N441 Exam 1 Concept Reviews

Week 1 Content:

1. Blood administration (transfusion reactions, patient verification)

    - Acute hemolytic – incompatibility issue; immediate or during
        - Sx: chills, fever, tachycardia, tachypnea, low-back pain, flushing, hypotension, chest pain, nausea, anxiety, hemoglobinuria, impending sense of doom
        - RN: stop the infusion, infuse NS using new tubing,
    - Febrile – anti-WBC antibodies (use WBC filter); within 2 hr
        - Sx: chills, 1 F or greater increase, flushing, hypotension, tachycardia
        - RN: stop the infusion and admin antipyretics, initiate NS
        - Tx: Tylenol
    - Allergic – sensitivity reaction to something in the blood product (probably a preservative); during or up to 24 hr
        - Tx: Benadryl, for anaphylactic rex; epinephrine, O2, or CPR
    - Bacterial – contaminated blood; during or up to several hrs
        - Sx: wheezing, dyspnea, chest tightness, cyanosis, hypotension, shock
        - RN: admin ABX, Get some blood cultures
    - Circulatory overload – too fast, can't handle the volume
        - Sx: crackles, dyspnea, cough, anxiety, JVD, tachycardia, can progress to pulmonary edema
        - RN
            - STOP the infusion
            - Sit up
            - Put on oxygen
            - Diuretics
            - Morphine sulfate (MS?)
            - Take the blood down (don't flush the tubing) and hang NS in clean tubing

    - Consent, type and cross-match, assess for hx of blood-transfusion reactions, 18- or 20-gauge needle
    - Two RNs must ID 1) the correct blood product and client by looking at the ID # on the blood product 2) # on ID band
    - Prime with NS, use Y-tubing with a filter
    - 30 min from the moment obtaining the blood product

2. Chest tubes (management, expected findings, complications)

- Supine or semi-Fowler's
- Post-procedure: VS, breath sounds, SaO2, color, resp. effort Q4h
- Coughing and deep breathing Q2h
- Check water seal level Q2h
- TIDALING in the WATER seal chamber and CONTINUOUS BUBBLING in the SUCTION chamber
- d/t the risk of tension PNX, chest tubes are clamped only
  - when prescribed in specific circumstances
  - during drainage system change
  - accidental disconnection of tubing
  - damage to the drainage system
- Complications
  - Air leaks
  - Accidental disconnection, system breakage, or removal
    - Immerse the end of the chest tube in sterile water to restore the water seal
    - If a chest tube is accidentally removed, dress the area with DRY, sterile gauze
  - Tension pneumothorax
    - Sucking chest wounds, prolonged clamping, kinks/ obstruction, mechanical ventilation w/ high levels of positive end expiratory pressure (PEEP)
    - Sx: tracheal deviation, absent breath sounds on one side, JVD, resp. distress, asymmetry of the chest, cyanosis

3. ET Tubes (Suctioning, complications, interventions)

- Insert the catherter w/o applying suction -> applying suction on insertion could injure the airway
- Suctioning complications
  - Hypoxia
  - Injury to the airway
  - Nosocomial infections
  - Cardiac dysrhythmias
- RN : hyperoxygenate before suctioning and assess the patient before, during, and after procedure

4. Dysrhythmias (characteristics, pulse, identification)

- Classified by site of origin: SA node (60 – 100 bpm), atria, AV node (40 – 60 bpm), or ventricle (20 – 40 bpm), Purkinje (20 bpm)

- Bradycardia, tachycardia, heart block, premature beat, flutter, fibrillation, or asystole
- Can be benign or life-threatening
- The life-threatening effects of dysrhythmias are generally r/t decreased cardiac output and ineffective tissue perfusion
- Tx is based on the cardiac rhythm, which can require cardioversion, defibrillation or pacemaker insertion, and/or medications

5. Mechanical ventilation (PPV, alarms)

- Delivering warm, 100% humidified O2 at FiO2 levels 21% - 100%
- Positive-pressure ventilators (PPV), via ET tube/tracheostomy tube
    - Forced/enhanced lung expansion
    - Improved gas exchange (oxygenation)
    - Decreased work or breathing
- Assess resp. status Q1-2hr
- Mx and document ventilator settings Q1h
    - Rate, FiO2, TV
    - Mode of ventilation
    - Use of adjuncts (PEEP, CPAP)
    - Plateau or peak inspiratory pressure (PIP)
    - Alarm settings
- Ventilator alarms
    - Volume (low pressure) alarms: low exhaled vol. d/t disconnection, cuff leak, and/or tube displacement
    - Pressure (high pressure) alarms: excess secretions, biting the tubing, kinks, coughing, pulmonary edema, bronchospasms, or pneumothorax
    - Apnea alarms: ventilator does not detect spontaneous respiration in a preset time period
- Admin meds
    - Analgesics: morphine and fentanyl
    - Sedatives: propofol, diazepam, lorazepam, midazolam, and haloperidol
        - To prevent competition between extrinsic and intrinsic breathing and the resulting effects of hyperventilation
    - Neuromuscular blocking agents: pancuronium, atracurium, and vecuronium (long half-life)
        - Paralyze muscles, but do not sedate or relieve pain. A sedative or analgesic agent in conjunction with a neuromuscular blocking agent
    - Ulcer-preventing agents: famotidine (H2 blocker) or lansoprazole (PPI)
    - Antibiotics for established infections

6. Cardiac cycle

Week 2 Content:

1. Breathing techniques
   - Deep breathing
   - Incentive Spirometry: 5 – 10 times Q1 – 2h
   - Pursed-lip breathing
   - Diaphragmatic breathing
   - Voluntary coughing

2. ARF (manifestations)
   - Acute respiratory failure: one or both of gas exchanging functions is inadequate
     - Hypoxemia (PaO_2 <60)
     - Hypercapnia ($PaCO_2$ >45)
   - Expected findings
     - SOB
     - Dyspnea w/ or w/o exertion
     - Orthopnea (difficulty breathing lying flat)
     - Cyanosis
     - Pallor
     - Hypoxemia
     - Tachycardia
     - Confusion
     - Irritability or agitation
     - Restlessness
     - Hypercarbia

3. ARDS (nursing interventions)
   - Acute respiratory distress syndrome: sudden, progressive pulmonary edema, increasing bilateral lung infiltrates visible on CXR, decreased lung compliance
   - Maintain patent airway and Mx resp. status Q1h or more
   - Oxygenate before suctioning
   - Assess and document sputum color, amount, and consistency
   - Mx for pneumothorax (a high PEEP can cause the lungs to collapse)
   - Obtain ABGs as prescribed
   - Maintain continuous ECG monitoring for changes that can indicate increased hypoxemia, esp. when repositioning and applying suction
   - Continually Mx VS, including SaO_2. Assess pain level
   - Position the client to facilitate ventilation and perfusion
   - Prevent infection (hand hygiene, oral care Q2h, etc.)
   - Promote nutrition

- Provide emotional support

4. Flail chest (manifestations/findings)
    - At least two neighboring ribs, usually on one side of the chest, sustain multiple fractures causing instability of the chest wall and paradoxical chest wall movement -> limitation in chest wall expansion
    - Expected findings
        - Unequal chest expansion
        - Paradoxical chest wall movement (inward movement of segment during inspiration, outward movement of segment during expiration)
        - Tachycardia
        - Hypotension
        - Dyspnea
        - Cyanosis
        - Anxiety
        - Chest pain

5. Mechanical ventilation (PPV, alarms)
6. Pneumonia (manifestations, treatment)
    - Acute infection of the lung parenchyma caused by various microorganisms including bacteria, mycobacteria, fungi, and viruses
    - It is not possible to Dx a specific form or classification of PNA by clinical manifestations alone
    - Onset of Sx is gradual and nonspecific
        - HA
        - Confusion from hypoxia (most common Sx among older adults)
        - Low-grade fever
        - Pleuritic chest pain; sharp (aggravated by deep breathing & coughing)
        - Myalgia
        - Rash, flushed face
        - Pharyngitis
        - After a few days -> mucoid or mucopurulent sputum (yellow-tinged) is expectorated
        - In severe PNA: tachypnea (25 – 45), SOB, labor breathing, central cyanosis (lips, nail beds), orthopnea, poor appetite, diaphoresis, weakness/fatigue
        - Assessment findings: crackles, wheezes, dull chest percussion, decreased SaO2
    - Treatment
        - Prevention: pneumonococcal conjugate vaccine (PCV13), pneumonococcal polysaccharide vaccine (PPSV23)
        - ABX: determined by results of culture and sensitivity
            - Penicillins, cephalosporins

- In HAP: Tx initiated w/ broad-spectrum IV abx
- Bronchodilators, anti-inflammatories

7. Pneumothorax (manifestations, complications, optimal outcomes)
   - The presence of air or gas in the pleural space that causes lung collapse
   - Expected findings
     - Anxiety
     - Pleuritic pain
     - Tachypnea, tachycardia, hypoxia, cyanosis, dyspnea, and use of accessory muscles
     - Tracheal deviation to the unaffected side (tension PNX)
     - Reduced/absent breath sounds
     - Asymmetrical chest wall movement
     - Hyperresonance on percussion d/t trapped air
     - SubQ emphysema (air accumulating in subQ tissue)
   - Complications
     - Decreased cardiac output
       - The amount of blood pumped by the heart decreases as intrathoracic pressure rises
       - Hypotension develops
     - Respiratory failure ; inadequate gas exchange d/t lung collapse
   - Optimal outcomes

8. Pulmonary Embolism (assessment findings, pharmacologic treatment, nursing interventions)
   - A substance (solid, gaseous, or liquid) enters venous circulation and forms a blockage in the pulmonary vasculature
   - Physical assessment findings
     - Pleurisy; inflammation of the pleurae
     - Pleural friction rub
     - Tachycardia
     - Hypotension
     - Tachypnea
     - Adventitious breath sounds (crackles) and cough
     - Heart murmur in S1 and S4
     - Diaphoresis
     - Low-grade fever
     - Decreased O2sat (< 95%)
     - Petechiae (red dots under the skin) over chest and axillae
     - Pleural effusion
     - Distended neck veins
     - Syncope
     - Cyanosis

- Pharmacologic treatment
  - Anticoagulants: heparin, enoxaparin, warfarin, fondaparinux
    - Prevent clots from getting larger or additional clots from forming
    - RN: assess for CI (active bleeding, PUD, hx of stroke, recent trauma), Mx for bleeding times (PT/INR, PTT, CBC), Mx for SE (thrombocytopenia, anemia, hemorrhage)
  - Direct factor Xa inhibitor: rivaroxaban (Xarelto)
    - Binds directly with the active center of factor Xa, which inhibits the production of thrombin
    - RN: assess for bleeding from any site (clients have experienced epidural hematoma, intracranial, retinal, adrenal, or GI bleeds), Risk for spinal/epidural hematoma; should DC med for 18 hr prior to removing epidural catheter and wait for another 6 hr to restart
  - Thrombolytic therapy: alteplase, reteplase, and tenecteplase
    - Dissolve blood clots and restore pulmonary blood flow
    - RN: asses for CI (known bleeding disorders, uncontrolled HTN, active bleeding, PUD, hx of stroke, recent trauma/surgery, pregnancy), Mx for evidence of bleeding, thrombocytopenia, and anemia, Mx BP, HR, RR, and O2Sat before, during, and after admin.
- Nursing interventions
  - Admin O2 therapy. Position the client to high-Fowler's
  - Initiate and maintain IV access
  - Admin meds
  - Assess resp. status at least Q30min
    - Auscultate lung sounds
    - Measure rate, rhythm, and ease of respirations
    - Inspect skin color and cap. Refill
    - Examine for position of trachea
  - Assess cardiac status
    - Compare BP in both arms
    - Palpate pulse quality
    - Check for dysrhythmias on cardiac monitor
    - Examine neck for distended neck veins
    - Inspect the thorax for petechiae
  - Provide emotional support and comfort to control client anxiety
  - Mx changes in LOC and mental status

9. Oxygen therapy (Prioritizing)
   - ?????

Week 3 Content:

1. Coronary Artery Disease (risk factors)
   - Non-modifiable
     - Age
     - Gender; more common in men than in women until 75 yr of age
     - Ethnicity (more common in white men than in African American)
     - Genetic predisposition & family hx of heart disease
   - Modifiable
     - Serum lipids:
       - TC > 200
       - Triglycerides > 150
       - LDL > 160
       - HDL < 40 in men and < 50 in women
     - BP > 140/90
     - Diabetes
     - Tobacco use
     - Physical inactivity
     - Obesity; WC > 102 cm in men and > 88 cm in women
     - Contributing: fasting blood glucose > 100, psychosocial risk factors (depression, hostility, anger, stress), elevated homocysteine levels (amino acid and breakdown product of protein metabolism, high levels -> plaque formation -> damaging arterial walls -> heart attack, stroke)

2. Aneurysms (manifestations of specific types)
   - Abdominal aortic aneurysm; AAA
     - Constant gnawing feeling in abdomen
     - Flank or back pain
     - Pulsating abdominal mass (DO NOT palpate, risk of rupture)
     - Bruit over the are of the aneurysm
     - Elevated BP (unless in cardiac tamponade or rupture of aneurysm)
   - Thoracic aortic aneurysm
     - Severe back pain (most common)
     - Hoarseness, cough, SOB and difficulty swallowing
     - Decrease in urine output (secondary to hypovolemic shock)
   - Aortic dissection “tear”
     - Sudden onset of “tearing” or “ripping” or “stabbing” abdominal and back pain
     - Hypovolemic shock
       - Diaphoresis, N/V, faintness, apprehension
       - Decreased or absent peripheral pulses
       - Neurologic deficits
       - Hypotension and tachycardia (initial)
       - Oliguria

3. Cardiac Enzymes
    - Troponin: any positive value indicates damage to cardiac tissue and should be reported (should be < 0.03)
        - Troponin I: levels no longer evident after 7 to 10 days
        - Troponin T: levels no longer evident after 10 to 14 days
    - Creatine kinase-MB (CK-MB): peaks around 24 hr after onset of chest pain. levels no longer evident after 3 days (men 2 – 6, women 2 – 5 mcg/L)
    - Myoglobin: earliest marker of injury to cardiac or skeletal muscle (rises w/in 2 hr, drastic drop after 7 hr) levels no longer evident after 24 hr

4. Inflammatory disorders (signs and symptoms)
    - Pericarditis: can be d/t MI
        - Chest pressure/pain aggravated by breathing (mainly inspiration), coughing, and swallowing; pericardial friction rub auscultated at left lower sternal border; SOB; and relief of pain when sitting and leaning forward
    - Myocarditis: can be d/t a viral, fungal, or bacterial infection, or a systemic inflame disease (Crohn's disease),
        - Tachycardia, murmur, friction rub auscultated in the lungs, cardiomegaly, chest pain, dysrhythmias
    - Rheumatic endocarditis: d/t a complication of rheumatic fever (produces lesions in the heart)
        - Fever, chest pain, joint pain, tachycardia, SOB, rash on trunk and extremities, friction rub murmur, muscle spasms
    - Infective endocarditis: d/t staphylococci, streptococci, fungi or other infectious organisms
        - Common in structural cardiac malformations, cardiac devices (pacemaker), prosthetic heart valves, IV substance use
        - RF: invasive procedures (dental procedures), body piercing, tattooing, can cause bacteremia
        - Fever, flu-like manifestations, murmur, petechiae (on the trunk and mucous memb.), positive blood cultures, splinter hemorrhages (red streaks under the nail beds)

5. CABG (post-op treatment)
    - Patient airway & adequate ventilation
    - Dangle the client's legs and turn the client from side to side as tolerated w/in 2 hr following exudation. Assist the client to a chair w/in 24 hr. Ambulate the client 25 to 100 ft three times a day by first postoperative day
    - Check chest tube patency and drainage (report drainage > 150 mL/hr could be a manifestation of hemorrhage)
    - Assess and control pain (morphine, fentanyl)
    - Mx fluid & electrolytes

- Mx for infection
- Encourage activity
- Risk for ARDs

6. Heart failure- left and right (manifestations) **BNP > 100 = HF
    - Left (has mainly pulmonary S/Sx b/c of backflow to the lungs)
        - Dyspnea, orthopnea, nocturnal dyspnea
        - Fatigue
        - Displaced apical pulse (hypertrophy)
        - S3 heart sound (gallop)
        - Pulmonary congestion (dyspnea, cough, bibasilar crackles)
        - Frothy sputum (can be blood-tinged)
        - Altered mental status
        - Manifestations of organ failure, such as oliguria
        - Nocturia
    - Right (has mainly systemic S/Sx b/c of backflow to the body)
        - JVD
        - Ascending dependent edema (legs, ankles, sacrum)
        - Abdominal distension, ascites
        - Fatigue, weakness
        - Nausea and anorexia
        - Polyuria at rest (nocturnal)
        - Liver enlargement (hepatomegaly) and tenderness
        - Weight gain

7. Cardiac catheterization (complications, post procedure care)
    - Complications
        - Artery dissection: hypotension, tachycardia
        - Cardiac tamponade: hypotension, JVD, muffled heart sounds
        - Hematoma at the insertion site
        - Embolism
        - Retroperitoneal bleeding: flank pain, hypotension
        - Restenosis of the vessel: chest pain, check EKG
    - Post procedure care
        - Assess VS Q15min x 4, Q30min x 2, Q1h x 4, then Q4h
        - Assess the groin site at the same intervals for
            - Bleeding and hematoma formation
            - Thrombosis (document pedal pulse, color, temperature)
        - Maintain bed rest in supine position w/ extremity straight for prescribed time
        - Conduct continuous cardiac monitoring for dysrhythmias
        - Admin antiplatelet or thrombolytic agents as prescribed to prevent clot formation and restenosis; aspirin, clopidogrel,

    ticlopidine, heparin, enoxaparin, GP IIb/IIIa inhibitors such as eptifibatide
  - Admin anxiolytics and analgesics as needed
  - Mx urine output and admin IV fluids for hydration (contrast media acts as an osmotic diuretic)
  - Perform/assist with sheath removal from vessel

8. MI (diagnostics, manifestations, pharmacologic tx, nursing interventions)
   - Diagnostics
     - EKG: ST depression and/or T-wave inversion = ischemia; ST-segment elevation = injury; abnormal Q-wave = necrosis
     - Stress test: tolerance of activity is tested (eval. Response to increased HR)
     - Thallium scan: assess for ischemia or absent perfusion, and the areas appear as “cold spots” *PE: NO smoking and NO caffeinated beverages 4 hr prior to the procedure
     - Coronary angiogram (cardiac catheterization): an invasive Dx procedure used to eval the presence and degree of coronary A. blockage; ensure the client understand the procedure prior to signing informed consent, NPO 8 hr prior to, assess for iodine/shellfish allergy (contrast media)
   - Manifestations
     - Chest pain (can radiate to the shoulder or arm)
     - Anxiety/feeling of impending doom
     - Tachycardia
     - Tachypnea
     - Diaphoresis
     - Nausea
     - Dizziness
   - Pharmacologic Tx
     - Morphine
     - Oxygen
     - Nitroglycerin
     - Aspirin
     - Heart-meds (beta-blockers, CCB, ARBs, etc.)
   - Nursing interventions
     - VS Q5min until stable, then Q1h
     - Serial ECG, continuous cardiac monitoring
     - Mx Location, precipitating factors, severity, quality, and duration of pain
     - Mx hourly urine output: greater than 30 mL/hr indicates renal perfusion
     - Mx lab data: cardiac enzymes, electrolytes, ABGs
     - Admin O2: 2 – 4 L/min

    - Obtain and maintain IV access
    - Promote energy conservation. Cluster nursing interventions

9. ABC’s for prioritization
    - Airway
    - Breathing
    - Circulation
10. EKG (patient instruction/education)
    - Instruct the client to remain still and breathe normally