Final Exam Concepts:

Week 1:
Blood administration

Nursing interventions pre-, intra-, and post- transfusion

- Check vital signs prior to, during, and post-infusion
- Type and Cross will be completed
    - What does this tell us?
- Stay with the client
    - Reaction will typically occur in the first 15 minutes
- Large bore IV
    - Size examples:
    - Why?
- Ask client if they have had previous reaction to blood products
- 2 RN's must verify correct client and product
- Use a tubing set specifically for blood with filter and prime with NS.
- How many hours do you have to give PRBC's?
- What S/S do you want to monitor for?
- Monitor vitals and rate of infusion per your hospital policy.
- Do not mix with any other IV's or medications.
    - Why?

Identifying s/sx of transfusion reactions

- Acute Hemolytic-
    - Fever
    - Chills
    - n/v
    - HA
    - Chest pain/tightness
    - Hypotension
    - Tachycardia
    - Tachypnea
    - **Low back pain**
    - Anxiety
- Febrile
    - Chills
    - Fever
    - Flushing
    - Headache
    - Anxiety
    -
- Allergic-

        - itching
        - Urticaria
        - Flushing
    - Anaphylactic
        - Wheezing
        - Cyanosis
        - Hypotension
        - Dyspnea
        - Chest tightness

- Bacterial-
    - Fever
    - Chills
    - n/v
    - abdominal pain
    - hypotension
- Circulatory Overload-
    - dyspnea
    - chest tightness
    - tachycardia
    - tachypnea
    - ha
    - jugular vein distention
    - hypertension
    - peripheral edema
    - orthopnea
    - anxiety
    - crackles
- **STOP the infusion**
- **Administer NS via new IV tubing (Do not flush through blood tubing as you will continue to administer blood product).**

Chest tubes

Expected findings

- 1st chamber: drainage collection
    - Receiving fluid from the pleural or mediastinal space
- 2nd chamber: water seal
    - One-way valve, tidaling occurs.
- 3rd chamber: Suction control
    - Bubbling occurs.

Nursing interventions pre-, intra-, and post- placement and removal

Pre-procedure:Nursing Interventions: Nurse will primarily be assisting in insertion

- Hemodynamically stable clients → provide adequate pain control for this procedure with local anesthetic infiltration and the use of conscious sedation (if feasible).
- Administer supplemental O2 as needed
- Place client in the supine position with the arm comfortably over the client's head
- Prepare the skin with chlorhexidine or 10% povidone-iodine solution; full barrier precautions (gloves, gown, mask, eye protection), full body drapes

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- Verify consent form is signed
- Reinforce client teaching
  - Breathing will improve when the chest tube is in place
- Assess for allergies to local anesthetics
- Assist the client into the desired position (supine or semi-Fowler's)
- Prepare the chest drainage system prior to the chest tube insertion per the facility protocol (fill the water seal chamber)
- Administer pain and sedation medications as prescribed
- Prep the insertion site with povidone-iodine or other facility approved agent

Intra-procedure:Nursing Interventions

- Apply a dressing to the insertion site
- Set-up of the drainage system
  - Place the chest tube drainage system below the client's chest level
  - Ensure that the tubing from the bed to the drainage system is straight to promote drainage via gravity
- The nurse should continually monitor vital signs and response to the procedure

Post-procedure: Nursing Interventions

- Assess VS, breath sounds, I&O, SaO2, color, and respiratory effort as indicated by the status of the client and at least every 4 hr
- Encourage coughing and deep breathing every 2 hr
- Keep the drainage system below the client's chest level, including during ambulation
- Monitor for chest tube placement and function
  - Check water seal level
  - Document the amount and color of drainage. Report excessive drainage (>70mL/hr)
  - Monitor the fluid in the suction control chamber, and maintain the prescribed fluid level

        - Ensure the regulator dial on the dry suction device is at the prescribed level
        - Check for expected findings of tidaling in the water seal chamber and continuous bubbling only in the suction chamber
    - Routinely monitor tubing for kinks, occlusions, or loose connections
    - Monitor the chest tube insertion site for redness, pain, infection, and crepitus (air leakage in the subcutaneous tissue)
    - Tape all connections between the chest tube and chest tube drainage system
    - Position the client in the semi- to high-Fowler's position to promote optimal lung expansion and drainage of fluid from the lungs
    - Administer pain medications as prescribed
    - Obtain a CXR to verify the chest tube's placement
    - Keep 2 enclosed hemostats, sterile water, and an occlusive dressing located at the bedside at all times
    - D/t risk of causing a tension pneumothorax, chest tubes are clamped only when prescribed in specific circumstances, such as in the case of an air leak, during drainage system change, accidental disconnection of tubing, or damage to the drainage system

    - CXR to confirm tube position and assess lung expansion.
    - Monitor the initial drainage from the tube.
    - Re-expansion pulmonary edema and be prepared to treat it
    - If a patient starts coughing, clamp the tube for a brief period of time and allow cough to subside before removing more fluid

Chest Tube Removal: Nursing Interventions

- Provide pain medication 30 min before
- Assist the provider with sutures and chest tube removal
- Instruct the client to take a deep breath, exhale, and bear down (Valsalva's maneuver) or to take a deep breath and hold it (increases intrathoracic pressure and reduces risk of air emboli) during chest tube removal
- Apply airtight sterile petroleum jelly gauze dressing; secure in place with heavyweight stretch tape
- Obtain chest x-ray as prescribed; this is performed to verify continued resolution of the pneumothorax, hemothorax, or pleural effusion
- Monitor for excessive wound drainage, signs of infection, or recurrent pneumothorax

Measuring output

ETT Suctioning

Nursing interventions

- Endotracheal or tracheostomy tube→ suction via either open or closed (in-line) method of suctioning
- Insert the catheter without applying suction; applying suction on insertion could injure the airway
- After you insert the catheter, apply suction while using a *rotating* motion to remove it
- Closed suctioning→ wear clean (not sterile) gloves and use a multi-use catheter enclosed in a plastic sheath
- Advantage of closed suction system is that you do not have to disconnect the patient from the mechanical ventilator

Cardiac rhythms

Identify by rhythm strip OR written description of rhythm

Atrial fibrillation

Manifestations

Irregularly irregular pulse
Possible tachycardia
Hypotension
Signs of heart failure
Respiratory distress
Finger clubbing
Ascites

Week 2:

Pneumothorax

Manifestations

-anxiety pleuritic pain
-tachypnea
-tachycardia
-hypoxia
-cyanosis
-dyspnea
-use of accessory muscles
-tracheal deviation to unaffected side (tension)
-reduced or absent breath sounds
-asymmetrical chest wall movement
-hyperresonance on percussion w/pneumo

Week 3:

MI

Diagnostic testing

- Use rapid transit to the hospital (e.g. EMS)
- Obtain 12-lead electrocardiogram to be read within 10 minutes.
- Obtain laboratory blood specimens of cardiac biomarkers, including troponin.
- Obtain other diagnostics to clarify the diagnosis

- **Specific markers in diagnosing a myocardial infarction (MI)**
- **Cardiac enzymes includes:**

Creatinine kinase MB (CK-MB)
Troponin T
Troponin I
Myoglobin

	Expected Reference Range	Elevated Levels 1st Detectable Following Myocardial Injury	Expected Duration of Elevated Levels
CK-MB	0% of total CK (30 to 170 units/L)	3-6 hr	2-3 days
Troponin T	<0.1 ng/mL	2-3 hr	10-14 days
Troponin I	<0.03 ng/mL	2-3 hr	7-10 days
Myoglobin	<90 mcg/L	2-3 hr	24 hr

Echocardiogram

Patient education prior to this test

- Nursing Considerations:

Pre-procedure → explain the reason for the test to the client. This is non-invasive and takes up to 1 hr.

- Nothing to eat or drink for 6 hours prior to study
- Food and oral fluids are withheld until the patient is fully alert and the effects of the topical anesthetic agent are reversed (usually 2 hr) after procedure
- Inform pt that a sore throat may be present for the next 24

Cardiac catheterization

Nursing interventions pre-procedure

- Maintain NPO for at least 8 hours
- Ensure consent form is signed
- Assess for iodine/shellfish allergy (contrast media)
- Assess renal function prior to introduction of contrast dye
- Administer pre-medications as prescribed (methylprednisolone, diphenhydramine)
- Patient Education: Instruct the client that he is awake and sedated during procedure. A local anesthetic is used. A small incision is made, often in the groin, to insert the catheter. The client can feel warmth and flushed when the dye is inserted. After the procedure, the client must keep the affected leg straight. Pressure (a sandbag) can be placed on the incision to prevent bleeding.

Cardiac tamponade

Manifestations
anxiety and restlessness
-low blood pressure
-weakness
-chest pain radiating to your neck, shoulders, or back
-trouble breathing or taking deep breaths
-rapid breathing
-discomfort that's relieved by sitting or leaning forward
-fainting, dizziness, and loss of consciousness

Diuretic therapy

Complications/adverse effects
Reflex Tachycardia
Fluid overload

Week 5:

Hypervolemia

Manifestations

- Acute weight gain
- peripheral edema and ascites,
- distended jugular veins
- crackles
- elevated CVP
- shortness of breath
- ↑ BP
- bounding pulse and cough,
- ↑ respiratory rate,
- ↑ urine output

Hypokalemia/Hyperkalemia

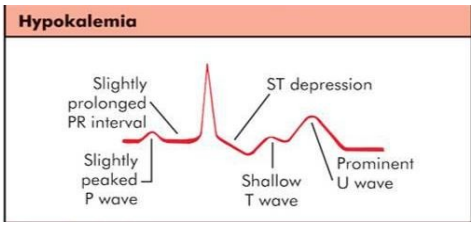
Interventions
Hypokalemia

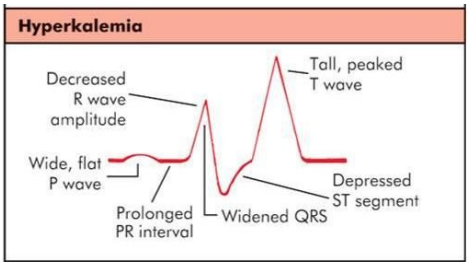
- assessment,
- severe hypokalemia is life-threatening,
- monitor ECG and ABGs,
- dietary potassium,
- nursing care related to IV potassium administration

Hyperkalemia

- assessment of serum potassium levels,
- mix IVs containing K^+ well,
- monitor medication affects,
- dietary potassium restriction/dietary teaching for patients at risk
- Hemolysis of blood specimen or drawing of blood above IV site may result in false laboratory result
- Salt substitutes, medications may contain potassium
- Potassium-sparing diuretics may cause elevation of potassium
- Should not be used in patients with renal dysfunction

EKG changes associated with electrolyte imbalances





Week 7:

Casts

Patient education

- Client Education:
    - Instruct clients:

        - Do not place any foreign objects inside the cast to avoid trauma to the skin; itching under the cast is relieved by blowing cool air from a hair dryer into the cast
        - Cover the cast with plastic if needed to avoid soiling from urine or feces
        - Report any areas under the cast that are painful, have a “hot spot”, have increased drainage, are warm to the touch, or have an odor, which can indicate infection
        - Report change in mobility and complications such as SOB, skin breakdown, and constipation
    - Demonstrate how plastic bags can cover the cast during baths and showers to keep the cast dry
- DO
    - Apply ice directly over fracture site for first 24 hrs
    - Check with HCP before getting fiberglass cast wet
    - Dry cast thoroughly if inadvertently exposed to water
    - Elevate extremity above the level of the heart for first 48 hrs
    - Regularly move joints about and below cast
    - Use hair dryer on cool setting for itching inside the cast
    - Report signs of possible problems
    - Keep appointment to have fracture and cast checked
- DON’T
    - Get cast wet
    - Remove any padding
    - Insert any objects inside the cast
    - Bear weight on new cast for 48 hrs (not all casts are made for weight bearing)
    - Cover cast with plastic for prolonged periods

Nursing interventions:

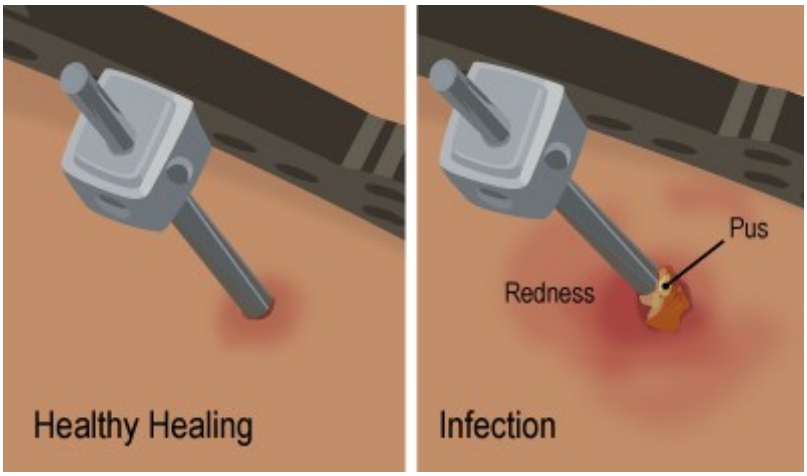
- Monitor neurovascular status every 1 hr for the first 24 hrs and assess pain
- Apply ice for 24-48 hrs
- Handle a plaster cast with the palms, not fingertips, until the cast is dry to prevent denting the cast
- Avoid setting the cast on hard surfaces or sharp edges
- Prior to casting, the area is cleaned and dried; tubular cotton web roll is placed over the affected area to maintain skin integrity; the casting material is then applied
- After cast application, position the client so that warm, dry air circulates around and under the cast (support the casted area without pressure under or directly on the cast) for faster drying and to prevent pressure from changing the shape of the cast. Use gloves to touch the cast until it is completely dry
- Elevate the cast above the level of the heart during the first 24-48 hrs to prevent edema of the affected extremity; use a cloth-covered pillow instead of plastic while cast is drying

- Ensure that cast is not too tight; there should be room for one finger between the skin and cast
- Document presence of drainage and report sudden increase in drainage; circling drainage on cast is an unreliable indicator of drainage amount and can increase client anxiety
- Older adult clients have an increased risk for impaired skin integrity d/t loss of elasticity of the skin and decreased sensation (comorbidities)
- Neurovascular Assessment
- Essential throughout immobilization
- Assessments are performed every 1 hr for the 1st 24 hrs and every 1-4 hrs thereafter
- Includes:
- Pain → assess pain level, location, and frequency; assess pain using 0 to 10 pain scale, and have the client describe the pain; immobilization, ice, and elevation of the extremity with the use of analgesics should relieve most of the pain
- Sensation → assess for numbness or tingling of the extremity; loss of sensation can indicate nerve damage
- Skin temperature → check the temperature of the affected extremity; extremity should be warm, not cool, to touch; cool skin can indicate decreased arterial perfusion
- Capillary refill → press nail beds of affected extremity until blanching occurs; blood return should be within 3 seconds; prolonged refill indicates decreased arterial perfusion; nail beds that are cyanotic can indicate venous congestion
- Pulses → should be palpable and strong; pulses should be equal to the unaffected extremity; edema can make it difficult to palpate pulses, so Doppler ultrasonography might be required
- Movement → client should be able to move affected extremity in active motion
- After a cast is applied, include the following instructions when teaching the patient and the caregiver.

Complications

Skeletal traction

Expected findings at pin sites



Buck's traction

What does this do?

- Traction uses a pulling force to promote and maintain alignment of the injured area

Week 8:

Increased ICP

Manifestations

- Changes in LOC
- Any change in condition
  - Restlessness, confusion, increasing drowsiness, increased respiratory effort, purposeless movements
- Pupillary changes and impaired ocular movements
- Weakness in one extremity or one side
- Headache: constant, increasing in intensity, or aggravated by movement or straining
- **Late**
- Respiratory and vasomotor changes
- VS: Increase in systolic blood pressure, widening of pulse pressure, and slowing of the heart rate; pulse may fluctuate rapidly from tachycardia to bradycardia; temperature increase
  - Cushing's triad: bradycardia, hypertension, bradypnea
- Projectile vomiting
- Further deterioration of LOC; stupor to coma
- Hemiplegia, decortication, decerebration, or flaccidity
- Respiratory pattern alterations including Cheyne-Stokes breathing and arrest
- Loss of brainstem reflexes: pupil, gag, corneal, and swallowing
-

Fluid resuscitation

- Use Parkland Baxter formula to calculate
- Parkland (Baxter) Formula
- 4mL/kg x % of TBSA = total fluid requirements for 1st 24 hrs
- Use Lactated Ringers
- Application:
    - ½ of total in 1st 8 hrs
    - ¼ of total in 2nd 8 hrs
    - ¼ of total in 3rd 8 hrs
- Formulas are guidelines. Fluid is given at a rate to produce 0.5-1 mL/kg/hr of urine output. The American Burn Association Consensus Fluid Resuscitation Formula has suggested 2-4mL/kg x % TBSA burned = total fluid requirements for 1st 24 hrs. This strategy avoids over-resuscitation of fluids or "fluid creep".
- Example:
- For a 70-kg patient w/ 50% TBSA burn:
- 4mL x 70 kg x 50 = 14,000mL in 24 hrs
- 7000mL (1/2) given in 1st 8 hrs
- 3500mL (1/4) given in the 2nd 8 hrs
- 3500mL (1/4) given in the 3rd 8 hrs

Week 11:

SIADH

Pharmacologic and nursing interventions

- Tetracycline derivative
    - Unlabeled use to correct fluid and electrolyte imbalances by stimulating urine flow
- Vasopressin antagonist
- Loop diuretic (furosemide)
- Hypertonic sodium IV fluid
- Restrict oral fluids
- Monitor I&O
- Monitor VS for increased BP, tachycardia, and hypothermia
- Auscultate lung sounds to monitor for pulmonary edema
- Weight client daily
- Report altered mental status
- Reduce environmental stimuli
- Monitor urine and blood chemistry

Myxedema coma

Nursing interventions/priorities

NURSING CONSIDERATIONS:

Maintain airway patency

Initiate aspiration precautions

Administer IV fluids as prescribed

Hypoglycemia

Treatment

- Check blood glucose level.
- Follow guidelines outlined by the provider or diabetes educator.
- Instruct the client who has hypoglycemia (glucose of <70) to take 15-20g of readily absorbable carbohydrates (4-6 oz of fruit juice or regular soft drink, glucose tablets or glucose gel per package instructions, 6-10 hard candies, or 1 tbsp of honey) and recheck blood glucose in 15 min.
- Repeat the administration of carbohydrates if not WNL, and recheck blood glucose if 15 min.

- If blood glucose is WNL, have a snack containing a carbohydrate and protein (if the next meal is more than 1 hr away). Blood glucose increases approximately 40mg/dL over 30 min following ingestion of 10g of absorbable carbohydrate.
- If the client is unconscious or unable to swallow, administer glucagon subcutaneous or IM (repeat in 10 if still unconscious) and notify the provider. Place the client into a lateral position to prevent aspiration.
- In acute care, the nurse should administer 50% dextrose if IV access is available. Consciousness should occur within 20 min.
- Once consciousness occurs and the client is able to swallow, have the client ingest oral carbohydrates.
    - Simple Carbohydrates to Treat Hypoglycemia
    - Commercially prepared glucose tablets
    - 6-10 Life Savers or hard candy
    - 4 tsp of sugar
    - 4 sugar cubes
    - 1 tbsp of honey or syrup
    - ½ cup of fruit juice or regular (nondiet) soft drink
    - 8 oz of low fat milk
    - 6 saltine crackers
    - 3 graham crackers
- DO NOT attempt to administer oral foods or fluids to the client experiencing a severe hypoglycemic reaction who is semiconscious or unconscious and is unable to swallow. This client is at risk for aspiration. For this client, an injection of glucagon is administered subcutaneously or intramuscularly. In the hospital or emergency department, the client may be treated with an IV injection of 25-50mL of 50% dextrose in water.

DKA

Treatment

- Vigorous IV electrolyte and fluid replacement both for hypovolemia and hyperosmolality
- Fluid loss averages 6-10L
- Goal → correct estimated deficits w/in first 24 hours; however, osmolality should not be reduced too rapidly because this may generate cerebral edema
- Initial fluid of choice is 0.9% NS → rate of infusion dependent on clinical state of patient
- If hypernatremic → 0.45% saline in order to provide electrolyte free water
- When BG reaches 200-300 or less → change to D5W to prevent decline in blood glucose level and so that insulin can be continued to achieve ketone clearance
- Monitoring of fluid volume status involves frequent measurements of VS, lung assessment, and monitoring of intake and output
- Initial UO lags behind IV fluid intake as dehydration is corrected
- Monitor for signs of fluid overload is especially important for patients who are older, have renal impairment, or are at risk for heart failure
- Major electrolyte of concern → POTASSIUM
- Initial plasma concentration may be low, normal, or high, but more often than not tends to be high (hyperkalemia)
- Rehydration leads to:
    - Increased plasma volume and subsequent decreases in serum potassium
    - Increased urinary excretion of potassium
- Insulin administration enhances the movement of potassium from the extracellular fluid into the cells
- Cautious but timely potassium replacement is vital to avoid dysrhythmias that may occur with hypokalemia
- Frequent (every 2-4 hrs initially) ECGs and laboratory measurements of potassium are necessary during the first 8 hours of treatment
- Reversed with insulin, which inhibits fat breakdown, thereby ending ketone production and acid buildup
- Insulin is usually infused IV at a slow, continuous rate (e.g., 5 units/hr)
- Hourly blood glucose values must be measured
- Regular insulin (only IV insulin) may be added to IV solutions
- Insulin must be infused continuously until subcutaneous administration of insulin can be resumed; any interruption in administration may result in the re-accumulation of ketone bodies and worsening acidosis
- Even if blood glucose levels are decreasing and returning to normal, the insulin drip must not be stopped until subcutaneous insulin therapy has been started
- In general, bicarbonate infusion to correct severe acidosis is avoided during treatment of DKA because it precipitates further, sudden (and potentially fatal) decreases in serum potassium levels
- Bicarbonate may be administered if arterial pH is <6.90 (controversial
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HHS

Pharmacologic treatment (remember there are 3 steps to this, you should know the order of them as well as what is used)

Week 12:

Pancreatitis

Manifestations
EXPECTED FINDINGS:
- Sudden onset of severe, boring pain (goes through the body)
- N/V
- Weight loss

PHYSICAL ASSESSMENT FINDINGS:
- Turner's sign
- Cullen's sign
- Generalized jaundice
- Absent or decreased bowel sounds
- Warm, moist skin
- Fruity breath

Hemodialysis

Assessing fistulas (patent vs non patent)

GI bleed

Priority assessment
- Emergency Assessment & Management
- Identify S/Sx of shock

Assess baseline vital signs to monitor patient progress:
- **Increased heart rate**
- **Prolonged capillary refill**
- **Weak pulse**
- **Hypotension**
- **Cool extremities**

- Monitor urine output
- Administer isotonic fluids (LR or NS) and/or blood for volume replacement
- First-line management → endoscopy (performed w/in 24 hrs of onset of bleeding)

Chronic Kidney Disease

Manifestations (including labs)
- Nausea, fatigue, lethargy, involuntary movement of legs, depression, intractable hiccups

- In most cases, findings of CKD are r/t fluid volume overload and can include the following:
- Neuro: lethargy, decreased attention span, slurred speech, tremors, ataxia,seizures, coma
- CV: fluid overload, HTN, dysrhythmias, heart failure
- Resp: SOB, tachypnea, crackles
- Heme: Anemia (pallor, weakness, dizziness)
- Skin: decreased skin turgor, yellow cast to skin, dry

LABS

- UA: hematuria, proteinuria, and decrease in specific gravity
- Serum creatinine: gradual increase over months to years
- BUN: gradual increase with elevated serum Cr over months to years
- Serum electrolytes: **Decreased** Na+ (dilutional) and calcium; increased K+, Ph-, Mg+
- CBC: decreased Hgb and Hct from anemia secondary to loss of erythropoietin in CKD