomiting and diarrhea with little or no fluid intake. When this and similar conditions are present, the posterior pituitary releases the hormone vasopressin, water in the kidneys is reabsorbed into the blood (i.e., conserved), and the urine becomes concentrated. Vasopressin exhibits its greatest activity on the renal tubular epithelium, where it promotes water reabsorption and smooth muscle contraction throughout the vascular bed. Vasopressin also has some vasopressor activity. (Ford 466)

Indications

- Diabetes insipidus
- **Unlabeled Use:** Management of pulseless VT/VF unresponsive to initial shocks, asystole, or pulseless electrical activity (PEA) (ACLS guidelines). Vasodilatory shock. Gastrointestinal hemorrhage (Davis 1)

Contraindications

Vasopressin is used cautiously in patients with a history of seizures, migraine headaches, asthma, congestive heart failure (HF), or vascular disease (because the substance may precipitate angina or myocardial infarction) and in those with preoperative polyuria. (Ford 467)

Interactions:

- **Norepinephrine:** Decreased antidiuretic effect
- **Lithium:** Decreased antidiuretic effect
- **Oral anticoagulants:** Decreased antidiuretic effect
- **Carbamazepine:** Increased antidiuretic effect
- **Chlorpropamide:** Increased antidiuretic effect

Adverse Reactions

- Tremor, sweating, vertigo
- Nasal congestion
- Nausea, vomiting, abdominal cramps
- Water intoxication

Nursing management

- Before administering vasopressin to relieve abdominal distention, document the patient's blood pressure, pulse, and respiratory rate. Auscultate the abdomen and record the findings. Additionally, measure and document the patient's abdominal girth. (Ford 467)
- Excessive dosage is manifested as water intoxication (fluid overload). Symptoms of water intoxication include drowsiness, listlessness, confusion, and headache (which may precede convulsions and coma). If signs of excessive dosage occur, notify the primary health care provider before the next dose of the drug is due; a change in the dosage, the restriction of oral or IV fluids, and the administration of a diuretic may be necessary.
- Monitor fluid volume status
- Monitor vitals
- Monitor intake and output closely
- Monitor weight

Generic	Trade	Use	Dose
Vasopressin	None	Diabetes insipidus, hemophilia A, Von Willebrand's disease, nocturnal enuresis	Diabetes insipidus: 5–10 units IM, subcut q 3–4 hr, parenteral solution may be used intranasally
Desmopressin	DDAVP	Diabetes insipidus, hemophilia A, Von Willebrand's disease, nocturnal enuresis	Doses are individualized, administered orally, intranasally, or subcut

Somatotropins

How do they work? "Action"

Somatropin is identical to human GH and produces skeletal growth in children. This drug is administered to children who have not grown because of a deficiency of pituitary GH; it must be used before closure of the child's bone epiphyses. (Ford 470)

Indications

- Growth failure in children due to Prader-Willi syndrome. Growth failure in children due to deficiency of growth hormone. Growth failure in children born small for gestational age (SGA) who fail to manifest catch-up growth by age 2

Adverse Reactions

- Edema of the hands and feet
- Hyperglycemia
- hypothyroidism, insulin resistance
- PANCREATITIS.
- pain at injection site, local lipoatrophy or lipodystrophy with subcutaneous use
- arthralgia.

Interactions:

- Excessive corticosteroid use (equivalent to 10– 15 mg/m² /day) may decrease response to growth hormone.

Contraindications

- Closure of epiphyses
- Active neoplasia
- Hypersensitivity to growth hormone or m-cresol preservative
- Acute critical illness (therapy should not be initiated)
- Respiratory failure
- Diabetic retinopathy
- Prader-Willi syndrome with obesity and respiratory impairment (risk of fatal complications; can be used only if growth hormone deficiency is documented).

Nursing management

- Monitor bone age annually and growth rate determinations, height, and weight every 3– 6 mo during therapy.
- Monitor bone age annually and growth rate determinations, height, and weight every 3– 6 mo during therapy.
- Assure parents and child that these dose forms are synthetic and therefore not capable of transmitting Creutzfeldt-Jakob disease, as was the original somatropin, which was extracted from human cadavers.
- Advise parents to monitor blood glucose closely in children with diabetes mellitus. Parents should also be advised to report persistent severe abdominal pain; may be a symptom of pancreatitis.
- Emphasize need for regular follow-up with endocrinologist to ensure appropriate growth rate, to evaluate lab work, and to determine bone age by

Generic	Trade	Use	Dose
Somatropin • Growth hormone	Genotropin, Humatrope, Norditropin, Nutropin, Serostim	Growth failure due to deficiency of pituitary GH in children, replacement of endogenous GH in adults	Doses are individualized, administered by subcut injection weekly
Octreotide • Growth hormone inhibitor	Sandostatin	Reduction of GH in acromegaly and treatment of certain tumors	50 mcg subcut or IV BID or TID

GI -Nutrition

Acid Neutralizers

How do they work? "Action"

They neutralize or reduce the acidity of stomach and duodenal contents by combining with HCl and increasing the pH of the stomach acid. They may increase the sphincter tone of the lower esophagus. Examples of antacids include aluminum (Amphojel), magaldrate (Riopan), and magnesium (Milk of Magnesia).

Why are they used for? "Indications"

- Heartburn, acid indigestion, or sour stomach
- Gastroesophageal reflux disease (GERD)
- Peptic ulcer
- **Aluminum carbonate:** Treats hyperphosphatemia associated with chronic renal failure

Adverse effects

- **Aluminum-containing antacids:** constipation, intestinal impaction, anorexia, **weakness, tremors, and bone pain**
- **Magnesium:** containing antacids—severe diarrhea, dehydration, and hypermagnesemia (nausea, vomiting, hypotension, decreased respirations)
- **Calcium-containing antacids:** rebound hyperacidity, metabolic alkalosis, hypercalcemia, vomiting, confusion, headache, renal calculi, and neurologic impairment
- **Sodium bicarbonate:** systemic alkalosis and rebound hyperacidity

Contraindications

- Severe abdominal pain of unknown
- During lactation
- Sodium-containing antacids are contraindicated in patients with cardiovascular problems, such as hypertension or heart failure, and those on sodium-restricted diets.
- Calcium-containing antacids are contraindicated in patients with renal calculi or hypercalcemia.

Think out of the box

Sodium bicarbonate

- **Use:** Symptomatic relief of peptic ulcer and stomach hyperacidity
- **Adverse effects:** Electrolyte imbalance and metabolic alkalosis

Sodium bicarb is also given to someone who is in acidosis to bind to the hydrogen ions and balance PH.

Caution

- Aluminum-containing antacids: gastric outlet obstruction or those with upper GI bleeding.
- Magnesium- and aluminum-containing antacids: decreased kidney function.
- Calcium-containing antacids: respiratory insufficiency, renal impairment, or cardiac disease.
- Antacids are classified as pregnancy category C drugs and should be used with caution during pregnancy

Interactions:

- **Digoxin, isoniazid, phenytoin, and chlorpromazine:** Decreased absorption of the interacting drugs results in a decreased effect of those drugs
- **Tetracycline:** Decreased effectiveness of anti-infective
- **Corticosteroids:** Decreased anti-inflammatory properties
- **Salicylates:** Pain reliever is excreted more rapidly in the urine

Nursing management

- Because of the possibility of an antacid interfering with the activity of other oral drugs, no oral drug should be administered within 1 to 2 hours of an antacid.
- When one of these drugs is given IV, monitor the rate of infusion at frequent intervals. Too rapid an infusion may induce cardiac arrhythmias.
- Keep a record of the patient's bowel movements, because these drugs may cause constipation or diarrhea.
- Observe the patient for signs of dehydration, which include poor skin turgor, dry mucous membranes, decrease in or absence of urinary output, concentrated urine, restlessness, irritability, increased respiratory rate, and confusion.
- Instruct the patient to chew the tablets thoroughly before swallowing and then drink a full glass of water or milk.
- Magnesium-containing products may produce a laxative effect and may cause diarrhea; aluminum- or calcium-containing antacids may cause constipation.
- Taking too much antacid may cause the stomach to secrete excess stomach acid. Consult the primary health care provider or pharmacist about appropriate dose. Do not use the maximum dose for more than 2 weeks, except under the supervision of a primary health care provider.

Generic	Trade	Use	Dose
Aluminum carbonate	Basaljel	Symptomatic relief of peptic ulcer and stomach hyperacidity, hyperphosphatemia	2 tablets or capsules (10 mL of regular oral suspension) as often as q 2 hr, up to 12 times daily
Calcium carbonate (May cause acid rebound)	Caltrate	Symptomatic relief of peptic ulcer and stomach hyperacidity, calcium deficiencies (osteoporosis)	0.5–1.5 g orally
Magnesia (magnesium hydroxide)	Milk of Magnesia	Symptomatic relief of peptic ulcer and stomach hyperacidity, constipation	Antacid: 622–1244 mg (5–15 mL in suspension) orally QID Laxative: 15–60 mL orally

Acid Reducers

- Proton Pump Inhibitors

How do they work? "Action"

These drugs suppress gastric acid secretion by inhibition of the hydrogen-potassium adenosine triphosphatase (ATPase) enzyme system of the gastric parietal cells. The ATPase enzyme system is also called the acid (proton) pump system. The proton pump inhibitors suppress gastric acid secretion by blocking the final step in the production of gastric acid by the gastric mucosa. Think of it as putting a cap on a volcano so it doesn't erupt!

Why are they used for? "Indications"

- Gastric and duodenal ulcers (specifically associated with H. pylori infections)
- GERD and erosive esophagitis
- Pathologic hypersecretory conditions
- Prevention of bleeding in high-risk patients using antiplatelet drugs

An important use of these drugs is combination therapy for the treatment of H. pylori infection in patients with duodenal ulcers. One treatment regimen used to treat infection with H. pylori is a triple-drug therapy, such as one of the proton pump inhibitors (e.g., omeprazole or lansoprazole) and two anti-infectives (e.g., amoxicillin and clarithromycin). (Ford 2006)

Adverse effects

- Headache, nausea, diarrhea, and abdominal pain.

Contraindications

- Hypersensitivity
- lansoprazole, rabeprazole, and pantoprazole (pregnancy category B) are contraindicated during pregnancy and lactation.

Caution

- Older adults
- patients with hepatic impairment.
- Prolonged treatment may decrease the body's ability to absorb vitamin B12, resulting in anemia.
- Omeprazole (pregnancy category C)

Critical Thinking

• Menopausal Women

An increase in fractures of the hip, wrist, and spine have been seen in those taking high doses of proton pump inhibitors and undergoing treatment of osteoporosis with bisphosphonates.

Interactions:

- **Sucralfate:** Decreased absorption of the proton pump inhibitor
- **Ketoconazole and ampicillin:** Decreased absorption of the anti-infective
- **Oral anticoagulants:** Increased risk of bleeding
- **Digoxin:** Increased absorption of digoxin
- **Benzodiazepines, phenytoin:** Risk for toxic level of antiseizure drugs
- **Clarithromycin (with omeprazole, specifically):** Risk for an increase in plasma levels of both drugs
- **Bisphosphonates:** Increased risk of fracture

Nursing management

- Because of the possibility of an antacid interfering with the activity of other oral drugs, no oral drug should be administered within 1 to 2 hours of an antacid.
- When one of these drugs is given IV, monitor the rate of infusion at frequent intervals. Too rapid an infusion may induce cardiac arrhythmias.
- Keep a record of the patient's bowel movements, because these drugs may cause constipation or diarrhea.
- Observe the patient for signs of dehydration, which include poor skin turgor, dry mucous membranes, decrease in or absence of urinary output, concentrated urine, restlessness, irritability, increased respiratory rate, and confusion.
- Instruct the patient to chew the tablets thoroughly before swallowing and then drink a full glass of water or milk.
- Magnesium-containing products may produce a laxative effect and may cause diarrhea; aluminum- or calcium-containing antacids may cause constipation.
- Taking too much antacid may cause the stomach to secrete excess stomach acid. Consult the primary health care provider or pharmacist about appropriate dose. Do not use the maximum dose for more than 2 weeks, except under the supervision of a primary health care provider.

Generic	Trade	Use	Dose
esomeprazole	Nexium	Erosive esophagitis, GERD, H. pylori eradication, NSAID-associated gastric ulcers	20-40 mg/day orally
omeprazole	Prilosec	Same as esomeprazole, hypersecretory conditions, heartburn, reduce risk of upper GI bleeding	20-60 mg/day orally
pantoprazole	Protonix	GERD, erosive esophagitis and hypersecretory conditions	40 mg/day orally or IV Hypersecretion: 80 mg IV q 12 hr
lansoprazole	Prevacid	Same as esomeprazole, hypersecretory conditions, cystic fibrosis (intestinal malabsorption)	15-30 mg/day orally

Histamine H2 Agonist - Acid Reducers

How do they work? "Action"

Reduces the secretion of gastric acid by inhibiting the action of histamine at H2 receptor cells of the stomach.

Why are they used for? "Indications"

- Heartburn, acid indigestion, and sour stomach (frequently sold as over-the-counter remedies)
- GERD
- Gastric or duodenal ulcer
- Gastric hypersecretory conditions (excessive gastric secretion of HCl)

Adverse effects

- Dizziness, somnolence, headache
- Confusion, hallucinations, diarrhea, and reversible impotence

Contraindications

- Hypersensitivity

Caution

- Renal or hepatic impairment
- In severely ill, older, or debilitated patients.
- Cimetidine is used cautiously in patients with diabetes. Histamine H2 antagonists are pregnancy category B (cimetidine, famotidine, and ranitidine) and C (nizatidine) drugs and should be used with caution during pregnancy and lactation.

Interactions:

- **Antacids and metoclopramide:** Decreased absorption of the H2 antagonists
- **Carmustine:** Decreased white blood cell count
- **Opioid analgesics:** Increased risk of respiratory depression
- **Oral anticoagulants:** Increased risk of bleeding
- **Digoxin:** May decrease serum digoxin levels

Nursing management

- Because of the possibility of an antacid interfering with the activity of other oral drugs, no oral drug should be administered within 1 to 2 hours of an antacid.
- When one of these drugs is given IV, monitor the rate of infusion at frequent intervals. Too rapid an infusion may induce cardiac arrhythmias.
- Keep a record of the patient's bowel movements, because these drugs may cause constipation or diarrhea.
- Observe the patient for signs of dehydration, which include poor skin turgor, dry mucous membranes, decrease in or absence of urinary output, concentrated urine, restlessness, irritability, increased respiratory rate, and confusion.
- Instruct the patient to chew the tablets thoroughly before swallowing and then drink a full glass of water or milk.
- Magnesium-containing products may produce a laxative effect and may cause diarrhea; aluminum- or calcium-containing antacids may cause constipation.
- Taking too much antacid may cause the stomach to secrete excess stomach acid. Consult the primary health care provider or pharmacist about appropriate dose. Do not use the maximum dose for more than 2 weeks, except under the supervision of a primary health care provider.

Hint!

- Look for similarities such as uses and suffixes
- Meds that end in * Dine are H2 antagonists

Generic	Trade	Use	Dose
Cimetidine	Tagamet	Gastric/duodenal ulcers, GERD, gastric hypersecretory conditions, GI bleeding, heartburn	800–1600 mg/day orally; 300 mg q 6 hr IM or IV
Famotidine	Pepcid	Gastric/duodenal ulcers, GERD, gastric hypersecretory conditions, GI bleeding, heartburn	20–40 mg orally; IV if unable to take orally
Ranitidine	Zantac	Gastric/duodenal ulcers, GERD, gastric hypersecretory conditions, GI bleeding, heartburn	150–600 mg orally in one dose or divided doses orally; 50 mg q 6–8 hr IM, IV (do not exceed 400 mg/day)

Acid Prevention

Antacid, H2 Blockers & PPI

Antacid:

S	Sodium Bicarbonate (brand: Alka-selzer)
C	Calcium Carbonate (brand: Tums, Rolaids)
A	Aluminum Hydroxide
M	Magnesium Hydroxide (brand: Milk of Mag)

Side Effects:

Aluminum & Calcium Constipation

Magnesium "mellow" = Diarrhea

MOA:

Immediately neutralizes stomach acid, but **ONLY** temporary (NOT long lasting)



IT DOESN'T LAST LONG

HESI Question

Magnesium hydroxide

Can upset stomach + Liquid bowel movements



KEY POINTS & MEMORY TRICK

- **Anti** -Acids
- **Anti** -MIXING with other MEDs
- 1 hour **BEFORE** or **AFTER** OTHER MEDs !
- **NOT** for heart failure!
 - Nothing **OTC** "over the counter"
 - Sodium = Swells

H2 Blockers:

- **"-tidine"**
- **Ranitidine** (brand: Zantac)
- **Famotidine** (brand: Pepcid)



Indication:

GERD & Ulcers (duodenal & gastric) prevention

MOA:

Reduces gastric secretions by **BLOCKING** H2O receptors in the stomach



Patient Education:

- No over eating
- No stress/smoking
- No NSAIDS + Asa - GI bleeds



KEY POINTS & MEMORY TRICK

30 MIN BEFORE MEALS



PPI:

Proton Pump Inhibitor "-prazole"

- **Omeprazole** (brand: Prilosec)
- **Esomeprazole** (brand: Nexium)
- **Pantoprazole** (brand: Protonix)

MOA:

Inhibits proton pump in the parietal cells of the stomach to reduce gastric acid



Key Terms:

Stress ulcer prophylaxis in hospitalized /surgical patients

KEY POINTS & MEMORY TRICK

P	P	P	P
Prazole	Prevents holes "Stress ulcer prophylaxis"	Porous Bones "regular bone density tests"	Possible GI infections "C-Diff"

Indication:

Stress ulcer prevention, GERD, heart-burn

Aminosalicylates

How do they work? "Action"

Exert a topical anti-inflammatory effect in the bowel. The exact mechanism of action of these drugs is unknown.

Why are they used for? "Indications"

The aminosalicylates are used to treat Crohn's disease and ulcerative colitis as well as other inflammatory diseases.

Adverse Reactions

- Abdominal pain
- Nausea
- Diarrhea.
- Headache
- Dizziness
- Fever
- Weakness.

Contraindications

- Known hypersensitivity
- hypersensitivity to sulfonamides and sulfites
- Intestinal obstruction
- Children younger than 2 years.

Caution

Aminosalicylates are pregnancy category B drugs (except olsalazine, which is in pregnancy category C); all are used with caution during pregnancy and lactation (safety has not been established). (Ford 436)

Interactions

- **Digoxin:** Reduced absorption of digoxin
- **Methotrexate:** Increased risk of immunosuppression
- **Oral hypoglycemic drugs:** Increased blood glucose level
- Warfarin: Increased risk of bleeding

Nclex Tip

Hypoactive bowel sounds in severe cases of obstipation (liquid stool leaked around the fecal mass, presenting as loose stool) are evidence that the patient is constipated, which would indicate very different drug therapy. (Ford 439)

Nursing management

- Review the patient's chart for the course of treatment and find the reason for administration of the prescribed drug
- Question the patient regarding the type and intensity of symptoms (e.g., pain, discomfort, diarrhea, or constipation) to provide a baseline for evaluation of the effectiveness of drug therapy. (Ford 439)
- Assess for relief of symptoms
- Monitor vitals
- Report abdominal distention, fever, or abdominal pain
- If diarrhea is chronic encourage increased fluid intake such as, weak tea, water, bullion, or drinks that have added electrolytes (pedialyte, gatorade)
- Monitor fluid intake & output

Herbal Considerations

Chamomile has several uses in traditional herbal therapy, including as a mild sedative and for treatment of digestive upsets, menstrual cramps, and stomach ulcers. It has been used topically for skin irritation and inflammation. Chamomile is on the U.S. Food and Drug Administration (FDA) list of herbs generally recognized as safe. It is one of the most popular teas in Europe. When used as an infusion, it appears to produce an antispasmodic effect on the smooth muscle of the GI tract and to protect against the development of stomach ulcers. Although the herb is generally safe and nontoxic, the infusion is prepared from the pollen-filled flower heads and has resulted in mild symptoms of contact dermatitis to severe anaphylactic reactions in individuals hypersensitive to ragweed, asters, and chrysanthemums (DerMarderosian, 2003). (Ford 436)

Generic	Trade	Use	Dose
Balsalazide	Colazal	Treats active ulcerative colitis	2250 mg orally TID for 8 wk
Mesalamine	Asacol, Pentasa,	Treats active ulcerative colitis, proctosigmoiditis, proctitis	800–1000 mg orally TID or QID Suspension enema: 4 g daily
Olsalazine	Dipentum	Maintenance and remission of ulcerative colitis	1 g/day orally in two divided doses
Sulfasalazine	Azulfidine	Ulcerative colitis, rheumatoid arthritis	Initial: 3–4 g/day orally in divided doses Maintenance: 2 g orally QID

Antiemetics

Anti-Nausea & Vomiting

Drug name:

Ondansetron
(brand: Zofran)

HESI EXIT

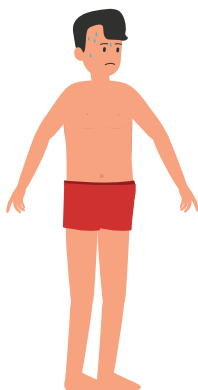
Priority side effect: Torsades de Pointes



KEY POINT



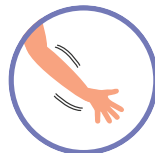
Agitation



Hypertension



Tachycardia



Muscle Rigidity

Serotonin Syndrome

ATI Question

Ondansetron used to decrease Nausea & Vomiting caused by chemo

HESI Question

Question:

- During infusion, child reports **nausea and vomits**, priority nursing action?

Answer:

- STOP the chemo, flush the line and **administer ondansetron**



Drug name:

Metoclopramide
(brand: Reglan)

HESI

Contraindicated
- bleeding duodenal ulcer



Key Point:

QUESTION
prescription "order"
& **REPORT TO HCP**
IMMEDIATELY!!

KEY WORDS

- Lip smacking
- Puffing of cheeks
- Blinking of eyes



Memory Trick:



REPORT

KEY POINT

M - Metoclopramide

M - Major lip smacking & puffing cheeks

Notes

Emetics

How do they work? "Action"

They neutralize or reduce the acidity of stomach and duodenal contents by combining with HCl and increasing the pH of the stomach acid. They may increase the sphincter tone of the lower esophagus. Examples of antacids include aluminum (Amphojel), magaldrate (Riopan), and magnesium (Milk of Magnesia).

Why are they used for? "Indications"

Used to empty the stomach rapidly when someone has ingested poison or for drug overdose

Adverse effects

- Dehydration
- Nausea vomiting
- Tachycardia
- Electrolyte imbalance

Interactions:

- Activated charcoal: Decreases the effects of Ipecac

Contraindications

- **Do not use** on patients who are fully conscious
- **Only use under the supervision of a licensed healthcare provider**
- **Do not use** if turpentine, corrosives, alkalis (lye for soap), strong acids, petroleum distillates, kerosene, cleaning fluid, paint thinner, or furniture polish.
- **Do not use** if patient is comatose, has altered mental status, or is at risk for aspiration of stomach contents
- **Do not give** if a patient is having seizures
- **Do not give** if the substance ingested can cause altered mental status or seizures
- **Do not give** if the agent is caustic or corrosive such as kerosene which brings a high risk of pulmonary aspiration.
- **Do not give** if the patient has a medical condition that can be exacerbated by vomiting; Bradycardia severe hypertension, hemorrhagic diathesis.
- **Do not give** during pregnancy or lactation
- **Do not give** if the patients has crohn's disease

Nursing management

- **Before giving the emetic you must know:** The chemical ingested, time ingested, and what symptoms occur before being brought in.
- The primary healthcare provider should also call the poison control center to obtain information on proper treatment.

Generic	Trade	Use	Dose
Ipecac	n/a	Induction of vomiting post poison ingestion or drug overdose	To cause vomiting after suspected poisoning: 15mL ipecac syrup followed by 1-2 glasses of water. This dose may be repeated once in 20 minutes if vomiting does not occur. Before using ipecac syrup to treat poisoning, call a poison control hotline for advice. Ipecac syrup is available both as a nonprescription product and as an FDA-approved prescription product.

Antiflatulents

How do they work? "Action"

Work by reducing flatus in the GI tract via expulsion such as:

- Belching or passing gas.
- Simethicone also has a defoaming
- Agent that disperses and prevents
- The formation of gas pockets.

Caution

- Pregnancy category C

Interactions

- Decreases the effectiveness of other drugs

Why are they used for? "Indications"

- Post op gas distention & air swallowing
- Dyspepsia
- Peptic ulcer
- Irritable bowel syndrome
- Diverticulosis
- Charcoal may be used to prevent pruritus associated with kidney dialysis treatment & as an antidote in poisoning

Adverse Reactions

No adverse reactions have been reported.

Contraindications

- Known hypersensitivity

Nursing management

- Assess patient for abdominal pain, distention, and bowel sounds prior to and periodically throughout course of therapy. Frequency of belching and passage of flatus should also be assessed.
- PO: Administered after meals and at bedtime for best results. Shake liquid preparations well prior to administration. Chewable tablets should be chewed thoroughly before swallowing, for faster and more complete results.
- Drops can be mixed with 30 mL of cool water, infant formula, or other liquid as directed. Shake well before using.
- Explain to patient the importance of diet and exercise in the prevention of gas. Also explain that this medication does not prevent the formation of gas.
- Advise patient to notify health care professional if symptoms are persistent.

Generic	Trade	Use	Dose
Charcoal	Charcocaps, Flatulex	Intestinal gas, Diarrhea, poisoning antidote	520 mg orally after meals
Simethicone	Gas-x, mylicon, maalox, mylanta	Post op gas distention, dyspepsia, IBS, peptic ulcer	40-125 mg QID after meals and at bedtime

GI Stimulants

How do they work? "Action"

Increases the motility of the upper GI tract without increasing the production of secretions. By sensitizing tissue to the effects of acetylcholine, the tone and amplitude of gastric contractions are increased, resulting in faster emptying of gastric contents into the small intestine. It also inhibits stimulation of the vomiting center in the brain.

Interactions:

- **Cholinergic blocking drugs or opioid analgesics:** Decreased effectiveness of metoclopramide
- **Cimetidine:** Decreased absorption of cimetidine
- **Digoxin:** Decreased absorption of digoxin
- **Monoamine oxidase inhibitor antidepressants:** Increased risk of hypertensive episode
- **Levodopa:** Decreased metoclopramide and levodopa

Why are they used for? "Indications"

- GERD
- Gastric stasis (failure to move food normally out of the stomach) in diabetic patients, in patients with nausea and vomiting associated with cancer chemotherapy, and in patients in the immediate postoperative period

Nursing management

- When one of these drugs is given IV, monitor the rate of infusion at frequent intervals. Too rapid an infusion may induce cardiac arrhythmias.
- Give on an empty stomach
- Monitor for symptoms of EPS and tardive dyskinesia
- Keep a record of the patient's bowel movements, because these drugs may cause constipation or diarrhea.
- Observe the patient for signs of dehydration, which include poor skin turgor, dry mucous membranes, decrease in or absence of urinary output, concentrated urine, restlessness, irritability, increased respiratory rate, and confusion.
- Instruct the patient to chew the tablets thoroughly before swallowing and then drink a full glass of water or milk.
- Magnesium-containing products may produce a laxative effect and may cause diarrhea; aluminum- or calcium-containing antacids may cause constipation.
- Taking too much antacid may cause the stomach to secrete excess stomach acid. Consult the primary health care provider or pharmacist about appropriate dose. Do not use the maximum dose for more than 2 weeks, except under the supervision of a primary health care provider

Adverse effects

Higher doses or prolonged administration may produce central nervous system (CNS) symptoms, such as restlessness, drowsiness, dizziness, extrapyramidal effects (tremor, involuntary movements of the limbs, muscle rigidity), facial grimacing, and depression.

Contraindications

- Hypersensitivity to the drug
- GI obstruction, gastric perforation or hemorrhage
- Pheochromocytoma.
- Patients with Parkinson's disease or a seizure disorder who are taking drugs likely to cause extrapyramidal symptoms should not take these drugs.

Caution

- Diabetes and cardiovascular disease
- Caution during pregnancy and lactation because it is excreted in breastmilk

Critical Thinking

- Tardive dyskinesia (nonreversible, involuntary muscle spasms), which is typically associated with conventional antipsychotics, is known to occur with long-term use (12 weeks or more) of metoclopramide. Immediately report extrapyramidal symptoms to prevent tardive dyskinesia from occurring.

Generic	Trade	Use	Dose
Metoclopramide	Reglan	Diabetic gastroparesis, GERD, prevention of nausea and vomiting	10–15 mg orally; 10–20 mg IM, IV

Lactulose & Sodium Polystyrene Sulfonate

Lactulose

LAC

- **L** - Laxative for
- **A** - Ammonia levels-decrease
- **C** - Cognition returns
"improved mental status"

Given to decrease ammonia levels in Cirrhosis patients, to treat **hepatic encephalopathy** (cloudy brain)

Memory Trick:

Lacto - **LOSE**

Ammonia



"Lose ammonia via Loose bowels"

Key Points:

KEY POINTS:

- 2 - 3 soft stools per day
- Ammonia levels decrease
- Cognition improved
"Improved mental status" **NCLEX TIP**

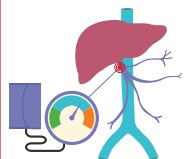


NOT a Diuretic

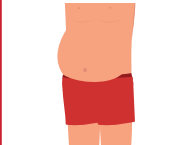
NO
renal excretion of ammonia



NO
it **does not** decrease portal HTN



NO
Abdominal distention will not improve with lactulose

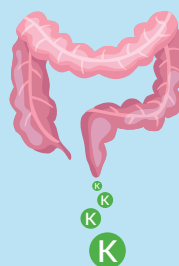
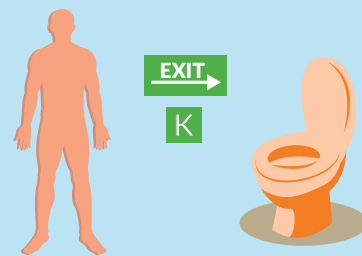


Sodium Polystyrene Sulfonate

Given to decrease HIGH potassium (over 5.0)

Memory Trick:

Kayexalate - helps K⁺ to Exit the body



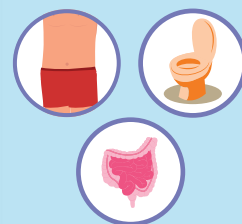
KEY WORDS

- Helps the large intestine to remove excess K⁺ within the body

Key Points:

KEY POINTS

- **Assess the Abdomen**
- Recent bowel patterns & frequency of stools
- Bowel Function
- Potassium (K⁺) within normal limits (3.5-5.0 mEq/L)



HESI Question

Sodium Polystyrene

Encourage patient to **drink fluids after administration**



Notes

Antidiarrheal

How do they work? "Action"

Difenoxin (Motofen) and diphenoxylate (Lomotil) are chemically related to opioid drugs; therefore, they decrease intestinal peristalsis (Ford 436)

Loperamide (Imodium) acts directly on the muscle wall of the bowel to slow motility and is not related to the opioids. (Ford 437)

Why are they used for? "Indications"

- **Loperamide:** Chronic diarrhea associated with irritable bowel syndrome
- **Difenoxin & diphenoxylate:** Diarrhea

Contraindications

- Known hypersensitivity
- In patients whose diarrhea is associated with organisms that can harm the intestinal mucosa (*Escherichia coli*, *Salmonella* and *Shigella* spp.) (Ford 437)
- Pseudomembranous colitis
- Abdominal pain of unknown origin
- Obstructive jaundice
- Antidiarrheal drugs are contraindicated in children younger than 2 years of age.

Caution

- Severe hepatic impairment
- Pregnancy category C drugs and should be used cautiously during pregnancy and lactation.
- Loperamide is a pregnancy category B drug but is not recommended for use during pregnancy and lactation.

Adverse Reactions

- Anorexia, nausea, vomiting, and constipation
- Abdominal discomfort, pain, and distention
- Dizziness, drowsiness, and headache
- Sedation and euphoria

Interactions

- **Antihistamines, opioids, sedatives, or hypnotics:** Increased risk of central nervous system (CNS) depression
- **Antihistamines and general antidepressants:** Increased cholinergic blocking adverse reactions
- **Monoamine oxidase inhibitor (MAOI):** Increased risk of hypertensive crisis

Nursing management

- Review the patient's chart for the course of treatment and find the reason for administration of the prescribed drug
- Question the patient regarding the type and intensity of symptoms (e.g., pain, discomfort, diarrhea, or constipation) to provide a baseline for evaluation of the effectiveness of drug therapy. (Ford 439)
- Assess for relief of symptoms
- Monitor vitals
- Report abdominal distention, fever, or abdominal pain
- If diarrhea is chronic encourage increased fluid intake such as, weak tea, water, bullion, or drinks that have added electrolytes (pedialyte, gatorade)
- Monitor fluid intake & output

Nclex Tip

If diarrhea persists for more than 2 days when over-the-counter (OTC) antidiarrheal drugs are being used, the patient should discontinue use and seek treatment from the primary health care provider. (Ford 437)

Generic	Trade	Use	Dose
Bismuth	Pepto bismol, bismatrol	<i>H. pylori</i> infection with duodenal ulcer, nausea, vomiting diarrhea, abdominal cramps	2 tablets or 30 mL orally every 30 min to 1 hr, up to 8 doses in 24 hr
Difenoxin with atropine	Motofen	Relieves symptoms of acute diarrhea	Initial dose: 2 tablets orally, then 1 tablet after each loose stool (not to exceed 8 tablets/day)
Diphenoxylate with atropine	Lomotil, lonox	Relieves symptoms of acute diarrhea	5 mg orally QID
Loperamide	Imodium, kaopectate, maalox	Relieves symptoms of acute diarrhea	Initial dose 4 mg orally; then 2 mg after each loose stool (not to exceed 16 mg/day)
Tincture of opium	Paregoric	Severe diarrhea	0.6 mL orally QID

Antispasmodic - Dicyclomine

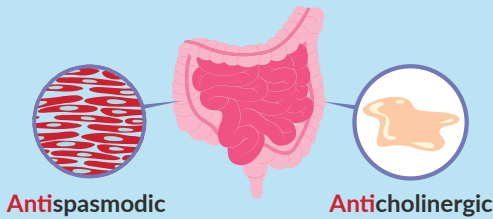
Drug name:

Dicyclomine
(brand: Bentyl)



MOA:

Relaxation of smooth muscle & dries secretions



Indication:

IBS (Irritable bowel syndrome) with many loose stools per day



Side Effect:

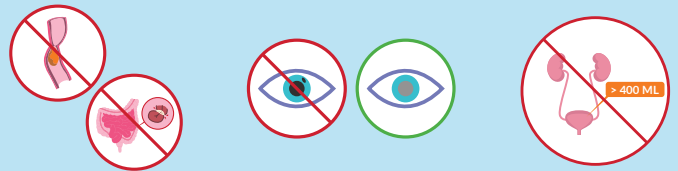
Dry body: Constipation, dry mouth, urine retention



KEY POINT

Contraindications AVOID

- NOT - Paralytic Ileus or bowel obstruction
- NOT - Narrow-angle glaucoma (cataracts are ok!)
- NOT - Full bladder (> 400 mL) "urinary retention"



MEMORY TRICK

diCYCLOmine
DRY - cycle

NO pee
Not for full bladder

NO see
Not glaucoma

NO spit & NO sh*t
Bowel obstruction & Paralytic ileus

Notes

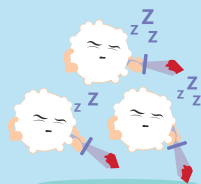
Anti-inflammatory SULFasalazine

INDICATION

- Inflammatory bowel disease (IBD)
- Crohn disease
- Ulcerative Colitis

MOA:

Decreases colon inflammation by stopping prostaglandins (which cause inflammation)



Kaplan

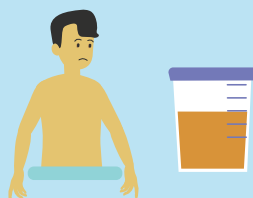
- Continue medication even after symptoms subside



Side Effects:

NORMAL

- Yellow-orange discoloration of the client's skin and urine
- No need for follow-up!
DO NOT stop taking med



HESI

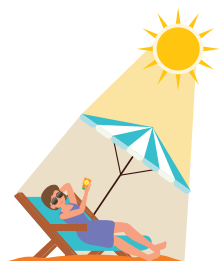
- Contraindicated in patient with **SULFA** allergy.



Major Adverse Effects:

S

Sun Dried!
(sunblock & dry body!)

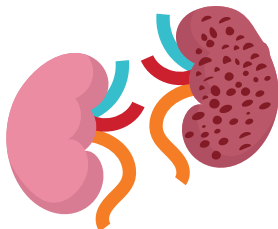


Photosensitivity

- Wear sunblock
- Avoid "direct" sun exposure

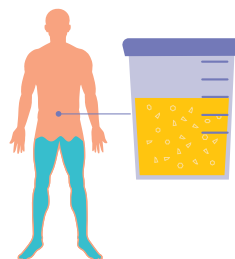
U

Urine Crystals
(Kidney Stones)



L

Low Urine Output
(SG HIGH = Dry)



Dehydration

- Elevated urine Specific Gravity
- High & DRY!!! (norm: 1.003-1.030)

F

Fluid & Folic Acid



- **DRINK** 8 glasses of water daily
- **TAKE** Folic acid - 1mg/day

Notes

Laxatives

How do they work? "Action"

There are many forms of laxatives, but the main goal is to relieve constipation.

Why are they used for? "Indications"

- Stimulant, emollient, and saline laxatives—evacuate the colon for rectal and bowel examinations
- Stool softeners or mineral oil—prevention of strain during defecation (after anorectal surgery or a myocardial infarction)
- Psyllium and polycarbophil—irritable bowel syndrome and diverticular disease
- Hyperosmotic (lactulose) agents—reduction of blood ammonia levels in hepatic encephalopathy

Adverse Reactions

- Constipation
- Diarrhea and a loss of water and electrolytes
- Abdominal pain or discomfort, nausea, vomiting, perianal irritation, fainting, bloating, flatulence, cramps, and weakness.
- Prolonged use of a laxative can result in serious electrolyte imbalances, as well as the "laxative habit", that is, dependence on a laxative to have a bowel movement.
- Some of these products contain tartrazine (a yellow food dye), which may cause allergic-type reactions (including bronchial asthma) in susceptible individuals. Obstruction of the esophagus, stomach, small intestine, and colon has occurred when bulk-forming laxatives are administered without adequate fluid intake or in patients with intestinal stenosis.

Interactions

- Mineral oil may impair the GI absorption of fat-soluble vitamins (A, D, E, and K).
- Laxatives may reduce absorption of other drugs present in the GI tract by combining with them chemically or hastening their passage through the intestinal tract.
- When surfactants are administered with mineral oil, they may increase mineral oil absorption.
- Milk, antacids, histamine H₂ antagonists, and proton pump inhibitors should not be administered 1 to 2 hours before bisacodyl tablets because the enteric coating may dissolve early (before reaching the intestinal tract), resulting in gastric lining irritation or dyspepsia and decreasing the laxative effect of the drug.

Contraindications

- Known hypersensitivity
- Persistent abdominal pain
- Nausea or vomiting of unknown cause
- Signs of acute appendicitis

Caution

Magnesium: Used cautiously in any degree of renal impairment

Nursing management

- Avoid long-term use of these products unless use of the product has been recommended by the primary health care provider. Long-term use may result in the "laxative habit," which is dependence on a laxative to have a normal bowel movement. Constipation may also occur with overuse of these drugs. Laxatives are not to be used for weight loss. Read and follow the directions on the label.
- Do not use these products in the presence of abdominal pain, nausea, or vomiting.
- Notify the primary health care provider if constipation is not relieved or if rectal bleeding or other symptoms occur.
- To avoid constipation, drink plenty of fluids, get exercise, and eat foods high in bulk or roughage. Cascara sagrada or senna—Pink-red, red-violet, red-brown, yellow-brown, or black discoloration of urine may occur. (Ford 440)

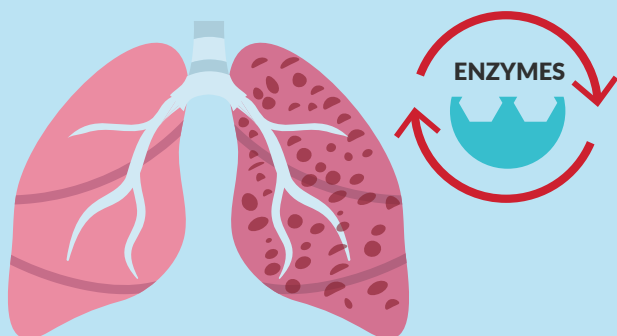
Types

- Bulk-producing laxatives are not digested by the body and therefore add bulk and water to the contents of the intestines. The added bulk in the intestines stimulates peristalsis, moves the products of digestion through the intestine, and encourages evacuation of the stool. Sometimes these laxatives are used with severe diarrhea to add bulk to the watery bowel contents and slow transit through the bowel. Psyllium "Metamucil"
- Emollient laxatives lubricate the intestinal walls and soften the stool, thereby enhancing passage of fecal material. Mineral oil
- Stool softeners promote water retention in the fecal mass and soften the stool. One difference between emollient laxatives and stool softeners is that the emollient laxatives do not promote the retention of water in the stool. Docusate
- Hyperosmolar drugs dehydrate local tissues, which causes irritation and increased peristalsis, with consequent evacuation of the fecal mass. Glycerine or lactulose
- Irritant or stimulant laxatives increase peristalsis by direct action on the intestine. Cascara sagrada
- Saline laxatives attract or pull water into the intestine, thereby increasing pressure in the intestine, followed by an increase in peristalsis. Magnesium preparations

Pancrelipase Enzymes

Indication:

Given to replace digestive enzymes in patients with cystic fibrosis

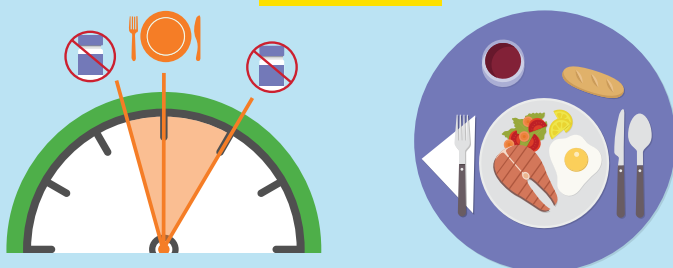


KEY POINTS

MUST be eaten **WITH every Meal & Snack** or med is not effective

- NOT before
- NOT After

KEY TERM



MOA:

- Enzymes help break down food
- end in "**-ase**"

Helps break down food

- Lipase → Fat
- Protease → Protein
- Amylase → Carb



Kaplan Question

Pancrelipase Admin:
Open capule &
sprinkle contents on
 food without chewing



HESI Question

Pancrelipase Admin:
Reduction in fatty
 stools is an expected
 outcome



Vitamins & Electrolytes

Iron

Ferrous Sulfate (oral)

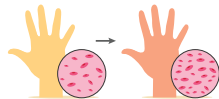


Iron Dextran (IV / IM)



Indication:

Treat anemia r/t iron deficiency



KEY POINTS

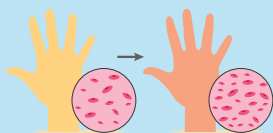
- Dark or black stools = **Normal & Expected** NOT GI BLEED
- Empty stomach **1 HOUR BEFORE** medications

Kaplan & HESI Question

- Calcium given with ferrous sulfate **BLOCKED Absorption**
- Orange juice/ fruit juice = enhance absorption
- Ferrous Sulfate**
Teaching is Effective when the Client states: "I will eat more fresh fruits and whole grain bread"

B12 (Cyanocobalamin)

Indication: Pernicious anemia



Key Point:

Body lacks intrinsic factors so can't absorb building blocks to make RBCs (iron, folic acid, B12)

Folic Acid

Patients who lack Folic acid: Anemia (low blood cell count), Sulfa drugs decrease folic acid absorption



- While taking **Sulfa drugs** (Sulfasalazine)
- Folic acid supplement - 1 mg/day



Pregnant patients **HESI!**

- Prevents** of neural tube defects
- Take before pregnancy

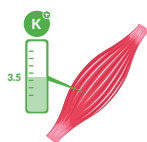


Pottassium K+



Indication:

Hypokalemia (low K+ below 3.5)



Memory Trick:



POTASSIUM PUMPS muscles

K+ Wasting Diuretics

- "-ide"**
- Furosemide
 - Hydrochlorothiazide

K+ Sparing Drugs

- S** - Spironolactone
- S** - "-Sartans" Lo**Sartan**
- P** - "-Prils" Lisino**Pril**



Key Point:



KEY POINTS

SLOW infusion rate if infusion **irritates client** reports of burning/ discomfort



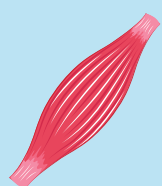
most commonly chosen distractor **48%**

Potassium Pumps the Heart **Potassium IV** (Normal 3...5-5.0)

1. First Action = Heart monitor
2. Never push = DEATH
3. ONLY 10-20 mEq/hr! (IV Pump)
4. Slow infusion (if arm burns)

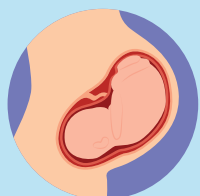
Magnesium Sulfate

MAGNESIUM SULFATE **MELLOWS** the muscles



Indication:

- Preterm labor** = wild contractions
- Anticonvulsant**
- Cardiac** = Torsades de Pointes **NCLEX TIP**



Key Terms:

CAUTION

- Respiratory Depression
- Paralysis & weak muscles = Low DTRs



HESI Question

Magnesium sulfate ... When to **STOP** the infusion?

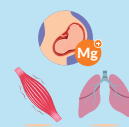
- Respiratory rate below 12
- Decreased DTRs



ATI Question

Possible findings in a newborn?

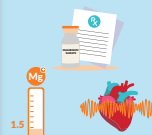
- Flaccid muscle tone
- Respiratory depression



Kaplan Question







What is the indication for **Mag Sulfate**?

- Replace for low magnesium (below 1.5)
- Treatment for **Torsades de Pointes** **NCLEX TIP**



Herbal Supplements

Bleed Risk:

E Vitamin E 	G Ginger 	G Garlic 
G Ginkgo Biloba 	G Ginseng 	O Omega 3 

All Supplements

KEY POINTS

- Assess for interactions with clients other meds
- PRIORITY!** Drug to drug interactions
- STOP** 2 - 3 weeks before surgery

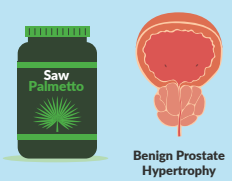
PRIORITY



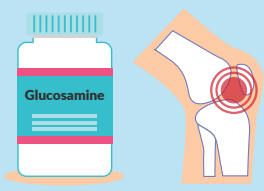

2 - 3 weeks



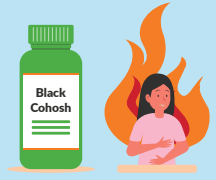

JOINT
Glucosamine
 WATCH for **hypoglycemia** when taking **anti-diabetic meds**



Prostate
 Saw Palmetto: **TREATs BPH**
SP - Saw Palmetto
SP - Swollen **Prostate**

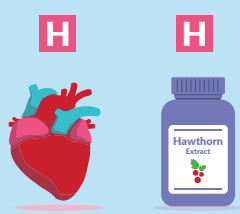


ATI Question
 Glucosamine = Treats **arthritic** pain

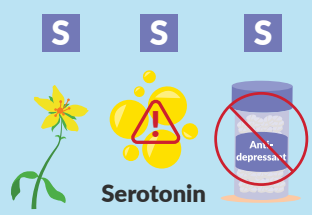


Menopause - "HOT FLASHES"

- Black Cohosh
- Bad Co**HOT** flash



Heart
H - Heart
H - Hawthorn extract



Mental - Depression & Insomnia

V - Valerian
 V - Valium effects

S - St. John Wort affects
S - Serotonin - CAUTION - Serotonin syndrome!
S - Stay away from Antidepressants !!



Skin
E - Eczema/ skin irritations
E - Evening Primrose



KEY PRIORITY

DO NOT MIX!!!

- Antidepressants SSRI's, MAOIs, TCAs
- Serotonin Syndrome
 - Mild signs
 - Shivering/ Diarheas
 - Severe signs
 - Muscle rigidity/ Fever
 - Seizures
 - Death

Mucosal Protectant

Drug name:

Sucralfate
(brand: Carafate)



Indication:

Given to treat and prevent both stomach and duodenal ulcers (small intestines)



MOA:

Forms thick protective layer over ulcers to provide a physical barrier against stomach acids & enzymes



KEY Point

AVOID

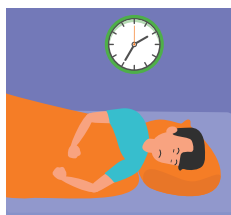
- FOOD & MEDS at least **1-2 hours** before or after taking med
- DO NOT TAKE WITH ANY OTHER MEDS!**



MEMORY TRICK

Sucralf**ATE**

- 2 hours Before **YOU ATE!!!**
- Taken **LATE**



Drug name:

Misoprostol

Indication:

Protect against gastric ulcers



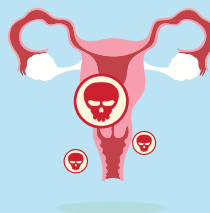
MOA:

Synthetic prostaglandin that increases protective mucous inside the stomach



Major Adverse Effect:

Misoprostol
Miscarriage RISK!!!
Due to cervical ripening



Patient Education:

HESI Key Term

Cervical ripening

- Reliable birth control
- Do not take with antacids (Anti-Acids = Anti Mixing meds)



Notes

Immune

Antineoplastics "Cell Cycle Nonspecific"

- Alkylating Agents

What do they do?

Alkylating agents make the cell a more alkaline environment, which in turn damages the cell. Malignant cells appear to be more susceptible to the effects of alkylating drugs than normal cells.

Indications

- Treatment of cancer

Adverse Reactions

- Bone marrow suppression (anemia, leukopenia, thrombocytopenia)
- Stomatitis
- Diarrhea
- and hair loss.
- The most common reactions are leukopenia and thrombocytopenia

Nursing Alert

Radiation recall is a skin reaction in which an area that was previously irradiated becomes reddened when a patient is administered certain specific chemotherapy drugs. This is well differentiated from a reaction exclusive to the drugs, because of the defined outline of the previous radiation treatment field on the body.

Contraindications

Antineoplastic drugs are contraindicated in patients with leukopenia, thrombocytopenia, anemia, serious infections, serious renal disease, or known hypersensitivity to the drug, and during pregnancy

Interactions:

- **Phenytoin:** Increased risk of seizures
- **Aminoglycosides:** Increased risk of nephrotoxicity and ototoxicity
- **Loop diuretics:** Increased risk of ototoxicity

Herbal Consideration

The shiitake mushroom, an edible variety of mushroom, is associated with general health maintenance but not with any severe adverse reactions. Mild side effects, such as skin rashes and GI upset, have been reported. Lentinan, a derivative of the shiitake mushroom, is proving to be valuable in boosting the body's immune system and may prolong the survival time of patients with cancer by supporting immunity. In Japan, lentinan is commonly used to treat cancer. Additional possible benefits of this herb include lowering cholesterol levels by increasing the rate at which cholesterol is excreted from the body. Under no circumstances should shiitake or lentinan be used for cancer or any serious illness without consulting a primary health care provider (DerMarderosian, 2003).

Nursing management

- Wear personal protective equipment when preparing any of these drugs for parenteral administration.
- Administer any prophylactic medications or fluids in a timely manner to prevent reactions.
- Observe the patient closely before, during, and after the administration of an antineoplastic drug.
- Observe the IV site closely to detect any signs of extravasation (leakage into the surrounding tissues). Tissue necrosis can be a serious complication. Discontinue the infusion and notify the oncology health care provider if discomfort, redness along the pathway of the vein, or infiltration occurs.
- Continually update nursing assessments, nursing diagnoses, and nursing care plans to meet the changing needs of the patient.
- Notify the oncology health care provider of all changes in the patient's general condition, the appearance of adverse reactions, and changes in laboratory test results.
- Provide the patient and family with both physical and emotional support during treatment.
- Institute neutropenic precautions to prevent infections.
- Immediately report a temp higher than 100.4 or higher, cough, sore throat, chills, frequent urination, or a white blood cell count of less than 2500/mm³.
- Immediately before administering the first dose of an antineoplastic drug, take the patient's vital signs and obtain a current weight
- Get a baseline CBC before first dose
- Monitor ongoing blood results
- You may need to hydrate the patient before administration of cisplatin.
- You may need to administer antiemetics prior to administration.
- Educate the patient on side effects including weight loss and alopecia.
- Provide support and comfort.
- Teach the patient to report to you or to the health care provider immediately any of the following: bleeding gums, easy bruising, petechiae (pinpoint hemorrhages), increased menstrual bleeding, tarry stools, bloody urine, or coffee-ground emesis.

Generic	Side Effects	Route
Cyclophosphamide	<p>Immediate: nausea, vomiting</p> <p>During therapy cycles: leukopenia, hemorrhagic cystitis, thrombocytopenia</p> <p>Long term: fertility problems, secondary cancers</p>	<p>Leukemia/lymphomas: ALL, AML, CLL, advanced lymphomas, Hodgkin's disease</p> <p>Solid tumors: breast, ovary, neuroblastoma, retinoblastoma</p> <p>Nonmalignant: mycosis fungoides, nephrotic syndrome (children), rheumatoid arthritis, systemic lupus erythematosus, multiple sclerosis</p>
Chlorambucil	<p>During therapy cycles: anemia, leukopenia, thrombocytopenia</p> <p>Long term: fertility problems</p>	<p>Leukemia/lymphomas: chronic lymphocytic leukemia (CLL), lymphomas, Hodgkin's disease</p>

Immunologic Agents

- IG & Antivenin

What do they do?

Immune globulins are solutions obtained from human or animal blood containing antibodies that have been formed by the body to specific antigens. Because they contain ready-made antibodies, they are given for passive immunity against disease. **Antivenins** are used for passive, transient protection from the toxic effects of bites by spiders (black widow and similar spiders) and snakes (rattlesnakes, copperhead and cottonmouth, and coral). The most effective response is obtained when the drug is administered within 4 hours after exposure.

Interactions

Antibodies in the immune globulin preparations may interfere with the immune response to live virus vaccines, particularly measles, but including others such as mumps and rubella. It is recommended that the live virus vaccines be administered 14 to 30 days before or 6 to 12 weeks after administration of immune globulins. No known interactions have been reported with antivenins.

Contraindications

The immune globulins are contraindicated in patients with a history of allergic reactions after administration of human immunoglobulin preparations and in individuals with isolated immunoglobulin A (IgA) deficiency (individuals could have an anaphylactic reaction to subsequent administration of blood products that contain IgA).

Human immune globulin intravenous (IGIV) products have been associated with renal impairment, acute renal failure, osmotic nephrosis, and death. Individuals with a predisposition to acute renal failure (e.g., those with pre-existing renal disease), those with diabetes mellitus, individuals older than 65 years of age, or patients receiving nephrotoxic drugs should not be given human IGIV products.

Notes

Immunosuppressants

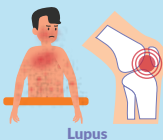
Drug name:

Hydroxychloroquine



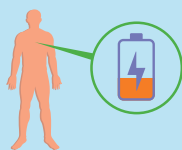
Indication:

Treat autoimmune diseases where the body is attacking itself



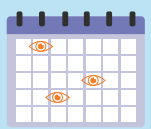
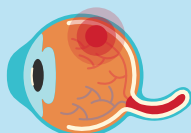
MOA:

Increased energy levels
NOT decreased



KEY POINT

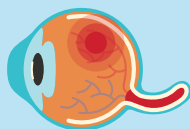
Major Adverse Effects:
Retinal damage & vision problems
Teach: Regular eye appt.
Every **6 -12 months**



6 - 12 months

MEMORY TRICK

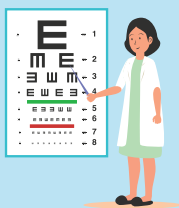
Hyyy-dddroxy Chloroquine
"Eyye Damage Clorine"



HESI Question

Teaching is effective when the client states

"I need to see my **optometrist at least** once a year"



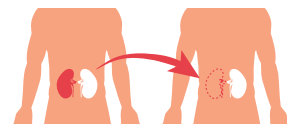
Drug name:

Cyclosporine / Azathioprine



Indication:

Prevent organ transplant rejection



MEMORY TRICK

Cyclo-Sporine

CycloSPARIN



Sparing the organ from rejection

KEY POINT | ADVERSE EFFECT

- BEFORE giving**
- Check WBC + Plts
- **REPORT** leukopenia
Low WBC < 4000
 - **Monitor for bleeding**
 - **No pregnant patients** - Use Contraception

KEY POINT

Common Side Effect
Cyclosporine
Gingival hyperplasia



ATI

Notify provider for **any sign of infection**



HESI

Teaching - Cyclosporine & Azathioprine

- Avoid crowds
- No live vaccines (Herpes Zoster + Shingles)
- Soft bristled toothbrush
- Use contraception

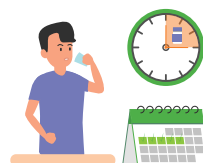
KAPLAN

Patient statement that requires further teaching

- "I will mix **cyclosporine** with grapefruit juice"

Cyclosporine teaching: Organ transplant

- Take med for life
- HCP will eval blood work regularly
- Take med at same time everyday



Notes

Immunosuppressants

NCLEX Questions

Indication:

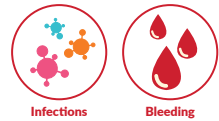
Given to help the body **STOP** attacking itself - like in clients with **autoimmune diseases**



Bad News:

Bone marrow suppression =
 1. Low WBC = **Infection** Risk
 2. Low Plt = **Bleed** Risk

NCLEX TIPS



Common NCLEX Question

A patient is prescribed **methotrexate** for treatment of an autoimmune disorder. Which patient report requires immediate assessment and intervention by the nurse?

- A. "I will consult with my provider before discontinuing birth control."
- ✓ B. "I noticed that I have developed tiny reddish-purple lesions all over my arms."
- C. "I have not had a normal bowel movement in two days."
- D. "I seem to be losing an excessive amount of hair since starting this medication."

What should the nurse include in teaching for a patient newly prescribed **hydroxychloroquine** for the treatment of systemic lupus erythematosus? **Select all that apply.**

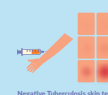
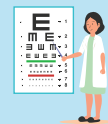
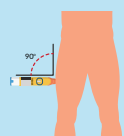
- 1. Ensure to see your optometrist at least every 2 years.
- ✓ 2. Report any new visual changes to your provider.
- 3. This medication is likely to increase feelings of fatigue associated with lupus.
- 4. Notify your provider if no improvement in symptoms is noticed within one week of beginning this medication.

The nurse is instructing a patient with a severe allergy to wasp stings on the proper use of the **epinephrine auto-injector**. Which patient statement **best** demonstrates that teaching has been effective?

- 1. "I will keep my epi-pen stored in my refrigerator at all times."
- ✓ 2. "I will inject the medication into my outer thigh at the first sign of an allergic reaction."
- 3. "I will seek follow-up treatment within 24 hours of injecting the medication."
- 4. "I will hold the epi-pen firmly in place for at least 5 seconds to ensure full delivery of the medication."

Which lab results should the nurse review prior to administration of **etanercept** to a patient with psoriatic arthritis? **Select all that apply**

- ✓ 1. Tuberculin skin test (TB skin test)
- 2. aPTT (partial thromboplastin time)
- ✓ 3. White blood cell count
- 4. Total cholesterol panel
- ✓ 5. Red blood cell count



Immunologic Agents

- Vaccines & Toxoids

What do they do?

The weakened or killed antigens contained in the vaccine do not have sufficient strength to cause disease. Although it is a rare occurrence, vaccination with any vaccine may not result in a protective antibody response in all individuals given the vaccine.

A toxin that is attenuated (or weakened) but still capable of stimulating the formation of antitoxins is called a toxoid.

Contraindications

- Immunologic agents are contraindicated in patients with known hypersensitivity to the agent or any component of it. Allergy to eggs is a concern with some vaccines.
- The measles, mumps, rubella, and varicella vaccines are contraindicated in patients who have had an allergic reaction to gelatin, neomycin, or a previous dose of one of the vaccines
- Vaccines and toxoids are contraindicated during acute febrile illnesses, leukemia, lymphoma, immunosuppressive illness or drug therapy, and non localized cancer. Always ask about allergy history before preparing a vaccine for administration.

Indications

- Routine immunization of infants and children
- Immunization of adults against tetanus
- Immunization of adults at high risk for certain diseases (e.g., pneumococcal and influenza vaccines)
- Immunization of children or adults at risk for exposure to a particular disease (e.g., hepatitis A for those going to endemic areas)
- Immunization of prepubertal girls or nonpregnant women of childbearing age against rubella
- Routine immunization of infants and children
- Immunization of adults against tetanus
- Immunization of adults at high risk for certain diseases (e.g., pneumococcal and influenza vaccines)
- Immunization of children or adults at risk for exposure to a particular disease (e.g., hepatitis A for those going to endemic areas)
- Immunization of prepubertal girls or nonpregnant women of childbearing age against rubella

Interactions

Vaccinations containing live organisms are not administered within 3 months of immune globulin administration, because antibodies in the globulin preparation may interfere with the immune response to the vaccination. Corticosteroids, antineoplastic drugs, and radiation therapy depress the immune system to such a degree that insufficient numbers of antibodies are produced to prevent the disease. When the salicylates are administered with the varicella vaccination, there is an increased risk of Reye's syndrome developing.

Nursing management

- Most vaccine preparations require refrigeration. Always have a backup plan for storage of the vaccine should the health care facility lose power. Temperature fluctuations can harm the vaccines.
- Monitor the patient before allowing them to leave after administering any vaccine.
- State agencies, drug companies, and immunization organizations all provide standardized forms for parents or caregivers that document immunization history. In addition to your facility documentation, provide or record on the document presented by the parent or caregiver the following information:
 - Date of vaccination
 - Route and site, vaccine type, manufacturer
 - Lot number and expiration date
 - Name, address, and title of individual administering vaccine

Adverse Reactions

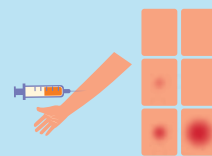
- Chills, fever
- muscular aches and pains
- Rash
- lethargy

Tumor Necrosis Factor Inhibitors

Etanercept, Infliximab, Adalimumab

Drug name:

- Etanercept
- Infliximab
- Adalimumab



Negative Tuberculosis skin test



PATIENT EDUCATION

- **Tuberculosis (TB) Reactivation**
- **Neg. TB skin test** needed to start therapy
- **Vaccines:**
 - Yearly flu vaccine
 - NO Live vaccines (herpes zoster or shingles)
- **Contraindication:**
Cannot take med: Chronic, reoccurring, or recent infections!

MEMORY TRICK

INTERCEPT



ADALIMUMAD
INFLIXIMAD

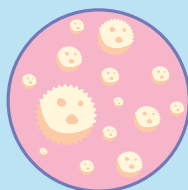
- Etanercept - **Intercepts** immune response
- causing immune suppression
- **MAB** ending think **MAD** immune **suppression**
adalimumab & infliximab

KEY POINT

Priority to Report to HCP!

- Elevated WBC
- Fever (over 100.3 F, 38 C)

NCLEX TIP



> 100.3° F / 38°C

AVOID



Chronic



Reoccurring



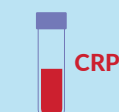
Recent



LABs

- **REPORT!** Elevated WBCs
- Elevated CRP
= **NOT** "the most important" lab

(CRP is the most commonly chosen wrong answer nearly 50% of the time) Elevated CRP is expected with these patients, since there is inflammation all over the body



most commonly
chosen wrong answer



CRP



Notes

Epinephrine

Epi auto-injectors "Epi-Pen"

Indication:

Anaphylaxis (severe allergic reaction)



MOA:

- Vasopressor that presses the vital signs up!
- Increased BP, RR, HR

KEY POINT

HESI Epi is the **1st drug** to use for anaphylaxis.

ATI **First signs** of anaphylaxis (hives, dyspnea, hypotension) **give Epi Pen**

- Repeat every 5 -15 minutes if s/s continue **NCLEX TIP**
- Repeat Epi until signs & symptoms resolve! **NCLEX TIP**

1st



Epinephrine

2nd



Diphenhydramine

3rd



Albuterol
Steroids

KAPLAN

Patient scenario:

Administration of ampicillin & client reports itchy skin and **difficulty breathing**.

- Priority actions:
 1. Stop infusion
 2. Auscultate lungs
 3. Prepare to administer epinephrine 1st
- Effective management of shock
 - BP 130/67
 - Apical HR 99
 - Cap refill less than 2 seconds



Normal EXPECTED

Side Effects

- Tachycardia (HR over 100)
- Palpitations
- Dizziness



How to use Epi-Pen

KEY POINTS

1. Inject into **outer THIGH** at **90 degree** angle at onset of s/s

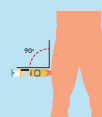
HESI "Stab pen into outer thigh"

- Hold in place for **10 seconds**

2. Seek immediate medical attention after use!

- Go to the hospital!

3. Store epi pens in **dark place** at **room temperature** (not too cold/ not too hot)



Notes

Immunosuppressants

Methotrexate

Drug name:

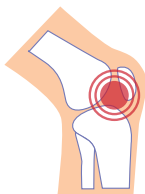
Methotrexate



Indication:

Kaplan

Mainly for **Rheumatoid Arthritis** (Autoimmune disease) body is attacking it's own joints



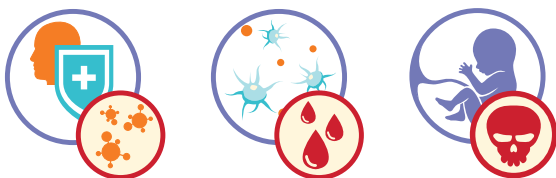
MOA:

Stops folic acid metabolism, which stops cell reproduction



Adverse Effects:

- Low immunity = Infections
- Low Platelets = serious bleeding
- Fetal death in pregnancy



HESI Question

Methotrexate:

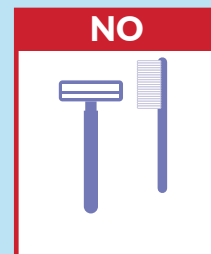
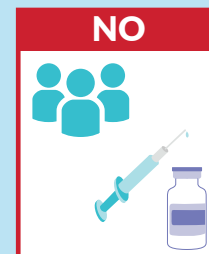
Suppresses B and T lymphocytes



B lymphocyte T lymphocyte

MEMORY TRICK

Meth **NOOO** trexate



- **NO** pregnant clients
- **NO** crowds or LIVE vaccines
- **NO** razors or brushing teeth hard

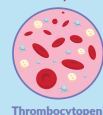
KEY POINT

Infection & Bleeding

- **Infection Risk**
 - Report Fever (over **100.3° F**, 38°C)
 - Avoid crowds & sick people
 - Avoid fresh fruit & flowers
- **Thrombocytopenia** (platelets under **100,000**)
 - Report bleeding:
 - Petechiae (bleeding under **skin**)
 - Purpura (purple spots on **skin**)
 - Melena (black tarry **stool**)
 - Hematemesis (**vomiting** blood)
 - Bleeding Gums



< 100,000



Thrombocytopenia

KEY POINT

NO Pregnancy - NOT BABY SAFE
MUST use Birth Control

- **"No pregnancy** until **one menstrual cycle** after treatment is resolved"
- **"No pregnancy** until **3 months** after treatment is finished"
- **"Men ... no trying for a baby** until **3 months** after treatment with methotrexate is complete"



Notes

**Maternity
&
pediatrics**

Contraception

Drug names:

Estrogen & Progesterone

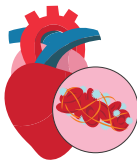


Major Adverse Effects

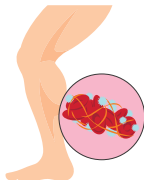
- Increased risk for blood clots!

That's why it's not given to patients with:

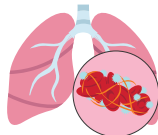
MI



DVT



PE



CVA stroke



KEY POINTS

Patient teaching:

- DO NOT** smoke! **HESI**
- REPORT:**
 - Severe leg pain, swelling, vision loss (Could be DVT/ CVA)

Memory Trick

E - **Estro**gen & **Progestero**ne

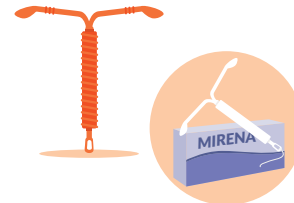
E - Emboli



Drug names:

2 types

- Copper Intrauterine Device
- Levonorgestrel



KEY POINTS

Copper Intrauterine Device

- Mild discomfort upon insertion (spotting/ cramping)
- Heavier **bleeding** and **increased cramping** during menses

Both IUDs **TEACH:**

- Check strings MONTHLY** after menses to ensure IUD still in place
- Longer, shorter, missing string = **REPORT to the HCP**

HESI Question

- Estrogen & Smoking** = increases risk for blood clots
- Estrogen = contraindication** for a patient with **Thrombophlebitis**

KAPLAN Question

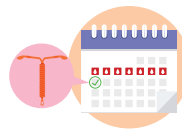
Priority finding:
Client taking **estrogen** with report of **left leg pain** behind the knee = **possible DVT**

ATI Question

- Do not take with **carbamazepine...** makes oral contraceptives ineffective

QUESTION BANK

Medroxy**progEsterone** acetate
Instruct client that **ovulation may not occur for a few months** after using this med.



Don't let

NCLEX TRICK YOU



Missed periods randomly - **NOT** normal - **COULD MEAN PREGNANCY!**



- IUDs are **NOT** affected by lubricants
- NOT** affected by **weight gain or loss**

Notes

Uterine Drugs

- Oxytocics

How do they work? "Action"

Uterine stimulants increase the strength, duration, and frequency of uterine contractions and decrease the incidence of uterine bleeding. They are given after the delivery of the placenta and are used to prevent postpartum and postabortal hemorrhage caused by uterine atony (marked relaxation of the uterine muscle). These drugs include carboprost, methylergonovine, and misoprostol. (Ford 506)

Oxytocin is an endogenous hormone produced by the posterior pituitary gland. This hormone has uterus-stimulating properties, acting on the smooth muscle of the uterus, especially on the pregnant uterus.

Adverse Reactions

Administration of oxytocin may result in the following:

- Fetal bradycardia, uterine rupture, uterine hypertonicity
- Nausea, vomiting, cardiac arrhythmias, anaphylactic reactions
- Oxytocin is similar to the hormone vasopressin and because of its antidiuretic effect, serious water intoxication (fluid overload, fluid volume excess) may occur.

Adverse reactions associated with other uterine stimulants include the following:

- Nausea, vomiting, diarrhea
- Elevated blood pressure, temporary chest pain
- Dizziness, water intoxication, headache
- Allergic reactions may also occur. In some instances hypertension associated with seizure or headache may occur. (Ford 506)

Contraindications

Oxytocin

- Cephalopelvic disproportion
- Unfavorable fetal position or presentation.
- Also contraindicated in obstetric emergencies, situations of fetal distress when delivery is not imminent
- Severe preeclampsia, eclampsia, and hypertonic uterus,
- During pregnancy when there is total placenta previa.
- It is contraindicated as an agent to induce labor when vaginal delivery is contraindicated

Other uterine stimulants

- Methylergonovine is not used before delivery of the placenta.
- It is contraindicated in those with known hypersensitivity to the drug or hypertension. (Ford 506)

Indications

- Prevent postpartum and postabortal hemorrhage caused by uterine atony
- Induce an early vaginal delivery when there are fetal or maternal problems, such as a woman with diabetes and a large fetus, Rh problems, premature rupture of the membranes, uterine inertia, and preeclampsia
- Managing inevitable or incomplete abortion

Nursing management

When **oxytocin** is administered with vasopressors, however, severe maternal hypertension may occur.

- Obtain an obstetric history (e.g., parity, gravidity, previous obstetric problems, type of labor, stillbirths, abortions, live-birth infant abnormalities) and a general health history.
- Keep a record of the activity of the uterus (strength, duration, and frequency of contractions, if any).
- All patients receiving IV oxytocin must be under constant observation to identify complications. In addition, the health care provider attending the delivery should be immediately available at all times.

When monitoring uterine contractions, immediately stop the oxytocin infusion and notify the health care provider attending the delivery immediately if any of the following occurs:

- A significant change in the FHR or rhythm
- A marked change in the frequency, rate, or rhythm of uterine contractions; uterine contractions lasting more than 60 seconds; or contractions occurring more frequently than every 2 to 3 minutes, or no palpable relaxation of the uterus
- A marked increase or decrease in the patient's blood pressure or pulse or any significant change in the patient's general condition (vital signs are typically obtained every 15 to 30 minutes in active labor)

Other uterine stimulants

- When the patient is to receive any of these drugs after delivery, it is important to take the blood pressure, pulse, and respiratory rate before administration. (Ford 507)
- Methylergonovine is administered for uterine atony and hemorrhage, abdominal cramping can occur and is usually an indication of drug effectiveness. The uterus is palpated in the lower abdomen as small, firm, and round. However, report persistent or severe cramping to the primary health care provider. (Ford 508)

Generic	Trade	Dose	Use
Methylergonovine	Methergine	Control of postpartum bleeding and hemorrhage, uterine atony	0.2 mg IM, IV after delivery of the placenta; 0.2 mg orally TID, QID
Misoprostol	Cytotec	Postpartum hemorrhage, cervical ripening	100-mcg tablet vaginally administered
Oxytocin	Pitocin	Antepartum: to initiate or improve uterine contractions Postpartum: control of postpartum bleeding and hemorrhage	Induction of labor: individualize dose not to exceed 10 units/min Postpartum bleeding: IV infusion of 10–40 units in 1000-mL IV solution or 10 units IM after placenta delivery

Labor Drugs

Drug name:

Terbutaline



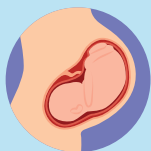
Indication:

Delays labor momentarily by suppressing contractions



Memory Trick

Turbuta**LINE**

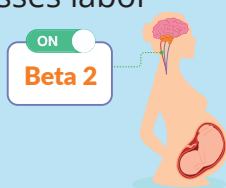


Wait in **LINE** for the baby & Terbutaline slows down Turbulent contractions



MOA:

Activated beta 2 receptors to activate the sympathetic nervous system, which suppresses labor



HESI Question

Terbutaline

- May be used for **48 hours to suppress** preterm labor



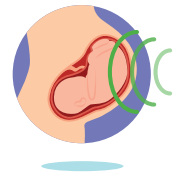
Drug name:

Oxytocin



Indication:

Induces labor & stimulates contractions

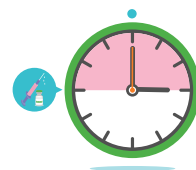


Nursing Care:

HESI Question

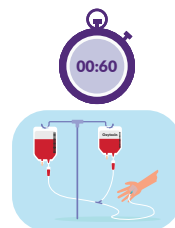
Oxytocin

- Used to **stimulate uterine contractions**
- Administered **6 - 12 hours after last dose of dinoprostone**



HESI Question

- Discontinue if contractions last **longer than 60 seconds**
- Maintain one on one care
- **Piggyback** the oxytocin into the main IV fluids



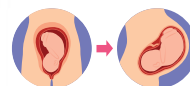
KAPLAN Question

- Stop oxytocin infusion for contractions sustained **over 2minutes**
- **Priority action** for 3 consecutive **late decelerations** = Turn off Oxytocin



ATI Question

Turn the client **to the side** if **late decelerations** are noted.



Notes

Uterine Drugs

Tocolytics

How do they work? "Action"

These drugs are used to manage premature labor. Indomethacin is an NSAIDS that inhibits the production of prostaglandins which contribute to uterine contractions. Beta (β)-2-adrenergic and calcium channel blockers are used to delay the delivery process for 24 to 48 hours. These drugs block the contractions of the smooth muscle of the uterus. Magnesium is used drugs to decrease uterine muscle contractions, and is used for seizure control with eclampsia. Magnesium is a calcium antagonist that works to decrease the force of uterine contractions.

Indications

- Used to stop or decrease uterine contractions in preterm labor

Adverse Reactions

- Fatigue, flushing, headache, dizziness, diplopia
- Nausea, vomiting, stomach upset, heartburn
- Prolonged vaginal bleeding
- Sweating, hypotension, depressed reflexes, and flaccid paralysis are other adverse reactions associated with IV administration. They are related to hypocalcemia induced by the therapy.

Contraindications

Magnesium and calcium channel blockers are contraindicated in patients with known hypersensitivity to these drugs, in patients with heart block or myocardial damage, and when the woman is within 2 hours of delivery. (Ford 509)

Critical Thinking

In case of emergency, when administering magnesium sulfate have calcium gluconate and reflex hammer ready in case of overdose.

Nursing management

During the ongoing assessment of a patient receiving a tocolytic drug, nursing activities include the following at 15- to 30-minute intervals:

- Obtaining blood pressure, pulse, and respiratory rate
- Monitoring FHR
- Checking the IV infusion rate
- Examining the area around the IV needle insertion site for signs of infiltration
- Monitoring uterine contractions (frequency, intensity, length)
- Measuring maternal intake and output
- Maternal reflexes (if using magnesium) (Ford 509)

Interactions

- Increase CNS depressant effects of opioid analgesics when given with magnesium

Generic	Trade	Dose	Use
Indomethacin	Indocin	Preterm labor before 31 weeks' gestation	100 mg rectally, then 50 mg orally q 6 hr for a total of 8 doses
Magnesium	n/a	Preterm labor, seizure control	4–6 g IV over 2 min, then infuse 1–4 g/hr
Terbutaline	Brethine	Preterm labor	Subcut: 250 mcg hourly until contractions stop Orally: 2.5 mg q 4–6 hr until delivery (Ford 511)

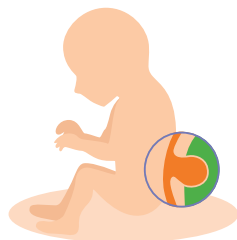
Prenatal Folic Acid & Betamethasone

Vitamin name:

Folic Acid

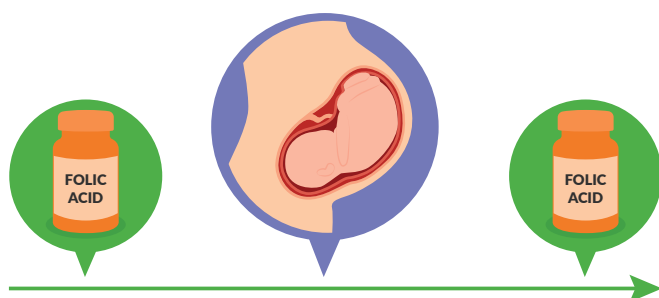


Indication:



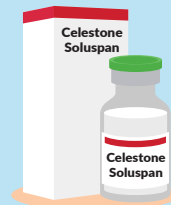
Given to prevent spina bifida:

- Prevention of **neural tube defects**
- Begin taking before pregnancy



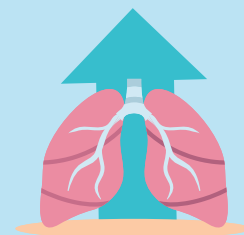
Drug name:

Betamethasone



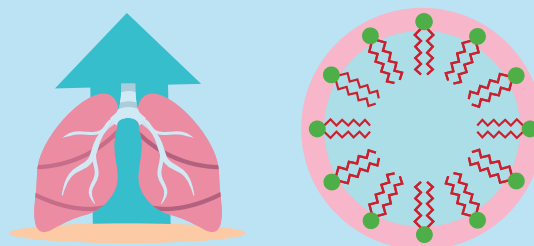
Indication:

Helps lung development with preterm babies



MOA:

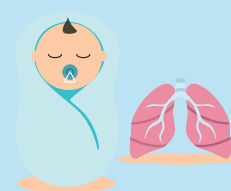
Increases **surfactant** production which helps lungs to expand



ATI Question

Evaluation of effectiveness

- Normal respiratory pattern in newborn



Notes

Mental health

Antidepressants

- 4 Rules

1. Increased risk of suicide

- Antidepressants can increase suicidal thoughts in first few weeks of Treatment
- NOTIFY provider of **any suicidal thoughts!**
- CLARIFY any **new** prescription MONITOR for:
 - **New** thoughts of suicide
 - **Unusual** behavior
 - **Worsening** depression



2. Slow Onset & SLOW taper off

NEVER STOP abruptly



3. NEVER Mix

- SSRI + St John's Wart or
- MAOI + Antidepressant (TCA, SSRI, SNRI)



4. ALL psych drugs

- **Decrease BP** (slow position changes)
- Cause weight changes



SSRI

SNRI

TCA

MAOI

TOP 3 MISSED Questions:

Which medication have the most potential risk for injury?

Select all that apply

Looking for sedating meds

1. Amitriptyline
2. Diphenhydramine
3. Colace
4. Alprazolam
5. Buspirone

Which combination of drugs should the nurse question?

Select all that apply

SSRI

Sertraline
Escitalopram
Citalopram

MAOI

Phenelzine
Selegiline

- 1. Sertraline with Selegiline
- 2. Alprazolam with citalopram
- 3. Buspirone with Phenelzine
- 4. Lithium with Ketorolac
- 5. St John's Wort with Buspirone

Most potential for injury?

Select all that apply

- 1. Amitriptyline to treat fibromyalgia pain
- 2. Headache while on Phenelzine
- 3. Taking St Johns wart with Sertraline
- 4. Discontinuing **escitalopram** the day before taking Isocarboxazid.
- 5. Peanut butter and jelly sandwich while on Selegiline
- 6. Reporting sore throat, fatigue and low grade fever while on clozapine

Notes

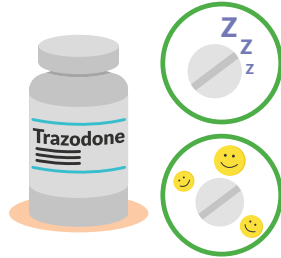
Atypical Antidepressant

Drug name:

Trazodone

KEY WORD

Avoid ETOH & other sedatives



Indication:

Depression & Sleep aid



Side Effects & Memory Trick:

Sleepy and sedated

Tra**ZZZ**adone



TRANCE**adone**



• Avoid ETOH & other sedatives (benzos, antihistamines)



• Take at night

• Orthostatic hypotension = Teach: Slow position changes



• Rare: Priapism (erection) Teach: Erection that lasts for hours - go to hospital!

Drug name:

Bupropion SR, XL

Brand: Wellbutrin



Indication:

Depression & aid to stop smoking

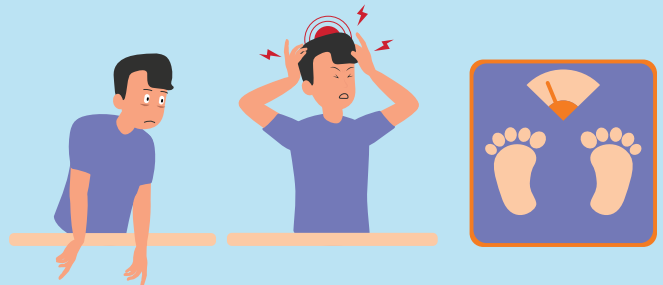


Side Effects:

Insomnia,

HA,

weight loss



Patient Teaching:

KEY POINT

- XL, SR pill
- NEVER crush, chew, cut



• Never "double up" on missed dose

• Do not crush XR - extended release or SR - Sustained release

Notes

Antidepressants - MAOI

Drug names:

PHENELZINE Brand: Nardil
SELEGILINE
ISOCARBOXAZID
TRANLYCYPROMINE



KEY Words

- Pt States: **“This med is not working after 2 weeks”**
- **ASSESS 1st**
- Further expressions of:
 1. Hopelessness
 2. Despair
 3. Suicidal thoughts
 4. Thoughts of self-harm

Indication:

Very powerful antidepressants:
 Depression, Panic disorder & Social phobia. Used for depression that is resistant to other meds



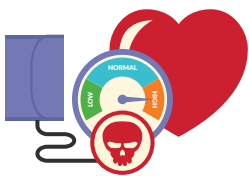
MOA:

Increase availability of norepinephrine, serotonin, and dopamine in brain



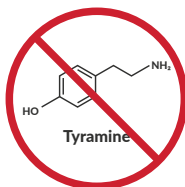
M A O O I

Massive HTN crisis Risk



NCLEX Key terms:
 Headache
 Increased Agitation

AVOID TYRAMINE



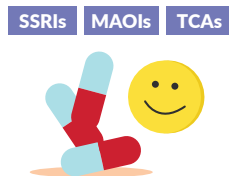
1. Wine & Cheese (NO wine tasting)
2. Beer & Sausage, Salami (NO beer fest)
3. Chocolate

OTC drugs = HTN CRISIS!!!



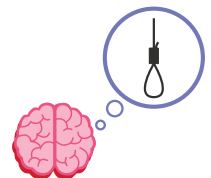
- C - Calcium
- A - Anti acids
- A - Acetaminophen
- N - NSAIDS (Naproxen, Ibuprofen)

Other Antidepressants



Serotonin Syndrome
 2 week wash-out
KEY DRUGS:
 NO! Escitalopram (SSRI)
 NO! Imipramine (TCA)

Increased Suicide risk



NCLEX Key terms:
 When starting med.
 Increasing Dose

Notes

Antidepressants SNRI vs. TCA

Drug name:

DULOXETINE



Indication:

1. Depression
2. Pain: Neuro pathic pain = Diabetics & Fibromyalgia



Memory Trick:

DUAL-OXETINE
 - **DOUBLE PURPOSE**
 - **DEPRESSION & PAIN**

Patient Education:

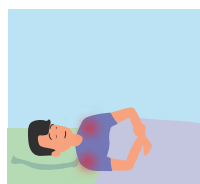
"If a fibromyalgia patient is prescribed this & they're not depressed they need education on the purpose that it is to help with their pain"



KEY POINT

Patient Teaching

Helps with **chronic pain** & **improves sleep** in patients with fibromyalgia



Drug name:

AMITRIPTYLINE
 SLOW position changes
IMIPRAMINE



Indication:

1. Depression, Anxiety
2. Neuro pathic pain = Diabetics & Fibromyaliga



Side Effects:

Dry body (can't see, pee, spit or shh - poop)



NCLEX TIP

KEY POINT

- **Orthostatic Hypotension**
 - Slow position changes esp

MEMORY TRICK

Amitriptyline - Amy trips on things !! - SLOW position changes

- **Urinary Retention**

MEMORY TRICK

Imipramine - Inhibit my PEEING

- **NEVER** take with MAOI
 2 week wash-out period
NO MAOI + Antidepressants (TCA, SSRI, SNRI)



Notes

Antidepressants

- SSRI

Drug names:

- **SERTRALINE**
- **CITALOPRAM**
- **ESCITALOPRAM**
- **PAROXETINE**
- **FLUOXETINE**



Indication:

Depression, Anxiety, PTSD



MOA:

Inhibits the REuptake of Serotonin keeping MORE around. So Serotonin levels are INCREASED

**SELECTIVE
SEROTONIN
REUPTAKE
INHIBITORS**



Side Effects:

1. Sexual dysfunction
2. Weight Gain
3. Insomnia, **NOT** sleepiness or sedation, don't get tricked

Serotonin Syndrome

S

**SUICIDE Risk
INCREASED**



S

**SLOW Onset &
Slow Taper off!**



S

**SWEATY & HOT
+ FEVER**



R

**RIGID muscles
+ Restlessness
& Agitation**



I

**INCREASED
Heart Rate
"Tachycardia"**



Notes

ADHD Meds

Drug names:

Methylphenidate

(brand: Ritalin)

Amphetamine mixture

(brand: Adrenal)

Dextroamphetamine

Stimulants



Indication:

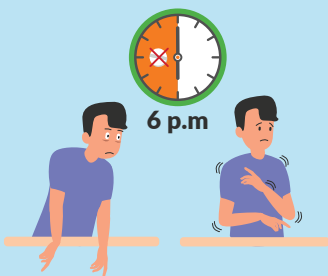
Given to treat:

ADHD in children & adolescents
& even narcolepsy



KEY POINT

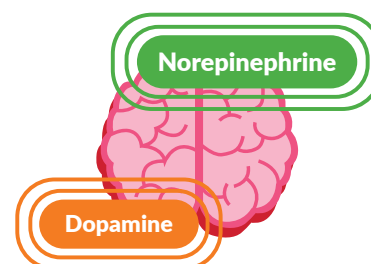
- Loss of Appetite & Weight
- Loss of Sleep
 - Restlessness
 - Give last dose **NO LATER** than 6 PM
- Improvements in school work
- **PRIORITY** nursing assessments
 - Monitor BP
 - **MONITOR** and report height, weight trends with HCP
- **Reversal Agent: Alprazolam**



PRIORITY nursing assessment

MOA:

Enhance effects of dopamine and norepinephrine in brain



Notes

Antipsychotics

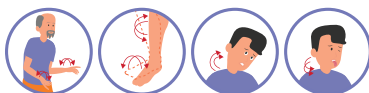
Drug name:

1st generation Typical
HALOPERIDOL



Normal Side Effects:

No need to report to HCP
- EPS "extrapyramidal symptoms"
Dystonia (spasm of neck, face & tongue)



Key point

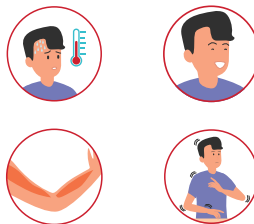
NEUROLEPTIC MALIGNANT SYNDROME

LIFE threatening!



Key Signs

- High Fever & Diaphoresis
- Change in Mental Status
- Muscle Rigidity
- Tremors



Priority Action

- HOLD** Haloperidol
- Assess patient
- NOTIFY HCP** immediately!!!



Indication:

- Schizophrenia
- Tourettes - to control motor movement



Drug name:

2nd generation A-typical
- **CLOZAPINE**
- **RISPERIDONE**



Normal Side Effects:

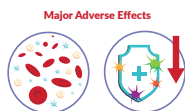
No need to report:
Weight gain, drooling & sedation



Killer Side Effects:

Report To Provider

Leukopenia - Low WBC
High Risk for Infection

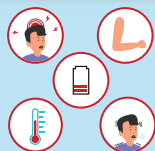


Memory Trick

CloZAPine
Zaps WBCS!!

Key Points

Sore Throat
Fever
Flu like symptoms



Priority Action

Immediately report to HCP!!



Indication:

Schizophrenia & Schizoaffective who are NOT responding to other antipsychotics



HESI question:

Which med order for dementia patient Requires intervention by the NURSE?

Risperidone

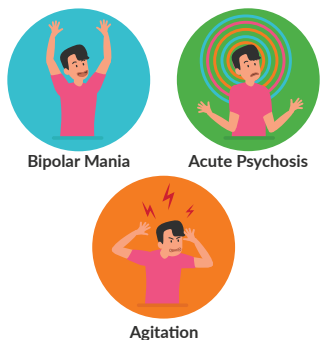
Drug name:

Ziprasidone hydrochloride
(brand: Geodon)



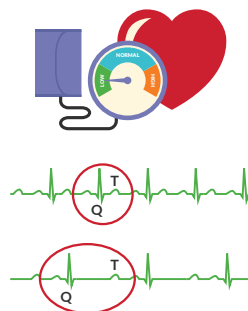
Indication:

Bipolar mania, acute psychosis & agitation



KEY POINT

Hypotension
Monitor for **Widened QT intervals**



MEMORY TRICK

ZiprasiDONE



Done prolonged your QT interval & dropped the BP

Notes

Anxiolytics

Class:

Benzodiazepines

Drug names:

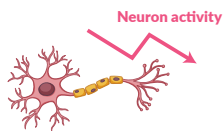
- **"-lam"**
Alprazo**LAM**
Midazo**LAM**
- **"-pam"**
Temaze**PAM**
Clonaze**PAM**

Indication:

Anxiety, seizures

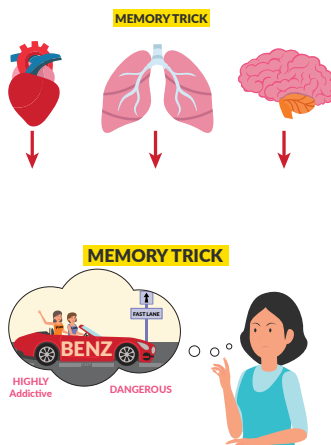
MOA:

Increases GABA



Side Effects:

Low & slow vitals & brain



KEY POINT:

- Take at bedtime **NCLEX TIP**
- Don't skip doses **NCLEX TIP**
- Stop drinking alcohol (wine)
- Do not operate dangerous machines
- Antidote Benzos: Flumazenil
Antidote Opioids: Naloxone (brand: Narcan)

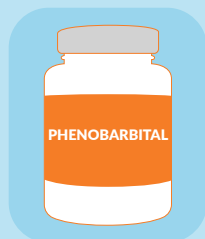


Class:

Barbiturates

Drug name:

Phenobarbital



GOOD NEWS

Lasts **LONGER** in the body



BAD NEWS

Take **LONGER** to get out of the body

Higher risk for **Toxicity** leading to hypotension, Respiratory depression

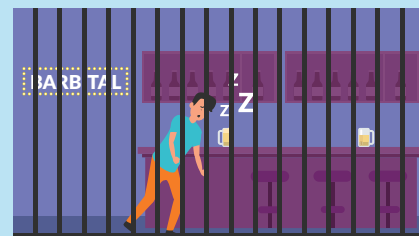
HESI Question

Is a scenario of a patient, on phenobarbital with low blood pressure & increased sedation!



Memory Trick:

Sedation like at a bar & lasts a long time, like stuck behind bars



Drug name:

Bupirone

KEY POINT

- **2 - 4 weeks for full effect**
- **NO Withdrawal symptoms!**
- **NO sedation**

Memory Trick:



BAD NEWS
Takes a **LONG TIME** to kick in

Patient Teaching:

- OK to drive
- "drive the BUSpirone"
- NOT used for acute attacks



2 Common Test questions for Anxiolytics:

Patient teaching for Diazepam?
Select All That Apply

- ✓ 1. Avoid valerian root
- 2. Avoid Ginkgo and Ginseng
- ✓ 3. Avoid muscle relaxants
- ✓ 4. Report history of reaction to midazolam
- 5. Naloxone is the antidote for this med.
- 6. Decrease alcohol consumption

Client on phenobarbital, which of the follow should the nurse do? **SATA**

- 1. Monitor for hypertension
- ✓ 2. Assess for respiratory depression
- ✓ 3. Assess for low blood pressure
- 4. Teach patient there is NO withdrawal symptoms
- ✓ 5. Teach sedation is an early side effect

Notes

Bipolar Meds

Carbamazepine vs. Valproic Acid

Drug name:

Carbamazepine



Indication:

- Bipolar & Seizures
- Trigeminal neuralgia (neuropathic pain)



Side Effects:

- Leukopenia - LOW WBC
- Increased risk for BIG infection



KEY WORD

Report fever / sore throat!!

Accidental Pregnancy!!

- Oral contraceptives ineffective
- Will need alternative birth control methods



Drug name:

Valproic Acid

Side Effects & Memory Trick:

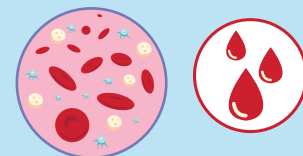
VALLLLLLLL

Think of L's for va**LL**proic Acid

- **L** - Liver toxic
Jaundice & Liver labs (ALT & AST)



- **L** - Low Platelets
AKA - Thrombocytopenia
BIG bleed risk



Thrombocytopenia

Not Pregnancy Safe!
Teach client not to discontinue abruptly



Notes

Bipolar Meds - Lithium

Drug name:

Lithium



Indication:

Treatment:

- Bipolar
- Schizoaffective disorder

Given for long term treatment

Lithium Battery "B" Bipolar
Since Lithium lasts a Long time

MEMORY TRICK

- Lithium +

KEY POINT

Toxicity Over 1.5
Key Kidney signs:

- Creatinine **OVER 1.3 = BAD kidney!**
- Urine: **30 ml / hr or LESS = kidneys DISTRESS!**
- **S/S = Tinnitus (ringing of the ears)**



Urine Output < 30ml/hr



Creatinine > 1.3

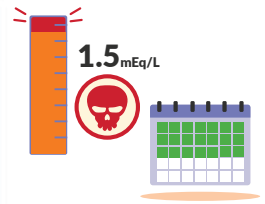


L

LEVELS OVER 1.5 MEQ/L = TOXIC!

Common Test Question:

Is it lithium at Therapeutic level?
Yes - continue at **CURRENT** dose



I

INCREASE FLUID & SODIUM (Na+)

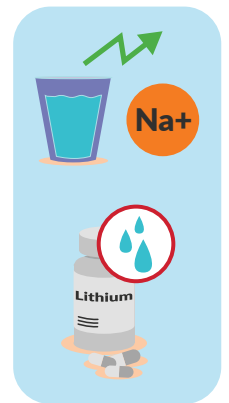
KEY POINT Contraindicated

- **Dehydration!**
- **Low sodium** "Hyponatremia" below 135 mEq/L

Do NOT limit sodium or water intake

HIGH RISK Toxicity

Stomach Flu (diarrhea & vomiting)



T

TOXIC SIGNS

REPORT to HCP!

- Report excessive urination and extreme thirst!!
- Vomiting & diarrhea
- Neuro Muscular excitability (tremors / myoclonic jerks)



H

HOLD NSAIDS
(Ibuprofen, Naproxen)

KEY POINT

- **NSAIDS** (ibuprofen) decrease renal blood flow increasing r/t toxicity
- **AVOID!! NEED FURTHER TEACHING!**



Notes

Withdrawal Meds

Drug name:

Methadone

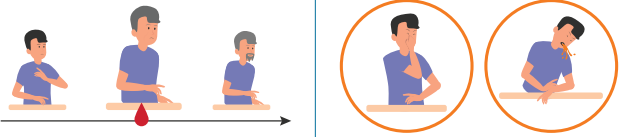
(opioid withdrawal)

Indication:

Opioid withdrawal



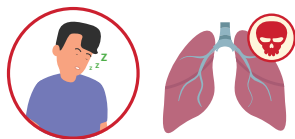
Key Points:



- LONG half life
- **Early** signs of Toxicity:
 - N & V and lethargy
 - Frequent emesis
- Monitor:
 - Prolonged QT interval (ECG)
 - O2 Sat less than 90% (95-100% in healthy adults)
 - Client falls asleep easily

<90 %

 95-100%
 in healthy adults



Drug name:

Disulfiram

(brand: Antabuse)

Caution:

alcohol based products
 with ARTS & CRAFTS

Indication:

Alcohol withdrawal



Expected Effects:

Including patient teaching to be caution with working with rubbing alcohol, or alcohol based products with ARTS & CRAFTS could cause a reaction



Notes

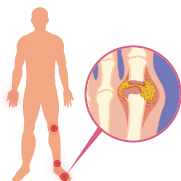
Musculoskeletal

Uric Acid

Allopurinol & Colchicine

Indication:

Given for Gout - uric acid build up causes inflammation in the joints

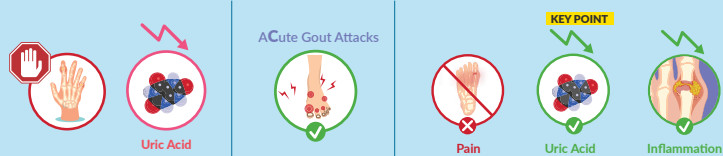


BIG KEY DIFFERENCE

Allo**P**urinol - **P**revents gout

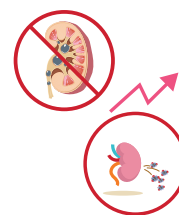
Colchicine - for a **C**ute gout attacks

NOT given to reduce pain, but to reduce uric acid



Patient Teaching:

- Increase fluids & take with full glass of water
- AVOID clients with Kidney & Liver Disease
- Evaluation of effectiveness?
= Normal uric acid levels



HESI Question

- Allopurinol** - Do not take for acute gout attacks
- Colchicine** - for acute attack, DOES NOT provide pain relief
- Naproxen (NSAID)** - used for PAIN relief with gout.



KEY POINTS:

Allopurinol

1. **STOP** taking = MILD rash
& report to the HCP immediately **NCLEX TIP**

MEMORY TRICK

- Rash **ALL** Over
- **ALL**opurinol = Deadly

2. Increase fluids
3. Take with full glass of water



KAPLAN Question

"I can use ibuprofen for pain ... Gout"



HESI Question

Needs **FURTHER teaching** when taking Allopurinol

"I will **limit** my **fluid intake** with this medication"



Skeletal Muscle Drugs

- Uric Acid Inhibitors

How do they work? "Action"

Allopurinol (Zyloprim) reduces the production of uric acid, thereby decreasing serum uric acid levels and the deposit of urate crystals in joints. This probably accounts for its ability to relieve the severe pain of acute gout. Febuxostat (Uloric), a newer drug, is used to reduce serum uric acid levels, preventing gout attacks.

Indications

Drugs indicated for treatment of gout may be used to manage acute attacks of gout or in preventing acute attacks of gout (prophylaxis).

Adverse Reactions

- Headache
- Urinary frequency
- One adverse reaction associated with allopurinol is skin rash, which in some cases has been followed by serious hypersensitivity reactions, such as exfoliative dermatitis and Stevens-Johnson syndrome. Colchicine administration may result in severe nausea, vomiting, and bone marrow depression; therefore, it is used as a second line of treatment when other drugs fail.

Contraindications

- Colchicine is contraindicated in patients with serious GI, renal, hepatic, or cardiac disorders and those with blood dyscrasias
- Probenecid is contraindicated in patients with blood dyscrasias or uric acid kidney stones, and in children younger than 2 years. If patients are taking azathioprine (Imuran), mercaptopurine, or theophylline they should not be prescribed febuxostat.

Interactions

Allopurinol and febuxostat

- **Ampicillin:** Increased risk of rash
- **Theophylline:** Increased risk of theophylline toxicity
- **Aluminum-based antacids:**
 - Decreased effectiveness of allopurinol
- **Probenecid**
 - **Penicillins, cephalosporins, acyclovir, rifampin, and the sulfonamides:** Increased serum level of anti-infective
 - **Barbiturates and benzodiazepines:** Increased serum level of sedative
 - **NSAIDs:** Increased serum level of NSAID
 - **Salicylates:** Decreased effectiveness of probenecid

Nursing management

- Drink at least 10 glasses of water a day until the acute attack has subsided.
- Take this drug with food to minimize GI upset.
- If drowsiness occurs, avoid driving or performing other hazardous tasks.
- Acute gout—notify the primary health care provider if pain is not relieved in a few days.
- Notify the primary health care provider if a skin rash occurs.
- When using drugs for muscle spasm and cramping:
- This drug may cause drowsiness. Do not drive or perform other hazardous tasks if drowsiness occurs.
- This drug is for short-term use. Do not use the drug for longer than 2 to 3 weeks.
- Avoid alcohol or other CNS depressants while taking this drug.

Generic	Trade	Use	Dose
Allopurinol	Zyloprim	Management of symptoms of gout	100–800 mg/day orally
Colchicine	NA	Relief of acute attacks of gout, prevention of gout attack	Prophylaxis: 0.5–0.6 mg/day orally Acute attack: initial dose 0.5–1.2 mg orally or 2 mg IV, then 0.5–1.2 mg orally q 1–2 hr or 0.5 mg IV q 6 hr until attack is aborted or adverse effects occur

Bones

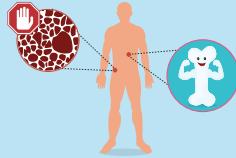
Drug name:

Calcium Carbonate



Indication:

Osteoporosis & bone health to help make bones stronger

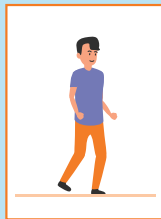


KEY POINTS

- **TAKE IN DIVIDED DOSES-** Less than 500 mg
- Doses **OVER 500 mg** at one time are **NOT absorbed**
- **NO** need for frequent blood tests or routine labs



COMMON SIDE EFFECT



- Constipation which is normal & to be expected.
- Just add fluids & ambulation

MEMORY TRICK



Since calcium makes bones hard, just think Calcium makes bowels hard too!

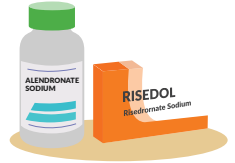
• High CAL = Hard Bowel



• Low CAL = Loose Bowel

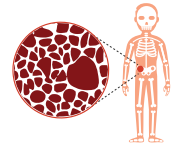
Drug name:

End in “-dronate”
alendronate
risedronate



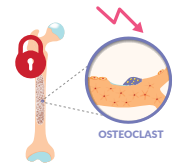
Indication:

Osteoporosis



MOA:

Inhibits bone reabsorption by reducing osteoclast activity, which breaks down the bone



KEY POINT

- Monitor bone density
- Take on Empty Stomach
- **Esophagitis = Sit up 30 minutes** **NCLEX TIP**



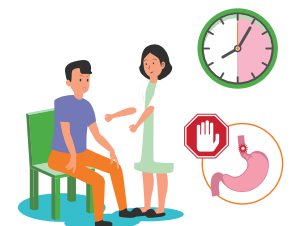
HESI Question

- Treats Osteoporosis
- Drink full **8 oz** with medication



KAPLAN Question

Teach patient to sit upright for at least **30 minutes**



Notes

Skeletal Muscle Drugs

- Dmards

How do they work? "Action"

When the immobility and pain of RA can no longer be controlled by pain relief agents and anti-inflammatory drugs, DMARDs are used. These drugs have properties to produce immunosuppression, which in turn decreases the body's immune response. Therefore, in RA treatment, DMARDs are useful for their immunosuppressive ability.

Indications

- Rheumatoid arthritis
- Crohn's disease
- Fibromyalgia

Adverse Reactions

- Nausea
- Stomatitis
- Alopecia (hair loss)
- The adverse reactions to sulfa-based drugs, such as sulfasalazine, include ocular changes, gastrointestinal (GI) upset, and mild pancytopenia.

Contraindications

Patients with renal insufficiency, liver disease, alcohol abuse, pancytopenia, or folate deficiency should not take methotrexate. Etanercept (Enbrel), adalimumab (Humira), and infliximab (Remicade) should not be used in patients with congestive heart failure or neurological demyelinating diseases. Anakinra (Kineret) should not be used in combination with etanercept, adalimumab, or infliximab.

Interactions

- Sulfa antibiotics: Increased risk of methotrexate toxicity

Nursing management

- Because DMARDs are designed to produce immunosuppression, patients need to be monitored routinely for infections. Instruct patients to report any problem, no matter how minor, such as a cold or open sore—even these can become life-threatening.
- Explain carefully that treatment for the disorder includes drug therapy, as well as other medical management, such as diet, exercise, limitations or specifications of activity, and periodic physical therapy treatments.
- Teach the importance of asking the primary health care provider before taking any nonprescription drugs or supplements.
- Some drugs used for RA require self-administered subcutaneous injections. Teach the patient and family proper injection and disposal techniques.
- Teach about site rotation, and have the patient demonstrate proper injection technique before this becomes a self-administered procedure.
- Patients need to be taught how to manage the discomfort to the site of injection and to report redness, pain, and swelling to the primary health care provider.
- When using drugs to treat RA:
- When taking methotrexate, use a calendar or some other memory device to remember to take the drug on the same day each week.
- Notify the primary health care provider immediately if any of the following occur: sore mouth or sores in the mouth, diarrhea, fever, sore throat, easy bruising, rash, itching, or nausea and vomiting.
- Women of childbearing age should use an effective contraceptive during therapy with methotrexate and for 8 weeks after therapy.

Generic	Trade	Use	Dose
Adalimumab	Humira	RA; other autoimmune disorders (e.g., Crohn's disease)	40 mg subq every other week
Etanercept	Enbrel	RA	25 mg subcut twice weekly, or 50 mg subcut weekly
Hydroxychloroquine	Plaquenil	RA, antimalarial	400–600 mg/day orally

Skeletal Muscle Drugs

- Skeletal Muscle Relaxants

How do they work? "Action"

Many of these drugs do not directly relax skeletal muscles, but their ability to relieve acute painful musculoskeletal conditions may be due to their sedative action.

Cyclobenzaprine appears to have an effect on muscle tone, thereby reducing muscle spasm

Indications

- Skeletal muscle relaxants are used in various acute painful musculoskeletal conditions, such as muscle strains and back pain.

Adverse Reactions

- Drowsiness
- Sedation
- sleepiness, lethargy, constipation
- Diarrhea
- bradycardia or tachycardia, and rash.

Contraindications

- Baclofen is contraindicated in skeletal muscle spasms caused by rheumatic disorders.
- Carisoprodol is contraindicated in patients with a known hypersensitivity to meprobamate.
- Cyclobenzaprine is contraindicated in patients with a recent myocardial infarction, cardiac conduction disorders, and hyperthyroidism.
- Cyclobenzaprine is contraindicated within 14 days of the administration of a monoamine oxidase inhibitor (MAOI).
- Oral dantrolene is contraindicated during lactation and in patients with active hepatic disease and muscle spasm caused by rheumatic disorders.

Interactions

- **Central nervous system (CNS) depressants, such as alcohol, antihistamines, opiates, and sedatives:** Increased CNS depressant effect

Cyclobenzaprine

- **MAOIs:** Risk for high fever and convulsions

Orphenadrine

- **Haloperidol:** Increased psychosis

Tizanidine:

- **Antihypertensives:** Increased risk of hypotension

Nursing management

- This drug may cause drowsiness. Do not drive or perform other hazardous tasks if drowsiness occurs.
- This drug is for short-term use. Do not use the drug for longer than 2 to 3 weeks.
- Avoid alcohol or other CNS depressants while taking this drug.

Muscle Relaxers

3 BIG TEST TIPS

- 1. Dizziness** upon changing positions is expected
- 2. NO** alcohol
- 3. DO NOT** Abruptly Stop

Top 3 Missed Questions

Which teaching should the nurse provide for a patient who is prescribed **calcium carbonate** for a new diagnosis of osteoporosis? **Select all that apply.**

- 1. Always take calcium carbonate in divided doses less than 500 mg per dose.
- 2. Take calcium carbonate 2 hours before or after meals.
- 3. Stop taking calcium carbonate if constipation develops
- 4. Schedule weekly blood draws to monitor serum calcium levels.
- 5. Continue taking Vitamin D supplements while taking calcium carbonate.

What teaching should the nurse include for a patient newly prescribed **allopurinol** for the treatment of gout? **Select all that apply.**

- 1. Report the development of any new rash to your provider immediately.
- 2. Take your allopurinol at the first sign of an acute attack.
- 3. You may continue to treat pain associated with acute attacks with ibuprofen.
- 4. Report any symptoms of nausea to your provider immediately.
- 5. Allopurinol helps prevent the build up of uric acid which leads to acute attacks.

When providing education to a patient who is newly prescribed **cyclobenzaprine**, which instructions should be included? **Select all that apply.**

- 1. Notify the provider of a temperature greater than 99.5 F
- 2. Report any drowsiness to the health care provider.
- 3. Do not stop taking this medication abruptly.
- 4. Limit wine consumption to 3-4 glasses per day while taking this medication.
- 5. Avoid taking ibuprofen while taking this medication.

Drug name:

Dantrolene



MOA:

Acts directly on the muscle to **prevent the release of calcium**

Indication:

- Spinal Cord injury
- Cerebral Palsy
- Multiple Sclerosis

SIDE EFFECT



MEMORY TRICK

Calcium Contracts muscles
Less calcium = Less Contraction



KAPLAN

Dantrolene
Muscle relaxant

HESI

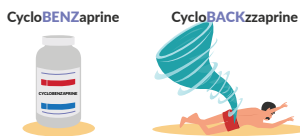
Dantrolene
Contraindicated in client with MS and **Cirrhosis**

Drug name:

CycloBENZaprine & Carisoprodol

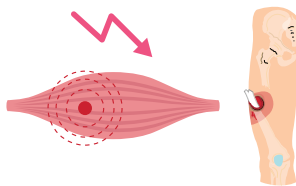


MEMORY TRICK



Indication:

Reduces muscle spasms after surgery on open fractures



Side Effects

HESI Question

- Carisoprodol**
- Risk of dependence
 - Drowsiness & sedation

Pt teaching

ATI Question

Taper off medication - **DO NOT** stop abruptly!

Drug name:

Baclofen



MOA:

Enhances GABA to make everything low & slow



Side Effects:

- Constipation
- Low BP & orthostatic hypotension

Indication:

Decrease in flexor and extensor spasticity with spinal cord injury, MS & cerebral palsy



KEY POINTS

- Dizziness upon changing positions
- **NOT** a contraindication to giving this med
- **NEVER** Abruptly Stop (any muscle relaxant)

Memory Trick

- **Baclofen**
- **Back** off slowly (do not abruptly stop)

HESI Question

- Side effects of **Baclofen**:
- Ortho-hypotension, Dizziness, Nausea
- Potential Deadly Effects:**
- Rhabdomyolysis
 - Multiple organ failure



Skeletal Muscle Drugs

- Bisphosphonates

How do they work? "Action"

Bisphosphonates act primarily on the bone by inhibiting normal and abnormal bone resorption. This results in increased bone mineral density, reversing the progression of osteoporosis.

Indications

- Osteoporosis in postmenopausal women and men (caused by glucocorticoid use)
- Hypercalcemia (increased serum calcium) of malignant diseases and bony metastasis of some solid tumors
- Paget's disease of the bone

Adverse Reactions

- Increased or recurrent bone pain
- Headache
- Dyspepsia (GI discomfort), acid regurgitation, dysphagia
- Abdominal pain

Contraindications

- Alendronate (Fosamax) and risedronate (Actonel) are contraindicated in patients with hypocalcemia. Alendronate is a pregnancy category C drug and is contraindicated during pregnancy.
- Delayed esophageal emptying or renal impairment. Concurrent use of these drugs with hormone replacement therapy is not recommended.

Interactions

- **Calcium supplements or antacids with magnesium and aluminum:** Decreased effectiveness of bisphosphonates
- **Aspirin:** Increased risk of GI bleeding
- **Theophylline:** Increased risk of theophylline toxicity

Nursing management

- When bisphosphonates are administered, serum calcium levels are monitored before, during, and after therapy.
- When to treat. Diagnosis for osteoporosis treatment is made by your T-score (from the bone mineral density scan). You may not be a candidate for treatment if you have gastroesophageal problems, kidney disease, or severe vitamin D deficiency. Some preparations are taken daily and others as infrequently as monthly. Research shows good results when taken for 5 to 10 years—so correct administration is important.
- Supplements. These drugs work by using the building blocks of bone formation. You need an intake of 1500 mg of calcium and 400 to 800 units of vitamin D daily. The drug you take may or may not have this supplement in the preparation. Check with your primary health care provider and follow the vitamin supplement recommended.
- Specific drug administration routine. These drugs are absorbed slowly from the stomach and can cause severe irritation of the esophagus. You must take the pill with 6 to 8 ounces of plain water and cannot eat or drink for 30 minutes after taking the drug, and you must be in an upright position during that time. Here are suggestions to make taking this drug easier and build it into your weekly routine:
 - Use a calendar or cell phone alert to remember your monthly dose.
 - Put the medication out the night before in a place you will see it when you first get up out of bed.
 - Take your medication and then do a distracting activity, such as taking your morning shower or sitting in a chair and watching the morning news on television, listening to music on the radio, or looking at or answering email.
 - Make this morning's breakfast special with foods you especially like to eat; use breakfast as a reward for having taken your medication correctly!
 - Make a habit of calling your primary health care provider at least every 6 months (if taking monthly) to talk about whether you are or are not having any GI changes (belching, pressure, heartburn)—it could be from the medication.

Generic	Trade	Use	Dose
Alendronate	Fosamax	Treatment and prevention of postmenopausal osteoporosis, glucocorticoid-induced osteoporosis, osteoporosis in men, Paget's disease	5–10 mg orally, in daily or (70-mg) weekly doses
Pamidronate	Aredia	Hypercalcemia of malignancy, Paget's disease	60–90 mg in a single IV dose infused over 2–24 hr

Nervous System

CNS

CNS Stimulants

- Amphetamines

How do they work? "Action"

Amphetamines are sympathomimetic "adrenergic". Which means that they mimicking a response from the sympathetic nervous system, causing the CNS to speed up, resulting in :

- Elevated blood pressure
- Wakefulness
- Increased or decreased pulse rate

Indications

- ADHD
- Drug-induced respiratory depression
- Post Anesthesia respiratory depression, without reduction of analgesia
- Narcolepsy
- Obstructive sleep apnea
- Exogenous obesity
- Fatigue (caffeine)

Adverse Reactions

- Excessive CNS stimulation, headache, dizziness
- Apprehension, disorientation, hyperactivity
- Nausea, vomiting, cough, dyspnea
- Urinary retention, tachycardia, palpitations

Contraindications

- Known hypersensitivity
- Convulsive disorders
- Ventilation disorders (COPD)
- Cardiac problems
- Hypertension
- Hyperthyroidism
- Glaucoma
- Pregnancy

Interactions

- **Anesthetics:** Increased risk of cardiac arrhythmias
- **Theophylline:** Increased risk of hyperactive behaviors
- **Oral contraceptives:** Decreased effectiveness of oral contraceptive when taken with modafinil

Nursing management

- An increased risk of suicidal ideation in children and adolescents has been found when using the drug atomoxetine (Strattera). Patients with ADHD started on atomoxetine should be monitored carefully for suicidal thoughts or behaviors.
- Stimulants enhance dopamine transmission to areas of the brain that interpret well-being. To maintain pleasurable feelings, people continue the use of stimulants, which leads to their abuse and the potential for addiction.
- Older adults are especially sensitive to the effects of the CNS stimulants and may exhibit excessive anxiety, nervousness, insomnia, and mental confusion. Cardiovascular disorders, common in the older adult, may be worsened by the CNS stimulants. Careful monitoring is important because these reactions may result in the need to discontinue use of the drug.
- **ADHD:** Give the drug in the morning 30 to 45 minutes before breakfast and before lunch. Do not give the drug in the late afternoon.
- **Narcolepsy:** Keep a record of the number of times per day that periods of sleepiness occur, and bring this record to each visit to the primary health care provider or clinic.
- **Amphetamines and anorexiant:** These drugs are taken early in the day to avoid insomnia. Do not increase the dose or take the drug more frequently, except on the advice of the primary health care provider.
- **Caffeine (oral, nonprescription):** Over-the-counter caffeine preparations should be avoided if the individual has a history of heart disease, high blood pressure, or stomach ulcers.

Generic	Trade	Use	Dose
Amphetamine	N/A	Narcolepsy, ADHD, exogenous obesity N	Narcolepsy: 5–60 mg/day orally in divided doses ADHD: 5 mg BID, increase by 10 mg/wk until desired effect.
Dexmethylphenidate	Focalin	ADHD	2.5 mg orally BID; maximum dosage, 20 mg/day
Methamphetamine	Desoxyn	ADHD, exogenous obesity	ADHD: up to 25 mg/day orally Obesity: 5 mg orally 30 min before meals

CNS Stimulants

- Analeptics

How do they work? "Action"

Drugs that stimulate the respiratory center of the brain and cardiovascular system, used with narcolepsy and as an adjuvant treatment for obstructive sleep apnea

Indications

- Narcolepsy
- Obstructive sleep apnea

Adverse Reactions

- Excessive CNS stimulation, headache, dizziness
- Apprehension, disorientation, hyperactivity
- Nausea, vomiting, cough, dyspnea
- Urinary retention, tachycardia, palpitations

Contraindications

- Known hypersensitivity
- Convulsive disorders
- Ventilation disorders (COPD)
- Cardiac problems
- Hypertension
- Hyperthyroidism
- Glaucoma
- Pregnancy

Interactions

- **Anesthetics:** Increased risk of cardiac arrhythmias
- **Theophylline:** Increased risk of hyperactive behaviors
- **Oral contraceptives:** Decreased effectiveness of oral contraceptive when taken with modafinil

Facts

Stimulants enhance dopamine transmission to areas of the brain that interpret well-being. To maintain pleasurable feelings, people continue the use of stimulants, which leads to their abuse and the potential for addiction. (Ford 190)

Nursing management

- An increased risk of suicidal ideation in children and adolescents has been found when using the drug atomoxetine (Strattera). Patients with ADHD started on atomoxetine should be monitored carefully for suicidal thoughts or behaviors.
- Stimulants enhance dopamine transmission to areas of the brain that interpret well-being. To maintain pleasurable feelings, people continue the use of stimulants, which leads to their abuse and the potential for addiction.
- Older adults are especially sensitive to the effects of the CNS stimulants and may exhibit excessive anxiety, nervousness, insomnia, and mental confusion. Cardiovascular disorders, common in the older adult, may be worsened by the CNS stimulants. Careful monitoring is important because these reactions may result in the need to discontinue use of the drug.
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- **Amphetamines and anorexiant:** These drugs are taken early in the day to avoid insomnia. Do not increase the dose or take the drug more frequently, except on the advice of the primary health care provider.
- **Caffeine (oral, nonprescription):** Over-the-counter caffeine preparations should be avoided if the individual has a history of heart disease, high blood pressure, or stomach ulcers.

Generic	Trade	Use	Dose
Armodafinil	Nuvigil	Narcolepsy, obstructive sleep apnea, sleepiness due to shift work	150–250 mg/day orally in a single morning dose
Doxapram	Dopram	Respiratory depression: postanesthesia, drug-induced, acute respiratory insufficiency superimposed on COPD	0.5–1 mg/kg IV
Modafinil	Provigil	Narcolepsy, obstructive sleep apnea	200–400 mg/day orally

CNS Stimulants

- Anorexiant

How do they work? "Action"

Anorexiant are drugs pharmacologically similar to the amphetamines. Their ability to suppress the appetite is thought to be due to their action on the appetite center in the hypothalamus. (Ford 190)

Indications

Treatment of obesity via appetite suppression

Adverse Reactions

- Excessive CNS stimulation, headache, dizziness
- Apprehension, disorientation, hyperactivity
- Nausea, vomiting, cough, dyspnea
- Urinary retention, tachycardia, palpitations

Education

- These drugs are intended for patients with chronic weight management issues when used with an approved diet and physical activity program.
- These drugs should only be used for obesity (body mass index [BMI] of 30 or greater) or overweight (BMI of 27) when comorbid conditions exist, such as hypertension, type 2 diabetes, or dyslipidemia.
- Never take over-the-counter weight loss preparations with these drugs.
- If you have not achieved 5% weight loss in 12 weeks, contact your primary health care provider; never increase the dose to speed up or increase weight loss.
- Call your primary health care provider immediately if you experience mental changes (agitation or hallucinations), rapid heartbeat, dizziness, lack of coordination, or feelings of warmth. This may be a condition called neuroleptic malignant syndrome, which needs emergent treatment.
- Be aware of possible impairment in the ability to drive or perform hazardous tasks.
- Avoid other stimulants, including those containing caffeine such as coffee, tea, and cola drinks
- Read labels of foods and nonprescription drugs for possible stimulant content.
- Women: Use pregnancy protection and do not breastfeed when using these drugs.
- Men: Seek immediate medical treatment if you have an erection lasting more than 4 hours. (Ford 192)

Contraindications

- Known hypersensitivity
- Convulsive disorders
- Ventilation disorders (COPD)
- Cardiac problems
- Hypertension
- Hyperthyroidism
- Glaucoma
- Pregnancy

Interactions

- **Anesthetics:** Increased risk of cardiac arrhythmias
- **Theophylline:** Increased risk of hyperactive behaviors
- **Oral contraceptives:** Decreased effectiveness of oral contraceptive when taken with modafinil

Nursing management

- An increased risk of suicidal ideation in children and adolescents has been found when using the drug atomoxetine (Strattera). Patients with ADHD started on atomoxetine should be monitored carefully for suicidal thoughts or behaviors.
- Stimulants enhance dopamine transmission to areas of the brain that interpret well-being. To maintain pleasurable feelings, people continue the use of stimulants, which leads to their abuse and the potential for addiction.
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- **Narcolepsy:** Keep a record of the number of times per day that periods of sleepiness occur, and bring this record to each visit to the primary health care provider or clinic.
- **Amphetamines and anorexiant:** These drugs are taken early in the day to avoid insomnia. Do not increase the dose or take the drug more frequently, except on the advice of the primary health care provider.
- **Caffeine (oral, nonprescription):** Over-the-counter caffeine preparations should be avoided if the individual has a history of heart disease, high blood pressure, or stomach ulcers.

Generic	Trade	Use	Dose
Benzphetamine	Didrex	Obesity	25–50 mg orally 1–3 times/day
Phendimetrazine	Bontril	Obesity	35 mg orally 2–3 times/day

CNS Drugs

- Cholinesterase Inhibitors

How do they work? "Action"

The cholinesterase inhibitors act to increase the level of acetylcholine in the central nervous system (CNS) by inhibiting its breakdown and slowing neural destruction. (Ford 197)

Indications

Cholinesterase inhibitors are used to treat early and moderate stages of dementia associated with AD. Their use for severe cognitive decline as well as other dementias, such as vascular or Parkinson's dementia, is being studied. (Ford 198)

Adverse Reactions

- Anorexia, nausea, vomiting, diarrhea
- Dizziness and headache

Interactions

- **Anticholinergics:** Decreased effectiveness of anticholinergics
- **Nonsteroidal anti-inflammatory drugs:** Increased risk of GI bleeding
- **Theophylline:** Increased risk of theophylline toxicity

Nursing management

- Should cholinesterase inhibitor therapy be discontinued, individuals lose any benefit they have received from the drugs within 6 weeks.
- Keep all appointments with the primary care provider or clinic, because close monitoring of therapy is essential. Dose changes may be needed to achieve the best results.
- Report any unusual changes or physical effects to the primary health care provider.
- Take the drug exactly as directed. Do not increase, decrease, or omit a dose or discontinue use of this drug unless directed to do so by the primary health care provider.
- Do not drive or perform other hazardous tasks if drowsiness occurs. Discuss with your primary health care provider when patients should be evaluated for their continued ability to drive.
- Do not take any nonprescription drug before talking to your primary health care provider.
- Keep track of when the drug is taken. Marking the calendar, cell phone alarms, or a pill counter that holds the medicine for each day of the week may be helpful tools to remind the patient to take the medication or determine whether the medication has been taken for the day.
- Notify the primary care provider if the following adverse reactions are experienced for more than a few days: nausea, diarrhea, difficulty sleeping, vomiting, or loss of appetite.
- Immediately report the occurrence of the following adverse reactions: severe vomiting, dehydration, or changes in neurologic functioning.
- Notify the primary health care provider if the patient has a history of ulcers, feels faint, experiences severe stomach pains, vomits blood or material that resembles coffee grounds, or has bloody or black stools.
- Remember that these drugs do not cure AD but slow the mental and physical degeneration associated with the disease. The drug must be taken routinely to slow the progression.

Herbal Consideration

Ginkgo, one of the oldest herbs in the world, has many beneficial effects. It is thought to improve memory and brain function and enhance circulation to the brain, heart, limbs, and eyes. However, research is inconclusive as to whether or not this is true. Ginkgo is contraindicated in patients taking selective serotonin reuptake inhibitor (SSRI) or monoamine oxidase inhibitor (MAOI) antidepressants because of the risk of a toxic reaction.

Dementia Vs. Delirium	Delirium	Dementia
Onset	Sudden change	Progressive change
Presentation	Affects senses	Affects memory and judgment
Reversibility	Yes, when cause such as oxygen or chemical imbalances or infections found and treated	No, can slow progression with drugs, need to change environment for patient to remain safe

Generic	Trade	Use	Dose
Donepezil	Aricept	Mild to severe dementia due to AD, memory improvement in dementia due to stroke, vascular disease, multiple sclerosis	5–10 mg/day orally
Galantamine	Razadyne	Mild to moderate (AD) dementia	16–24 mg BID orally

Nervous System

PNS

Neuromuscular Drugs

- Cholinergic Blocking Drug

How do they work? "Action"

Drugs with cholinergic blocking activity block ACh in the CNS, enhancing dopamine transmission.

Indications

Adjunctive therapy in all forms of Parkinson-like symptoms and in the control of drug-induced extrapyramidal disorders

Adverse Reactions

- Dry mouth
- Blurred vision
- Dizziness, mild nausea, and nervousness
- Skin rash, urticaria (hives)
- Urinary retention, dysuria
- Tachycardia, muscle weakness
- Disorientation and confusion

Contraindications

- Glaucoma (angle-closure glaucoma)
- Pyloric or duodenal obstruction
- Peptic ulcers, prostatic hypertrophy, achalasia (failure of the muscles of the lower esophagus to relax, causing difficulty swallowing), myasthenia gravis, and megacolon.

Interactions

- **Amantadine:** Increased anticholinergic effects
- **Digoxin:** Increased digoxin serum levels
- **Haloperidol:** Increased psychotic behavior
- **Phenothiazines:** Increased anticholinergic effects

Drugs with Parkinson-like Adverse Reactions

The following drugs can produce symptoms similar to Parkinson's disease, also known as extrapyramidal symptoms (EPS), which may be treated with similar drugs to reduce the adverse reactions:

- Antidepressants
- Antiemetics
- Antipsychotics—first generation
- Lithium
- Stimulants
- Individuals older than 60 years frequently develop increased sensitivity to anticholinergic drugs and require careful monitoring. Confusion and disorientation may occur. Lower doses may be required.

Nursing management

- If dizziness, drowsiness, or blurred vision occurs, avoid driving or performing other tasks that require alertness.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Relieve dry mouth by sucking on hard candy (unless the patient has diabetes) or taking frequent sips of water. Consult a dentist if dryness of the mouth interferes with wearing, inserting, or removing dentures or causes other dental problems.
- Keep all appointments with the primary health care provider or clinic personnel because close monitoring of therapy is necessary.
- Ask your primary health care provider before buying vitamin supplements when taking levodopa. Vitamin B6 (pyridoxine) may interfere with the action of levodopa.

Generic	Trade	Use	Dose
Benzotropine	Cogentin	Parkinson's disease, drug-induced EPS	0.5–6 mg/day orally Acute dystonia: 1–2 mL IM or IV
Diphenhydramine	Benadryl	Drug-induced EPS, allergies	25–50 mg orally TID or QID

PNS Drugs

- A/B Blocking Drugs

How do they work? "Action"

α/β -Adrenergic blocking drugs block the stimulation of both the α - and β -adrenergic receptors, resulting in peripheral vasodilation. The two drugs in this category are carvedilol (Coreg) and labetalol (Trandate). (Ford 256)

Indications

- **Carvedilol** is used to treat essential hypertension and in HF to reduce progression of the disease.
- **Labetalol** is used in the treatment of hypertension, either alone or in combination with another drug, such as a diuretic. (Ford 256)

Adverse Reactions

General body system adverse reactions include fatigue, dizziness, hypotension, drowsiness, insomnia, weakness, diarrhea, dyspnea, chest, pain, bradycardia, and skin rash. (Ford 256)

Contraindications

- Hypersensitivity to the drugs bronchial asthma
- Decompensated HF
- Severe bradycardia

Interactions

- **Antidepressants (tricyclics and SSRIs):** Increased risk of tremors
- **Cimetidine:** Increased effect of the adrenergic blocker
- **Clonidine:** Increased effect of the clonidine
- **Digoxin:** Increased serum level of the digoxin and higher risk of digoxin toxicity (Ford 256)

Nursing Alert

When administering a sympatholytic drug, such as propranolol (Inderal), take an apical pulse rate and blood pressure before giving the drug. If the pulse is below 60 beats/min, or if there is any irregularity in the patient's heart rate or rhythm, or if systolic blood pressure is less than 90mm Hg, withhold the drug and contact the primary health care provider. (Ford 258)

Nursing management

- Do not stop taking the drug abruptly, except on the advice of the primary health care provider. Most of these drugs require that the dosage be gradually decreased to prevent precipitation or worsening of adverse effects.
- Notify the primary health care provider promptly if adverse drug reactions occur.
- Observe caution while driving or performing other hazardous tasks because these drugs (β -adrenergic blockers) may cause drowsiness, dizziness, or lightheadedness.
- Immediately report any signs of HF (weight gain, difficulty breathing, or edema of the extremities).
- Do not use any nonprescription drug (e.g., cold or flu preparations or nasal decongestants) unless you have discussed use of a specific drug with the primary health care provider.
- Inform dentists and other primary health care providers of therapy with this drug.
- Keep all primary health care provider appointments because close monitoring of therapy is essential.
- Check with a primary health care provider or clinical pharmacist to determine if the drug is to be taken with food or on an empty stomach. (Ford 259-260)

Generic	Trade	Use	Dose
Carvedilol	Coreg	Hypertension, HF, left ventricular dysfunction	6.25–25 mg orally BID
Labetalol	Trandate	Hypertension	200–400 mg/day orally in divided doses IV: 20 mg over 2 min with blood pressure monitoring, may repeat

PNS Drugs

- Alpha Adrenergic Blockers

How do they work? "Action"

Stimulation of α -adrenergic nerves results in vasoconstriction. If stimulation of α -adrenergic nerves is interrupted or blocked, the result is vasodilation.

Indications

- Hypertension caused by pheochromocytoma (a tumor of the adrenal gland that produces excessive amounts of epinephrine and norepinephrine)
- Hypertension during preoperative preparation
- They are also used to prevent or treat tissue damage caused by extravasation of dopamine.

Adverse Reactions

- weakness, orthostatic hypotension
- cardiac arrhythmias, hypotension, and tachycardia.

Contraindications

- Hypersensitivity
- Coronary artery disease

Nursing management

- Do not stop taking the drug abruptly, except on the advice of the primary health care provider. Most of these drugs require that the dosage be gradually decreased to prevent precipitation or worsening of adverse effects.
- Notify the primary health care provider promptly if adverse drug reactions occur.
- Observe caution while driving or performing other hazardous tasks because these drugs (β -adrenergic blockers) may cause drowsiness, dizziness, or lightheadedness.
- Immediately report any signs of HF (weight gain, difficulty breathing, or edema of the extremities).
- Do not use any nonprescription drug (e.g., cold or flu preparations or nasal decongestants) unless you have discussed use of a specific drug with the primary health care provider.
- Inform dentists and other primary health care providers of therapy with this drug.
- Keep all primary health care provider appointments because close monitoring of therapy is essential.
- Check with a primary health care provider or clinical pharmacist to determine if the drug is to be taken with food or on an empty stomach. (Ford 259-260)

Interactions

None listed.

Generic	Trade	Use	Dose
Phentolamine	Regitine	Diagnosis of pheochromocytoma, hypertensive episodes before and during surgery, prevention/treatment of dermal necrosis after IV administration of norepinephrine or dopamine	5 mg IV, IM Tissue necrosis: 5–10 mg in 10 mL saline solution infiltrated into affected area

PNS Drugs

- Cholinergics

How do they work? "Action"

- Cholinergic drugs that act like the neurotransmitter ACh are called direct-acting cholinergics. Cholinergic drugs causes contraction of the bladder smooth muscles and passage of urine. (Ford 266)
- Cholinergic drugs that prolong the activity of ACh by inhibiting the release of AChE are called indirect-acting cholinergics or anticholinesterase muscle stimulants.

Indications

- Urinary retention
- Myasthenia gravis

Adverse Reactions

- Nausea, diarrhea, abdominal cramping
- Salivation
- Flushing of the skin
- Cardiac arrhythmias and muscle weakness

Contraindications

Hypersensitivity to the drugs, asthma, peptic ulcer disease, coronary artery disease, and hyperthyroidism. Bethanechol is contraindicated in those with mechanical obstruction of the GI or genitourinary tracts. Patients with secondary glaucoma, iritis, corneal abrasion, or any acute inflammatory disease of the eye should not use the ophthalmic cholinergic preparations. (Ford 267)

Interactions

- **Aminoglycoside:** Anti-infective agent
Increased neuromuscular blocking effect
- **Corticosteroids:** Decreased effect of the cholinergic drug

Nursing Alert

Cholinergic crisis (cholinergic drug toxicity) symptoms include severe abdominal cramping, diarrhea, excessive salivation, muscle weakness, rigidity and spasm, and clenching of the jaw. Patients exhibiting these symptoms require immediate medical treatment. In the case of drug overdose, an antidote such as atropine (0.4 to 0.6 mg intravenously [IV]) is administered. (Ford 267)

Nursing management

Because of the need to make frequent dosage adjustments, observe the patient closely for symptoms of drug overdose or underdose. Signs of drug overdose include muscle rigidity and spasm, salivation, and clenching of the jaw. Signs of drug underdosage are signs of the disease itself, namely, rapid fatigability of the muscles, drooping of the eyelids, and difficulty breathing. If symptoms of drug overdose or underdose develop, contact the primary health care provider immediately.

Generic	Trade	Use	Dose
Bethanechol	Duvoid, Urecholine	Acute non obstructive urinary retention, neurogenic atony of urinary bladder with urinary retention	10–50 mg orally BID to QID; 2.5–5 mg subcutaneously TID to QID
Ambenonium	Mytelase	Myasthenia gravis	5–75 mg orally TID, QID

PNS Drugs

- B-Adrenergic Blockers

How do they work? "Action"

These drugs decrease the heart's excitability, decrease cardiac workload and oxygen consumption, and provide membrane-stabilizing effects that contribute to the antiarrhythmic activity of the β -adrenergic blocking drugs. Examples of β -adrenergic blocking drugs used for cardiac purposes are esmolol (Brevibloc) and propranolol (Inderal). (Ford 256)

Indications

- Hypertension (first-choice drug for patients with stable angina)
- Cardiac arrhythmia (abnormal rhythm of the heart), such as ventricular or supraventricular tachycardia
- Migraine headaches
- Heart failure (HF)
- Angina pectoris
- Glaucoma (topical ophthalmic eye drops) (Ford 256)

Adverse Reactions

Cardiac reactions that affect the body in a generalized manner include orthostatic hypotension, bradycardia, dizziness, vertigo, and headache. Gastrointestinal (GI) reactions include hyperglycemia, nausea, vomiting, and diarrhea. Another bodily system reaction is bronchospasm (especially in those with a history of asthma). (Ford 256)

Contraindications

These drugs are contraindicated in patients with an allergy to β blockers; in patients with sinus bradycardia, second or third-degree heart block, or HF; and in those with asthma, emphysema, and hypotension. The drugs are used cautiously in patients with diabetes, thyrotoxicosis, or peptic ulcer. (Ford 256)

Interactions

- **Antidepressants (monoamine oxidase inhibitors [MAOIs], selective serotonin reuptake inhibitors [SSRIs]):** Increased effect of the β blocker, bradycardia
- **Nonsteroidal anti-inflammatory drugs (NSAIDs), salicylates:** Decreased effect of the β blocker
- **Loop diuretics:** Increased risk of hypotension
- **Clonidine:** Increased risk of paradoxical hypertensive effect
- **Cimetidine:** Increased serum level of the β blocker and higher risk of β blocker toxicity
- **Lidocaine:** Increased serum level of the β blocker and higher risk of β blocker toxicity

Nursing Alert

Hypertension research studies demonstrate better patient outcomes for African Americans when β blockers are used in combination with diuretics than other drugs alone to treat hypertension, such as angiotensin-converting enzyme (ACE) inhibitors (Ferdinand, 2007). (Ford 256)

Nursing management

- Do not stop taking the drug abruptly, except on the advice of the primary health care provider. Most of these drugs require that the dosage be gradually decreased to prevent precipitation or worsening of adverse effects.
- Notify the primary health care provider promptly if adverse drug reactions occur.
- Observe caution while driving or performing other hazardous tasks because these drugs (β -adrenergic blockers) may cause drowsiness, dizziness, or lightheadedness.
- Immediately report any signs of HF (weight gain, difficulty breathing, or edema of the extremities).
- Do not use any nonprescription drug (e.g., cold or flu preparations or nasal decongestants) unless you have discussed use of a specific drug with the primary health care provider.
- Inform dentists and other primary health care providers of therapy with this drug.
- Keep all primary health care provider appointments because close monitoring of therapy is essential.
- Check with a primary health care provider or clinical pharmacist to determine if the drug is to be taken with food or on an empty stomach. (Ford 259-260)

Generic	Trade	Use	Dose
Acebutolol	Sectral	Hypertension, ventricular arrhythmias H	Hypertension: 400 mg orally in 1–2 doses Arrhythmias: 400–1200 mg/day orally in divided doses
Propranolol	Inderal	Cardiac arrhythmias, MI, angina, hypertension, migraine prophylaxis, hypertrophic subaortic stenosis, pheochromocytoma, essential tremor	Arrhythmias: 10–30 mg orally TID, QID Hypertension: 120–240 mg/day orally in divided doses, Angina: 80–320 mg/day orally in divided doses, Migraine: 160–240 mg/day orally in divided doses

NEUROMUSCULAR DRUGS: CHOLINERGIC BLOCKING DRUGS

HOW DO THEY WORK?

"ACTION"

Drugs with cholinergic blocking activity block ACh in the CNS, enhancing dopamine transmission.

INDICATIONS

Adjunctive therapy in all forms of Parkinson-like symptoms and in the control of drug-induced extrapyramidal disorders

ADVERSE REACTIONS

- ❖ Dry mouth
- ❖ Blurred vision
- ❖ Dizziness, mild nausea, and nervousness
- ❖ Skin rash, urticaria (hives)
- ❖ Urinary retention, dysuria
- ❖ Tachycardia, muscle weakness
- ❖ Disorientation and confusion

CONTRAINDICATIONS

- ❖ Glaucoma (angle-closure glaucoma)
- ❖ pyloric or duodenal obstruction
- ❖ peptic ulcers, prostatic hypertrophy, achalasia (failure of the muscles of the lower esophagus to relax, causing difficulty swallowing), myasthenia gravis, and megacolon.



INTERACTIONS

- ❖ **Amantadine:** Increased anticholinergic effects
- ❖ **Digoxin:** Increased digoxin serum levels
- ❖ **Haloperidol:** Increased psychotic behavior
- ❖ **Phenothiazines:** Increased anticholinergic effects

DRUGS WITH PARKINSON-LIKE ADVERSE REACTIONS

The following drugs can produce symptoms similar to Parkinson's disease, also known as extrapyramidal symptoms (EPS), which may be treated with similar drugs to reduce the adverse reactions:

- ❖ Antidepressants
- ❖ Antiemetics
- ❖ Antipsychotics—first generation
- ❖ Lithium
- ❖ Stimulants
- ❖ Individuals older than 60 years frequently develop increased sensitivity to anticholinergic drugs and require careful monitoring. Confusion and disorientation may occur. Lower doses may be required.

NURSING MANAGEMENT

- ❖ If dizziness, drowsiness, or blurred vision occurs, avoid driving or performing other tasks that require alertness.
- ❖ Avoid the use of alcohol unless use has been approved by the primary health care provider.
- ❖ Relieve dry mouth by sucking on hard candy (unless the patient has diabetes) or taking frequent sips of water. Consult a dentist if dryness of the mouth interferes with wearing, inserting, or removing dentures or causes other dental problems.
- ❖ Keep all appointments with the primary health care provider or clinic personnel because close monitoring of therapy is necessary.
- ❖ Ask your primary health care provider before buying vitamin supplements when taking levodopa. Vitamin B₆(pyridoxine) may interfere with the action of levodopa.



Generic	Trade	Use	Dose
benztropine	Cogentin	Parkinson's disease, drug-induced EPS	0.5–6 mg/day orally Acute dystonia: 1–2 mL IM or IV
diphenhydramine	Benadryl	Drug-induced EPS, allergies	25–50 mg orally TID or QID



PNS DRUGS: CHOLINERGICS



HOW DO THEY WORK?

"ACTION"

- ❖ Cholinergic drugs that act like the neurotransmitter ACh are called direct-acting cholinergics. cholinergic drugs causes contraction of the bladder smooth muscles and passage of urine. (Ford 266)
- ❖ Cholinergic drugs that prolong the activity of ACh by inhibiting the release of AChE are called indirect-acting cholinergics or anticholinesterase muscle stimulants.

INDICATIONS

- ❖ Urinary retention
- ❖ Myasthenia gravis

ADVERSE REACTIONS

- ❖ Nausea, diarrhea, abdominal cramping
- ❖ Salivation
- ❖ Flushing of the skin
- ❖ Cardiac arrhythmias and muscle weakness

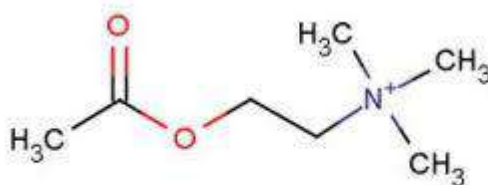


CONTRAINDICATIONS

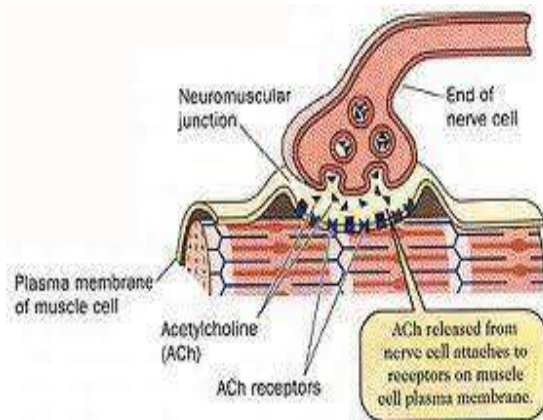
Hypersensitivity to the drugs, asthma, peptic ulcer disease, coronary artery disease, and hyperthyroidism. Bethanechol is contraindicated in those with mechanical obstruction of the GI or genitourinary tracts. Patients with secondary glaucoma, iritis, corneal abrasion, or any acute inflammatory disease of the eye should not use the ophthalmic cholinergic preparations. (Ford 267)

INTERACTIONS

- ❖ **Aminoglycoside:** Anti-infective agent Increased neuromuscular blocking effect
- ❖ **Corticosteroids:** Decreased effect of the cholinergic drug



Acetylcholine



NURSING ALERT

Cholinergic crisis (cholinergic drug toxicity) symptoms include severe abdominal cramping, diarrhea, excessive salivation, muscle weakness, rigidity and spasm, and clenching of the jaw. Patients exhibiting these symptoms require immediate medical treatment. In the case of drug overdose, an antidote such as atropine (0.4 to 0.6 mg intravenously [IV]) is administered. (Ford 267)



Myasthenia Gravis



CHOLINERGIC CRISIS

Salivation 

Lacrimation 

Urination 

Defecation 

Generic	Trade	Use	Dose
bethanechol	Duvoid, Urecholine	Acute non obstructive urinary retention, neurogenic atony of urinary bladder with urinary retention	10–50 mg orally BID to QID; 2.5–5 mg subcutaneously TID to QID
ambenonium	Mytelase	Myasthenia gravis	5–75 mg orally TID, QID

Cardiac

Antidysrhythmics I

Cardiac Pharmacology

Class	Drug Name	Mainly for	Image of ECG Strip
Class 1 Sodium-channel blockers	Procainamide & Lidocaine	V Tach & V Fib	
Class 2 Beta blockers	Propranolol	Atrial Fibrillation Atrial Flutter HTN (hypertension)	
Class 3 Potassium-channel blockers	Amiodarone	V Tach & V Fib	
Class 4 Calcium-channel blockers	Verapamil Diltiazem Nifedipine	Atrial Fibrillation Atrial Flutter HTN (hypertension)	
Others	Adenosine	SVT	
	Digoxin (cardiac glycoside)	A Fib	
	Atropine (anticholinergic)	Symptomatic Bradycardia	

Key Points

- Dizziness
- Teach SLOW position changes



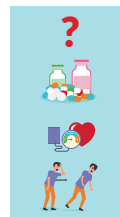
Hypotension - must reassess the BP every hour
When BP is LOW - we got to go SLOW!



Top Missed Question

Which drugs do we teach slow position changes due to orthostatic hypotension? Select all that apply.

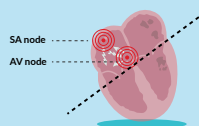
- 1. **Atenolol**
- 2. Atropine
- 3. **Amiodarone**
- 4. **Amlodipine**
- 5. Digoxin
- 6. **Diltiazem**
- 7. **Furosemide**



MEMORY TRICK

Think **ABCD** start on TOP of the heart affecting atrial rhythms.
Think **LAP** like in your lap, since these drugs affect ventricular rhythms.

	Drug Name	Indication & Key Terms:
A	Atropine Adenosine	Symptomatic Bradycardia SVT (supraventricular tachycardia)
B	Beta Blockers "Propranolol"	Hypertension , SVT, Tachycardia, A fib & A flutter SE: LoL = Low BP, Low HR, bronchospasm
C	Ca Channel Blockers "Verapamil" "Diltiazem"	Hypertension , SVT, Tachycardia, A fib & A flutter SE: Low BP, Low HR, dizziness
D	Digoxin	A fib & Heart Failure SE: Toxicity (NV, Vision changes)



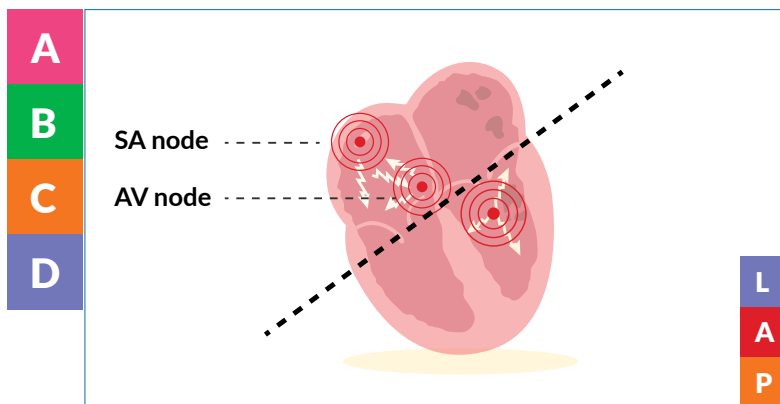
	Drug Name	Indication & Key Terms:
L	Lidocaine	V Tach & V Fib SE: Low BP, Low Platelets
A	Amiodarone	V Tach & V Fib SE: Low BP, Low HR, Pulmonary TOXICITY!!!
P	Procainamide	V Tach SE: Low BP, Low Platelets

Antidysrhythmics II

ABCDs - Atrial Rhythm drugs

Cardiac Pharmacology

MEMORY TRICK



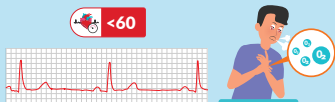
Think **ABCD**, start on the TOP of the heart affecting atrial rhythms affecting the SA or AV node

Notes

A	Drug Name	Indication & Key Terms:
	Atropine	Symptomatic Bradycardia

Puts the heart rate really HIGH like on TOP of "a PINE" tree for atropINE.

Given for: **"Symptomatic Bradycardia"** below 60 BPM with **signs of low oxygenation** like mental status changes (confusion, altered, agitation) or pale blue skin signs. Goal is to get back to **NORMAL sinus rhythm!**



TOP MISSED Test Question

Atropine for a client with a **heart rate of 38**, **bp of 88/65**, reports **confusion** and **dizziness**. Which ECG strip would show medication effectiveness?

- 1.
- 2.
- 3.
- 4. **CORRECT**

60-100

8 x 10 = 80

Evenly Spaced

A	Drug Name	Indication & Key Terms:
	Adenosine	SVT (supraventricular tachycardia)

DEcreases the heart rate, like putting it into a **DEN** (for foxes) or **Downstairs**.

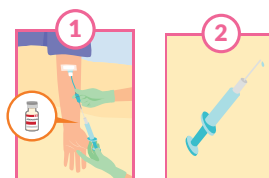
Given for:

SVT - Supraventricular Tachycardia

*** Key points:**

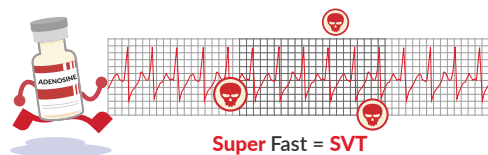
Know how this rhythm looks! SVT = Super Fast!

Give it FAST = IV push in 2 seconds followed by flush



KEY Points

- Give it FAST = **IV push in 1-2 seconds** **NCLEX TIP**
- Saline Flush immediately **AFTER**



B	Drug Name	Indication & Key Terms:
	Beta Blockers "Propranolol"	Hypertension , SVT, Tachycardia, A fib & A flutter SE: LoL = Low BP, Low HR

Beta blockers end in "-LOL"

Memory trick: Lower the 2 L's - Low HR & Low BP

Given for:

Hypertension & to put the brakes on fast rhythms like SVT, tachycardia, A fib, & A flutter.

Side Effects:

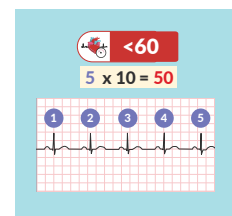
- **B** - Bradycardia (HR below 60 BPM) & low BP
- **B** - Bronchospasm (avoid asthma & COPD)
- **B** - Blood glucose masking s/s of low sugar
- **B** - Bad for clients in end stage heart failure

* Orthostatic hypotension (dizziness upon standing) - **teach slow position changes!**

Common Question

What drug is causing this rhythm?

Propranolol



Antidysrhythmics III

ABCDs - Atrial Rhythm Drugs

Cardiac Pharmacology

C	Drug Name	Indication & Key Terms:
	Ca Channel Blockers "Verapamil" "Diltiazem"	H ypertension, SVT, Tachycardia, A fib & A flutter

Since calcium contracts the muscles, when calcium is blocked with CCBs, it **calms the heart**

Memory Trick: CCBs lower the Couple heart vitals: HR & BP

Given for:

Hypertension, tachycardia, SVT, A Fib, & A Flutter

Side Effects:

Orthostatic hypotension (dizziness upon standing) - **teach slow position changes**

C
Calcium

C
Contracts the muscles

3 Common Questions

Q1: Intended EFFECT for Diltiazem?

✔️ **Ventricular rate decreased from 160 to 70s**

Q2: Priority adverse effect to watch for when giving Amlodipine?

✔️ **Dizziness**

Q3: Most important patient teaching when giving Verapamil?

✔️ **Slow position changes**

D	Drug Name	Indication & Key Terms:
	Digoxin	A fib & Heart Failure SE: Toxicity (NV, Vision changes)

Digoxin

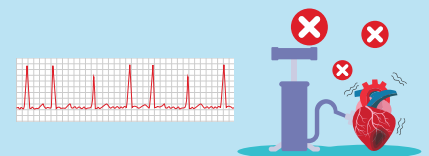
Is a **TOXIN** so monitor levels - under 2.0 is SAFE.

It **DIGs** for a **deeper** heart contraction to help the heart contract more forcefully & **decreases** the heart rate (NOT Blood pressure), so no need for slow position changes

D is for **DEEP** Contraction

DIGOXIN

DEEP contraction



Main Side Effect = Toxicity

- Max Range **2.0**
- 1st signs of toxicity:
 - Anorexia
 - Nausea / Vomiting
 - **Vision changes** (difficulty reading)

Key Sign

Report "dizziness & lightheaded"

Bradycardia

Max 2.0

Common NCLEX Question

Q1: A client on digoxin is having difficulty reading a book or some type of vision problem

✔️ **TOXICITY for vision changes**

Q2: Client on digoxin with a history of renal failure...what is the key lab value to monitor?

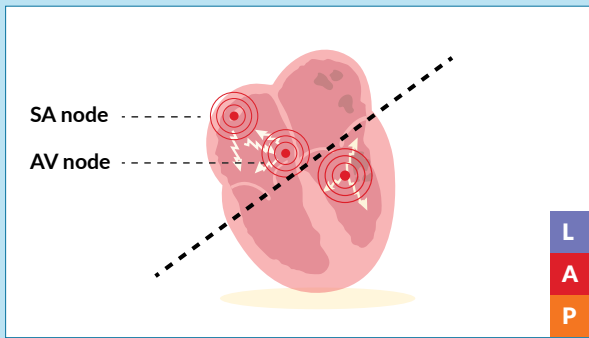
✔️ **Creatinine! Over 1.3 = bad kidney**

Antidysrhythmics IV

LAP - Ventricular Rhythm Drugs

Cardiac Pharmacology

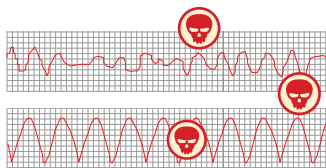
L	Lidocaine
A	Amiodarone
P	Procainamide



Think **LAP** like in your lap, since these drugs affect ventricular rhythms

Mainly give for those **deadly ventricular rhythms**:

- Ventricular Fibrillation (V Fib)
- Ventricular Tachycardia (V Tach)



Vfib

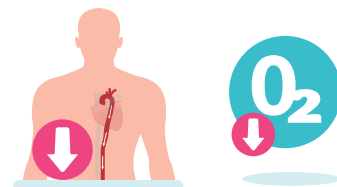
Vtach

LOW cardiac **OUT**put
LOW oxygen **OUT** to the body

Memory Trick:

Any rhythm starting with a **V = VERRRY** deadly.

Since the ventricles are responsible for all the Cardiac **OUTPUT** meaning **OXYGEN** rich blood **OUT TO the body**, so low Cardiac **OUT**put means Low oxygen **OUT** to the body.



Lidocaine

“Cain” Calms the ventricles.

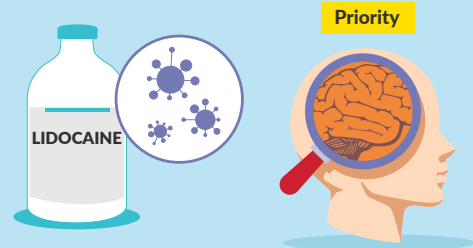
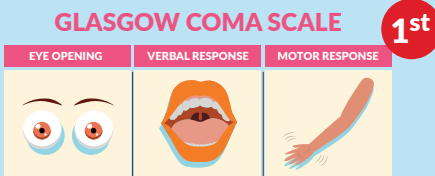
Given for:

V tach, & V fib mainly, but also can work for SVT, A fib, & A flutter.

L **Lidocaine**

Key Point

- **HYPO**tension
- Lidocaine Toxicity
 - Neuro checks are a **PRIORITY**



Amiodarone

Typically given 2nd if Lidocaine does not work. This is because of its **life-threatening TOXIC** effects!

A **Amiodarone**

Key Point

Pulmonary toxicity

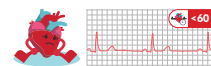
- “dry cough & dyspnea”
- “difficulty breathing while ambulating”
- “shortness of breath”

Memory trick



Side Effects

Neg. **Chronotropic** = Less beats



Neg. **Dromo** = Less Electrical impulse



P **Procainamide**

“Cain” calms those ventricles just like Lidocaine but this drug is becoming less & less popular in the hospital setting & therefore not commonly tested.



Atropine Symptomatic Bradycardia

Drug name:

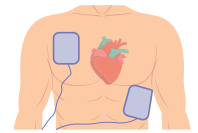
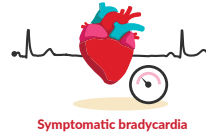
Atro**PINE**



Memory tricks



Side Note

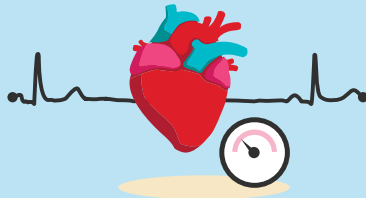


Indication:

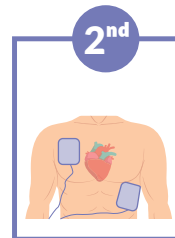
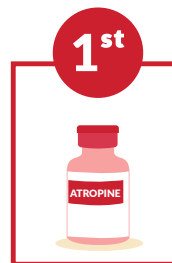
Given to speed up a slow heart rate with

Key word

**Symptomatic
bradycardia**



If drugs do not work to fix the problem, then we have to put the patient on external pacing:



- Correct sequence:
1. Atropine
 2. External pacing

Signs: Symptomatic bradycardia

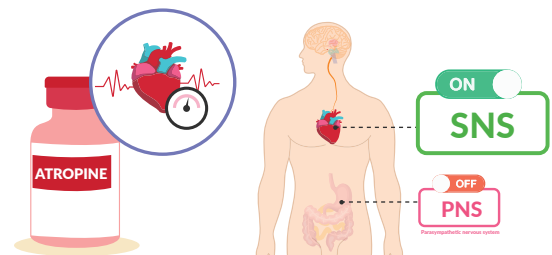
Mental status changes

1. Confusion
2. Irritability
3. Agitation



MOA:

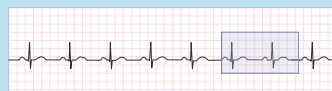
Atropine acts to increase the heart rate by blocking the action of the vagus nerve to block the PNS (parasympathetic nervous system) REST & DIGEST, and turns ON the SNS (fight & flight) in the heart like flicking a light switch.



Key points

Atropine is effective when we see normal sinus rhythm and reversal of the symptoms. They will show you normal sinus rhythm like this & no more hypoxic symptoms, like confusion, agitation, hypotension or syncope.

Normal Sinus rhythm
and reversal of the symptoms



Common NCLEX Question

Atropine for a client with a heart rate of 38, bp of 88/65, reports confusion and dizziness. Which ECG strip would show medication effectiveness?

1.



2.



3.



4.



CORRECT

60-100

**R peak x 10
8 x 10 = 80**

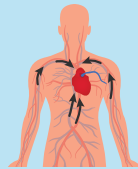
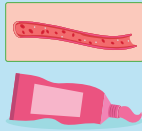
Vasopressors

Alpha & Beta Physiology

Cardiac Pharmacology

Vaso**PRESS**ors - **PRESS** on the vessels

Goes back to the heart



Main Vasopressors

- Epinephrine
- Norepinephrine
- Vasopressin
- Dobutamine
- Dopamine

Vaso**PRESS**ors - **PRESS** on the blood vessels, **increasing blood pressure** in order to squeeze oxygen rich blood back to the CORE of the body to perfuse the vital organs (sort of like squeezing a toothpaste bottle).

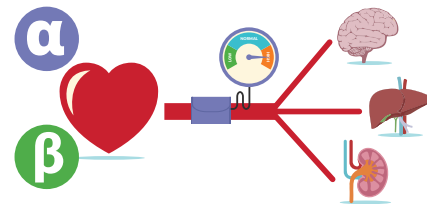
Indication

Increase BP	Cardiac Arrest	Shock

Mode of Action

They work by activating **Alpha & Beta receptors** inside the heart & blood vessels

Key Receptors: **Alpha & Betas**



Alpha 1 - Constriction of Vessels

Alpha 1 - Anaconda (memory trick)

- Squeezing down the blood vessels so blood is pushed back to the heart.

Alpha Agonist

- Think **AG**onists **ADD** to the BP to increase it (example: vasopressors)

Alpha Antagonists

- Are **ANTI** constriction - less constriction = less pressure to lower BP (example: clonidine)



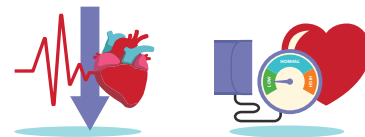
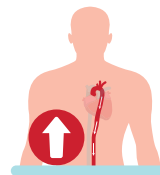
Beta 1 = 1 Heart

Beta Agonists - think **AG**onists **ADD** - Faster heart rate. (example: Vasopressors)

- Positive **Chronotropic** (chronos = time) more beats per minute.
- Positive **Inotropic** = more **FORCEFUL** beats, which increased Cardiac **OUTPUT** (increased blood coming **OUT** of the heart to perfuse the body)

Beta Antagonists - are **ANTI** heart, used to decrease the HR & BP (example: beta blockers)

- Negative **Chronotropic** - Less Beats
- Negative **Inotropic** - Less force



Beta 2 = 2 Lungs

Beta 2 Agonist

- Think they **ADD** to the lungs - dilating both the vessels & bronchi - like a big balloon or beach ball (example: Vasopressors & Albuterol)



	Indication	Alpha 1	Beta 1	Beta 2
		Anaconda Constriction	1 heart • Chrono - High HR • Inotropic - C.O.	2 Lungs & Dilation Big Lungs & Vessels
Epinephrine	Septic shock & Cardiac arrest	BIG	Medium	Small
Norepinephrine	Septic shock	BIG	Medium	Small
Vasopressin Desmopressin	Hypovolemic shock	-	-	-
Dopamine	Cardiogenic shock	Med.	BIG	Small
Dobutamine	Cardiogenic shock	Small	BIG	Medium

Adenosine

Drug name:

Adeno**SINE**

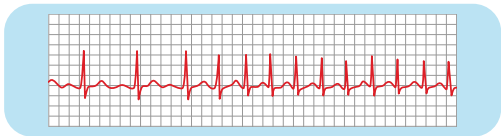
MEMORY TRICK



Puts the HR Down
in a **DE**N with a **DE**Nosine

MOA:

It works by slowing impulse conduction through the AV node to slow down the heart rate. Therefore can work too well & stop the heart all together - so SAFETY is the main concern.



Common TEST Question

Which **drug** does the nurse anticipate the provider will order?

✔️ Adenosine



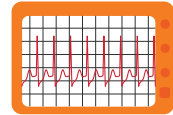
Indication:

1st line drug to treat
- **supraventricular tachycardia**



SUPRAventricular tachycardia
SUPER tachy heart rate

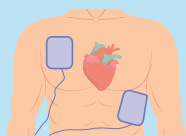
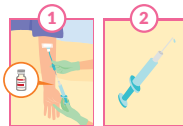
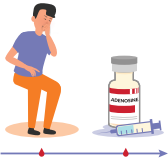
150 beats/min



KEY Points

SVT ORDER of treatment

1. Vasovagal maneuver **FIRST!**
BEFORE adenosine (bearing down like having a **BOWEL MOVEMENT**)
2. Adenosine **IV push "rapidly over 1-2 seconds"** followed by a saline flush
3. Cardioversion to Convert the heart rhythm - "Push the **SYNCHRO-NIZE BUTTON**" for Cardioversion



CARDIOVERSION



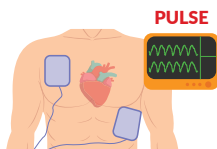
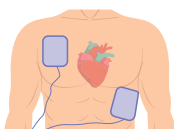
Don't let
THE NCLEX TRICK YOU



DEFIBRILLATION

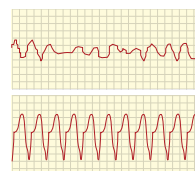
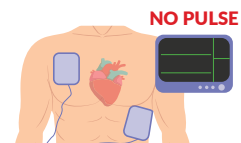
Cardioversion

- C** - Cardioversion
 - C** - Count a pulse
 - C** - Controlled Rhythms
- Synchronized button & sedation



Defibrillation

- D** - Defibrillation - if you
- D** - Don't have a pulse
- D** - Deadly rhythms (VFib & Vtach no pulse)
- D** - Don't Synch (shock away!)



Antihypertensive Clonidine

Cardiac Pharmacology

Indication



Very strong blood pressure lowering drug! Used last if high blood pressure is not responsive to other meds.

MEMORY TRICK

Clonidine

Cardiac **DOWN**



NCLEX TIP

Don't get tricked with sound alike drug names!

Clonidine is not Famotidine or Clozapine.

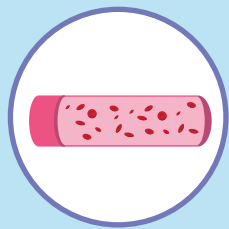
- Famotidine (H2 blocker for acid reflux)
- Clo-zapine (antipsychotic med)

Caution

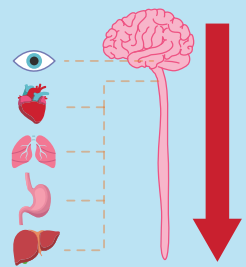
Don't get tricked!



Mech Action



It decreases the heart rate, cardiac output, & blood pressure. In fancier terms, it is an **Alpha 2 agonist** & decreases the sympathetic response from the central nervous system (CNS) resulting in decreased peripheral vascular resistance and vasodilation.



Patient Teaching

Key point

PRIORITY Teaching:

NCLEX TIP

1. Do **NOT** stop taking **"Abruptly"**
2. **Slowly** taper off over 2 - 4 days
3. Teach **Slow** position changes



MEMORY TRICK

If BP is **Low** = Got to go **SLOW**



HESI Question

Clonidine

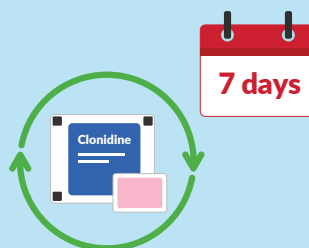
- Do **NOT** stop taking abruptly!
- Selectively activates alpha 2 receptors in CNS



Kaplan Question

Clonidine Patch...

- Change the patch **every 7 days**



Vasopressors

Top Tested Drugs

Cardiac Pharmacology

Epinephrine & Norepinephrine

Epinephrine

(Brand: Adrenaline)

Norepinephrine

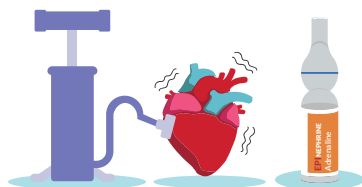
(Brand: Levophed)

Key difference

Epinephrine

- Cardiac Arrest
 - Asystole
 - PEA (pulseless electrical Activity)

1st line drug



HESI Question

Epinephrine

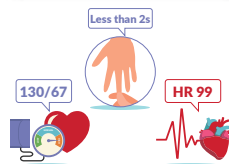
Initiates heart contraction during **cardiac arrest**

Kaplan Question

Epinephrine

treatment is effective if ...

Answer: BP 130/67, Apical HR 99, Cap refill less than 2 seconds



Vasopressin & Desmopressin (ADH)

Vasopressin

Vasopressin - synthetic ADH (AntiDiuretic Hormone)

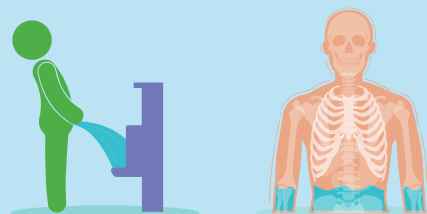
- **ADH - Adds Da H₂O**

Indication

Given for **Diabetes Insipidus (DI)** where clients **Drain** a lot of fluid! ADH is given to "Add Da H₂O" to the body, adding fluid volume & not affecting the constriction of vessels.

DI - Diabetes Insipidus

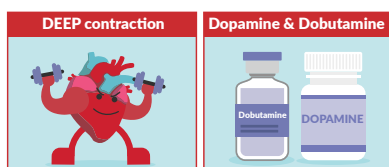
DI - end up **DI**uresing or **Drain**ing a lot of fluid



Pressin - PRESSes that BP UP

Dobutamine & Dopamine

D's for **DEEP** Contraction



Indication

Given to treat **cardiogenic shock** - where the heart **FAILS** to pump! These guys give a **DEEPER** heart contraction, to increase that blood out of the heart & to the body (increasing cardiac output & BP)

INOtropic

"**IN**creased cardiac contractility"

"**IN**creased forceful contraction"



HESI Question

Dopamine

- Activates **alpha 1** and **beta 1** receptors
- Therapeutic Effects:
 - Low doses act on **dopamine receptors**
 - Moderate doses acts on **beta 1 receptors**
 - High doses acts on **alpha 1 and beta 1 receptors**
- Assess IV site **hourly** for s/s infiltration



Kaplan Question

Dopamine

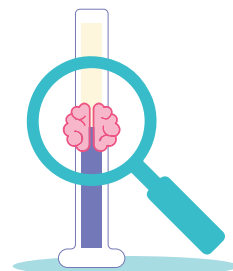
Given for a patient with hypotension, what indicates effectiveness?

Answer: **Increased cardiac output**

ATI Question

Dobutamine, Dopamine

- Assess BP hourly
- Monitor vital signs




Notes

Inotropic, Chronotropic, Dromotropic


D

Digoxin




D

Dopamine



D

Dobutamine

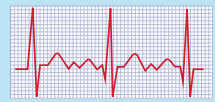
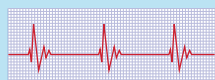


INOtropic

“**IN**creased cardiac contractility”
 “**IN**creased forceful contraction”

3 Ds for DEEP contraction

- D - Digoxin
- D - Dopamine
- D - Dobutamine



Chronos

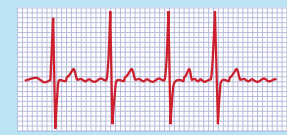
Clock

- Neg. Chronos - Neg time
- Positive Chronos - Positive time
- Faster HR - Positive Chronotropic
- Lower HR - Negative Chronotropic

Dromo

Drums

- Neg. Dromotropic - stable heart rhythm



Drug	Inotropic Force of Heartbeat	Chronotropic Rate of Heartbeat	Dromotropic Rhythm of Heartbeat
A amiodarone	+ Pos.	- Neg.	- Neg.
B beta blockers Atenolol	- Neg.	- Neg.	- Neg.
C calcium CB	- Neg.	- Neg.	- Neg.
C cardiac glycosides Digoxin	+ Pos.	- Neg.	- Neg.
D dobutamine	+ Pos.	X	X
D dopamine	+ Pos.	+ Pos.	X
E epinephrine	+ Pos.	+ Pos.	X

SIGNS & SYMPTOMS

PAIN-law, back, mid back/shoulder pain, heartburn (epigastric), Substernal
Key words = priority: "Sudden" "Crushing" "radiating" **NCLEX TIP**

SOB "dyspnea" "labored breathing"

NAUSEA Vomiting "abdominal pain"

SWEATING "Diaphoresis"

PALE COOL SKIN "dusky"

ANXIETY

CAUSES

SODDA

S-Stress, Smoking, Stimulants (caffeine, amphetamines)

O-Obesity (BMI over 25)

D-Diabetes & HTN (over 140/90)

D-Diet (high cholesterol) animal fats

A-African American males & Age (over 50)

*Men more than women

PROGRESSION

"Ischemic heart disease"

CAM

C-CAD "coronary artery disease"

A-ACS "acute coronary syndrome"

Angina - Stable "Safer" - relieved w/ rest

Angina - Unstable "Unsafe" - Unrelieved

M-MI (heart die)



PATIENT EDUCATION

DRESS

D-Diet low (sodium & fluids (2g/2L per day)

Prevent **HF** Heart Failure=Heavy Fluid

Report "New, Rapid" Weight Gain=Water Gain!

R-Reduce Stress, Alcohol, Caffeine, Cholesterol (animal fats)

E-Exercise (30 min x 5 days/wk)

S-Smoking Cessation

S-Sex (2 flights of stairs with NO SOB)

* **AVOID** NSAIDS (naproxen, ibuprofens) = increases CLOT risk!

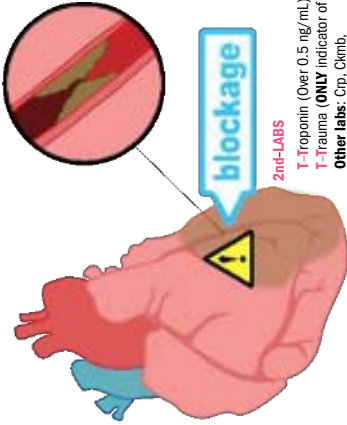
NCLEX TIP

MYOCARDIAL INFARCTION

PATHO

MI=Heart muscles **DIE** "necrosis" (minutes = muscle death)

Blockage of Coronary Artery "O2 Tube"



2nd-LABS

T-Troponin (Over 0.5 ng/mL)

T-Trauma (ONLY indicator of MI)

Other labs: Crp, Ckmb,

Myoglobin, CRP (inflammation)



DIAGNOSTICS

1st-**ECG**

(Any chest pain or MI symptoms)

TREATMENT: PHARMACOLOGY

DURING-Any Chest Pain

O-Oxygen

A-Asa

N-Nitro-under tongue x 3 Max

M-Morphine - Any pain after = MI (injury)

AFTER-MI

Clot Stabilization:

Heparin: prevents CLOT growth (**NOT dissolve** only t-PA)

PTT: 46 - 70 ***3 x MAX**: Antidote: Protamine Sulfate

Memory Trick: "HaPTT" frog

Heart Rest:

B-Beta Blockers (**Lot**) Atenolol

Blocks both BP & HR (Lol = Low BP & HR)

CAUTION:

B-Bad for Heart Failure patients (CHF)

B-Bradycardia (60 or Less) & BP low (HR LESS than 60)

B-Breathing Problems "wheezing" (Asthma, COPD)

B-Blood sugar masking "hides s/s" (Diabetics)

C-Calcium Channel Blockers

Calms BP & HR-(**AVOID** Low Hr & BP)

(**Nifedipine**, Diltiazem, Verapamil)

-dipine "declined BP & HR"

-zem "zen yoga for heart"

-amil "chill heart"

D-Dilators (vasoDilators = O₂ to heart)

Nitro (Nitroglycerin) (only for HTN crisis) & Isosorbide

Nitro "Pillow for heart"

NO viagra "-afil" Sildenafil = **DEATH!**

Nitro drip: **STOP** if Systolic BP below 90 or 30 mmHg Drop

SE: HA is Common + SLOW Positions changes "syncope"

DISCHARGE-GOING HOME

Heart Rest:

1st choice **A-Ace** (-pril) Lisinopril "chill pill"

2nd choice **A-ARBs** (-sartan) Losartan "relax man"

AntiHypertensive (BP ONLY) ***HOLD**: Low BP (not HR)

Precautions:

A-Avoid Pregnancy

A-Angioedema "thick tongue"

(Airway Risk) *only Ace ***NCLEX TIP***

C-Cough *only Ace

E-Elevated K+ (normal: 0.9 -1.2) *only Ace

AVOID Salt Substitutes + Green Leafy veggies

· 1st-Cardiac Monitor

· High Potassium = High Pump

· Monitor: muscle cramps, spasms,

peaked T waves, ST changes

CHOLESTEROL PANEL

C-CLOGGED ARTERIES (risk)

200 or Less- Total Cholesterol

150 or Less- Triglycerides

100 or Less- LDL

40 or More = HDL



TREATMENT: PHARMACOLOGY

AC-Anti Clogging of Arteries

A-Antiplatelet **HOLD** if: Platelets 50K or LESS

"below 50 gets risky" (not INR, not aPTT)

A-ASA

C-Clopidogrel

C-Cholesterol: Lowering "Statin"

Lowastatin "stay clean"

CAUTION:

NO grapefruit

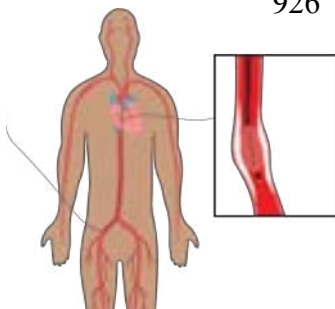
Liver toxic-report "clay colored stools"

Muscle pain (Rhabdomyolysis risk)

Late night-take at dinner

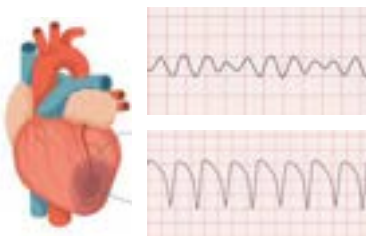
CATH LAB

- C-Contrast** = Kills Kidneys "Angioplasty, Angiogram, CABG"
- A-Allergy** to Iodine (warm flushing normal)
- B-Bleeding**—direct manual pressure (above site)
NO=heparin, warfarin, ASA, clopidogrel
- C-Creatinine** "Kidney" (normal: 0.9 - 1.2)
REPORT: Creatinine Over 1.3 & Urine **below 30 ml/hr**
STOP Metformin 48 hrs (before/after)
- C-Can't feel pulses** (Pulses = Perfusion O2)
 Diminished pulses (4-12 hrs post-procedure) **MAX PRIORITY:**
 Non palpable pedal pulse **AFTER** = CALL HCP (Dr.)
Key words: "cool leg, pulse non palpable, present only with doppler US."



COMPLICATIONS AFTER MI

- ACUTE:** (weeks after)
- Cardiogenic Shock (severe hypotension)
 - V fib/V tach (no pulse) = **DEADLY**
 - Defibrillate=Don't have a pulse
 - Cardioversion=Count a pulse *synchronize*
- CHRONIC:** (lifetime)
- Heart failure "Heavy Fluid"
 - Rapid** weight gain (Water Gain),
 - Worsening** crackles (fluid in Lungs "pulmonary, edema")
 - Sudden** edema (JVD, peripheral edema "+1 pitting")
 - #1 Priority**—IV Diuretics—Furosemide, Bumetanide "dried"
 - (**NOT** isosorbide)



NitroGlycerin

O₂ to Heart

- NO** viagra "-afil" Sildenafil = **DEATH!**
- NORMAL ADVERSE EFFECT:**
 HA=Normal Side Effect
 Hypotension=Adverse effect
 (need slow position changes)

PILL (or spray)

- S**—Stable Angina
S—Safe Angina
S—Stops when activity **STOPS** (Stress Induced)
 *Take Before strenuous activity
- GOAL:**
NO chest pain=Daily activities
 "comb hair, fix hair, get dressed, make up, making bed etc."
- TAKING MED:**
 CALL 911: PAIN 5 min. After 1st dose.
 3 doses max x 5 min apart
NO SWALLOW—SL under
- STORAGE:**
NO LIGHT-NO HEAT
NOT: pill box, car, plastic bag, pocket
YES: purse ok
 *Replace every **6 months**



Nitro Patch (Transdermal nitro patch)

- U**—Unstable Angina
U—Unsafe Angina
U—Unrelieved with rest / Unpredictable (anytime)
 1 x daily **NOT PRN**
 1 patch at a time **NOT 2** patches
YES Shower is ok
- LOCATION:** Rotate locations **Daily**
"Clean, Dry, shaven area" teach patient to wash hands after application
 Upper Body (subclavian, arm, upper chest)
NOT: hairy, scarred, burned, callous
NOT BROKEN SKIN
- *TEST TIP:** Patch fall off? (Over 1 hour ago)
 Take nitro (pill/spray) New patch can take 40-60 min.
***Nurses wear gloves!** Will cause **MAJOR HA** if it comes into contact with skin!



ANTICOAGULANTS (clot prevention)

- Antiplatelets (**LESS** potent)
 ASA & Clopidogrel
 Platelets **LESS** than **50k** = **RISKY** (Normal: 150-400k)
NOT INR or PTT
- Anticoagulants (**MOST** potent)
Warfarin = INR "warINR"
 Range: 2.5-3.5 (**3 x MAX range**)
 Antidote: Vitamin K (green leafy veggies) ***NOT** K+ = potassium*
- Heparin** (Enoxaparin) = aPTT "HaPTT" frog Partial Thromboplastin Time
 Range: 46-70 (**3 x MAX range**)
 Antidote: Protamine Sulfate

BLEED RISK (Patient Education)



- NO** peptic ulcers (or active bleeds)
- NO** Rugs/dim halls (Well lit halls)
- NO** razors, hard brushing, constipation
- NO** NSAIDS like naproxen/ ibuprofen
- NO** EGGO vitamins
- E-E** Echinacea, A vitamin
- G-Gingko**, Garlic, Ginseng
- O-O** mega 3

MYOCARDIAL INFARCTION

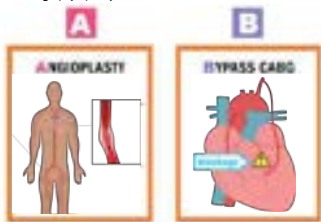
TREATMENT

(+) Positive Troponin = Heart Attack (MI)

PRIORITY: REMOVE THE CLOT!

"CATH LAB" OR SURGERY

"PCI" -graphy, -plasty



BEFORE

NPO 6 - 12 hrs

AFTER

NO heavy lifting- lie flat
NO Baths-Shower ok (dont soak)
 Infected Incision
 "red, warm, drainage"

CLOT BUSTER "Thrombolytics, Fibrinolytics"

t-PA: Alteplase, Streptokinase (Allergy risk)
 Dissolves Clot **ONLY** (heparin does NOT)

BLEED RISK

8 hour duration

NO injections (IV, SQ, IM, ABG)

NOT via central lines (CVC)

ONLY "compressible site" (IV, PICC)

NOT FOR:

Active Bleeds:

Peptic Ulcers (but menstruation is safe)

History:

Arteriovenous malformations

Intracranial "Cerebral" hemorrhage

Hypoglycemia (relative contraindication)

Hypertension (over 180/110) **TEST TIP**

STRESS TEST

Non MI (Non priority) · Spot the Narrowing

TREADMILL STRESS TEST

STOP test:
 chest pain
 ST elevation

CHEMICAL: NUCLEAR PHARMACOLOGICAL STRESS TEST

24-48 hours BEFORE

NO Cigarettes, Caffeine (tea, soda, coffee) ***NO DECAF**

NO Meds: Nitro, Beta Blocker, Theophylline (stimulant)

NPO (nothing oral) **4 hrs** before/after



NOTES

Cholesterol Lowering Agents

Drug name:

“-statin”

- Atorv**astatin**
- Simv**astatin**
- Lov**astatin**
- Rosuv**astatin**

Memory Trick:

S

S - Statin
S - Stay Clean



S

S - Statin
S - Smooth Tin Can
“StaaTIN”



Caution

statin  Nystatin  

NOT Nystatin – that’s an antifungal medicine for treating YEAST infections

Indication:

High cholesterol levels

- Hyper**cholesterolemia**
- Hyper**lipidemia**

(Different names for the same thing)



MOA:

It does this by preventing cholesterol production in the liver. Technically by preventing an enzyme the LIVER needs to make the cholesterol!

Bad

- Total Cholesterol **200**
- Triglycerides **150**
- LDL “Loser Lipids” **100**



Good

- HDL “HIGH Lipids” **40**



KEY POINTS

STAT

“MUSCLE CRAMPS”
“MUSCLE spasms”
“MUSCLE ACHES”

S

Sore MUSCLES

T

Toxic Liver (ALT & AST)

A

AVOID Grapefruit & St Johns Wart

T

Take at NIGHT **NCLEX Term**
“Take at **dinner time** or **bed-time**”

ATI Question

“Patient on Lovastatin, when would the nurse notify the HCP?”

Answer: Muscle aches & cramps

Kaplan Question

“Report new muscle tenderness to the HCP”

HESI Question

“Report muscle pain & Tenderness without Injury”

Answer: Rosuvastatin

Notes

**Cardiac
(Anti hypertensive
&
Heart failure drugs)**

Antihypertensives: Adrenergic blocking drugs

/ Alpha & Beta Central and Peripherally Acting

How it works? "Action"

Peripherally acting: Inhibits norepinephrine in the PNS (treats BPH, HTN)

Centrally acting: Decreases CNS activity (HTN)

Why do we give it? "Reason"

- Certain cardiac arrhythmias
- BAH
- HTN

Adverse effects

EENT: dry eyes.

CV: AV block, bradycardia, hypotension (with epidural), palpitations.

GI: dry mouth, constipation, nausea, vomiting.

GU: erectile dysfunction.

Derm: rash, sweating.

F&E: sodium retention, hyperkalemia

Metab: weight gain.

Neuro: paresthesia.

Misc: withdrawal phenomenon

Nursing management

- Monitor intake and output ratios and daily weight
- Assess for edema daily, especially at beginning of therapy.
- Monitor BP and pulse prior to starting, frequently during initial dose adjustment and dose increases and periodically throughout therapy.
- Titrate slowly in patients with cardiac conditions or those taking other sympatholytic drugs. Report significant changes.
- Transdermal: Instruct patient on proper application of transdermal system. Do not cut or trim unit. Transdermal system can remain in place during bathing or swimming.

Interactions:

- **Adrenergic:** risk of HTN
- **Levodopa:** hypotension, decrease levodopa
- **Anesthetic agents:** increase anesthetic
- **Beta blockers:** hypertension
- **Lithium:** lithium toxicity
- **Haloperidol:** psychotic behavior

Contraindications

- **Central:** Hepatic disease (active), MAOI antidepressant therapy
- **Peripheral:** ulcerative colitis , peptic ulcer

Generic	Trade	Central / peripheral	Safe dose	Route
Clonidine	Catapres	Central	100 mcg (0.1 mg) BID	PO, TD
Methyldopa	N/A	Central	250- 500 mg 2- 3 times daily	PO
Doxazosin	Cardura, Cardura XL	Periphera	1 mg once daily	PO
Prazosin	Minipress	Periphera	1 mg 2- 3 times daily	PO

Diuretics

- Carbonic Anhydrase Inhibitors

How it works? "Action"

- Diuretics work by altering the reabsorption or excretion of electrolytes and alter fluid volume.

Carbonic anhydrase inhibitors: sulfonamides without bacteriostatic action, inhibit CAH enzyme thus results in excretion of Na^+ K^+ HCO_3^- and H_2O

Why do we give it? "Reason"

- Hypertension
- Used with antihypertensives
- To reduce edema
- Glaucoma
- Seizures
- Renal disease.

Adverse effects

Neuro: Dizziness, headache, encephalopathy, lightheadedness, weakness, fatigue

EENT: Hearing loss, tinnitus

CV: Orthostatic hypotension

GU: Electrolyte imbalances, glycosuria

GI: Anorexia, nausea, vomiting

Derm: Rash, photosensitivity

Endo: Hyperglycemia, hyperuricemia.

F & E: Dehydration, hypocalcemia, hypochloremia, hypokalemia, hypomagnesemia, hyponatremia, hypokalemia, metabolic alkalosis

MS: Arthralgia, muscle cramps, myalgia.

Contraindications

- Hypersensitivity
- Electrolyte imbalances
- Severe kidney or liver dysfunction
- Anuria.
- **Mannitol:** active intracranial bleeding except during craniotomy

Nursing management

- Monitor BP and pulse frequently
- Assess for allergy to sulfonamides
- Monitor intake and output ratios and daily weight.
- Do not stop the drugs abruptly unless you speak with the DR.
- If GI upset occurs then take the med with food or milk
- Take early in the morning
- Do not reduce fluid intake
- Avoid alcohol and non prescription drugs
- Notify the healthcare provider if: muscle cramps, weakness, dizziness, diarrhea, restlessness, excessive thirst, general weakness, rapid pulse, increased heart rate or pulse, gi distress.
- Weight yourself daily.
- These drugs may cause hypokalemia, monitor serum potassium levels and electrolytes.

Interactions:

- **Primidone:** decreased effectiveness of primidone
- **Barbiturates & aspirin:** decrease diuretic effectiveness
- **tricyclic antidepressants:** can lead to toxicity

Simple Nursing Brain bits

If a client has an allergy to sulfonamides this drug should not be given.

Generic	Trade	Safe Dose	Route
Acetazolamide	Diamox	250- 1000 mg/day in 1- 4 divided doses	PO
Methazolamide	Neptazane	50- 100 mg 2- 3 times daily.	PO

Heart Failure

Patho

HF-HEART FAILURE (failure to PUMP forward)
HF-HEAVY FLUID (lungs & body)

Memory Trick:

S-Sodium Swells
W-Weight Gain = Water Gain Crisis!

Signs & Symptoms

R-RIGHT sided HF
R-ROCKS the **BODY** with fluid
 Peripheral Edema
 Weight Gain = Water Gain
 Edema (pitting)
 JVD (big neck veins)
 Abdominal Growth
 Ascites
 Hepatomegaly (big liver)
 Splenomegaly (big spleen)

L-LEFT sided HF
L-LUNG fluid
 "Pulmonary Edema"
 Crackles "rales" that don't clear
 with cough (**NOT** rhonchi or wheeze)
 Frothy Pink "blood tinged" sputum
 orthopnea-dyspnea while lying flat

Causes

R-RIGHT sided HF
 Left sided HF can cause Right HF
 Pulmonary HTN
 Fibrotic Lungs "stiff lungs"

L-LEFT sided HF
 (weak heart = weak pump)
 MI (heart attack)
 Ischemic Heart Disease
 (CAD, ACS)

Treatment Priority

KEY WORDS: new, sudden, worsening, rapid =
 Pulmonary Edema **CRISIS** (Lung Fluid!)

#1 Furosemide "Body Dried" (drain fluid)
H-HOB 45 degrees + (semi fowlers, high fowlers, orthopneic position)
O-Oxygen
P-Push Furosemide + Morphine, Positive inotropes
E-End sodium & fluids (Sodium Swells)
NO drinking fluids + STOP IV fluids

Diagnostic tests

Labs: BNP—"Broken Venticles"

300+ Mild • 600+ Moderate • 900+ SEVERE HF

Echo

Ejection Fraction 40% or LESS is HF! (normal-55-70%)
 LVH-Left Ventricular Hypertrophy

Hemodynamic Monitor "Swan Ganz" (Pulmonary artery catheter)
 CVP (norm: 2-8) Over 8 = NOT GREAT

Risk Factors

#1 risk factor is HTN
 ECG Dysrhythmias (Atrial Fibrillation)
 Valvular Malfunction (mitral valve regurgitation)
 Cardiomyopathy

Nursing Care

DR. BEDS

D-Diet: Low SCC (Sodium, Calories, Cholesterol)
 Low Sodium & Fluid (2L + 2g or LESS/day)
NO OTC meds (Cough or Flu, Antacids
 or NSAIDS **NCLEX TIP**)
NO Canned or packaged foods (chips, sauces, meats, cheeses,
 wine)
R-Risk for Falls! (Change positions slowly!)
B-Blood Pressure & BNP (should NOT be increasing)
E-Elevate HOB & Legs (with pillows) high fowlers
D-Daily Weights and Is and Os (Over 3 lbs/day or
 5 lbs in 7 days) = Worsening! **NCLEX TIP**
S-Stairs (No sex until able to climb 2 flights of stairs
 without dyspnea)
S-Stocking (TED hose) (decreases blood pooling, remove daily)
NEVER massage calves (CHF patients) **NCLEX TIP**

Pharmacology

A-ACTS on BP only (**not HR**)
A-ACE (-pril) Lisinopril "chill pril" 1st choice
A-ARBS (-sartan) Losartan "relax man" 2nd choice
A-Avoid Pregnancy
A-Angioedema (Airway Risk) *only Ace
C-Cough *only Ace
E-Elevated K+ (normal 3.5-5.0)
B-BETA BLOCKERS (-lol) Ateno**LOL** "LOL = LOW"
 Blocks both BP & HR (**AVOID** Low HR & BP)
 Caution: **HOLD IF:**
B-Bradycardia (LESS than 60) & BP low (90/60)
 only hold if the patient is in an acute exacerbation of CHF
B-Breathing problems "wheezing" (Asthma, COPD)
B-Bad for Heart Failure patients
B-Blood sugar masking "hides S/S" (Diabetics)
C-CALCIUM CHANNEL BLOCKERS
 Calms BP & HR (**AVOID** Low HR & BP)
 (Nifedipine)
-dipine "declined BP & HR"
-amilipine "chill heart"
D-DIURETICS Drain Fluid
D-Drains Fluid "Diurese" "Dried"
K+ Wasting-Furosemide & Hydrochlorothiazide
 (caution: Low K+, Eat melons, banana & green leafy)
K+ Sparing-Spironolactone "Spares potassium"
 (**AVOID** Salt Substitutes, melons & green leafy)
D-DILATORS (Vasodilators)
 Nitroglycerin, Isosorbide
Nitroglycerin "Nitro = Pillow for heart"
Caution: NO Viagra "-afil" Sildenafil = **DEATH!**
 Nitro drip: **STOP** = Systolic BP below 90 or 30 mmHg Drop
 Adverse effect:
 HA= side effect
 Low BP= adverse effect (SLOW position changes)
D-DIGOXIN (Inotropic)
 Digs for a DEEP contraction
 Increased contractility
Apical Pulse x 1 minute
Toxicity (over 2.0) Vision changes, N/V **TEST TIP**
Potassium 3.5 or less (higher r/f toxicity)

Notes

Antihypertensives

Ace Inhibitors

How it works? "Action"

Suppress the renin-angiotensin-aldosterone system and prevent the activity of ACE which converts angiotensin 1 to angiotensin 2 (vasoconstrictor). Inhibiting the conversion causes Na⁺ and H₂O to not be retained thus sodium and BP will decrease.

Why do we give it? "Reason"

- Treatment of hypertension

Adverse effects

CV: Orthostatic hypotension, syncope tachycardia, hypotension, chest pain
CNS: Dizziness, fatigue, headache, weakness.
GI: Abdominal pain, diarrhea, nausea, vomiting
GU: Erectile dysfunction, impaired renal function.proteinuria
Derm: Rashes. F and E: hyperkalemia.
 Misc: ANGIOEDEMA
RESP: Upper respiratory infections and cough,
HEMAT: Neutropenia

Contraindications

- ACE1/Angiotensin receptor blockers: HF, salt or volume depletion, bilateral stenosis, angioedema, pregnancy 2nd/3rd trimester due to neonatal death.

Nursing management

- Monitor BP and pulse frequently
- Assess patient for signs of angioedema (dyspnea, facial swelling).
- Heart Failure: Monitor weight and assess patient routinely for resolution of fluid overload (peripheral edema, rales/crackles, dyspnea, weight gain, jugular venous distention).
- May cause hyperkalemia.
- Instruct your clients to get up slowly and avoid salt substitutes.

Interactions:

- **NSAIDs:** Reduced hypotensive effects
- **Rifampin:** Decreased ace1 effects
- **Allopurinol:** Increased risk of hypersensitivity
- **Digoxin:** Decreased dig levels
- **Loop diuretics:** Decrease diuretic effects
- **Lithium:** Possible lithium toxicity
- **Hypoglycemics(insulin):** Increase risk of hypoglycemia
- **Potassium sparing diuretics:** Elevated potassium levels (hyperkalemia)

Simple Nursing Brain bits

- Be mindful of suffixes! All ACE inhibitors end in "april" Use caution with African American population as drugs may not be effective and/or may cause extremely uncomfortable side effects

Generic	Trade	with/without food	Safe dose	Route
Captopril	Capoten	Without food	12.5- 25 mg 2- 3 times daily	PO
Lisinopril	Prinivil	With food	10 mg once daily	PO
Enalapril	Vasotec	with/ without	2.5- 5 mg once daily	PO , IV
Ramipril	Altace	with/without	2.5 mg once daily	PO

Antihypertensives: Adrenergic blocking drugs

- Alpha & Beta

How it works? "Action"

Block Alpha receptors causing **vasodilation** by relaxing the smooth muscle of the blood vessels in ophthalmic preps they constrict the pupil

Why do we give it? "Reason"

- Carvedilol: essential HTN, HF to reduce progression
- Labetalol: HTN usually as an adjunct to a Diuretic

Adverse effects

CNS: Dizziness, fatigue, weakness, anxiety, depression, drowsiness, insomnia, memory loss, mental status changes, nervousness, nightmares.
EENT: Blurred vision, dry eyes, intraoperative floppy iris syndrome, nasal stuffiness.
 Resp: bronchospasm, wheezing.
CV: BRADYCARDIA, HF, PULMONARY EDEMA
GI: diarrhea, constipation, nausea. GU: erectile dysfunction, pibido.
Derm: STEVENS-JOHNSON SYNDROME, TOXIC EPIDERMAL NECROLYSIS, itching, rashes, urticaria.
 Endo: hyperglycemia, hypoglycemia.
MS: arthralgia, back pain, muscle cramps.
 Neuro: paresthesia.
Misc: ANAPHYLAXIS, ANGIOEDEMA, drug-induced lupus syndrome.

Nursing management

- Monitor BP, pulse, and ECG every 2 min until stable during IV administration. If hypotensive crisis occurs, epinephrine is contraindicated and may cause paradoxical further decrease in BP. Norepinephrine may be used
- Instruct client to change positions slowly to minimize orthostatic hypotension.
- Instruct patient to notify health care professional if chest pain occurs during IV infusion

Interactions:

- **Antidepressants:** tremors
- **Cimetidine:** increased adrenergic blocker effect
- **Clonidine:** increase clonidine effects
- **Digoxin:** digoxin toxicity

Contraindications

- History of serious hypersensitivity reaction.
- Stevens-Johnson syndrome, angioedema, anaphylaxis
- Pulmonary edema
- Cardiogenic shock
- Bradycardia, heart block or sick sinus syndrome
- Uncompensated HF requiring IV inotropic agents (wean before starting carvedilol); Severe hepatic impairment; Asthma or other bronchospastic disorders.

Generic	Trade	Safe Dose	Route
Carvedilol	Coreg, Coreg CR	6.25 mg twice daily	PO
Labetalol	Trandate	100 mg twice daily	PO, IV

Diuretics

- Loop Diuretics

How it works? "Action"

- Diuretics work by altering the reabsorption or excretion of electrolytes and alter fluid volume.

Loop diuretics: inhibit the reabsorption of sodium chloride in the proximal and distal convoluted tubules and the loop of henle. This site increase their effectiveness .

Why do we give it? "Reason"

- Hypertension
- Used with antihypertensives
- To reduce edema
- Glaucoma
- Seizures
- Renal disease.

Adverse effects

Neuro: Dizziness, headache, encephalopathy, lightheadedness, weakness, fatigue
EENT: Hearing loss, tinnitus
CV: Orthostatic hypotension
GU: Electrolyte imbalances, glycosuria
GI: Anorexia, nausea, vomiting
Derm: Rash, photosensitivity
Endo: Hyperglycemia, hyperuricemia.
F & E: Dehydration, hypocalcemia, hypochloremia, hypokalemia, hypomagnesemia, hyponatremia, hypokalemia, metabolic alkalosis
MS: Arthralgia, muscle cramps, myalgia.

Contraindications

- Hypersensitivity
- Electrolyte imbalances
- Severe kidney or liver dysfunction
- Anuria.
- **Mannitol:** active intracranial bleeding except during craniotomy

Nursing management

- Monitor BP and pulse frequently
- Monitor intake and output ratios and daily weight.
- Do not stop the drugs abruptly unless you speak with the HCP.
- If GI upset occurs then take the med with food or milk.
- Take early in the morning.
- Do not reduce fluid intake.
- Avoid alcohol and non prescription drugs.
- Notify the healthcare provider if: muscle cramps, weakness, dizziness, diarrhea, restlessness, excessive thirst, general weakness, rapid pulse, increased heart rate or pulse, gi distress.
- Weight yourself daily.
- These drugs may cause hypokalemia, monitor serum potassium levels

Interactions:

- Cisplatin/aminoglycosides: increased risk of ototoxicity
- Anticoagulant/thrombotic: increased risk of bleeding
- Digitalis: increase risk of arrhythmia
- Lithium: increased risk of lithium toxicity
- Hydantoins: decreased diuretic effect
- Nsaid: decreased Diuretics effect

Simple Nursing Brain bits

- Taking this medication early in the day can prevent injury r/t getting out of bed at night for the client.

Generic	Trade	Safe Dose	Route
Bumetanide	Bumex	0.5- 2 mg/day given in 1- 2 doses	PO
Furosemide:	Lasix	20- 80 mg/day as a single dose	PO, IM, IV
Torsemide	Demadex	2.5- 5 mg once daily	PO

Antihypertensives

Angiotension Receptor Blockers

How it works? "Action"

Block the binding of angiotensin 2 at various sites on smooth muscle, blocking the vasoconstriction effects of the renin-angiotensin-aldosterone system thus causing a decrease in blood pressure.

Why do we give it? "Reason"

- Treatment of hypertension

Adverse effects

CNS: dizziness, fatigue, headache, insomnia, weakness.

CV: chest pain, edema, hypotension.

EENT: nasal congestion.

Endo: hypoglycemia, weight gain.

GI: diarrhea, abdominal pain, dyspepsia, nausea.

GU: impaired renal function.

F and E: hyperkalemia.

MS: back pain, myalgia.

Misc: ANGIOEDEMA, fever.

Contraindications

- ACE1/Angiotensin receptor blockers: HF, salt or volume depletion, bilateral stenosis, angioedema, pregnancy 2nd/3rd trimester due to neonatal death.

Nursing management

- Monitor BP and pulse frequently
- Assess patient for signs of angioedema (dyspnea, facial swelling).
- Heart Failure: Monitor weight and assess patient routinely for resolution of fluid overload (peripheral edema, rales/crackles, dyspnea, weight gain, jugular venous distention).
- May cause hyperkalemia.
- Instruct your clients to get up slowly and avoid salt substitutes.

Interactions:

- **NSAIDs:** Reduced hypotensive effects
- **Rifampin:** Decreased ace1 effects
- **Allopurinol:** Increased risk of hypersensitivity
- **Digoxin:** Decreased dig levels
- **Loop diuretics:** Decrease diuretic effects
- **Lithium:** Possible lithium toxicity
- **Hypoglycemics(insulin):** Increase risk of hypoglycemia
- **Potassium sparing diuretics:** Elevated potassium levels (hyperkalemia)

Simple Nursing Brain bits

- Be mindful of suffixes! All ARBS end in "TAN"
These replace ACE in african american population and when the side effects of ace become too much the client.

Generic	Trade	Safe Dose	Route
Irbesartan	Apravo	150 mg once daily	PO
Losartan	Cozaar	50 mg once daily	PO
Valsartan	Diovan	80 mg or 160 mg once daily	PO

Antihypertensives: Adrenergic blocking drugs

- Alpha

How it works? "Action"

Block Alpha receptors causing **vasodilation** by relaxing the smooth muscle of the blood vessels. In ophthalmic preps they constrict the pupil.

Why do we give it? "Reason"

- Hypertension caused by pheochromocytoma
- Hypertension caused by pre op prep.
- Treat tissue damage caused by dopamine injection.

Adverse effects

CNS: CEREBROVASCULAR SPASM, dizziness, weakness.

EENT: nasal stuffiness.

CV: HYPOTENSION, MI, angina, arrhythmias, tachycardia.

GI: abdominal pain, diarrhea, nausea, vomiting, aggravation of peptic ulcer.

Derm: flushing. Local: injection site pain (local).
Interactions

Contraindications

- Coronary artery disease

Nursing management

- Monitor BP, pulse, and ECG every 2 min until stable during IV administration. If hypotensive crisis occurs, epinephrine is contraindicated and may cause paradoxical further decrease in BP.
- Norepinephrine may be used
- Instruct client to change positions slowly to minimize orthostatic hypotension.
- Instruct patient to notify health care professional if chest pain occurs during IV infusion.

Interactions:

- **Epinephrine or methoxamine:**
Severe hypotension
- **Ephedrine or phenylephrine:**
Decreased pressor response

Simple Nursing Brain bits

If you are giving multiple meds remember, If it makes you hyper or shaky check the drug book before administering it with Alpha Adrenergic blockers

Generic	Trade	Safe Dose	Route
Phentolamine	Oraverse, Regitine	5 mg given 1- 2 hr pre op, repeated PRN. can infuse at 0.5- 1 mg/min during surgery.	IM, IV, Local

Diuretics

- Osmotic

How it works? "Action"

- Diuretics work by altering the reabsorption or excretion of electrolytes and alter fluid volume.

Osmotic Diuretics: increase the density of the filtrate in the glomerulus preventing selective reabsorption of H₂O and it passes as urine.

Why do we give it? "Reason"

Adjunct in the treatment of:

- Acute oliguric renal failure
- Edema
- Increased intracranial or intraocular pressure
- Toxic overdose
- GU irrigant During transurethral procedures (2.5- 5% solution only).

Adverse effects

CNS: Confusion, headache.

EENT: Blurred vision, rhinitis.

CV: Transient volume expansion, chest pain, HF, pulmonary edema, tachycardia.

GI: Nausea, thirst, vomiting.

GU: Renal failure, urinary retention.

F and E: Dehydration, hyperkalemia, hypernatremia, hypokalemia, hyponatremia.

Local: Phlebitis at IV site.

Contraindications

- **Mannitol:** active intracranial bleeding except during craniotomy
- Hypersensitivity
- Anuria
- Dehydration
- Severe pulmonary edema or congestion.

Nursing management

- Monitor BP and pulse frequently
- Monitor intake and output ratios and daily weight
- Assess patient for anorexia, muscle weakness, numbness, tingling, paresthesia, confusion, and excessive thirst. Report signs of electrolyte imbalance.
- Avoid alcohol
- Hypokalemia, monitor serum potassium levels and electrolyte levels

Interactions:

- **Digoxin:** Hypokalemia increases the risk of dig toxicity

Simple Nursing Brain bits

Symptoms of fluid and electrolyte imbalance include dry mouth, thirst, weakness, lethargy, drowsiness, restlessness confusion, muscle pain or cramps, confusion, gastrointestinal disturbances, hypotension, oliguria, tachycardia, and seizures.

Generic

Mannitol

Trade

Osmitol

Safe Dose

50- 100 g as a 5- 25% solution

Route

IV

Antihypertensives

Beta Blockers

How it works? "Action"

Block beta receptors in the heart to decrease cardiac workload to decrease HR and dilate blood vessels, provides membrane stabilizing effects. Timolol treats glaucoma.

Why do we give it? "Reason"

- Hypertension
- Cardiac arrhythmia
- Heart failure
- Angina
- Glaucoma
- Prevention of MI

Adverse effects

CV: Orthostatic hypotension, bradycardia, PULMONARY EDEMA,

ENDO: May cause \uparrow BUN, serum lipoprotein, potassium, triglyceride, and uric acid levels.

May cause \uparrow blood glucose levels. In labile diabetic patients, hypoglycemia may be accompanied by precipitous \uparrow of BP.

RESP: bronchospasm (hx of asthma)

Contraindications

- Sinus bradycardia
- Heart block
- Heart Failure
- Asthma
- Emphysema
- Hypotension

Nursing management

- Monitor BP, heart rate, ECG, cardiac output, CVP, and urinary output continuously
- Abrupt withdrawal of propranolol may precipitate life-threatening arrhythmias, hypertension, or myocardial ischemia
- Take HR and BP immediately prior to administering medication and 30 minutes after. Observe provider's parameters to hold drug if BP and/or HR are low.
- Advise patient to notify health care professional if slow pulse, difficulty breathing, wheezing, cold hands and feet, dizziness, lightheadedness, confusion, depression, rash, fever, sore throat, unusual bleeding, or bruising occur. If diabetic monitor for hypoglycemia. Teach not to stop taking abruptly.

Interactions:

- **Antidepressants:** bradycardia and increase beta blocker effects
- **NSAID:** decrease beta blocker effects
- **Diuretics:** increase beta blocker effects/hypotension
- **Clonidine:** paradoxical hypertensive effects
- **Cimetidine:** beta blocker toxicity
- **Lidocaine:** beta blocker toxicity

Simple Nursing Brain bits

- **Never give a beta blocker to a client with a history of asthma because it can cause bronchospasm.**
- Beta Blockers end in **-OLOL**

4 B'S

- Bradycardia
- Blood pressure decrease
- Bronchial constriction (relief)
- Blood sugar masking

Generic	Trade	Safe Dose	Route
Propranolol	Inderal, Inderal LA, InnoPran XL	80- 320 mg/day in 2- 4 divided doses	PO, IV , PO-ER
Metoprolol: lopressor	lopressor	25- 100 mg/day as a single dose	PO, IV , PO-ER
Sotalol Give on an empty stomach	Betapace, Betapace AF	80 mg twice daily	PO
Timolol Ophthalmic	Novo-Timol	One drop of 0.25% eye drops into each affected eye(s) twice daily, approximately 12 hours apart.	Ophthalmic

Diuretics

- Potassium Sparing

How it works? "Action"

- Diuretics work by altering the reabsorption or excretion of electrolytes and alter fluid volume.

Potassium Sparing Diuretics: reduce the excretion of potassium, block the reabsorption of sodium into the kidney. And thereby increasing sodium and h₂O in the urine and reduces excretion of K⁺

Why do we give it? "Reason"

- Hypertension
- Used with antihypertensives
- To reduce edema
- Glaucoma
- Seizures

Adverse effects

Neuro: Dizziness, headache, encephalopathy, lightheadedness, weakness, fatigue

EENT: Hearing loss, tinnitus

CV: Orthostatic hypotension

GU: Electrolyte imbalances, glycosuria

GI: Anorexia, nausea, vomiting

Derm: Rash, photosensitivity

Endo: Hyperglycemia, hyperuricemia.

F & E: Dehydration, hypocalcemia, hypochloremia, **hyperkalemia**, hypomagnesemia, hyponatremia, hypokalemia, metabolic alkalosis

MS: Arthralgia, muscle cramps, myalgia.

Contraindications

- Hypersensitivity
- Electrolyte imbalances, hyperkalemia
- Severe kidney or liver dysfunction
- Anuria.
- **Mannitol:** active intracranial bleeding except during craniotomy

Nursing management

- Monitor BP and pulse frequently
- Monitor intake and output ratios and daily weight.
- Do not stop the drugs abruptly unless you speak with the HCP.
- If GI upset occurs then take the med with food or milk.
- Take early in the morning
- Do not reduce fluid intake
- Avoid alcohol and non prescription drugs.
- Notify the healthcare provider if: muscle cramps, weakness, dizziness, diarrhea, restlessness, excessive thirst, general weakness, rapid pulse, increased heart rate or pulse, GI distress.
- Weight yourself daily.
- These drugs may cause hyperkalemia, monitor serum potassium levels.

Interactions:

- **Angiotensin converting enzyme/potassium supplement:** Increased risk of hyperkalemia
- **Nsaids/anticoagulants:** decreased diuretic effect

Simple Nursing Brain bits

Avoid foods high in potassium:

Avocado, Acorn squash, Spinach, Sweet potato, Wild-caught salmon, Dried apricots, Pomegranate, Coconut water, White beans, Banana

Generic	Trade	Safe Dose	Route
Spironolactone	Aldactone	25- 400 mg/day as a single dose	PO

Calcium Channel Blockers

How it works? "Action"

Systemic and coronary arteries are influenced by Ca^{++} moving across cell membranes. CCB act by inhibiting the movement of calcium across the cell membrane of cardiac and arterial muscles. Resulting in less calcium available for nerve impulse transmission and relax blood vessels to increase O_2 supply to decrease cardiac workload

Why do we give it? "Reason"

- Hypertension
- Angina pectoris
- Vasospastic (Prinzmetal's) angina

Adverse effects

CNS: dizziness, fatigue.

CV: peripheral edema, angina, bradycardia, hypotension, palpitations.

GI: gingival hyperplasia, nausea.

Derm: flushing

Contraindications

- Calcium channel blockers: sick sinus syndrome, 2nd/3rd degree atrioventricular block, ventricular dysfunction, cardiogenic shock.

Nursing management

- Monitor BP and pulse frequently
- Monitor intake and output ratios and daily weight. Assess for signs of HF (peripheral edema, rales/crackles, dyspnea, weight gain, jugular venous distention).
- Angina: Assess location, duration, intensity, and precipitating factors of patient's anginal pain
- Avoid large amounts (6- 8 glasses of grapefruit juice/day)
- Have the client check pulse and report any sudden changes

Interactions:

- **Cimetidine:** increase effects of CCB
- **Theophylline:** toxic effects of theophylline
- **Digoxin:** Dig toxicity
- **Rifampin:** decreased CCB effects

Generic	Trade	Safe Dose	Route
Amlodipine	Norvasc	5- 10 mg once daily	PO
Diltiazem	Cardizem	30- 120 mg 3- 4 times daily o	PO
Verapamil	Calan	80- 120 mg 3 times daily	PO, IV

Diuretics

- Thiazides

How it works? "Action"

- Diuretics work by altering the reabsorption or excretion of electrolytes and alter fluid volume.

Thiazide Diuretics: Inhibit reabsorption in the ascending portion of the loop of henle and early distal tubule. Excrete sodium, chloride, and H₂O

Why do we give it? "Reason"

- Hypertension
- Used with antihypertensives
- To reduce edema
- Glaucoma
- Seizures
- Renal disease.

Adverse effects

Neuro: Dizziness, headache, encephalopathy, lightheadedness, weakness, fatigue

EENT: Hearing loss, tinnitus

CV: Orthostatic hypotension

GU: Electrolyte imbalances, glycosuria

GI: Anorexia, nausea, vomiting

Derm: Rash, photosensitivity

Endo: Hyperglycemia, hyperuricemia.

F & E: Dehydration, hypocalcemia, hypochloremia, hypokalemia, hypomagnesemia, hyponatremia, hypokalemia, metabolic alkalosis

MS: Arthralgia, muscle cramps, myalgia.

Contraindications

- Hypersensitivity
- Electrolyte imbalances
- Severe kidney or liver dysfunction
- Anuria.
- **Mannitol:** active intracranial bleeding except during craniotomy

Nursing management

- Monitor BP and pulse frequently .
- Monitor intake and output ratios and daily weight.
- Do not stop the drugs abruptly unless you speak with the DR.
- If GI upset occurs then take the med with food or milk.
- Take early in the morning.
- Do not reduce fluid intake.
- Avoid alcohol and non prescription drugs.
- Notify the healthcare provider if: muscle cramps, weakness, dizziness, diarrhea, restlessness, excessive thirst, general weakness, rapid pulse, increased heart rate or pulse, gi distress.
- Weight yourself daily.
- These drugs may cause hypokalemia, monitor serum potassium levels.
- May cause in serum and urine glucose in diabetic patients. May cause anqin serum bilirubin, calcium, creatinine, and uric acid.

Interactions:

- **Allopurinol:** increased risk of hypersensitivity to allopurinol
- **Anesthetics:** increased anesthetic effects
- **Antineoplastic drugs:** extended leukopenia
- **Antidiabetic drugs:** hyperglycemia

Simple Nursing Brain bits

- **Thiazide and Loop:** liver disease, lupus, diabetes, a cross sensitivity may occurs with thiazides and sulfonamides
- Yellow dye may cause allergic reactions or bronchial asthma with thiazides.

Generic	Trade	Safe Dose	Route
Hydrochlorothiazide	Microzide	12.5- 100 mg/day in 1-2 doses	PO
Metolazone	Zaroxolyn	2.5- 5 mg/day	PO

Cardiotonic Drugs

How it works? "Action"

Cardiotonics such as digoxin increase cardiac output through positive inotropic activity (an increase in the force of the contraction). They slow the conduction velocity through the atrioventricular (AV) node in the heart and decrease the heart rate through a negative chronotropic effect.

Milrinone has inotropic action and is used in the short-term management of severe heart failure that is not controlled by the digitalis preparation. (Ford 403)

Why do we give it? "Reason"

- Heart failure
- Atrial fibrillation

Contraindications

- Digitalis toxicity
- known hypersensitivity
- ventricular failure, ventricular tachycardia, cardiac tamponade, restrictive cardiomyopathy, or AV block. (Ford 404)

Digoxin toxicity & electrolyte imbalances

- Plasma digoxin levels are monitored closely. Blood for plasma level measurements should be drawn immediately before the next dose or 6 to 8 hours after the last dose regardless of route. Therapeutic drug levels are between 0.8 and 2 nanograms/mL. Plasma digoxin levels greater than 2 nanograms/mL are considered toxic and are reported to the primary health care provider. Hypokalemia makes the heart muscle more sensitive to digitalis, thereby increasing the possibility of developing digitalis toxicity. At frequent intervals, observe patients with hypokalemia closely for signs of digitalis toxicity. (Ford 405)

Nursing management

The physical assessment should include the following:

- Taking blood pressure, apical-radial pulse rate, respiratory rate
- Auscultating the lungs, noting any unusual sounds during inspiration and expiration
- Examining the extremities for edema
- Checking the jugular veins for distention
- Measuring weight
- Inspecting sputum raised (if any) and noting the appearance (e.g., frothy, pink tinged, clear, yellow)
- Looking for evidence of other problems such as cyanosis, shortness of breath on exertion (if the patient is allowed out of bed) or when lying flat, and mental changes (Ford 405)
- Pediatric
- The drug is withheld and the primary health care provider notified before administration of the drug if the apical pulse rate in a child is below 70 bpm, or below 90 bpm in an infant.
- Daily weights

Interactions:

- **Thyroid hormone:** Decreased effects of digoxin
- **Thiazide and loop diuretics:** Increased diuretic electrolyte disturbances, especially hypokalemia

Adverse effects

- Headache
- Weakness, drowsiness
- Visual disturbances (blurring or yellow halo)
- Arrhythmias
- Nausea and anorexia

Generic	Trade	Use	Route
Digoxin	Lanoxin	Heart failure, atrial fibrillation	Loading dose:* 0.75–1.25 mg orally or 0.6–1 mg IV Maintenance: 0.125–0.25 mg/day orally Lanoxicaps: 0.1–0.3 mg/day orally
Milrinone.	Short-term management of heart failure	Short-term management of heart failure	Loading dose: 50 mcg/kg IV IV: Up to 1.13 mg/kg/day

Nitrates

How it works? "Action"

The nitrates act by relaxing the smooth muscle layer of blood vessels, increasing the lumen of the artery or arteriole, and increasing the amount of blood flowing through the vessels. (Ford 382)

Why do we give it? "Reason"

- Relieve pain of acute anginal attacks
- Prevent angina attacks (prophylaxis)
- Treat chronic stable angina pectoris (Ford 382)

Adverse effects

- Central nervous system (CNS) reactions, such as headache (may be severe and persistent), dizziness, weakness, and restlessness
- Other body system reactions, such as hypotension, flushing (caused by dilation of small capillaries near the surface of the skin), and rash (Ford 382)

Contraindications

- Hypersensitivity to the drugs, severe anemia, closed-angle glaucoma, postural hypertension, early myocardial infarction (sublingual form), head trauma, cerebral hemorrhage (may increase intracranial hemorrhage), allergy to adhesive (transdermal system), or constrictive pericarditis. Patients taking phosphodiesterase inhibitors (drugs for erectile dysfunction) should not use nitrates. (Ford 382)

Nursing management

- The dose of sublingual nitroglycerin may be repeated every 5 minutes until pain is relieved or until the patient has received three doses in a 15-minute period. One to two sprays of translingual nitroglycerin may be used to relieve angina, but no more than three metered doses are recommended within a 15-minute period.
- Do not rub the nitroglycerin ointment into the patient's skin, because this will immediately deliver a large amount of the drug through the skin. Exercise care in applying topical nitroglycerin and do not allow the ointment to come in contact with your fingers or hands while measuring or applying the ointment, because the drug will be absorbed through your skin, causing a severe headache.
- The primary health care provider is notified if any of the following occur:
 - Heart rate of 20 bpm or more above the normal rate
 - Rapid weight gain of 5 lb or more
 - Unusual swelling of the extremities, face, or abdomen
 - Dyspnea, angina, severe indigestion, or fainting
- Avoid the use of alcohol unless use has been permitted by the primary health care provider.
- Notify your emergency response providers if the drug does not relieve pain or if pain becomes more intense despite use of this drug.
- Follow the recommendations of the primary health care provider regarding frequency of use.
- Keep an adequate supply of the drug on hand for events, such as vacations, bad weather conditions, and holidays.
- Keep a record of the frequency of acute anginal attacks (date, time of the attack, drug, and dose used to relieve the acute pain), and bring this record to each primary health care provider or clinic visit.

Interactions:

- **Aspirin:** Increased nitrate plasma concentrations and action may occur
- **Calcium channel blockers:** Increased symptomatic orthostatic hypotension
- **Dihydroergotamine:** Increased risk of hypertension and decreased antianginal effect
- **Heparin:** Decreased effect of heparin
- **Phosphodiesterase inhibitors:** Severe hypotension and cardiovascular collapse may occur
- **Alcohol:** Severe hypotension and cardiovascular collapse may occur

Generic	Trade	Use	Route
Isosorbide	Isordil, Dilatate SR, Monoket	Treatment and prevention of angina	Initial dose 5–20 mg orally; maintenance dose 10–40 mg BID, TID orally Sublingually: 2.5–5 mg Prevention: 5–10 mg sublingually, 5 mg chewable

CNS Drugs

Central Acting Antiadrenergics

How do they work? "Action"

Acts on the central nervous system (CNS) rather than on the peripheral nervous system. This group affects specific CNS centers, thereby decreasing some of the activity of the sympathetic nervous system. (Ford 256)

Indications

- Hypertension
- BPH

Adverse Reactions

- Dry mouth, drowsiness, sedation, anorexia, rash, malaise, and weakness are generalized reactions to antiadrenergic drugs that work on the CNS.
- Hypotension, weakness, lightheadedness, and bradycardia are adverse reactions associated with the administration of peripherally acting antiadrenergic drugs. (Ford257)

Contraindications

Centrally acting antiadrenergic drugs are contraindicated in active hepatic disease, in antidepressant therapy using MAOIs, and in patients with a history of hypersensitivity to these drugs. (Ford 257)

Interactions

- **Adrenergic drugs:** Increased risk of hypertension
- **Levodopa:** Decreased effect of the levodopa, hypotension
- **Anesthetic agents:** Increased effect of the anesthetic
- **β blockers:** Increased risk of hypertension
- **Lithium:** Increased risk of lithium toxicity
- **Haloperidol:** Increased risk of psychotic behavior

Nursing Alert

If a significant decrease in blood pressure (a drop of 20 mm Hg systolic or a systolic pressure below 90 mm Hg) occurs after a dose of an adrenergic blocking drug, withhold the next drug dose and notify the primary health care provider immediately. A dosage reduction or discontinuation of the drug may be necessary. Some adrenergic blocking drugs (e.g., prazosin or terazosin) may cause a first-dose effect. A first-dose effect occurs when the patient experiences marked hypotension (or postural hypotension) and syncope with sudden loss of consciousness with the first few doses of the drug. (Ford 259)

Nursing management

- Do not stop taking the drug abruptly, except on the advice of the primary health care provider. Most of these drugs require that the dosage be gradually decreased to prevent precipitation or worsening of adverse effects.
- Notify the primary health care provider promptly if adverse drug reactions occur.
- Observe caution while driving or performing other hazardous tasks because these drugs (β -adrenergic blockers) may cause drowsiness, dizziness, or lightheadedness.
- Immediately report any signs of HF (weight gain, difficulty breathing, or edema of the extremities).
- Do not use any nonprescription drug (e.g., cold or flu preparations or nasal decongestants) unless you have discussed use of a specific drug with the primary health care provider.
- Inform dentists and other primary health care providers of therapy with this drug.
- Keep all primary health care provider appointments because close monitoring of therapy is essential.
- Check with a primary health care provider or clinical pharmacist to determine if the drug is to be taken with food or on an empty stomach. (Ford 259-260)

Generic	Trade	Use	Dose
Clonidine	Catapres, Catapres-TTS (transdermal)	Hypertension, severe pain in patients with cancer	100–600 mcg/day orally Transdermal: release rate 0.1–0.3 mg/24 hr
Methyldopa	N/A	Hypertension, hypertensive crisis	250 mg orally BID or TID; maintenance dose: 2 g/day; 250–500 mg q 6 hr IV

PNS Drugs

- Peripherally Acting Antiadrenergics

How do they work? "Action"

Inhibits the release of norepinephrine from certain adrenergic nerve endings in the peripheral nervous system. (Ford 256)

Indications

- Hypertension
- BPH

Adverse Reactions

- Dry mouth, drowsiness, sedation, anorexia, rash, malaise, and weakness are generalized reactions to antiadrenergic drugs that work on the CNS.
- Hypotension, weakness, lightheadedness, and bradycardia are adverse reactions associated with the administration of peripherally acting antiadrenergic drugs. (Ford 257)

Contraindications

The peripherally acting antiadrenergic drugs are contraindicated in patients with a hypersensitivity to any of the drugs. Reserpine (Serpasil) is contraindicated in patients who have an active peptic ulcer or ulcerative colitis and in patients who are mentally depressed.

Interactions

- **Adrenergic drugs:** Increased risk of hypertension
- **Levodopa:** Decreased effect of the levodopa, hypotension
- **Anesthetic agents:** Increased effect of the anesthetic
- **β blockers:** Increased risk of hypertension
- **Lithium:** Increased risk of lithium toxicity
- **Haloperidol:** Increased risk of psychotic behavior

Education

Instruct patients to rise slowly from a sitting or lying position. Provide assistance for the patient getting out of bed or a chair if symptoms of postural hypotension are severe. Place the call light nearby and instruct patients to ask for assistance each time they get in and out of bed or a chair. Assist the patient in bed to a sitting position and have the patient sit on the edge of the bed for about 1 minute before ambulating. Help seated patients to a standing position and instruct them to stand in one place for about 1 minute before ambulating. Remain with the patient while he or she is standing in one place, as well as during ambulation. Instruct the patient to avoid standing in one place for prolonged periods. This is rarely a problem in the hospital but should be included in the patient and family discharge teaching plan. Teach the patient to avoid taking hot showers or baths, which tend to increase vasodilation. (Ford 259)

Nursing management

- Do not stop taking the drug abruptly, except on the advice of the primary health care provider. Most of these drugs require that the dosage be gradually decreased to prevent precipitation or worsening of adverse effects.
- Notify the primary health care provider promptly if adverse drug reactions occur.
- Observe caution while driving or performing other hazardous tasks because these drugs (β-adrenergic blockers) may cause drowsiness, dizziness, or lightheadedness.
- Immediately report any signs of HF (weight gain, difficulty breathing, or edema of the extremities).
- Do not use any nonprescription drug (e.g., cold or flu preparations or nasal decongestants) unless you have discussed use of a specific drug with the primary health care provider.
- Inform dentists and other primary health care providers of therapy with this drug.
- Keep all primary health care provider appointments because close monitoring of therapy is essential.
- Check with a primary health care provider or clinical pharmacist to determine if the drug is to be taken with food or on an empty stomach. (Ford 259-260)

Generic	Trade	Use	Dose
Doxazosin	Cardura	Hypertension, BPH	Hypertension: 1–8 mg orally daily BPH: 1–16 mg orally daily
Prazosin	Minipress	Hypertension	1–20 mg orally daily in divided doses

Neurological

Anticonvulsant Phenytoin

Indication:

Epilepsy (long term protection against seizures)



Patient Teaching:

- **NO** oral contraceptives
- **NO** stopping abruptly
- Take Folic acid,



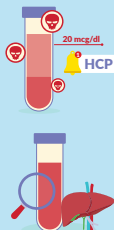
Phenytoin = pheny**TOXIC**



KEY POINTS

10-20 mcg/dl **Therapeutic Range**

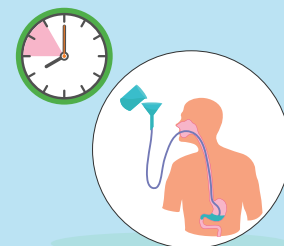
- **Below 10 - Seizure Risk**
REPORT TO HCP!
- **OVER 20 - Toxic Risk**
HOLD MED & notify HCP!
- **Routine Blood Tests**
"blood levels monitored routinely"



Administration:

- **STOP** Tube Feeding for **1-2 hours** before and after admin.

Mentioned multiple times - as a priority!!!



Toxicity: NCLEX TIPS

EARLY Signs to Report to HCP

- **Ataxia** (*unsteady gait or gait disturbance)
- Hand Tremor
- Slurred speech



Other Adverse Effects:

Key Word

- **Suicidal** Ideations
- Skin **Rash** - "new" "painful" = **PRIORITY!!!**



HESI Question

- Hold med for level **higher than 20**
- Take at same time daily - **narrow therapeutic index**

ATI Question

TEACH pt. to inform **dentist** that they are taking phenytoin

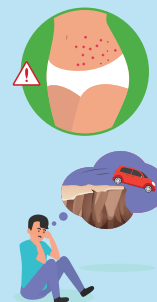
HESI Question

- Perform or assist with oral care every shift.
- Skin rash, fatigue & dyspnea - **priority**

KAPLAN Question

Statements requiring immediate intervention:

- "I noticed a **rash** on my stomach last week"
- "Lately I find myself thinking about **driving off a cliff**"



KAPLAN Question

Encourage foods such as milk, cantaloupe and kale (foods high in folate & Vitamin D)

Requires further teaching: "If I start having adverse effects I will **stop taking** this med immediately"



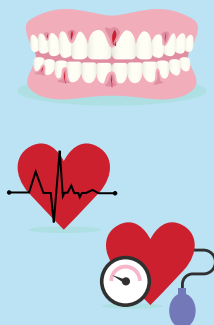
Expected Side Effect

- Bradycardia & Hypotension
- Gingival hyperplasia

NCLEX TIP

TEACH:

Good dental hygiene with soft toothbrush



Anticonvulsants

- Benzodiazepines

How do they work? "Action"

Benzodiazepines elevate the seizure threshold by decreasing postsynaptic excitation. Benzos are specific to treatment of status epilepticus.

Indications

- Seizures of all types
- Neuropathic pain
- Bipolar disorders
- Anxiety disorders

Adverse Reactions

- Nystagmus (constant, involuntary movement of the eyeball)
- Ataxia (loss of control of voluntary movements, especially gait)
- Slurred speech
- Gingival hyperplasia (overgrowth of gum tissue)

Contraindications

All categories of anticonvulsants are contraindicated in patients with known hypersensitivity to the drugs. Benzodiazepines are used cautiously during pregnancy (pregnancy category D) and in patients with psychoses, patients with acute narrow-angle glaucoma, and older or debilitated patients.

Interactions

- Antibiotics/antifungals: Increased effect of the anticonvulsant
- Tricyclic antidepressants: Increased effect of the anticonvulsant
- Salicylates: Increased effect of the anticonvulsant
- Cimetidine: Increased effect of the anticonvulsant
- Theophylline: Decreased serum levels of the anticonvulsant
- Antiseizure medications: May increase seizure activity
- Protease inhibitors: Increased carbamazepine levels, resulting in toxicity
- Oral contraceptives: Decreased effectiveness of birth control, resulting in breakthrough bleeding or pregnancy
- Analgesics or alcohol: Increased depressant effect
- Antidiabetic medications: Increased blood glucose levels

Fun Fact

- Research suggests an association between the use of anticonvulsants by pregnant women with epilepsy and an increased incidence of birth defects. The use of anticonvulsants is not discontinued in pregnant women with a history of major seizures because of the danger of precipitating status epilepticus. However, when seizure activity poses no serious threat to the pregnant woman, the primary health care provider may consider discontinuing use of the drug during pregnancy.
- Recurrence of seizure activity may result from abrupt discontinuation of the drug, even when the anticonvulsant is being administered in small daily doses
- Hematologic changes (e.g., aplastic anemia, leukopenia, and thrombocytopenia) need to be reported immediately. Teach the patient how to identify signs of thrombocytopenia (bleeding gums, easy bruising, increased menstrual bleeding, tarry stools) or leukopenia (sore throat, chills, swollen glands, excessive fatigue, or shortness of breath) and to contact the primary health care provider..

Nursing management

- Do not omit, increase, or decrease the prescribed dose.
- Anticonvulsant blood levels must be monitored at regular intervals, even if the seizures are well controlled.
- This drug should never be abruptly discontinued, except when recommended by the primary health care provider.
- Do not attempt to put anything in the mouth of a person having a seizure.
- If the primary health care provider finds it necessary to stop the drug, another drug usually is prescribed. Start taking this drug immediately (at the time the next dose of the previously used drug was due).
- Anticonvulsant drugs may cause drowsiness or dizziness. Observe caution when performing hazardous tasks. Do not drive unless the adverse reactions of drowsiness, dizziness, or blurred vision are not significant. Driving privileges will be approved or reinstated by the primary health care provider based on seizure control.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Wear medical identification, such as a Medic Alert tag or bracelet, indicating drug use and the type of seizure disorder.

Generic	Trade	Use	Dose
Diazepam	Valium	Status epilepticus, seizure disorders (all forms), anxiety disorders, alcohol withdrawal	Seizure control: 2–10 mg/day orally BID to QID Status epilepticus: 5–10 mg IV initially, maximum dose 30 mg Rectally: 0.2–0.5 mg/kg

Neuromuscular Drugs

- Cholinergic Blocking Drugs

How do they work? "Action"

Drugs with cholinergic blocking activity block ACh in the CNS, enhancing dopamine transmission.

Indications

Adjunctive therapy in all forms of Parkinson-like symptoms and in the control of drug-induced extrapyramidal disorders.

Adverse Reactions

- Dry mouth
- Blurred vision
- Dizziness, mild nausea, and nervousness
- Skin rash, urticaria (hives)
- Urinary retention, dysuria
- Tachycardia, muscle weakness
- Disorientation and confusion

Contraindications

- Glaucoma (angle-closure glaucoma)
- Pyloric or duodenal obstruction
- Peptic ulcers, prostatic hypertrophy, achalasia (failure of the muscles of the lower esophagus to relax, causing difficulty swallowing), myasthenia gravis, and megacolon.

Interactions

- **Amantadine:** Increased anticholinergic effects
- **Digoxin:** Increased digoxin serum levels
- **Haloperidol:** Increased psychotic behavior
- **Phenothiazines:** Increased anticholinergic effects

Drugs with Parkinson-Like Adverse Reactions

The following drugs can produce symptoms similar to Parkinson's disease, also known as extrapyramidal symptoms (EPS), which may be treated with similar drugs to reduce the adverse reactions:

- Antidepressants
- Antiemetics
- Antipsychotics—first generation
- Lithium
- Stimulants
- Individuals older than 60 years frequently develop increased sensitivity to anticholinergic drugs and require careful monitoring. Confusion and disorientation may occur. Lower doses may be required.

Nursing management

- If dizziness, drowsiness, or blurred vision occurs, avoid driving or performing other tasks that require alertness.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Relieve dry mouth by sucking on hard candy (unless the patient has diabetes) or taking frequent sips of water. Consult a dentist if dryness of the mouth interferes with wearing, inserting, or removing dentures or causes other dental problems.
- Keep all appointments with the primary health care provider or clinic personnel because close monitoring of therapy is necessary.
- Ask your primary health care provider before buying vitamin supplements when taking levodopa. Vitamin B6 (pyridoxine) may interfere with the action of levodopa.

Generic	Trade	Use	Dose
Benzotropine	Cogentin	Parkinson's disease, drug-induced EPS	0.5–6 mg/day orally Acute dystonia: 1–2 mL IM or IV
Diphenhydramine	Benadryl	Drug-induced EPS, allergies 2	25–50 mg orally TID or QID

Anticonvulsant Levetiracetam

Drug name:

Levetiracetam



Indication:

- Prevent & treat seizures



- Often preferred **over phenytoin** due to minimal drug to drug interactions

Over phenytoin



Common Side Effects:

CNS depressant - LOW & SLOW body
- drowsiness & fatigue



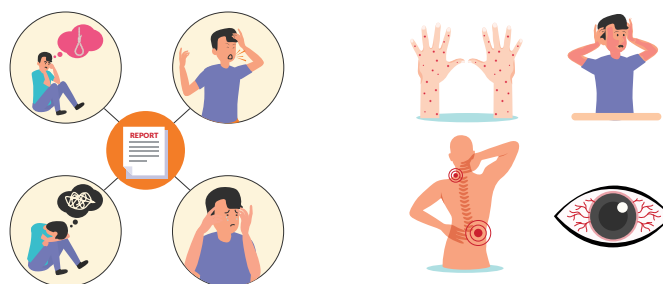
MAJOR ADVERSE EFFECTS:

Just like Phenytoin -

- Suicidal thoughts
- Stevens-Johnson



- Report: New anxiety, agitation, depression, mood changes
- Report: Rash, blistering, muscle/joint pain



KEY POINTS

Patient teaching:

- **Driving** = Get permission from HCP & follow transportation dept. guidelines.



Notes

Anticonvulsants

- Misc

How do they work? "Action"

Miscellaneous drugs have differing properties; for example, gabapentin is a GABA agonist, and topiramate blocks the seizure activity rather than raising the threshold.

Indications

- Seizures of all types
- Neuropathic pain
- Bipolar disorders
- Anxiety disorders

Adverse Reactions

- Nystagmus (constant, involuntary movement of the eyeball)
- Ataxia (loss of control of voluntary movements, especially gait)
- Slurred speech
- Gingival hyperplasia (overgrowth of gum tissue)

Contraindications

All categories of anticonvulsants are contraindicated in patients with known hypersensitivity to the drugs. Carbamazepine should not be given within 14 days of monoamine oxidase inhibitor (MAOI) antidepressants. Carbamazepine is contraindicated in patients with bone marrow depression or hepatic or renal impairment and during pregnancy (pregnancy category D).

Interactions

- **Antibiotics/antifungals:** Increased effect of the anticonvulsant
- **Tricyclic antidepressants:** Increased effect of the anticonvulsant
- **Salicylates:** Increased effect of the anticonvulsant
- **Cimetidine:** Increased effect of the anticonvulsant
- **Theophylline:** Decreased serum levels of the anticonvulsant
- **Antiseizure medications:** May increase seizure activity
- **Protease inhibitors:** Increased carbamazepine levels, resulting in toxicity
- **Oral contraceptives:** Decreased effectiveness of birth control, resulting in breakthrough bleeding or pregnancy
- **Analgesics or alcohol:** Increased depressant effect
- **Antidiabetic medications:** Increased blood glucose levels

Fun Fact

- Research suggests an association between the use of anticonvulsants by pregnant women with epilepsy and an increased incidence of birth defects. The use of anticonvulsants is not discontinued in pregnant women with a history of major seizures because of the danger of precipitating status epilepticus. However, when seizure activity poses no serious threat to the pregnant woman, the primary health care provider may consider discontinuing use of the drug during pregnancy.
- Recurrence of seizure activity may result from abrupt discontinuation of the drug, even when the anticonvulsant is being administered in small daily doses
- Hematologic changes (e.g., aplastic anemia, leukopenia, and thrombocytopenia) need to be reported immediately. Teach the patient how to identify signs of thrombocytopenia (bleeding gums, easy bruising, increased menstrual bleeding, tarry stools) or leukopenia (sore throat, chills, swollen glands, excessive fatigue, or shortness of breath) and to contact the primary health care provider..

Nursing management

- Do not omit, increase, or decrease the prescribed dose.
- Anticonvulsant blood levels must be monitored at regular intervals, even if the seizures are well controlled.
- This drug should never be abruptly discontinued, except when recommended by the primary health care provider.
- Do not attempt to put anything in the mouth of a person having a seizure.
- If the primary health care provider finds it necessary to stop the drug, another drug usually is prescribed. Start taking this drug immediately (at the time the next dose of the previously used drug was due).
- Anticonvulsant drugs may cause drowsiness or dizziness. Observe caution when performing hazardous tasks. Do not drive unless the adverse reactions of drowsiness, dizziness, or blurred vision are not significant. Driving privileges will be approved or reinstated by the primary health care provider based on seizure control.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Wear medical identification, such as a Medic Alert tag or bracelet, indicating drug use and the type of seizure disorder.

Generic	Trade	Use	Dose
Carbamazepine	Tegretol, Carbatrol, Epitol, Equetro	Epilepsy, bipolar disorder, trigeminal/postherpetic neuralgia	Maintenance: 800–1200 mg/day orally in divided doses

Neuromuscular Drugs

- Dopaminergics

How do they work? "Action"

Drugs that work to stimulate the dopamine receptors are called agonists. An example of this drug category includes bromocriptine. The action of amantadine is to make more of the dopamine available at the receptor site. Rasagiline (Azilect) and selegiline inhibit monoamine oxidase type B, again making more dopamine available. (Ford 282)

Indications

- Parkinson's disease
- Parkinson-like symptoms (extrapyramidal) as a result of injury, drug therapy, or encephalitis
- Restless leg syndrome (RLS)
- Viral infections (amantadine) (Ford 282-283)

Adverse Reactions

- Dry mouth and difficulty in swallowing
- Anorexia, nausea, and vomiting
- Abdominal pain and constipation
- Increased hand tremor
- Headache and dizziness (Ford 283)
- The most serious adverse reactions seen with levodopa include choreiform movements (involuntary muscular twitching of the limbs or facial muscles) and dystonic movements (muscular spasms most often affecting the tongue, jaw, eyes, and neck). (Ford 283)

Contraindications

Levodopa is contraindicated in patients with narrow-angle glaucoma and those receiving MAOI antidepressants.

Interactions

- **Tricyclic antidepressants:** Increased risk of hypertension and dyskinesia
- **Antacids:** Increased effect of levodopa
- **Anticonvulsants:** Decreased effect of levodopa
- Foods high in pyridoxine (vitamin B6) or vitamin B6 preparations reduce the effect of levodopa.

Nursing management

- The patient should be screened for unusual skin lesions, because levodopa can activate malignant melanoma
- The dopamine agonists selegiline and rasagiline should not be used with the opioid meperidine (Demerol) because of antimetabolite conversion. Caution should be taken with any other opioid used with these antiparkinson drugs.
- Hallucinations occur more often in the older adult than in the younger adult receiving antiparkinson drugs. This is especially likely when taking dopamine receptor agonists.
- If dizziness, drowsiness, or blurred vision occurs, avoid driving or performing other tasks that require alertness.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Relieve dry mouth by sucking on hard candy (unless the patient has diabetes) or taking frequent sips of water. Consult a dentist if dryness of the mouth interferes with wearing, inserting, or removing dentures or causes other dental problems.
- Keep all appointments with the primary health care provider or clinic personnel because close monitoring of therapy is necessary.
- Ask your primary health care provider before buying vitamin supplements when taking levodopa. Vitamin B6 (pyridoxine) may interfere with the action of levodopa.

Generic	Trade	Dose	Use
Amantadine	N/A	Parkinson's disease/drug-induced extrapyramidal symptoms, prevention and treatment of infection with influenza A virus	200–400 mg/day orally in divided doses
Carbidopa/ Levodopa	Sinemet, Sinemet CR, Parcopa	Parkinson's disease	Begin with 10 mg/100 mg tablet orally TID, titrated dose combination to minimize symptoms

Cholinergics

Neostigmine, Pyridostigmine

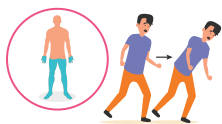
Drug name:

Neostigmine
Pyridostigmine



Indication:

- MG - Myasthenia Gravis
- Dry body & lack of mobility



MOA:

Helps lube up the body with secretions by increasing acetylcholine



Memory Trick:

"-stigmine"
Secretions MINE



Adverse Effects:

CCCholinergic Crisis
is a **SeCCCre**tion crisis!

<p>Pupil constriction</p>	<p>Tears "lacrimation"</p>	<p>Saliva "Drooling"</p>	<p>Sweating "Diaphoresis"</p>	<p>Diarrhea, N/V</p>
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Antidote:

Atropine (**Anti**cholinergic)
- Ending in Tropine
- NO pee with tropine
Dry body



HESI Question

Anticipate drug to treat myasthenia gravis?

- Neostigmine

Patient being managed for **myasthenic crisis** develops asthma:

- Discontinue **Pyridostigmine**

Patient with anticholinergic toxicity

- **Physostigmine**

Med Effectiveness: "-Stigmine"

- Absence of **muscle cramps** and adequate vision without **diplopia**



ATI Question

- Pupil constriction
- Difficulty with visual accommodation
- Atropine given for **cholinergic crisis caused by** excess amount of **neostigmine**



KAPLAN Question

Client on **pyridostigmine** having salivation, lacrimation, and urination - notify the HCP



Notes

Neuromuscular Drugs

- Compt Receptor

How do they work? "Action"

Thought to prolong the effect of levodopa by blocking an enzyme, COMT, which eliminates dopamine. When given with levodopa, the COMT inhibitors increase the plasma concentrations and duration of action of levodopa.

Indications

Used as adjuncts to levodopa/carbidopa in treating Parkinson's disease. Entacapone is a mild COMT inhibitor and is used to help manage fluctuations in the response to levodopa in individuals with Parkinson's disease. Tolcapone is a potent COMT inhibitor that easily crosses the blood-brain barrier. However, the drug is associated with liver damage and liver failure. Because of the danger to the liver, tolcapone is reserved for people who are not responding to other therapies.

Adverse Reactions

- Dizziness
- Dyskinesias, hyperkinesia, akathisia
- Nausea, anorexia, and diarrhea
- Orthostatic hypotension, sleep disorders, excessive dreaming
- Somnolence and muscle cramps

Interactions

- **MAOI antidepressants:**
- Increased risk of toxicity of both drugs
- **Adrenergic drugs:** Increased risk of cardiac symptoms

Contraindications

These drugs are contraindicated in patients with hypersensitivity to the drugs and during pregnancy and lactation (pregnancy category C). Tolcapone is contraindicated in patients with liver dysfunction. The COMT inhibitors are used with caution in patients with hypertension, hypotension, and decreased hepatic or renal function.

Nursing management

- If dizziness, drowsiness, or blurred vision occurs, avoid driving or performing other tasks that require alertness.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Relieve dry mouth by sucking on hard candy (unless the patient has diabetes) or taking frequent sips of water. Consult a dentist if dryness of the mouth interferes with wearing, inserting, or removing dentures or causes other dental problems.
- Keep all appointments with the primary health care provider or clinic personnel because close monitoring of therapy is necessary.
- Ask your primary health care provider before buying vitamin supplements when taking levodopa. Vitamin B6 (pyridoxine) may interfere with the action of levodopa.

Generic	Trade	Dose	Use
Entacapone	Comtan	As adjunct to levodopa/carbidopa in Parkinson's disease	200-1600 mg/day orally
Tolcapone	Tasmar	Parkinson's disease when refractory to levodopa/carbidopa	100-200 mg orally TID

Anticonvulsants

- Carboxylic Acid

How do they work? "Action"

Carboxylic acid derivatives increase levels of gamma (γ)-aminobutyric acid (GABA), which stabilizes cell membranes.

Indications

- Seizures of all types
- Neuropathic pain
- Bipolar disorders
- Anxiety disorders

Adverse Reactions

- Nystagmus (constant, involuntary movement of the eyeball)
- Ataxia (loss of control of voluntary movements, especially gait)
- Slurred speech
- Gingival hyperplasia (overgrowth of gum tissue)

Contraindications

Carbamazepine should not be given within 14 days of monoamine oxidase inhibitor (MAOI) antidepressants. Carbamazepine is contraindicated in patients with bone marrow depression or hepatic or renal impairment and during pregnancy (pregnancy category D). Valproic acid (Depakote) is not administered to patients with renal impairment or during pregnancy (pregnancy category D). Oxcarbazepine (Trileptal), a miscellaneous anticonvulsant, may exacerbate dementia.

Interactions

- Antibiotics/antifungals: Increased effect of the anticonvulsant
- Tricyclic antidepressants: Increased effect of the anticonvulsant
- Salicylates: Increased effect of the anticonvulsant
- Cimetidine: Increased effect of the anticonvulsant
- Theophylline: Decreased serum levels of the anticonvulsant
- Antiseizure medications: May increase seizure activity
- Protease inhibitors: Increased carbamazepine levels, resulting in toxicity
- Oral contraceptives: Decreased effectiveness of birth control, resulting in breakthrough bleeding or pregnancy
- Analgesics or alcohol: Increased depressant effect
- Antidiabetic medications: Increased blood glucose levels

Nursing management

- Do not omit, increase, or decrease the prescribed dose.
- Anticonvulsant blood levels must be monitored at regular intervals, even if the seizures are well controlled.
- This drug should never be abruptly discontinued, except when recommended by the primary health care provider.
- Do not attempt to put anything in the mouth of a person having a seizure.
- If the primary health care provider finds it necessary to stop the drug, another drug usually is prescribed. Start taking this drug immediately (at the time the next dose of the previously used drug was due).
- Anticonvulsant drugs may cause drowsiness or dizziness. Observe caution when performing hazardous tasks. Do not drive unless the adverse reactions of drowsiness, dizziness, or blurred vision are not significant. Driving privileges will be approved or reinstated by the primary health care provider based on seizure control.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Wear medical identification, such as a Medic Alert tag or bracelet, indicating drug use and the type of seizure disorder.
- Do not use any nonprescription drug unless the preparation has been approved by the primary health care provider.
- Keep a record of all seizures (date, time, length), as well as any minor problems (e.g., drowsiness, dizziness, lethargy), and take the record to each clinic or office visit.
- Contact the local branches of agencies, such as the Epilepsy Foundation of America, for information and assistance with problems, such as legal matters, insurance, driver's license, low-cost prescription services, and job training or retraining.

Generic	Trade	Dose	Use
Valproic acid	DEPAKOTE	Epilepsy, migraine headache, mania	10–60 mg/kg/day orally; if dosage is more than 250 mg/day, give in divided doses

Neuromuscular Drugs

- Dopamine Receptor Agonist

How do they work? "Action"

It is thought that non ergot dopamine receptors act directly on postsynaptic dopamine receptors of nerve cells in the brain, mimicking the effects of dopamine in the brain.

Indications

Treatment of the signs and symptoms of Parkinson's disease. It is also used in the treatment of RLS. apomorphine (Apokyn) is used for the on-off phenomena of Parkinson's disease. Antiemetic therapy must be initiated with this drug.

Adverse Reactions

- Nausea, dizziness, vomiting
- Somnolence, hallucinations, confusion, visual disturbances
- Postural hypotension, abnormal involuntary movements
- Headache

Contraindications

Dopamine receptor agonists are used with caution in patients with dyskinesia, orthostatic hypotension, hepatic or renal impairment, cardiovascular disease, and a history of hallucinations or psychosis. Both ropinirole and pramipexole are pregnancy category C drugs, and safety during pregnancy has not been established.

Interactions

- Cimetidine, ranitidine: Increased dopamine agonist effectiveness
- verapamil, quinidine: Increased dopamine agonist effectiveness
- Estrogen: Increased dopamine agonist effectiveness
- Phenothiazines: Decreased dopamine agonist effectiveness

Nursing management

- Hallucinations occur more often in the older adult than in the younger adult receiving anti parkinson drugs. This is especially likely when taking dopamine receptor agonists.
- If dizziness, drowsiness, or blurred vision occurs, avoid driving or performing other tasks that require alertness.
- Avoid the use of alcohol unless use has been approved by the primary health care provider.
- Relieve dry mouth by sucking on hard candy (unless the patient has diabetes) or taking frequent sips of water. Consult a dentist if dryness of the mouth interferes with wearing, inserting, or removing dentures or causes other dental problems.
- Keep all appointments with the primary health care provider or clinic personnel because close monitoring of therapy is necessary.
- Ask your primary health care provider before buying vitamin supplements when taking levodopa. Vitamin B6 (pyridoxine) may interfere with the action of levodopa.

Generic	Trade	Use	Dose
Apomorphine	Apokyn	Parkinson's disease "off" episode	0.2 mL as needed for "off" episode
Pramipexole	Mirapex	Parkinson's disease, RLS	0.125–1.5 mg orally TID
Ropinirole	Requip	Parkinson's disease, RLS	0.25–1 mg orally TID

Migraine

Drug name:

Sumatriptan



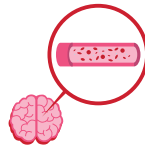
Indication:

Given to treat migraines & cluster headaches



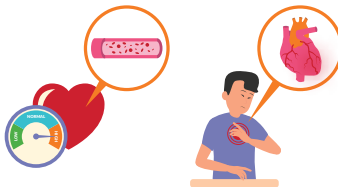
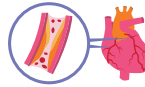
MOA:

Vasoconstriction of brain vessels



Contraindication:

- CAD - coronary artery disease
- Uncontrolled Hypertension
Risk for HTN crisis, angina & MI

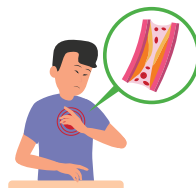


KEY POINT

- Screen for **history of uncontrolled HTN** & **REPORT** it!

ATI Teach: **Report** angina (coronary vasospasms) with **Sumatriptan**

REPORT



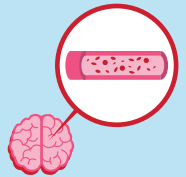
Drug name:

Ergotamine SL



MOA:

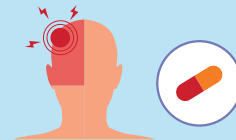
Vasoconstriction of brain vessels



ATI Question

Indication = Migraine Headaches

Teach = Take one tablet immediately at onset of headaches



HESI Question

Ergotamine

Priority finding: Pale extremities



Notes

Anticonvulsants

- Oxazolidinedione

How do they work? "Action"

Oxazolidinones decrease repetitive synaptic transmissions of nerve impulses.

Indications

- Seizures of all types
- Neuropathic pain
- Bipolar disorders
- Anxiety disorders

Adverse Reactions

- Nystagmus (constant, involuntary movement of the eyeball)
- Ataxia (loss of control of voluntary movements, especially gait)
- Slurred speech
- Gingival hyperplasia (overgrowth of gum tissue)

Contraindications

Oxazolidinones have been associated with serious adverse reactions and fetal malformations. They should be used only when other, less toxic drugs are not effective in controlling seizures.

Interactions

- **Antibiotics/antifungals:** Increased effect of the anticonvulsant
- **Tricyclic antidepressants:** Increased effect of the anticonvulsant
- **Salicylates:** Increased effect of the anticonvulsant
- **Cimetidine:** Increased effect of the anticonvulsant
- **Theophylline:** Decreased serum levels of the anticonvulsant
- **Antiseizure medications:** May increase seizure activity
- **Protease inhibitors:** Increased carbamazepine levels, resulting in toxicity
- **Oral contraceptives:** Decreased effectiveness of birth control, resulting in breakthrough bleeding or pregnancy
- **Analgesics or alcohol:** Increased depressant effect
- **Antidiabetic medications:** Increased blood glucose levels

Fun Fact

- Research suggests an association between the use of anticonvulsants by pregnant women with epilepsy and an increased incidence of birth defects. The use of anticonvulsants is not discontinued in pregnant women with a history of major seizures because of the danger of precipitating status epilepticus. However, when seizure activity poses no serious threat to the pregnant woman, the primary health care provider may consider discontinuing use of the drug during pregnancy.
- Recurrence of seizure activity may result from abrupt discontinuation of the drug, even when the anticonvulsant is being administered in small daily doses
- Hematologic changes (e.g., aplastic anemia, leukopenia, and thrombocytopenia) need to be reported immediately. Teach the patient how to identify signs of thrombocytopenia (bleeding gums, easy bruising, increased menstrual bleeding, tarry stools) or leukopenia (sore throat, chills, swollen glands, excessive fatigue, or shortness of breath) and to contact the primary health care provider..

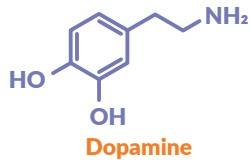
Nursing management

- This drug may cause photosensitivity. Take protective measures (e.g., wear sunscreens and protective clothing) when exposed to ultraviolet light or sunlight until tolerance is determined.
- Notify the primary health care provider if the following reactions occur: visual disturbances, excessive drowsiness or dizziness, sore throat, fever, skin rash, pregnancy, malaise, easy bruising, epistaxis, or bleeding tendencies.
- Avoid pregnancy while taking trimethadione; the drug has caused serious birth defects.

Generic	Trade	Dose	Use
Trimethadione	Tridione	Epilepsy	900 mg–2.4 g/day orally in equally divided doses

Parkinson's Carbidopa + Levodopa

Pathophysiology:



Parkinson's Disease

LOW Dopamine
HIGH acetylcholine



Memory Trick:

Levodopa - Leaves more dopamine in the brain

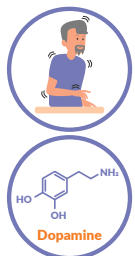
Carbidopa - Conserves the dopamine



HESI Question

Levodopa

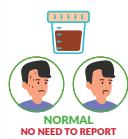
- Main drug of Parkinson treatment
- Dopamine precursor



KEY POINT

Patient Teaching

- **Slow** onset **2 - 6 weeks** to become effective
- **Slow** position changes
- **Red, brown** urine, sweat, saliva = NORMAL **NCLEX TIP**
- **NO** high protein meals **NCLEX TIP**
- **NOT** "elimination" of tremors or rigidity - Only Decreases **NCLEX TIP**
- **NEVER** stop abruptly!



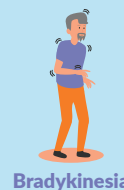
HESI Question

- MAOIs (antidepressant) enhance efficacy
- **Selegiline** (MAOIs) used as adjunct treatment with carbidopa-levodopa



KEY POINT

Improvement in spontaneous movement
(effective for bradykinesia)



Bradykinesia

Memory Trick:

- If you want to Jump Rope
- You need more DOP-amine



Kaplan Question

Carbidopa - Levodopa

- **Medication effective:** "My husband is able to walk around the yard"
- **Effectiveness:** Client is more ambulatory
- **Don't let the NCLEX trick you**
NO - it does not help with memory!



Notes

Anticonvulsants

- Hydantoins

How do they work? "Action"

Hydantoins stabilize the hyperexcitability postsynaptically in the motor cortex of the brain.

Indications

- Seizures of all types
- Neuropathic pain
- Bipolar disorders
- Anxiety disorders

Adverse Reactions

- Nystagmus (constant, involuntary movement of the eyeball)
- Ataxia (loss of control of voluntary movements, especially gait)
- Slurred speech
- Gingival hyperplasia (overgrowth of gum tissue)

Contraindications

Phenytoin is contraindicated in patients with sinus bradycardia, sinoatrial block, Adams-Stokes syndrome, and second- and third-degree atrioventricular (AV) block; it also is contraindicated during pregnancy and lactation (ethotoin and phenytoin are pregnancy category D drugs).

Interactions

- **Antibiotics/antifungals:** Increased effect of the anticonvulsant
- **Tricyclic antidepressants:** Increased effect of the anticonvulsant
- **Salicylates:** Increased effect of the anticonvulsant
- **Cimetidine:** Increased effect of the anticonvulsant
- **Theophylline:** Decreased serum levels of the anticonvulsant
- **Antiseizure medications:** May increase seizure activity
- **Protease inhibitors:** Increased carbamazepine levels, resulting in toxicity
- **Oral contraceptives:** Decreased effectiveness of birth control, resulting in breakthrough bleeding or pregnancy
- **Analgesics or alcohol:** Increased depressant effect
- **Antidiabetic medications:** Increased blood glucose levels

Fun Fact

- Research suggests an association between the use of anticonvulsants by pregnant women with epilepsy and an increased incidence of birth defects. The use of anticonvulsants is not discontinued in pregnant women with a history of major seizures because of the danger of precipitating status epilepticus. However, when seizure activity poses no serious threat to the pregnant woman, the primary health care provider may consider discontinuing use of the drug during pregnancy.
- Recurrence of seizure activity may result from abrupt discontinuation of the drug, even when the anticonvulsant is being administered in small daily doses
- Hematologic changes (e.g., aplastic anemia, leukopenia, and thrombocytopenia) need to be reported immediately. Teach the patient how to identify signs of thrombocytopenia (bleeding gums, easy bruising, increased menstrual bleeding, tarry stools) or leukopenia (sore throat, chills, swollen glands, excessive fatigue, or shortness of breath) and to contact the primary health care provider..

Nursing management

- Inform the dentist and other primary health care providers of use of this drug.
- Brush and floss the teeth after each meal and make periodic dental appointments for oral examination and care.
- Take the medication with food to reduce GI upset.
- Thoroughly shake a phenytoin suspension immediately before use.
- Do not take capsules that are discolored.
- Notify the primary health care provider if any of the following occurs: skin rash, bleeding, swollen or tender gums, yellowish discoloration of the skin or eyes, unexplained fever, sore throat, unusual bleeding or bruising, persistent headache, malaise, or pregnancy

Generic	Trade	Use	Dose
Fosphenytoin	N/A	Status epilepticus	Loading dose: 15–20 mg/kg IV Maintenance dose: 4–6 mg/kg/day IV
Phenytoin	Dilantin	Tonic-clonic seizures, status epilepticus, prophylactic seizure prevention	Oral: loading dose: 1 g divided into three doses prevention (400 mg, 300 mg, 300 mg) orally q 2 hr Maintenance dose: started 24 hr after loading dose, 300–400 mg/day Parenteral: 10–15 mg/kg IV

Anticholinergics

Benztropine, Atropine

Drug names:

Benztropine
Atropine



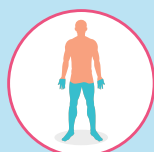
Indication:

1. Speeds up heart rate in symptomatic bradycardia
2. Antidote for cholinergic crisis
3. Treats tremors in Parkinsons



MOA:

Turns off the PNS - parasympathetic (rest & digest) by blocking the vagus nerve. This allows the SNS sympathetic fight or flight, to be ON IN FULL FORCE. Which activates the vital organs - SHOOTING UP the heart rate & making the body dry



KEY POINTS

- Treat Extrapramidal s/s (Dystonia)
- Parkinson's Tremors (Bradykinesia)
 - **Muscle rigidity**
 - **Shuffling gait**



Memory Trick:

TREMORS - Tropines
aTropines - Treat Tremors - Parkinsons

KEY POINTS

CONTRAINDICATIONS

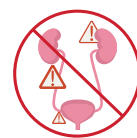
- **No Bowel obstruction**
- **No Glaucoma**

NCLEX

Atropine may precipitate acute glaucoma

Clients with glaucoma!- Notify HCP!

- **No BPH** or urinary retention!



HESI Question

Patient Teaching

- **Teaching:** Notify the HCP if you develop **urinary retention**.
- This med can **reduce the ability to sweat** so do not overheat
- Sit or stand up slowly to prevent lightheadedness



Notes

Anticonvulsants

- Succinimides

How do they work? "Action"

Succinimides depress the motor cortex, creating a higher threshold before nerves react to the convulsive stimuli.

Indications

- Seizures of all types
- Neuropathic pain
- Bipolar disorders
- Anxiety disorders

Adverse Reactions

- Nystagmus (constant, involuntary movement of the eyeball)
- Ataxia (loss of control of voluntary movements, especially gait)
- Slurred speech
- Gingival hyperplasia (overgrowth of gum tissue)

Contraindications

Succinimides are contraindicated in patients with bone marrow depression or hepatic or renal impairment. A higher incidence of systemic lupus erythematosus has been found in patients taking succinimides.

Interactions

- **Antibiotics/antifungals:** Increased effect of the anticonvulsant
- **Tricyclic antidepressants:** Increased effect of the anticonvulsant
- **Salicylates:** Increased effect of the anticonvulsant
- **Cimetidine:** Increased effect of the anticonvulsant
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Nursing management

- If GI upset occurs, take the drug with food or milk.
- Notify the primary health care provider if any of the following occurs: skin rash, joint pain, unexplained fever, sore throat, unusual bleeding or bruising, drowsiness, dizziness, blurred vision, or pregnancy.

Generic	Trade	Use	Dose
Ethosuximide	Zarontin	Partial seizures	Up to 1.5 g/day orally in divided doses; children, 250 mg/day orally
Methsuximide	Celontin	Partial seizures	300–1200 mg/day orally

Osmotic Diuretic Mannitol

Drug name:

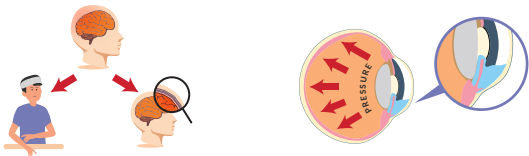
Mannitol



Indication:

Decreases cerebral edema resulting in increased ICP: head injury, brain swelling, etc.

Decreases intraocular pressure - glaucoma emergencies



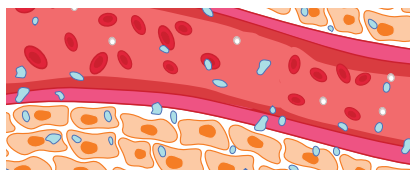
Memory Trick:

- Mannitol
- Man ICP hurts or Man Eyes hurt



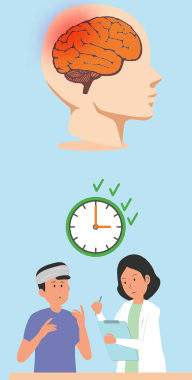
MOA:

Drains fluid out of brain cells & into vascular space = HIGH RISK for fluid volume overload (too much fluid in the body)



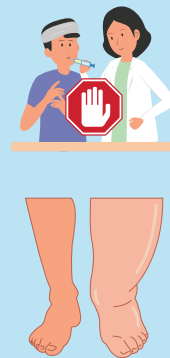
ATI

- Give **Mannitol** for increased ICP
- Assess LOC every hour



HESI

- **Mannitol**: Used to decrease ICP
- IV admin - cannot be given PO
- **Side effect** - Edema
- Begins 30 - 60 minutes after administration.



ATI

Mannitol

- Monitor for s/s heart failure: **Bibasilar crackles, pulmonary edema**



Side Effect:



Heart Failure



Heavy Fluid

HF =

Heart failure

Heavy Fluid all over the body

Notes

Neuromuscular Blocking Agent

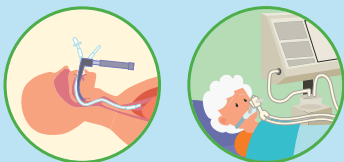
Drug names:

Succinylcholine
Pancuronium
Cisatracurium



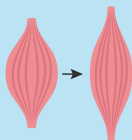
Indication:

Given before intubation & mechanical ventilation.
Like before surgery & in emergency settings



HESI

- Used to facilitate **mechanical ventilation**
- Produces **deep muscle relaxation** **NCLEX**

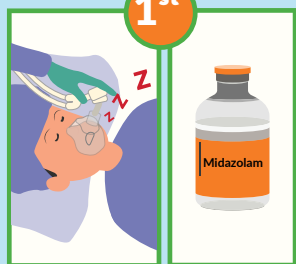


HESI

- MUST** give sedation!
- Primary result is **flaccid paralysis** - NOT loss of consciousness



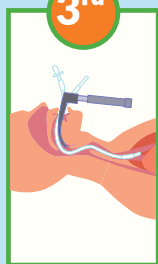
1st



2nd



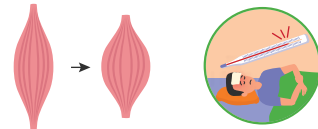
3rd



DEADLY Adverse Effect

Malignant hyperthermia (MH)

- M - Muscle rigidity
- H - HOT



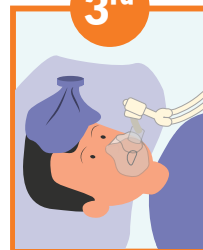
1st



2nd



3rd



1. Notify HCP
2. IV dantrolene
3. Oxygen

HESI

- After admin **succinylcholine** ... high fever and **muscle rigidity**
- Prepare to give **IV DANTROLENE**



KEY POINT

Screen for **HIGH RISK - MH**

1. **Prior reaction** to general anesthesia **MOST CRITICAL**
2. Blood relatives with significant reaction to general anesthesia
3. Alcoholics **HESI**

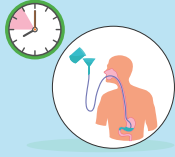


Notes


Neurological Top Missed Questions

Which nursing action(s) are appropriate for a nurse preparing to administer **phenytoin** via a nasogastric (NG) tube? **Select all that apply.**


- 1. Hold tube feedings for at least one hour prior to administration.**
- 2. Flush the nasogastric tube with 30 mL tap water before and after administration.**
- 3. Monitor blood pressure and heart rate every 15 minutes for two hours after administration.
- 4. Monitor liver function tests on a regular basis for patients taking phenytoin.**
- 5. Administer phenytoin at the onset of new seizure activity.



Flush with 30 - 50 mL tap water



before & after






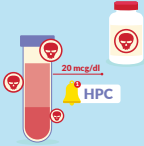

KEY POINTS

10-20 mcg/dl Therapeutic Range

- Below 10 - Seizure Risk - REPORT TO HCP!
- OVER 20 - Toxic Risk - HOLD MED & notify HCP!
- Routine Blood Tests "blood levels monitored routinely"


Which adverse effects of **phenytoin** should the nurse immediately report to the provider? **Select all that apply**

- 1. New reports of feeling "unsteady" when ambulating.**
- 2. The appearance of a new rash on the patient's chest.**
- 3. Reports of feeling hopeless and apathetic.**
- 4. A morning phenytoin level of 26 mg/ dL.**
- 5. Difficulty forming words and sentences.**

The health care provider has prescribed 4 mg **succinylcholine** to be administered IV push during a rapid sequence intubation. Which is the nurse's **priority action** when preparing to administer this medication?

- 1. Check the patient's core body temperature.
- 2. Ask the patient about a history of alcohol abuse.**
- 3. Prepare a dose of midazolam as prescribed for sedation.
- 4. Ensure that a non-rebreather mask is at the bedside prior to administration.




KEY POINT



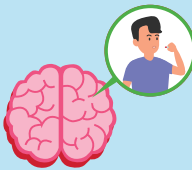

Screen for **HIGH RISK - MH**

1. **Prior reaction** to general anesthesia **MOST CRITICAL**
2. Blood relatives with significant reaction to general anesthesia
3. Alcoholics **HESI**

Which instruction(s) should the nurse include in the plan of care for a patient newly prescribed **carbidopa-levodopa** for the treatment of Parkinson Disease? **Select all that apply.**

- 1. "If you don't notice improvement in your symptoms within one week, notify your provider."
- 2. "When going from a sitting to a standing position, be sure to change your position slowly."**
- 3. "It is a good idea to remove any extra clutter from your home that could cause you to trip and fall."**
- 4. "Call your provider if you notice that your urine changes to a slightly reddish color."
- 5. "Avoid eating meals that contain large amounts of protein while taking this medication."**

LEAVEodopa

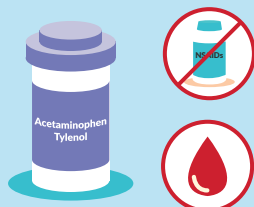





Pain Medication

Acetaminophen (brand: Tylenol)

Indication:

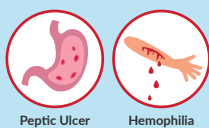
Fever & mild pain. Used instead of NSAIDs to decrease bleeding risk



Key Points:

A - Absence of BLEEDING

- Like in patients with Peptic Ulcer or Hemophilia



Peptic Ulcer

Hemophilia

- Mild joint pain or Fever



Mild joint pain

Fever

- Another Plus is that Tylenol & NSAIDs can be used interchangeably to reduce fever



- When you reach max dose on one you can use the other



- So it's recommended for child with flu



A - Alcohol history (Liver Toxic)

KEY Term

- Avoid ETOH



HESI Question

Acetaminophen high risk client?

54 year old male who **abuses alcohol**



A - Acetylcysteine = Antidote

Memory Trick:

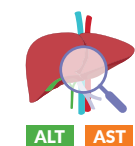
Acetylcysteine **blocks**
Acetaminophen



ATI question

During an Overdose to monitor for which labs?

ALT and AST



ALT AST

Notes

NSAIDS

Drug name:

- N** Naproxen **NCLEX TIP**
- S** Salicylate acid (Aspirin)
- A** Acetylsalicylic acid (Aspirin)
- I** Ibuprofen & Indomethacin
- K** Ketorolac (brand: Toradol) **NCLEX TIP**

Indication:

Anti-inflammatory & Antipyretic (Fever reducer)

MOA:

Decrease prostaglandin response to decrease pain & inflammation

HESI Question

Gout teaching effective
"I can use **ibuprofen** or **naproxen** for pain"



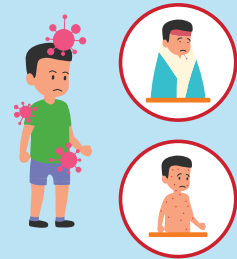
ATI Question

Patient with rheumatoid arthritis, **NSAIDS** relieve the symptoms

N	NOT GOOD FOR BODY (Kidneys, Heart Failure, Asthma, GI, clots ect)
S	STICKY BLOOD "CLOTS" Increased risk for thrombosis
A	ASTHMA WORSENING
I	INCREASED BLEED RISK!
D	DYSFUNCTIONAL KIDNEYS Renal Injury (long term use) Creatinine over 1.3, Urine output 30ml/hr or Less
S	SWELLING HEART CHF (heart failure) & HTN worsening

Aspirin Pt Education:

- **A - Aspirin**
- **A - Avoid Kids** **NCLEX TIPS**
= possible Reye's Syndrome
- Early sign of toxicity is Tinnitus
- report to HCP



NCLEX Question

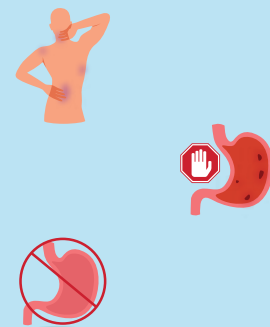
- Pt. with **asthma** or nasal polyps
- Use **acetaminophen** instead of an NSAID



NOTIFY HCP

KEY Words

- Easy bruising
- Tarry Stool & coffee-ground emesis = GI bleed
- AVOID - "Peptic Ulcer" (GI bleeding)
- Take medicine with food
- NEVER EMPTY STOMACH



Kaplan Question

"increased bleed risk"



HESI Question

- Ibuprofen
- Do **NOT** take on an **empty stomach**. - **YES**
 - Patient with Acid reflux on Ranitidine (PPI) & NSAID - **YES** ok
 - "I take occasional ibuprofen for my knees" - **YES**



HESI Question

Patient with HTN or CHF
"I will **call my HCP** before taking ibuprofen"



Opioids

Drug name:

Opioids - O's

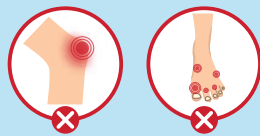
- mOrphine Sulfate
- HydrOmOrphOne
- cOdeine
- Oxycontin
- OxycOdOne
- Fentanyl

Memory Trick

Opioids LOW & SLOW

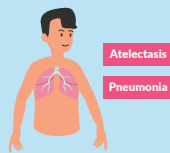
Indication:

Severe pain (not anti-inflammatory/antipyretic)



Killer Adverse Effects

- **Low RR - respiratory depression**
KEY Number:
Hold dose for RR **below 12**
- **Low BP - Hypotension**
"orthostatic Hypotension"
KEY Terms:
 - If client becomes dizzy/ light headed
Assist to a seated position!
 - **DO NOT** get up unassisted
- **Low Brain - CNS sedation**
KEY Terms:
 - Easily falls asleep when talking
 - Unarousable



Long term Side Effects

CONSTIPATION

KEY TERM

- PRN stool softeners
- TEACH preventative measures!



Greatest Risk DEATH

- "Advanced Age" (70 and older)
- Underlying pulmonary disease (COPD, Asthma)
- Post Surgery (24 hours)



OXycodone

KEY WORDS

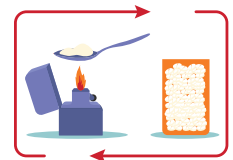
- "As Scheduled"
- "Around the clock"
- "Not reporting pain"
- Together with other pain meds



Antidote:

Naloxone (brand: Narcan)

Reversal agent for opioid & heroin overdose



KEY POINT

- 1-2 hours Half Life
- Reassess **Every 60 minutes**



Key terms

- RR below 12
- Unarousable
- Falling asleep while talking to you
- Prepare for second dose of Narcan!
- Notify HCP

A

Assess ABCs
1st



I

Intervention: Oxygen
2nd



M

Make HCP aware
3rd



S

Second dose of naloxone
4th



IV ADMINISTRATION

- 2 - 3 Minutes IV Push
- Reassess after 15 - 30 minutes
- **NOT** over 5 - 10 seconds!!
- **NOT** after 1 hour

Notes

PCA Pump vs. Fentanyl

Drug name:

Patient Controlled Analgesia Pump



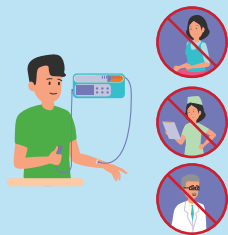
Indication:

Used for pain control after surgery or long term recovery



Key Points

- Client **ONLY**
- **NOT** family
- **NOT** nurse
- **NOT** Dr.



NCLEX TIPS

Nursing Care

- Twice the dose of Meds given
- If patient still reports pain
- **1 st action = pain ASSESSMENT**



A I R



AIR

- **A** - Assessment before **1st!**
- **I** - Intervention
- **R** - Re-assessment

Drug name:

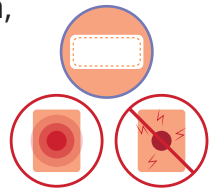
Fentanyl



Indication:

Given for chronic "persistent" pain, **NOT** used for acute pain

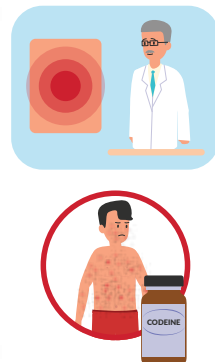
- **P** - Patches
- **P** - Persistent Pain



Can take up to 17 hours for full effect

KEY Words

- Not "Acute" Pain:
 - **NOT Post-op pain** **NCLEX TIP**
 - **NOT Intermittent pain** **NCLEX TIP**
 Clarify order with HCP!
- **Appropriate for allergy to codeine**



Kaplan Question

Fentanyl Patch

"constipation = use stool softeners"



ATI Question

Fentanyl Patch

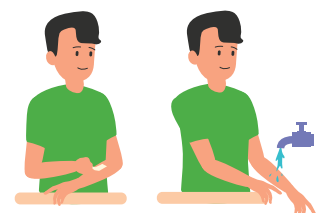
"Tolerance = need increase doses for pain relief"



HESI Question

Fentanyl Patch

- **"REMOVE** old patch **BEFORE** new one"
- Clean area
- Dry skin



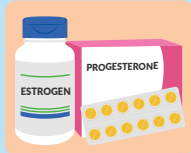
Notes

Reproductive & Labor

Contraception

Drug names:

Estrogen & Progesterone

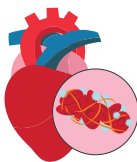


Major Adverse Effects

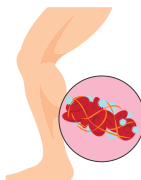
- Increased risk for blood clots!

That's why it's not given to patients with:

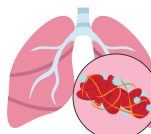
MI



DVT



PE



CVA stroke



KEY POINTS

Patient teaching:

- DO NOT** smoke! **HESI**
- REPORT:**
 - Severe leg pain, swelling, vision loss (Could be DVT/ CVA)

Memory Trick

E - **E**strogen & **P**rogestero**ne**

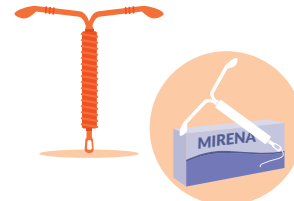
E - Emboli



Drug names:

2 types

- Copper Intrauterine Device
- Levonorgestrel



KEY POINTS

Copper Intrauterine Device

- Mild discomfort upon insertion (spotting/ cramping)
- Heavier **bleeding** and **increased cramping** during menses

Both IUDs **TEACH:**

- Check strings MONTHLY** after menses to ensure IUD still in place
- Longer, shorter, missing string = **REPORT to the HCP**

HESI Question

- Estrogen & Smoking** = increases risk for blood clots
- Estrogen = contraindication** for a patient with **Thrombophlebitis**

KAPLAN Question

Priority finding:
Client taking **estrogen** with report of **left leg pain** behind the knee = **possible DVT**

ATI Question

- Do not take with **carbamazepine...** makes oral contraceptives ineffective

QUESTION BANK

Medroxy**progE**sterone acetate
Instruct client that **ovulation may not occur for a few months** after using this med.



Don't let

NCLEX TRICK YOU



Missed periods randomly - **NOT** normal - **COULD MEAN PREGNANCY!**



- IUDs are **NOT** affected by lubricants
- NOT** affected by weight gain or loss

Notes

Contraceptives

How do they work? "Action"

Most contraceptives are formed from estrogen and progesterone. These two hormones act together to block the release of an egg during ovulation, thus preventing pregnancy.

Indications

- Regulation of menstrual cycle
- Prevention of unintended pregnancy
- Decrease menstrual bleeding
- Decreasing the risk of iron deficits during menstruation
- Decrease risk of ovarian cysts
- Decrease in fibrocystic breast disease
- Decrease in pelvic inflammatory disease
- Decrease risk of endometrial cancer
- Decrease risk of cervical cancer
- Decrease in acne

Adverse Reactions

Estrogen

- **Excess:** Nausea, bloating, cervical mucorrhea (increased cervical discharge), polyposis (numerous polyps), hypertension, migraine headache, breast fullness or tenderness, edema
- **Deficit:** Early or mid cycle breakthrough bleeding, increased spotting, hypomenorrhea, melasma (discoloration of the skin)

Progestin

- **Excess:** Increased appetite, weight gain, tiredness, fatigue, hypomenorrhea, acne, oily scalp, hair loss, hirsutism (excessive growth of hair), depression, monilia vaginitis, breast regression
- **Deficit:** Late breakthrough bleeding, amenorrhea, hypomenorrhea

Contraindications

The warnings associated with the use of oral contraceptives, notably the combined drug contraceptives, are the same as those for the estrogens and progestins and include cigarette smoking (especially those older than 35 years of age), which increases the risk of cardiovascular side effects, such as venous and arterial thromboembolism, myocardial infarction, and thrombotic and hemorrhagic stroke. Also reported with oral contraceptive use are hepatic adenomas and other tumors, visual disturbances, gallbladder disease, hypertension, and fetal abnormalities. (Ford 497)

Interactions

- **Oral anticoagulants:** Decreased anticoagulant effect
- **Tricyclic antidepressants:** Increased effectiveness of antidepressant
- **Rifampin:** Increased risk of breakthrough bleeding
- **Hydantoins:** Increased risk of breakthrough bleeding and pregnancy

Critical Thinking

- If the interval is greater than 14 weeks between the IM injections of medroxyprogesterone, be certain that the patient is not pregnant before administering the next injection. (Ford 498)
- There is an increased risk of postoperative thromboembolic complications in women taking oral contraceptives. If possible, use of the drug is discontinued at least 4 weeks before a surgical procedure associated with thromboembolism or during prolonged immobilization. (Ford 498)

Nursing management

- Assess likelihood of current pregnancy
- Administer pregnancy test
- Document the patient's sexual history and reason for contraception.
- Evaluate the patient's understanding of safe sexual practices and understanding that hormonal contraceptives do not protect against sexually transmitted infections (STIs).
- Inquire about a history of thrombophlebitis or other vascular disorders, a smoking history, and a history of liver diseases. Assess Blood pressure, pulse, and respiratory rate
- **Monophasic oral contraceptives** are administered on a 21-day regimen, with the first tablet taken on the first Sunday after the menses begin or on the day the menses begin if the menses begin on Sunday. After the 21-day regimen, the next 7 days are skipped,
- **Levonorgestrel**, a progestin, is available as an implant contraceptive system (Norplant System). Six capsules, each containing levonorgestrel, are implanted using local anesthesia in the subdermal (below the skin) tissues of the midportion of the upper arm. The capsules provide contraceptive protection for 5 years but may be removed at any time at the request of the patient.
- **Medroxyprogesterone (Depo-Provera)**, a synthetic progestin used in the treatment of abnormal uterine bleeding and secondary amenorrhea, is also used as a contraceptive. This drug is given IM every 3 months, and the initial dosage is given within the first 5 days of menstruation or within 5 days postpartum. (Ford 498)

Urinary System Drugs

- Estrogens

How do they work? "Action"

In addition to contraception, estrogen is most commonly used in HRT (or estrogen replacement therapy [ERT]) in postmenopausal women.

Indications

Changes to aging tissues can be lessened when estrogens are used for the following:

- Relief of moderate to severe vasomotor symptoms of menopause (flushing, sweating)
- Treatment of atrophic vaginitis
- Treatment of osteoporosis in women past menopause
- Palliative treatment of advanced prostatic carcinoma (in men)
- Selected cases of advanced breast carcinoma (Ford 516)

Adverse Reactions

- Headache, migraine
- Dizziness, mental depression
- Dermatitis, pruritus
- Chloasma (pigmentation of the skin) or melasma (discoloration of the skin), which may continue when use of the drug is discontinued
- Nausea, vomiting
- Abdominal bloating and cramps
- Breakthrough bleeding, withdrawal bleeding, spotting, changes in menstrual flow
- Dysmenorrhea, premenstrual-like syndrome, amenorrhea
- Vaginal candidiasis, cervical erosion, vaginitis
- Steepening of corneal curvature
- Intolerance to contact lenses
- Edema, rhinitis, changes in libido
- Breast pain, enlargement, and tenderness
- Reduced carbohydrate tolerance
- Venous thromboembolism, pulmonary embolism
- Weight gain or loss
- Generalized and skeletal pain
- Increased risk of endometrial cancer, gallbladder disease, hypertension, liver adenoma, thromboembolic disease, hypercalcemia

Contraindications

- breast cancer (except for metastatic disease),
- estrogen-dependent neoplasms
- undiagnosed abnormal genital bleeding
- and thromboembolic disorders. T
- he progestins also are contraindicated in patients with cerebral hemorrhage or impaired liver function.
- Both the estrogens and progestins are classified as pregnancy category X drugs and are contraindicated during pregnancy. (Ford 518)

Interactions

- **Oral anticoagulants:** Decreased anticoagulant effect
- **Tricyclic antidepressants:** Increased effectiveness of antidepressant
- **Rifampin:** Increased risk of breakthrough bleeding
- **Hydantoins:** Increased risk of breakthrough bleeding and pregnancy

Nursing management

Black cohosh, an herb reported to be beneficial in managing symptoms of menopause, is generally regarded as safe when used as directed. Black cohosh is a member of the buttercup family. Black cohosh tea is not considered as effective as other forms. Boiling the root releases only a portion of the therapeutic constituents. The benefits of black cohosh (not to be confused with blue cohosh) include:

Reduction in physical symptoms of menopause:

- hot flashes, night sweats, headache
- heart palpitations, dizziness, vaginal atrophy, and tinnitus (ringing in the ears)

Decrease in psychological symptoms of menopause:

- insomnia, nervousness, irritability, and depression
- Improvement in menstrual cycle regularity by balancing the hormones and reducing uterine spasms. Black cohosh is contraindicated during pregnancy. Toxic effects include dizziness, headache, nausea
- impaired vision, and vomiting.

This herb is purported to be an alternative to HRT. (Ford 518)

Estrogens

How do they work? "Action"

Estrogens are secreted by the ovarian follicle and in smaller amounts by the adrenal cortex. They are important in the development and maintenance of the female reproductive system and the primary and secondary sex characteristics they

- promote growth and development of the vagina, uterus, fallopian tubes, and breasts.
- affect the release of pituitary gonadotropin
- fluid retention, protein anabolism, thinning of the cervical mucus, and inhibition or facilitation of ovulation.
- contribute to the conservation of calcium and phosphorus, the growth of pubic and axillary hair, and pigmentation of the breast areola and genitals.

Indications

- combination with progesterones as a contraceptive agent
- as estrogen replacement therapy (ERT) in postmenopausal women

Adverse Reactions

CNS:

- Headache, migraine
- Dizziness, mental depression

Dermatologic

- Dermatitis, pruritus
- Chloasma (pigmentation of the skin) or melasma (discoloration of the skin), which may continue when use of the drug is discontinued

Gastrointestinal

- Nausea, vomiting
- Abdominal bloating and cramps

Genitourinary

- Breakthrough bleeding, withdrawal bleeding, spotting, change in menstrual flow
- Dysmenorrhea, premenstrual-like syndrome, amenorrhea
- Vaginal candidiasis, cervical erosion, vaginitis

Local

- Pain at injection site or sterile abscess with parenteral form of the drug
- Redness and irritation at the application site with transdermal system

Ophthalmic

- Steepening of corneal curvature
- Intolerance to contact lenses

Miscellaneous

- Edema, rhinitis, changes in libido
- Breast pain, enlargement, and tenderness
- Reduced carbohydrate tolerance
- Venous thromboembolism, pulmonary embolism
- Weight gain or loss
- Generalized and skeletal pain (Ford 496)

Contraindications

Estrogen and progestin therapy is contraindicated in patients with known hypersensitivity to the drugs, breast cancer (except for metastatic disease), estrogen-dependent neoplasms, undiagnosed abnormal genital bleeding, and thromboembolic disorders. The progestins also are contraindicated in patients with cerebral hemorrhage or impaired liver function. Both the estrogens and progestins are classified as pregnancy category X drugs and are contraindicated during pregnancy. (Ford 497) Estrogens are used cautiously in patients with gallbladder disease, hypercalcemia (may lead to severe hypercalcemia in patients with breast cancer and bone metastasis),

Interactions

- **Oral anticoagulants:** Decreased anticoagulant effect
- **Tricyclic antidepressants:** Increased effectiveness of antidepressant
- **Rifampin:** Increased risk of breakthrough bleeding
- **Hydantoins:** Increased risk of breakthrough bleeding and pregnancy

Nursing management

- Monitor blood pressure, pulse, respiratory rate, and weight
- Estrogens may be administered orally, IM, intravenously (IV), transdermally, or intravaginally.
- Monitor for excess fluid volume and sodium retention
- Teach the patient how to monitor for signs of thromboembolic effects, such as pain, swelling, and tenderness in the extremities, headache, chest pain, and blurred vision. These adverse effects are reported immediately to the primary health care provider
- Carefully read the patient package insert available with the drug. If there are any questions about this information, discuss them with the primary health care provider.
- If GI upset occurs, take the drug with food.
- Notify the primary health care provider if any of the following occurs: pain in the legs or groin area; sharp chest pain or sudden shortness of breath; lumps in the breast; sudden severe headache; dizziness or fainting; vision or speech disturbances; weakness or numbness in the arms, face, or legs; severe abdominal pain; depression; or yellowing of the skin or eyes.
- If pregnancy is suspected or abnormal vaginal bleeding occurs, stop taking the drug and contact the primary health care provider immediately.
- Patient with diabetes: Check the blood glucose daily, or more often. Contact the primary health care provider if the blood glucose is elevated. An elevated blood glucose level may require a change in diabetic therapy (insulin, oral antidiabetic drug) or diet; these changes must be made by the primary health care provider. (Ford 500)

Generic	Trade	Use	Dose
Estrogen conjugated	premarin	Oral: hypogonadism, primary ovarian failure Parenteral: abnormal uterine bleeding from hormonal imbalance	0.3–2.5 mg/day orally IM: 25 mg/injection
Estrogens esterified	menest	Oral: hypogonadism, primary ovarian failure Parenteral: abnormal uterine bleeding from hormonal imbalance	1–5 mg IM every 3–4 wk
Estropipate	Ogden, ortho est	Female hypogonadism, ovarian failure 0	0.3–2.5 mg/day orally IM: 25 mg/injection

Labor Drugs

Drug name:

Terbutaline



Indication:

Delays labor momentarily by suppressing contractions



Memory Trick

Turbuta**LINE**

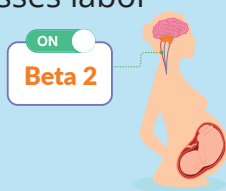


Wait in **LINE** for the baby & Terbutaline slows down Turbulent contractions



MOA:

Activated beta 2 receptors to activate the sympathetic nervous system, which suppresses labor



HESI Question

Terbutaline

- May be used for **48 hours to suppress** preterm labor



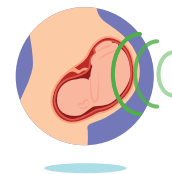
Drug name:

Oxytocin



Indication:

Induces labor & stimulates contractions

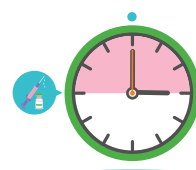


Nursing Care:

HESI Question

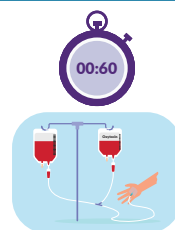
Oxytocin

- Used to **stimulate uterine contractions**
- Administered **6 - 12 hours after last dose of dinoprostone**



HESI Question

- Discontinue if contractions last **longer than 60 seconds**
- Maintain one on one care
- **Piggyback** the oxytocin into the main IV fluids



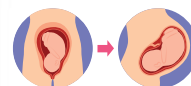
KAPLAN Question

- Stop oxytocin infusion for contractions sustained **over 2minutes**
- **Priority action** for 3 consecutive **late decelerations** = Turn off Oxytocin



ATI Question

Turn the client **to the side** if **late decelerations** are noted.



Notes

Gonadotropins

How do they work? "Action"

FSH and LH) influence the secretion of sex hormones, the development of secondary sex characteristics, and the reproductive cycle in both men and women.

Indications

- **Gonadotropins** are used to induce ovulation and pregnancy in anovulatory women (women whose bodies fail to produce an ovum or fail to ovulate).
- **Human chorionic gonadotropin (HCG)** is extracted from human placentas. This drug is also used in boys to treat prepubertal cryptorchidism and in men to treat selected cases of hypogonadotropic hypogonadism. (Ford 469)
- **Follistim AQ** is used to induce sperm production (spermatogenesis). (Ford 469)
- **Clomiphene and ganirelix** are synthetic nonsteroidal compounds that bind to estrogen receptors. These drugs are used to induce ovulation in anovulatory (non ovulating) women. (Ford 469)

Adverse Reactions

Hormone-Associated Reactions

- Vasomotor flushes (which are like the hot flashes of menopause)
- Breast tenderness
- Abdominal discomfort, ovarian enlargement
- Hemoperitoneum (blood in the peritoneal cavity)

Generalized Reactions

- Nausea, vomiting
- Headache, irritability, restlessness, fatigue
- Edema and irritation at the injection site (Ford 469)

Interactions

- **None listed**

Contraindications

- high gonadotropin levels
- thyroid dysfunction
- adrenal dysfunction
- liver disease
- abnormal bleeding, ovarian cysts, or sex hormone-dependent tumors,
- organic intracranial lesion (pituitary tumor).
Gonadotropins are contraindicated during pregnancy (pregnancy category X). (Ford 469)

Nursing management

- If the patient complains of visual disturbances, the drug therapy is discontinued and the primary health care provider notified. An examination by an ophthalmologist is usually indicated. (Ford 470)
- The patient is checked for signs of excessive ovarian enlargement (abdominal distention, pain, ascites [with serious cases]). The drug is discontinued at the first sign of ovarian stimulation or enlargement. The patient is usually admitted to the hospital for supportive measures. (Ford 470)

HORMONAL OVARIAN STIMULANTS

- Before beginning therapy, be aware of the possibility of multiple births and birth defects.
- It is a good idea to use a calendar to track the treatment schedule and ovulation.
- Report bloating, abdominal pain, flushing, breast tenderness, and pain at the injection site.

NON HORMONAL OVARIAN STIMULANTS

- Take the drug as prescribed (5 days) and do not stop taking the drug before the course of therapy is finished unless told to do so by the primary health care provider.
- Notify the primary health care provider if bloating, stomach or pelvic pain, jaundice, blurred vision, hot flashes, breast discomfort, headache, nausea, or vomiting occurs.
- Keep in mind that if ovulation does not occur after the first course of therapy, a second or third course may be used. If therapy does not succeed after three courses, the drug is considered unsuccessful and is discontinued.

Generic	Trade	Use	Dose
Gonadotropin • Gonadotropin ovarian stimulant	Bravelle, Follistim AQ, Gonal-f, Gonal-f RFF, Menopur, Repronex	Ovulation induction, multifollicular development, male infertility	Individualized dosing dependent on patient outcome
Nafarelin • Gonadotropin-releasing hormone/ synthetic	Synarel	Endometriosis, precocious puberty	400 mcg/day intranasally in 2 doses
Cetrorelix • Gonadotropin-Releasing Hormone Antagonists	Cetrotide	Infertility	Does individualized during cycle
Clomiphene • Nonsteroidal Ovarian Stimulant	Clomid, Serophene	Ovulatory failure	50 mg/day orally for 5 days, may be repeated

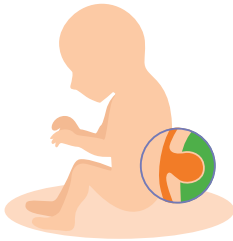
Prenatal Folic Acid & Betamethasone

Vitamin name:

Folic Acid

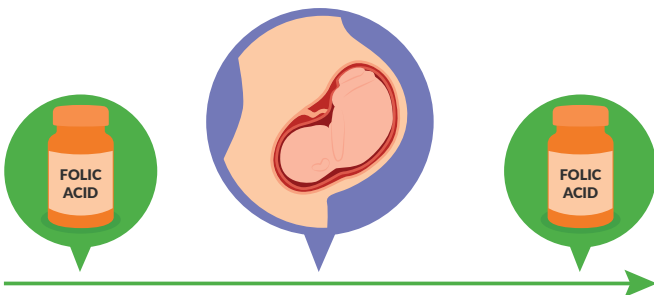


Indication:



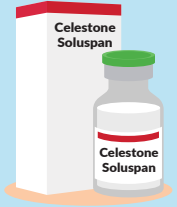
Given to prevent spina bifida:

- Prevention of **neural tube defects**
- Begin taking before pregnancy



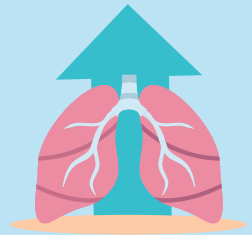
Drug name:

Betamethasone



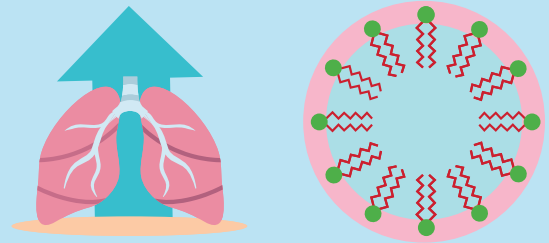
Indication:

Helps lung development with preterm babies



MOA:

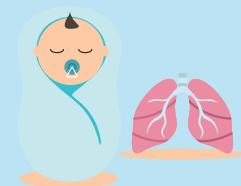
Increases **surfactant** production which helps lungs to expand



ATI Question

Evaluation of effectiveness

- Normal respiratory pattern in newborn



Notes

Progestins

How do they work? "Action"

Progesterone is secreted by the corpus luteum, placenta, and (in small amounts) adrenal cortex. They transform the proliferative endometrium into a secretory endometrium. Progestins are necessary for the development of the placenta and inhibit the secretion of pituitary gonadotropins, which in turn prevents maturation of the ovarian follicle and ovulation. (Ford 494)

Indications

- Treatment of amenorrhea,
- Endometriosis
- Functional uterine bleeding
- Progestins are also used as oral contraceptives, either alone or in combination with an estrogen (Ford 494)

Adverse Reactions

- Breakthrough bleeding, spotting, change in menstrual flow, amenorrhea
- Breast tenderness, edema, weight increase or decrease
- Acne, chloasma or melasma, insomnia, mental depression (Ford 496)

Contraindications

Estrogen and progestin therapy is contraindicated in patients with known hypersensitivity to the drugs, breast cancer (except for metastatic disease), estrogen-dependent neoplasms, undiagnosed abnormal genital bleeding, and thromboembolic disorders. The progestins also are contraindicated in patients with cerebral hemorrhage or impaired liver function. Both the estrogens and progestins are classified as pregnancy category X drugs and are contraindicated during pregnancy. (Ford 497)

Interactions

- **Anticonvulsants or rifampin:**
Decreased effectiveness of progestin
- **Penicillins or tetracyclines:**
Decreased effectiveness of oral contraceptive

Nursing management

- Monitor blood pressure, pulse, respiratory rate, and weight
- Estrogens may be administered orally, IM, intravenously (IV), transdermally, or intravaginally.
- Monitor for excess fluid volume and sodium retention
- Teach the patient how to monitor for signs of thromboembolic effects, such as pain, swelling, and tenderness in the extremities, headache, chest pain, and blurred vision. These adverse effects are reported immediately to the primary health care provider
- Carefully read the patient package insert available with the drug. If there are any questions about this information, discuss them with the primary health care provider.
- If GI upset occurs, take the drug with food.
- Notify the primary health care provider if any of the following occurs: pain in the legs or groin area; sharp chest pain or sudden shortness of breath; lumps in the breast; sudden severe headache; dizziness or fainting; vision or speech disturbances; weakness or numbness in the arms, face, or legs; severe abdominal pain; depression; or yellowing of the skin or eyes.
- If pregnancy is suspected or abnormal vaginal bleeding occurs, stop taking the drug and contact the primary health care provider immediately.
- Patient with diabetes: Check the blood glucose daily, or more often. Contact the primary health care provider if the blood glucose is elevated. An elevated blood glucose level may require a change in diabetic therapy (insulin, oral antidiabetic drug) or diet; these changes must be made by the primary health care provider. (Ford 500)

Generic	Trade	Use	Dose
Progesterone	prometrium	Endometrial hyperplasia (oral), amenorrhea, abnormal uterine bleeding (injection), infertility (gel)	Orally: 200 mg for 12 days of cycle IM: 5–10 mg/day for 6–8 days Gel: 90 mg/day
Medroxyprogesterone	Provera	Amenorrhea, abnormal uterine bleeding, endometrial hyperplasia	5–10 mg/day orally
Norethindrone	aygestin	Amenorrhea, abnormal uterine bleeding, endometriosis	2.5–10 mg/day for 5–10 days of cycle

Respiratory

Upper Respiratory Drugs

Cough Expectorants

Drug name:

Guaifenesin
(brand: mucinex)

KEY POINTS

- Increase fluid intake
- Drink at least 2 L / day
- **Asthma Safe**

Indication:

Helps patient to cough out excess secretions

MOA:

Thins the mucus



Drug name:

Acetylcysteine
(brand: mucomyst)

Antidote: Acetaminophen (Tylenol) poisoning

KEY POINT

NOT SAFE
Cause or **Worsen** bronchospasm!

Memory Trick:

A - Acetylcysteine
A - AVOID asthma patients



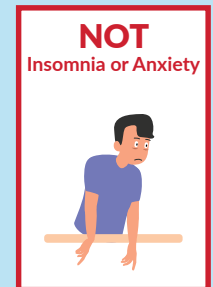
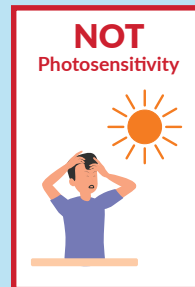
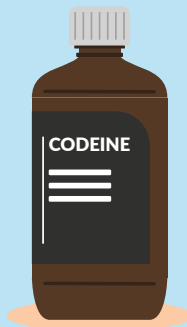
Cough Suppressant "Antitussive"

DON'T LET NCLEX TRICK YOU

Codeine

KEY POINT

1. Slow position changes!!!
2. NOT for COPD
3. Take with food!!!
4. Increase fluid intake!
5. 8 full glasses of water (minimum)



Antihistamine "allergy meds"

Drug name:

Diphenhydramine
(Brand: Benadryl)

Contraindicated:

- Closed angle glaucoma
- Urinary retention
- Peptic ulcer
- Small bowel obstruction



Indication:

For anaphylaxis (big allergic reactions)

MOA:

Blocks histamine which creates inflammation

Drug name:

Loratadine
(brand: Claritin)

Fewer sedation effects



Drug name:

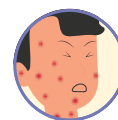
Fexofenadine
(brand: Allegra)

KEY POINT

NOT for Glaucoma
Due to anticholinergic effects that increase intraocular pressure



Sinusitis

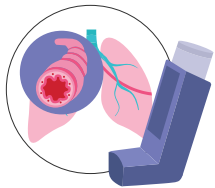


Allergies



Hives

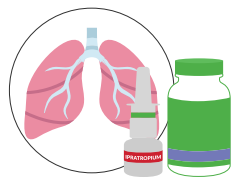
Lower Respiratory Drugs



BRONCHODILATORS

- B** Beta 2 Agonist
Albuterol
- A** Anticholinergics
Ipratropium
- M** Methylxanthines
Theophylline

NCLEX NOTES



ANTI-INFLAMMATORY Agents

- S** Steroids
Beclomethasone
- L** Leukotriene Inhibitor
Montelukast
- M** Mast Cell Stabilizers
Cromolyn

Most Commonly Missed Question

Patient with Severe asthma:

- Tachycardia (>120 BPM)
- Tachypnea (> 30 BPM)
- O2 sat < 90% on RA
- Peak exp. Flow < 40% predicted or best < 150L/min)

Which medication would you give?

Select All that apply

- 1. Inhaled salmeterol
- 2. Albuterol inhaler
- 3. Nebulizer Ipratropium
- 4. IV methamphetamines
- 5. IV Methylprednisolone



Common Exam Questions:

A client is receiving discharge instructions for a inhaled corticosteroid metered dose inhaler. Which teaching should the nurse include?

- 1. Discard the use fluticasone if albuterol provides relief.
- 2. Do not swallow the water as you wash your mouth after each use.
- 3. If taking albuterol, be sure to use after the steroid.
- 4. Steroid inhalers should be used before beta 2 agonists.

Which statement by the patient requires further teaching?

- 1. I will use cromolyn to prevent activity induced asthma
- 2. I will use montelukast to prevent asthma attacks.
- 3. I will use spacers to prevent oral thrush while using beclomethasone.
- 4. I will take cromolyn 45 minutes before physical activity



3 Common NCLEX & Exit Questions

Which of the follow prescriptions should the nurse question?

- 1. Naproxen for an asthmatic patient
- 2. Ipratropium for a patient with glaucoma
- 3. Losartan for a patient with diabetes.
- 4. Theophylline for a patient taking cimetidine.
- 5. Atenolol for a patient with asthma

What patient teaching should be included with a new prescription of albuterol, ibuprofen, tiotropium and beclomethasone?

Select All That Apply

- 1. Tinnitus is an expected side effect.
- 2. Tachycardia is expected after albuterol.
- 3. Report dark stool to the provider.
- 4. Drink fluids to prevent dry mouth and throat.
- 5. Ipratropium is used first during an attack.

Which medication prescribed for asthma causes of tachycardia & dysrhythmias?

- 1. Phenobarbital
- 2. Aminophylline
- 3. Salmeterol
- 4. Albuterol



Anti Inflammatory Agents

Drug names:

S - Steroids

"-Sone"

- Beclomethasone
- Fluticasone
- Methylprednisolone

Indication:

Swelling & inflammation

S

Slow onset !

NCLEX KEY WORD

DO NOT USE Fluticasone or Salmeterol for first sign of acute asthma attack!

AIM for Acute Attack

- A** - Albuterol 1st
- I** - Ipratropium 2nd
- M** - Methylprednisolone (brand: Solu Medrol)

Side Effects:

S

Sugar INCREASE



S

Sores in MOUTH (infection)



KEY POINT

- Use Spacers to Prevent oral **THRUSH** (Candida)
- RINSE MOUTH AFTER EACH USE**
- DON'T SWALLOW** water !!



Drug names:

L - Leukotriene Inhibitor

"-Lukast"

- Montelukast (Brand: singulair)
- Zafirlukast

SINGULAIR
Montelukast

ZAFIRLUKAST

Memory Trick

3 L's

Luke likes to **SING** (airway open)

LONG term management

Long Onset! (1-2 weeks to reach therapeutic range)



NCLEX Key Points

- NOT** during acute attacks
- NOT** a **RESCUE DRUG**
- This med will prevent inflammation that causes asthma attacks



Drug name:

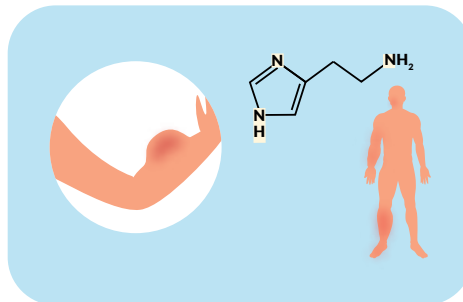
M - Mast cell stabilizers

Cromolyn



Indication:

Blocks massive swelling



Key Point

- PREVENTS** activity induced asthma
- Take **15 minutes before exertion** for maximum effects **HESI**
- Use **10-15 minutes before physical activity** **ATI**

Notes

Beta 2 Agonist

Drug name:

B - Beta 2 Agonist

"-buterol"
Albuterol
Levalbuterol

B - Buterol
B - Brutal Asthma Attacks



Indication:

1st drug used during
SEVERE asthma attacks

NCLEX TIP

- THE ONLY "rescue inhaler"
- **BEFORE steroid inhaler!!!!**
 - **S** - Salmeterol
 - **S** - Slower Acting (NOT rescue inhaler)



Common NCLEX Question

DO NOT use fluticasone or salmeterol for first sign of acute asthma attack!



MEMORY TRICK

AIM for Acute Asthma Attack

- A** - Albuterol 1st
- I** - Ipratropium 2nd
- M** - Methyl-prednisolone (brand: Solu Medrol)



Expected SE: **AlbuTerol**

T

Tachycardia & palpitations



T

Tremor



T

Toss & Turning at Night



Insomnia & difficulty sleeping **TEST TIP!!**

HESI Question

Albuterol Nebulizer Expected Findings After Treatment:

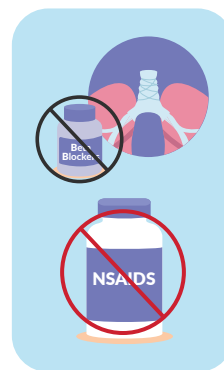
- ✓ Increased productive cough
- ✓ Reports of decreased anxiety
- ✓ Mild Bilateral hand tremors



NCLEX TIPS

AVOID

Beta Blockers - Atenolol
NSAIDS - Naproxen, Ibuprofen



KEY POINTS



SHAKE IT WELL!

Shake **IT** Before you take **IT**

KEY POINTS

If Not working after **3 doses?**

- NOTIFY HCP!!!

Effective:

- **Decrease** in **RR** (example: 34 to 24)
- **Oxygen Sat.** at least **90%** or higher

HCP

24

RR

HCP

90%

Oxygen

Anticholinergics & Methylxanthines

Drug name:

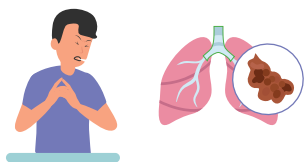
"-tropium"

Ipratropium
Tiotropium



Indication:

Moderate to severe asthma & COPD, longer acting bronchodilator used 2nd during asthma attacks



Memory Trick:

AIM for Acute Attack

- A** - Albuterol 1st
- I** - Ipratropium 2nd
- M** - Methylprednisolone (brand: Solu Medrol)



MOA:

Blocks secretions, anticholinergic effects: can't see, pee, spit or sh* - poop

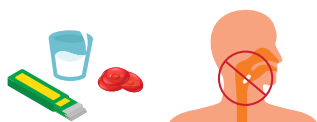
Side Effects:

Very dry body

Treat the DRY mouth & throat for all anticholinergics

- Use gum/candy
- **Drink fluids**

KEY POINT - NO swallowing tiotropium capsules!



HESI & ATI Question

Contraindication to ALL anticholinergics:

We Never give for patients who are already DRY.

No giving anticholinergis to:

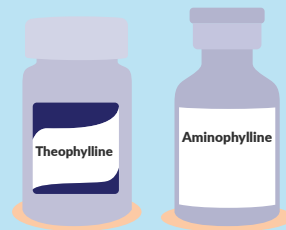
- Glaucoma
- Urinary retention (BPH)
- Bowel obstruction

Drug name:

M - Methylxanthines

"-phylline"

- Theophylline
- Aminophylline

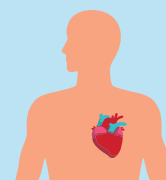


KEY POINTS

3 T's

NCLEX TIP

- **T** - Toxic! **Over 20** (mcg/mL) "Frequent blood draws"
- **T** - Tonic Clonic Seizures Severe Toxicit **1st Priority**
- **T** - Tachycardia & Dysrhythmias **NCLEX TIP**



Memory Trick:

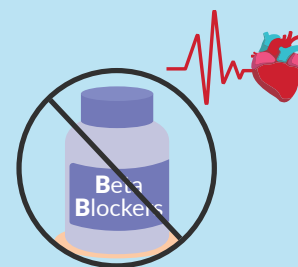
"-phyllines" make you feeling caffeinated & toxic



HESI Question

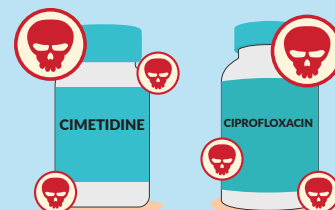
Teach pt to **AVOID beta blockers** that lower the heart rate while on **Theophylline**

"ALERT HCP of tachycardia **BEFORE** giving next dose"



Key Teaching Points

- 2 drugs that **INCREASE** toxicity risk **NCLEX TIP**
 - Cimetidine (H2 blocker)
 - Ciprofloxacin (ABX)
- Take in AM
- **AVOID** Caffeine
- **STOP** before cardiac



Notes

Urinary & Renal

Urinary Drugs

- Antispasmodics

How do they work? "Action"

Antispasmodics are cholinergic blocking drugs that inhibit bladder contractions and delay the urge to void. These drugs counteract the smooth muscle spasm of the urinary tract by relaxing the detrusor and other muscles through action at the parasympathetic nerve receptors (Ford 518)

Contraindications

Antispasmodics are cholinergic blocking drugs that inhibit bladder contractions and delay the urge to void. These drugs counteract the smooth muscle spasm of the urinary tract by relaxing the detrusor and other muscles through action at the parasympathetic nerve receptors (Ford 518)

Indications

- **Flavoxate** (Urispas) is used to relieve symptoms of dysuria (painful or difficult urination), urinary urgency, nocturia (excessive urination during the night), suprapubic pain and frequency, and urge incontinence.
- **Other antispasmodic** drugs are also used to treat bladder instability (i.e., urgency, frequency, leakage, incontinence, and painful or difficult urination) caused by a neurogenic bladder (impaired bladder function caused by nervous system abnormality, typically an injury to the spinal cord). (Ford 518)

Interactions

- **Antibiotics/antifungals:** Decreased effectiveness of anti-infective drug
- **Meperidine, flurazepam, phenothiazines:** Increased effect of the antispasmodic
- **Tricyclic antidepressants:** Increased effect of the antispasmodic
- **Haloperidol (Haldol):** Decreased effectiveness of the antipsychotic drug (Ford 519)

Adverse Reactions

- **Can't see, can't pee, can't spit, can't sh****
- Dry mouth, drowsiness, constipation or diarrhea, decreased production of tears, decreased sweating, gastrointestinal (GI) disturbances, dim vision, and urinary hesitancy
- Nausea and vomiting, nervousness, vertigo, headache, rash, and mental confusion (particularly in older adults)
- These drugs can also cause the urine to take on a dark brown color

Nursing management

- **Flavoxate:** Take this drug three to four times daily as prescribed. This drug is used to treat symptoms; other drugs are given to treat the cause.
- **Oxybutynin:** Take this drug with or without food. Oxybutynin (Ditropan XL) contains an outer coating that may not disintegrate and sometimes may be observed in the stool. This is not a cause for concern. If using the transdermal form (patch) of the drug, be sure to apply to a clean, dry area of the hip, abdomen, or buttocks. Remove the old patch and rotate sites of new application every 7 days.
- Antispasmodic drugs can cause heat prostration (fever and heat stroke caused by decreased sweating) in high temperatures. If you live in hot climates or will be exposed to high temperatures, take appropriate precautions. (Ford 523)

Generic	Trade	Use	Dose
Oxybutynin	Ditropan	Overactive bladder, neurogenic bladder	5 mg orally BID or TID
Solifenacin	Vesicare	Overactive bladder	5 mg/day orally
Trospium	Sanctura	Overactive bladder	20 mg orally TID

Urinary

Drug name:

- Bethanechol



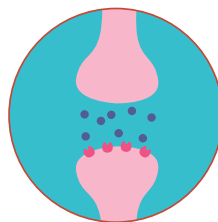
Memory Trick:

- Bethan-echol
- **Bladder Control**



MOA:

Stimulated cholinergic receptors
= more secretions



KAPLAN

Bethanechol - Used to treat functional urinary retention (neurogenic bladder)

HESI

Bethanechol - Used for urinary atony

- TCAs plus **bethanechol** used to prevent bladder dysfunction
- Expected outcome: **Non-distended bladder**

Indication:

Non obstructive urinary retention specifically neurogenic bladder, where clients with Neuro issues, get loss of strength in the urinary muscles

Drug name:

- Terazosin
- Tamsulosin



Memory Trick:

- **BPH**
- **Big Prostate Holds back urine**

KEY POINTS

Patient teaching:

- Slow position changes
- Avoid Sildenafil
- Grapefruit juice is actually OK with this drug

Side Effects:

- Tera**GOOO**sin - Helps w/ urination
- Tera**SLOW**sin - Slow position changes (orthostatic hypotension)
- Tera**LOW** sin - Avoid blood pressure lowering drugs



Indication:

Urinary retention with enlarged prostate - BPH - benign prostatic hyperplasia

MOA:

Relaxes smooth muscles in the bladder, prostate & periphery to help release urine



Drug name:

- Finasteride



Memory Trick:

If you want a **FUN** ride on a horse, take **FIN**aster**RIDE**



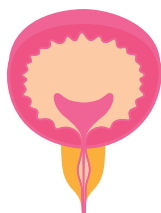
HESI

What med will **shrink** the prostate = **Finasteride**



Indication:

Shrinks the prostate



Top Missed Questions

The nurse is conducting teaching with an elderly patient newly prescribed **terazosin**. Which instruction(s) should be included in the teaching plan? **Select all that apply.**

- 1. It is not necessary to avoid foods that contain grapefruit.
- 2. Make sure to change positions slowly while on this medication.
- 3. I will not take this medication with antacids.
- 4. Do not take sildenafil while on this medication.
- 5. If you forget a dose of this medication, take two pills as soon as you remember.

Notes

Urinary Oxybutynin & Tolterodine

Drug name:

- Oxybutynin
- Tolterodine



Indication:

- Overactive bladder
- Decreases urgency, frequency & nighttime bathroom visits (nocturia)



Memory Trick:

Don't get tricked with sound

- **Oxy-Buty-nin** - B for Bladder
Ox is on your Bladder! Given for urinary frequency

OxyButynin

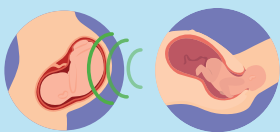


Don't get tricked with sound alike drug names:

- **Oxy-codone** - is a opioid pain med
Codone sounds like codeine
Opioid pain med, or just look for the O's in cOdOne - O for opioid



- **Oxy-tocin** - is for labor
To contract - given for contractions to induce labor



MOA:

Anticholinergic to dry the body, think **anti-secretions** for anti-cholinergic



Side Effects:

Dry body, avoid Glaucoma & BPH (all anticholinergics)

ATI

- Blurred vision
- Dry eyes
- Avoid Glaucoma
- Dry mouth **NCLEX TIP**



KEY POINTS

MAJOR ADVERSE EFFECT

1. Urinary retention

"No urination all day"

REPORT TO HCP! **NCLEX TIP**

PATIENT TEACHING

2. **Slow position changes** - prevent Orthostatic hypotension
3. **Avoid hyperthermia** = too much sun exposure



Common NCLEX Question

Which are expected side effects of oxybutynin?
Select all that apply.

- 1. Hypertension.
- 2. Dry eyes.
- 3. Dry mouth.
- 4. Diarrhea.
- 5. Hypokalemia



Notes

Urinary System Drugs

- Erectile Dysfunction Drugs

How do they work? "Action"

Phosphodiesterase type 5 inhibitors are oral drugs that facilitate the enzyme that allows blood flow into the penis, resulting in an erection.

Indications

- Allows blood flow into the penis, resulting in an erection.

Adverse Reactions

- Headache, flushing, GI upset, nausea, and runny nose or congestion

Contraindications

- Drugs for ED should not be taken by men who use nitrates (e.g., for anginal pain). Because these drugs affect smooth muscle, patients with pre-existing cardiac problems, especially those using drugs to lower blood pressures
- Medical attention should be sought for erections sustained for more than 4 hours.
- Pulmonary veno-occlusive disease
- Chronic use not recommended for pulmonary hypertension due to lack of efficacy INCREASED risk of death.

Interactions

- **Antiretrovirals;** Increased effectiveness of ED drug
- **Antihypertensives:** Increased effectiveness of antihypertensive

Nursing management

- **Viagra:** Determine erectile dysfunction before administration. Sildenafil has no effect in the absence of sexual stimulation.
- **Revatio:** Monitor hemodynamic parameters and exercise tolerance prior to and periodically during therapy.
- Instruct patient to take sildenafil as directed. For erectile dysfunction, take approximately 1 hour before sexual activity and not more than once per day. If taking sildenafil for pulmonary arterial hypertension, take missed doses as soon as remembered unless almost time for next dose; do not double doses.
- Advise patient that Viagra is not indicated for use in women.
- Caution patient not to take sildenafil concurrently with alpha-adrenergic blockers (unless on a stable dose) or nitrates. If chest pain occurs after taking sildenafil, instruct patient to seek immediate medical attention. Advise patient taking sildenafil for pulmonary arterial hypertension to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and to consult with health care professional before taking other medications.
- Instruct patient to notify health care professional promptly if erection lasts longer than 4 hr or if experience sudden or decreased vision loss in one or both eyes or loss or decrease in hearing, ringing in the ears, or dizziness.
- Inform patient that sildenafil offers no protection against sexually transmitted diseases. Counsel patient that protection against sexually transmitted diseases and HIV infection should be considered.

Generic	Trade	Use	Dose
Sildenafil	Viagra	Erectile dysfunction	25–50 mg orally 30–60 min before sexual activity
Tadalafil	Cialis	Erectile dysfunction, BPH	5–20 mg orally, take daily for BPH, as needed for sexual activity Up to 36 hours before sexual activity
Vardenafil	Levitra, Staxyn	Erectile dysfunction	5–20 mg orally 60 min before sexual activity 4 hours before sexual activity

Urinary System Drugs

- BPH Drugs

How do they work? "Action"

Peripherally acting, α 1a-adrenergic blockers that exert their action primarily on the smooth muscle of the prostate and the bladder neck. By blocking norepinephrine, the muscles relax and this allows urine to flow from the bladder. Adrenergic blockers can be uroselective ; therefore, the α 1a-adrenergic blockers exert their action on the bladder with minimal action on the vascular system.

Androgen hormone inhibitors prevent the conversion of testosterone into the androgen 5- α -dihydrotestosterone (DHT). The growth of the prostate gland depends on DHT. The lowering of serum levels of DHT reduces the effect of this hormone on the prostate gland, resulting in a decrease in the size of the gland and the symptoms associated with prostatic gland enlargement. (Ford 519)

Indications

Treatment and symptom control of BPH

Adverse Reactions

A- adrenergic blockers:

- weight gain, fatigue, dizziness, and transient orthostatic hypotension.

Androgen hormone inhibitors

- impotence, decreased libido,
- decreased volume of ejaculate. Changes to breast tissue ,pain or tenderness, nipple discharge, or enlargement (Ford 520)

Interactions

- **Antibiotics/antifungals:**
Decreased effectiveness of anti-infective drug
- **β blockers:** Increased hypotension
- **Phosphodiesterase type 5 inhibitors:**
Increased hypotension

Contraindications

- Uncontrolled angle-closure glaucoma
- Intestinal obstruction or atony
- Urinary retention.
- Both α -adrenergic blockers and AHI drugs should be used with caution in patients with hepatic or renal disease. Caution the patient with hypertension when using both beta (β) and α blockers that hypotensive symptoms may be increased. (Ford 520)

Nursing management

- Monitor voiding pattern and intake and output ratios
- Assess abdomen for bladder distention prior to and periodically during therapy.
- Catheterization may be used to assess postvoid residual.
- Cystometry is usually performed to diagnose type of bladder dysfunction prior to prescription of oxybutynin.
- **Geri:** Assess geriatric patients for anticholinergic effects (sedation and weakness).

Herbal Consideration

Saw palmetto is used to relieve the symptoms of BPH (urinary frequency, decreased flow of urine, and nocturia). The herb is believed to reduce inflammation and the hormone DHT (responsible for prostate enlargement). Saw palmetto does not cause impotence, yet it can aggravate GI disorders such as peptic ulcer disease. Men report reduction in urinary symptoms in 1 to 3 months when 160 mg twice daily is taken. It is not recommended as a tea, because the active constituents are not water soluble. It is usually recommended that the herb be taken for 6 months, followed by evaluation by a primary health care provider (Bent, 2006). (Ford 520)

Generic	Trade	Use	Dose
Finasteride • Androgen hormone inhibitor	Propecia, Proscar	Male-pattern baldness, BPH	1-5 mg/day orally
Doxazosin • Peripheral adrenergic	Cardura	Hypertension, BPH	Hypertension: 1-8 mg orally daily; BPH: 1-16 mg orally daily
Tamsulosin • Peripheral adrenergic	Flomax	BPH	0.4 mg orally daily

Urinary Drugs

- Urinary Anti Infectionives

How do they work? "Action"

Treat UTIs by either slowing the growth of more bacteria or killing the bacteria. Phenazopyridine is a dye that exerts a topical analgesic effect on the lining of the urinary tract. It does not have anti-infective activity. Phenazopyridine is available as a separate drug but is also included in some urinary tract anti-infective combination drugs. (Ford 531)

Indications

- Relieves pain associated with UTI
- Retards or halts the growth of bacteria in the urinary tract

Adverse Reactions

Adverse reactions are primarily gastrointestinal (GI) disturbances and include the following:

- Anorexia, nausea, vomiting, and diarrhea
- Abdominal pain or stomatitis

Other generalized body system reactions include:

- Drowsiness, dizziness, headache, blurred vision, weakness, and peripheral neuropathy
- Rash, pruritus, photosensitivity reactions, and leg cramps

Contraindications

- hypersensitivity to the drugs and during pregnancy (pregnancy category C) and lactation (Ford 531)

Herbal Consideration

Cranberry juice has long been recommended for use in treating and preventing UTIs. Clinical studies have confirmed that cranberry juice is beneficial to individuals with frequent UTIs. Cranberry juice inhibits bacteria from attaching to the walls of the urinary tract and prevents certain bacteria from forming dental plaque in the mouth. Cranberry juice is safe for use as a food and for urinary tract health.

Cranberry juice and capsules have no contraindications, no known adverse reactions, and no drug interactions. The recommended dosage is 9 to 15 capsules a day (400 to 500 mg/day) or 4 to 8 ounces of juice daily (Brown, 2012). (Ford 532)

Interactions

Sulfamethoxazole

- **oral anticoagulants:** Increased risk for bleeding

Nitrofurantoin

- **magnesium trisilicate or magaldrate:** Decreased absorption of anti-infective
- **Anticholinergics:** Delay in gastric emptying, thereby increasing the absorption of nitrofurantoin

Fosfomycin (Monurol)

- **metoclopramide (Reglan):** Lowers plasma concentration and urinary tract excretion (Ford 532)

Nursing management

- Check laboratory culture and sensitivity results before giving any antibiotic.
- Phenazopyridine is not administered for more than 2 days when used in combination with an antibacterial drug to treat a UTI. When used for more than 2 days, the drug may mask the symptoms of a more serious disorder.
- Take the drug with food or meals (nitrofurantoin must be taken with food or milk). If GI upset occurs despite taking the drug with food, contact the primary health care provider.
- Take the drug at the prescribed intervals and complete the full course of therapy. Do not discontinue taking the drug even though the symptoms have disappeared, unless directed to do so by the primary health care provider.
- If drowsiness or dizziness occurs, avoid driving and performing tasks that require alertness.
- Avoid alcoholic beverages and do not take any nonprescription drug unless its use has been approved by the primary health care provider.
- Notify the primary health care provider immediately if symptoms do not improve after 3 or 4 days.
- **Nitrofurantoin:** Take this drug with food or milk to improve absorption. Continue therapy for at least 1 week or for 3 days after the urine shows no signs of infection. Notify the primary health care provider immediately if any of the following occur: fever, chills, cough, shortness of breath, chest pain, or difficulty breathing. Do not take the next dose of the drug until the primary health care provider has been contacted. The urine may appear brown during therapy with this drug; this is not abnormal.
- **Methenamine:** Avoid excessive intake of citrus products, milk, and milk products.
- **Fosfomycin** comes in dry form as a one-dose packet to be dissolved in 90 to 120 mL of water (not hot water). Drink immediately after mixing and take with food to prevent gastric upset.
- **Phenazopyridine:** This drug may cause a reddish-orange discoloration of the urine and tears and may stain fabrics or contact lenses. This is normal. Take the drug after meals. Do not take this drug for more than 2 days if you are also taking an antibiotic for the treatment of a UTI. (Ford 533-534)

Generic/Class	Trade	Use	Dose
Fosfomycin	Monurol	Acute bacterial UTIs	3-g packet orally, provided in powder that must be mixed with fluid
Methenamine	Hiprex, Urex	Chronic bacterial UTIs	1 g orally BID
Phenazopyridine	Pyridium	Relief of pain associated with irritation of the lower genitourinary tract	200 mg orally TID