Infection

Cellulitis (Pearson pg. 566)

Common bacterial skin infection that can spread quickly and become very serious

- ★ **Causes**
  - Bacteria entering the skin
    - Bacteria is often Staphylococcus (staph infection)
- ★ **Symptoms**
  - Skin redness
  - Swelling
  - Warmth
  - Pain
  - Blisters and purulent fluid
  - Fever
  - Swollen lymph nodes
- ★ **Symptoms of sepsis**
  - High fever
  - Low BP
  - Shutdown of organs
- ★ **Diagnosis**
  - Generally diagnosed by appearance of skin and presence of bacteria
- ★ **Medication Intervention/Education**
  - Oral Antibiotics
    - Administered to prevent serious complications like periorbital cellulitis
    - Serious cases = systemic antibiotics and analgesics
      - Prevent sepsis
  - Medication should start recovery in 48 hours
    - Therapy should continue for 10 days
- ★ **Non Pharmacologic Interventions**
  - Raising the affected limb above heart

- Sterile saline dressings
  - Reduce edema and promote drainage

★ **Patient Teaching**

- Picking wounds or scratching bites = starting/worsening cellulitis
- Children should be monitored for rapidly growing bites/inflammation
  - 3 yo and >50 yo = most common to experience facial cellulitis
- Older adults with poor circulation, diabetes, weakened immune system
  - More likely to develop cellulitis
  - More likely to develop severe cellulitis
  - Sinus infections = turn in periorbital cellulitis
  - Examine limbs daily & and apply moisturizer to avoid breaks in skin
- Hand Hygiene
  - Wash hands regularly
  - Don't touch affected area
- Wound Care
  - Wash wound with soap and water **daily**
  - Clear away dead tissue and purulent drainage
  - Wash inside out/new to old
  - Apply antibiotic ointment and sterile bandages
  - Keep proper moisture on wound
  - Monitor size of wound
  - Report:
    - Spreading of infection 24-48 hours after starting treatment
    - Fever
    - Increased lethargy

★ **Management of Care**

- Administer prescribed antibiotics PO/IV on regularly scheduled routine
  - Prevent the risk of sepsis
- Provide warm compress 4x daily, elevate, rest

★ **Risk Factors**

- Overweight
- Weakened immune system
- Presence of skin diseases
  - Eczema/athlete's foot
- Swollen limbs
- Use of IV drugs
- Previous infections of cellulitis

Pneumonia (ATI pg. 128)

An infection in the lungs caused by microbes; Excess fluid in the lungs due to inflammation (bacterial, fungal or viral) leading to impaired gas exchange

Droplet

★ **Assessment/Manifestations**

- Weakness
- Chest discomfort (dyspnea)
- fever/chills
- Shortness of breath/difficulty breathing
- Short breath cycles
- Crackles, wheezing, coughing, **dull chest percussions** over areas of consolidation
  - Consolidation = lobar pneumonia
- Purulent, blood tinged sputum (may not always be present)
- **Diagnostics**
  - Sputum Test:
    - Obtain b4 antibiotic therapy
    - Suction out mucus if needed
    - Early morning
  - CBC:

- Elevated WBC
- ABG:
  - Hypoxemia (decreased PaO2 <80 mm Hg)
- Chest X-ray
  - Shows consolidation (solidifying of lung tissue)

★ **Promotion, Prevention and Teaching**

- Wash hands regularly
- Avoid crowded spaces
- **Smoking cessation**
- Obtain flu and pneumonia immunizations
  - Pneumonia yearly after 50
- Treatment and recovery can take a **long time**
- Suck on hard candies to moisten mouth and increase fluids
- Report black, tarry stools
- Take meds with food

★ **Nursing Care**

- High Fowler's (90 degrees)
- Increase coughing, suction, breathing treatment, oxygen and medications
  - Turn, cough, deep breathe
- Increase fluids and nutrition
  - 2 - 3 L on liquids daily
    - Thins secretion, prevents dehydration
- Provide rest for those with dyspnea
- Oxygen as ordered
- Incentive spirometer
  - 10x hourly

★ **Medication Interventions and Education**

- Antibiotics
  - Penicillins/Cephalosporins (usually IV)

- Obtain cultures BEFORE giving first dose
- Monitor kidney function
    - Especially older adults taking these medications
- Take with food

- Bronchodilators
    - Reduces spasms and reduces irritation
        - Like albuterol, ipratropium, theophylline
            - Monitor theophylline (small TI range)
    - Provides rapid relief, increases bronchodilation, decreases secretions
        - Adverse effects:
            - Theophylline: tachycardia, nausea and diarrhea
            - Albuterol: tremors and tachycardia
            - Ipratropium: DRY DRY DRY, blurred vision, palpitations and headache (can indicate toxicity)
- Anti-Inflammatories
    - Glucocorticosteroids such as fluticasone and prednisone to reduce inflammation
        - **Monitor:**
            - Immunosuppression, fluid retention, hyperglycemia, hypokalemia and poor wound healing
                - Report mouth lesions (canker sores)

Tuberculosis (ATI pg.143)

Infectious disease caused by *Mycobacterium tuberculosis* - airborne route

TB bacillus can lie dormant for years (latent TB) before producing disease as it becomes active when individual grows older or immunocompromised

Bacteria adheres to alveoli → triggers immune response with development of lesions in lungs → cough 3 weeks +, purulent/bloody sputum, unexplained weight loss, night sweats, lethargy

★ **Diagnostics**

- Acid-fast bacilli smear and culture
  - TB is confirmed by positive culture for *Mycobacterium tuberculosis*
  - Three early-morning sputum samples
  - Patient is considered non contagious when they have 3 - smears
- Mantoux test
  - Client will have + intradermal TB test within 2-10 weeks of exposure to TB
    - Test should be read within 24-72 hours of test
    - Findings include:
      - Palpable, raised, hardened area at insertion site (+ test)
      - Induration of 5 mm is considered + for immunocompromised patient
      - Induration of 10 mm is considered + for normal patients
  - Those with latent TB can test +, and can receive treatment to prevent forming of active TB
  - + test indicates client has development immune response to TB
    - Need chest x-ray or QuantiFERON test to determine presence of active TB infection
      - Will be + regardless of active/latent
  - BCG vaccine = false positive test
- Acid fast bacilli cultures
  - Uses three early morning sputum samples
  - Three negatives = negative/latent? (safe to be out in public)
- Quantiferon Gold Test
- Chest x ray
  - Prescribed to detect active lesions in lungs

★ **Nursing Care**

- PPE:
  - N95 mask or powered air purifier when caring for patient with TB
  - Patient should be in negative airflow area

        - Barrier protection
        - Surgical mask on patient when transporting/leaving room
    - Increase
        - Adequate nutrition
            - Foods with protein, iron, and vitamins C & B
        - Fluids
    - Screen patient's family

★ **Medication Intervention and Teaching**

- Typical **four medication regimen:**
    - **300 mg Isoniazid**
        - Monitor for hepatotoxicity malaise, anorexia, fatigue and nausea) & neurotoxicity (tingling of hands and feet)
        - Vitamin B is encouraged to be prescribed with
        - Education: do NOT drink alcohol on this medication, take on empty stomach
    - **600 mg Rifampin**
        - Liver testing BEFORE taking medication
        - Monitor for hepatotoxicity
        - Education: pee can be orange, report pain/swelling of joints, use different contraceptive
    - **1500 mg Pyrazinamide**
        - Observe hepatotoxicity and nephrotoxicity
            - Liver enzyme testing every 2 weeks after starting medication
        - Education: glass of water with each dose, reduce gout and kidney problems, and avoid alcohol
    - **1200 mg Ethambutol**
        - Obtain baseline visual acuity tests + monthly after starting tx
        - Should not be given to children younger than 8 yrs

- Education: report change in vision immediately

- **Streptomycin (for multidrug resistance)**
  - High level of toxicity only use on TB (MDR-TB)
  - Do renal and output function tests
  - Monitor for ototoxicity
  - Education: Drink at least 2 L of fluids daily and notify provider if there are any changes in hearing

- **RIPE Orange = Rifampin, Isoniazid, Pyrazinamide, Ethambutol**
  - **Orange = orange discoloration of secretions expected with rifampin**

★ **Client Safety and Teaching**

- TB is often treated at home
- Medication therapy = 6-12 mo. of treatment, and up to 2 years of multidrug resistant TB
- Sputum testing every 2 - 4 weeks
  - 3 consecutive negative sputum tests are required to be considered TB negative (and be out in public)
- Practice proper hand hygiene
- While TB is active wear a mask in all public settings
- Complete full series of all medications to ensure bacteria becomes eliminated
- Get tested on regular basis is you live in busy area
- Risk Factors:
  - Immunocompromised status
  - Recent travel out of USA where TB is endemic
  - Any client with persistent dry cough, chest pain, weakness, weight loss, anorexia, hemoptysis, dyspnea, low-grade fever in the afternoon, night sweats, or chills GO GET TESTED

Inflammation

Gallbladder Disease: Cholelithiasis/Cholecystitis (ATI pg. 355)

Cholecystitis is inflammation of the gallbladder wall caused by gallstones obstructing cystic or common bile ducts.

Cholelithiasis is the presence of stone in the gallbladder in relation to bile or cholesterol into stone.

- ★ **Assessment/Clinical Manifestations**
  - Risk Factors:
    - Females
    - Estrogen therapies/contraceptives
    - Cholelithiasis
    - Obesity
      - High fat diet
    - Older adults
    - Rapid weight loss
    - Native american or mexican american
  - Expected Findings:
    - Upper right quadrant pain: sharp pain, often radiating to shoulder
    - Pain with deep inspiration during right subcostal palpation (**Murphy's sign**)
    - Intense pain with N/V
    - Pain upon eating high-fat foods
    - Rebound tenderness (**Blomberg's sign**)
    - Dyspepsia, belching and fever
  - Physical assessment findings:
    - Jaundice, icterus, clay fatty stools, dark urine
      - From liver involvement
  - Laboratory Tests:
    - WBC: Increased, indicating inflammation
    - Bilirubin: increased
      - If bile is obstructed

- Amylase/Lipase: increased with pancreatic involvement
- AST/ALT: Increased (with liver involvement)

- Diagnostic Procedures:
  - Ultrasound: shows gallstones and dilated common bile duct
  - Hepatobiliary scan (HIDA): assesses patency after contrast injection

★ **Nutrition**

- Dietary counseling:
  - Low-Fat diet:
    - Lower dairy use, fried food, chocolate, nuts and gravies
  - Avoid gas forming food:
    - Beans, cabbage, cauliflower and broccoli
  - Weight reduction
  - Vitamins:
    - Fat-soluble or bile salts that enhance absorption and aid digestion
      - A DECK of cards
      - Vit. A, D, E, & K are fat soluble

Inflammatory Bowel Disease UC/Crohn's Disease (ATI pg. 347)

★ **Assessment**

- Risk Factors:
  - Genetics
  - Caucasion, jewish and African
  - Young adulthood = females
  - Older adulthood = males
  - Tobacco use
- Findings:
  - **Ulcerative Colitis** - edema and chronic inflammation of mucosa in rectum and rectosigmoid colon; continuous ulcer forming

- Abdomen pain/cramping (LLQ)
- anorexia/weight loss
    - electrolyte imbalance
- Fever, diarrhea, bloody/pus stool, high-pitched bowel sounds
    - 10-20 liquid stools daily
    - Anemia and dehydration
- Mucosa of colon can increase in blood flow and become edematous and reddened

- Crohn's - chronic inflammation and ulceration of entire GI tract, formation of patchy ulercations, affects all layers of lining leading to fistulas
    - Chronic autoimmune disorder
    - Abdomen pain/cramping (RLQ)
    - Anorexia and weight loss
    - Anemia and fatigue
    - Fever, diarrhea (5 loose stools daily), steatorrhea**
        - **High fat content in stool

- Laboratory Findings:
    - UC
        - Hct/Hgb = decreased
        - ESR = increased
        - WBC = increased
        - CRP = increased
            - From chronic inflammation
        - Watch CBC
        - Albumin = decreased
        - K+, Na, Mg, Ca and Cl = decreased (dehydrated)
    - Crohn's
        - Hct/Hgb = decreased
        - ESR = increased

- WBC = increased
- Albumin = decreased
- CRP = increased
- K+, Mg, Ca = decreased (dehydrated)
- C-reactive protein: increased
- Folic acid and B12 = decreased

★ **Diagnostic Procedures**

- Magnetic resonance enterography:
  - Used with all IBD
  - NPO for 4-6 hrs leading up to test
- UC:
  - Sigmoidoscopy/colonoscopy
  - Barium enema: distinguish difference b/w UC and other diagnoses, ulcers in sigmoid colon
  - CT scan/MRI: presence of abscesses
  - Stool exam: parasites or microbes
- Crohn's:
  - Endoscopy
    - Proctosigmoidoscopy: identify inflamed tissue
    - Colonoscopy/sigmoidoscopy: rectum and large intestine
  - Ultrasound, xray, CT scan: bowel thickening
  - Barium enema: small intestine ulcers and narrowing

★ **Surgical Interventions**

- UC:
  - proctocolectomy with or without ileostomy
- Crohn's:
  - Laparoscopic strictureplasty
    - Increases diameter of bowel for strictures
  - Surgical repair of fistulas (perforations)

        - Proctocolectomy
        - Small bowel resection (colectomy and ileostomy)

★ **Medication**

- Sulfonamides: sulfasalazine
    - Nausea, fever, and rash
    - Take up to 2-4 weeks for therapeutic effects
    - Education: full glass of water after meals, increase fluid intake 2L/day, take folic acid supplement
- Corticosteroids: prednisone, hydrocortisone, budesonide
    - Monitor BP, electrolytes, and glucose
    - Avoid crowds and report evidence of infection
- Antidiarrheals

★ **Nutrition**

- Ulcerative Colitis and Crohn's Disease
    - Eat high-protein, high calories, low-fiber food
    - Avoid nicotine and substances that cause diarrhea
    - Avoid caffeine, alcohol, and lactose
    - Small frequent meals only
    - Take multivitamin that contains iron

Peptic Ulcer Disease PUD (ATI pg. 327)

Disorder NEED TO KNOW, erosion in the mucosa of stomach, asophagus, duodena.

★ **Health Promotion and Prevention**

- Alcohol in moderation
- Smoking/tobacco cessation
- Limit caffeine-containing beverages
- Stress management
- NSAID use control
- Balanced diet and exercise

★ **Assessment and Clinical Findings**

- Risk Factors:
  - ***H. pylori infection***
  - NSAID/steroid use
  - High stress
  - Genetics
  - O blood type
  - Excess alcohol use
  - Pernicious anemia
- Expected findings:
  - Dyspepsia
    - Heartburn, bloating, nausea, and vomit
  - Dull, gnawing pain/burning sensation on the back
  - Gastric Ulcer Pain:
    - 30-60 min after a meal, worse in the day and eating
    - Malnourishment
  - Duodenal Ulcer Pain:
    - 1.5-3 hrs after meal
    - During the NIGHT, feels better with eating
    - Well-nourished
- Physical Assessment Findings:
  - Pain and abdominal distension
  - Bloody emesis and stools
  - Weight loss
- Laboratory Tests:
  - H. pylori testing
    - Collected via endoscopy
  - Urea breath testing
    - Exhales into collection container, NPO prior to test

- If H. pylori is present carbon dioxide will be released
- Stool samples

★ **Diagnostics**

- Esophagogastroduodenoscopy (EGD)
  - Definitive diagnosis of peptic ulcers
  - Monitor vitals until sedation wears off
  - NPO until return of gag reflex
  - NPO 6-8 hrs before exam

★ **Medications**

- Antibiotics
  - 2-3 combination of antibiotics
    - With H. pylori
  - Complete full course
- Histamine-receptor antagonists
  - Ranitidine, famotidine, cimetidine, and nizatidine
    - Prevent stress ulcers who are NPO after surgery
  - Education: notify about coffee ground emesis/stool, complete all meds
- Proton-pump inhibitors
  - Pantoprazole, esomeprazole, omeprazole, lansoprazole and rabeprazole
    - Suppress gastric acid secretion
    - Insignificant adverse effects with SHORT term use
    - Fractures, pneumonia, C-diff, acid rebound with LONG term use
  - Education: do NOT crush or chew, avoid alcohol and NSAIDs
- Antacids
  - Mg Hydroxide
    - Neutralize acid in the gut
  - Education: can be given 7x daily, 1-2 hours apart from other meds, take all of the medications
- Mucosal Protectants

- Sucralfate
  - Coats walls and protects actions of pepsin and acid
- Education: 1 hr before meals on empty stomach, monitor for constipation, if taking bismuth - stools can be black

★ **Patient Care/Management**

- Have client avoid foods that cause distress (coffee, tea and soda)
- Monitor change in vitals: BP down, HR AND RR up
  - Watch for hypovolemic shock
- Decrease stress
- Encourage rest
- Encourage smoking/alcohol cessation
- Monitor labs
- Treatment of perforation is emergency surgery
  - Washout of the abdomen, lavage
    - Need a wound vac

★ **Nutrition**

- Avoid spicy foods, gas forming foods, and alcohol
- High fiber foods
  - Oats, legumes, barley
- Vitamin A, probiotics and teas
- Avoid coffee and alcohol

Fluid and Electrolytes

Fluid Imbalances (deficit/excess) (ATI pg. 277)

★ **Deficit Assessment Manifestations**

- Deficit Risk Factors
  - Hypovolemia:
    - GI loss; vomit, diarrhea, suctioning
    - Excess skin loss; sweating without water/electrolyte replacement

- Diuretic therapy and adrenal insufficiency
- Burns
- Blood loss
- hyperventilation

■ Dehydration:

- hyperventilation/excess sweat without water replacement
- Prolonged fever
- Diabetic ketoacidosis
- Diabetes insipidus & osmotic diuresis
- Excess intake of salt, salt tablets or hypertonic IV fluids

○ FIndings

■ Hypovolemia

- Vitals: hypothermia, tachycardia, thready pulse and low BP, ortho hypotension, increased RR, hypoxia
- Neuro: dizzy, headache, weak, confused
- Renal: oliguria
- Other: no capillary refill, cool clammy skin, sunken eyeball, flat jugular veins
- Thirsty

★ **Excess Assessment Manifestations**

○ Risk Factors

■ Hypervolemia:

- Heart failure, kidney disease, cirrhosis
- Overdose fluids
- Severe stress
- Hyperaldosteronism
- corticosteroids

■ Overhydration:

- Water replacement WITHOUT electrolytes

- Excessive administration of IV D5W (hypotonic solutions)

- Expected Findings
  - Fluid Volume Excess:
    - "Everything up" HR, BP, RR, Central venous Pressure = Increased
    - Neuro: weak, vision change, paresthesia, seizures
    - GI: Ascites, hyper bowels, liver enlargement
    - RR: crackles, cough, dyspnea
    - PERIPHERAL EDEMA resulting in weight gain

★ **Diagnostics**

- **Deficit** Labs: CONCENTRATED
  - Hct: Increased (hypovolemia)
  - BUN: Increased (hemoconcentration)
  - Urine Specific Gravity: > 1.030
  - Blood Sodium: >145 (dehydration)
  - Blood Osmolality: > 295 (dehydration/hypernatremia)
- **Excess** Labs: DILUTED
  - Hct & Hgb: decreased
  - Blood osmolality: decreased
  - Urine Sodium and Specific gravity: decreased
  - BUN: decreased
- **Excess** testing:
  - X-ray
    - Reveals possible pulmonary congestion

★ **Pharmacologic Therapy**

- Deficit:
  - Fluid IV replacement therapy
  - Drink 2-3 L of fluids daily
  - Provide oxygen if needed
- Excess:

- Restrict fluid intake
- Consume low sodium diet
    - Diary on how much sodium is consumed daily
    - Review OTC medications for sodium
- Diuretics

★ **Care Management**

- Deficit
    - Monitor vitals, LOC, gait & stability
    - Encourage change in positions regularly, but move slow
    - Hypovolemic shock:
        - Significant loss of body fluid
            - Admin O2
            - Monitor vitals q 15 minutes
            - Colloids:
                - Packed with RBCs, plasma, and synthetic plasma expanders
            - Crystalloids:
                - Lactated ringer's, normal saline
            - Give vasoconstrictors: dopamine, phenylephrine
            - Perform hemodynamic monitoring
        - Notify if urine output falls below 30mL/hr

- Excess
    - Daily weight and monitor I&O
    - Assess RR regularly
        - Watch for pulmonary edema and heart failure (complication)
    - Monitor edema
    - Position: semi fowler's or fowler's
    - Oxygen therapy

- Use pressure reducing mattress
    - Watch skin
- Notify provider if there is 1-3lb weight gain 24hr-1week period
- Restrict fluid intake

Sodium, Potassium, Calcium and Magnesium Imbalances (Deficit/Excess) (ATI pg. 283)

★ **Expected Ranges**

- Sodium: 136 - 145
- Calcium: 9 - 10.5
- Potassium: 3.5 - 5
- Magnesium: 1.3 - 2.1
- Chloride: 98 - 106
- Phosphorus: 3 - 4.5

★ **Assessment Deficit**

- **Sodium** Deficit Risk Factors
    - Excess sweat
    - Diuretics
    - Hyperlipidemia
    - Low-sodium diet
    - Kidney disease
    - Heart failure
    - hypoglycemia
    - Wound drainage
    - UTI
- **Sodium** Deficit Expected Findings
    - Vitals: all up, hypotension, diminished peripheral pulses
    - Neuromusculoskeletal: headache, confused, lethargic, weak, seizures, DTR
    - Hyperactive bowel, motility, nausea, cramping, vomiting

- **Potassium** Deficit Risk Factor
  - Diuretics, corticosteroids, digitalis
  - Increased secretion of aldosterone
  - NPO status
  - Kidney disease
  - Cushing's syndrome
  - Metabolic alkalosis
  - Diaphoresis
  - Nausea and vomiting
  - Alkalosis
  - Water intoxication
- **Potassium** Deficit Expected Findings
  - Vitals: low BP, weak pulse, ortho hypotension
  - Neuro: altered mental status, anxiety, and lethargy leads to confusion and coma
  - ECG: flat T wave, prominent U wave, ST depression, prolonged PR interval
  - Dysrhythmias
  - GI: low bowels, nausea, vomit, constipated, paralysis can develop (ileus)
  - Muscular: weak/spasms, DTR can be reduced
  - Shallow breathing
- **Calcium** Deficit Risk Factors
  - Not consuming enough Ca
  - Vitamin D deficiency
  - Wound drainage
  - End-stage kidney disease
  - Diarrhea
  - Immobility
  - Parathyroid removal/damage

- **Calcium** Deficit Expected Findings
  - Positive Chvostek's signs (facial twitching)
  - Hyperactive DTR
  - Paresthesia of hands and feet
  - Positive Trousseau's signs
  - GI: Hyperactive bowel sounds, cramps and diarrhea
- **Magnesium** Deficit Risk Factors
  - Celiac disease or Crohn's
  - Malnourished
  - Alcohol abuse
  - Vomiting and diarrhea
  - Heart failure/MI
  - Ethanol ingestion
  - Concurrent hypokalemia or hypocalcemia
  - Diuretics
- **Magnesium** Deficit Expected Findings
  - Cardio: increased BP, dysrhythmias, tachycardia, ECG changes
  - Neuromusculoskeletal: paresthesia, muscle tetany, seizures, Positive Chvostek's and Trousseau's
  - Depressed mood and agitation
  - Increased DVT

★ **Assessment Excess**

- **Sodium** Excess Risk Factors
  - Kidney failure
  - Cushing's
  - Water deprivation
  - Heat stroke

        - Diabetes insipidus
        - Excess sweating
    - **Sodium** Excess Expected Findings
        - Vitals: Thirst, Hyperthermia, Tachycardia, Orthostatic hypotension, restlessness
        - Neuro: seizure, coma, death
        - GI: vomit, anorexia, diarrhea
    - **Potassium** Excess Risk Factors
        - Metabolic acidosis/DKA (diabetic ketoacidosis)
        - Chronically ill patients
        - Excessive K replacement
        - Kidney failure
        - RBC transfusions
        - Adrenal insufficiency
        - Older adults
        - Salt substitutes
    - **Potassium** Excess Expected Findings
        - Vitals: slow irregular pulse and low BP
        - Neuro: restless, weak, paralysis and paresthesia
        - GI: diarrhea and hyperactive bowels and oliguria
            - Vomit
        - Dysrhythmias
    - **Magnesium** Excess Risk Factors
        - Kidney disease/failure
        - Excess intake of antacids/laxatives
    - **Magnesium** Excess Expected Findings
        - Hypotension
        - Lethargy
        - Muscle weakness

        - Decreased deep tendon reflexes
        - Respiratory/cardiac arrest

★ **Imbalance Pharmacological Interventions**

- **Sodium Deficit**
    - IV and foods high in Sodium
        - Beef broth and tomato juice
        - Replacement of sodium should not exceed 12 mEq/L in a 24 hour period
- **Sodium Excess**
    - Dextrose 5% in 0.45% Sodium Chloride (Hypertonic Solution)
    - 0.3% Sodium Chloride (Hypotonic)
        - Preferred in severe cases
        - SLOWLY fix
    - Dextrose in 5% Water and 0.9% Sodium Chloride (Isotonic/Normal Saline)
    - Administer diuretics in patients with poor kidney excretion
        - furosemide
    - Water intake not sodium, eat foods low in sodium
- **Potassium Deficit**
    - IV Potassium Supplements
        - Can cause phlebitis, mix with lidocaine to decrease pain
        - No IV bolus
        - 10 mEq/hr with concentration NO more than 1 mEq per 10 mL of solution
    - Oral potassium medications
    - Salt substitutes
    - Foods high in K
        - Avocados, broccoli, milk, citrus, bananas, cantaloupe, potatoes
- **Potassium Excess**

- Loop diuretics
    - Furosemide
    - Insulin
        - Helps move insulin into ICF
        - Give dextrose to prevent hypoglycemia
- Albuterol
- Patiromer
    - Chronic hyperkalemia
- Sodium polystyrene sulfonate
    - Excretes K from body through the feces
- Administer IV fluids with Dextrose and Regular Insulin
- Administer Sodium bicarbonate to reverse acidosis

- **Calcium Deficit**
    - Vitamin D
        - Enhance absorption of Ca
    - Oral and IV Ca supplements
    - Encourage foods high in Ca
        - Dairy, leafy greens and canned salmon
    - Life threatening
        - Dextrose 5% and H2O Bolus IV
            - Too fast = cardiac arrest

- **Magnesium Deficit**
    - PO Magnesium Sulfate for mild cases
        - Can cause diarrhea and increased Mg depletion
    - IV Mg Sulfate for severe cases
        - Not to exceed 150 mg/min over 8 hours
    - Take food high in Mg
        - Dark green veggies, whole grains and peanut butter

- **Magnesium Excess**
  - Furosemide
  - Provide calcium
    - Reverses cardiac effects

★ **Diagnostics**

- **Hyponatremia**
  - Labs:
    - Blood Sodium: <135
    - Blood osmolarity: decreased
    - Urine Sodium: <20
    - Urine specific gravity: decreased
- **Hypernatremia**
  - Labs:
    - Blood Sodium: >145
    - Blood osmolarity: >300
    - Urine specific gravity: Increased
- **Hypokalemia**
  - Labs:
    - Blood K: <3.5
  - Diagnostic:
    - ECG: inverted, flat T waves, ST depression, U wave elevated
- **Hyperkalemia**
  - Labs:
    - Blood K: >5
    - Hgb & Hct:
      - Increased with dehydration and
      - Decreased with kidney failure
    - BUN & Creatinine: increased
    - ABG: metabolic acidosis

        - pH < 7.35
    - Diagnostic:
        - ECG: Peaked T wave, widened PR and QRS intervals, absent P wave, ST depression
- **Hypocalcemia**
    - Labs:
        - Ca: <9
    - Diagnostic:
        - ECG: prolonged QT and ST interval

★ **Patient Centered Care**

- **Hyponatremia**
    - If they can tolerate PO meds, then they should take foods high in sodium
    - Education:
        - Weigh daily
        - Notify provider of 1-2 lb gain in 24 hrs
            - Or 3 lb gain in 1 week
        - Monitor vitals and LOC
- **Hypernatremia**
    - Monitor LOC, vitals and heart rhythm
    - Education:
        - Consume low sodium diet and OTC meds that contain sodium bicarbonate
        - Notify provider of 1-2 lb gain in 24 hrs
            - Or 3 lb gain in 1 week
    - Implement seizure precautions
- **Hyperkalemia**
    - Prevent falls, assessing for cardiac changes
    - Monitor I&Os
    - Observe for GI manifestations

- **Hypokalemia**
  - Observe for shallow RR and diminished breath sounds
  - Monitor LOC, bowel sounds and oxygen saturation levels
  - Implement fall precautions for weakness
  - Watch for RR failure and cardiac arrest (complications)
- **Hypocalcemia**
  - Calcium gluconate or calcium chloride for life threatening manifestations
  - Avoid overstimulation
  - Have emergency equipment on standby
  - Implement seizure and fall precautions
- **Hypercalcemia**
  - 0.9% IV fluids
  - Calcitonin
    - "Tones down" amount of Ca in blood
  - Dialysis for severe cases
- **Hypomagnesemia**
  - Monitor DTR hourly during administration
  - Have calcium gluconate ready to reverse

Immunity

HIV/AIDs (ATI pg. 571)

★ **Assessment and Clinical Manifestations**

- HIV Risk Factors:
  - Unprotected sex and multiple sex partners
  - Blood transfusions
  - IV drug use with contaminated needles
  - Occupational exposure
  - Can go undiagnosed in older adults b/c of flu-like s&s

- Perinatal exposure

- HIV Infection
  - Occurs 2-4 weeks of infection
  - Similar to flu
    - Fever, night sweats, chills, headache, rash, sore throat
    - Anorexia, nausea, weight loss
  - Thrush
  - Lymphadenopathy (swollen lymph nodes)
  - STAGE 1:
    - Non defining conditions
    - CD4+ T-Lymphocyte: < 500 cells/mm
  - STAGE 2:
    - No defining conditions
    - CD4+ T-Lymphocyte: < 200 - 499 cells/mm
  - STAGE 3 (**AIDS**): All people with AIDs have HIV…but not all people with HIV have AIDS
    - Findings:
      - WBC decreased
      - Life-threatening opportunistic infections
      - END OF STAGE HIV
        - Untreated = death in 5 years
      - CD4+ T-Lymphocyte:< 200
        - Helper T cells
      - Chronic ulcers
      - Encephalopathy
      - Kaposi' sarcoma
      - Recurring Pneumonia
      - Wasting syndrome
      - Tuberculosis

        - STAGE 4: unknown

★ **Medications**

- ART (antiretroviral Therapy) 3-4 HIV medications in combination with antiretroviral medications reduce resistance, adverse effects and dosages.
- Fusion Inhibitors: Enfuvirtide
    - Blocks fusion of HIV with host cell
- Entry Inhibitors: Maraviroc
    - Prevents progression of infection
- Zidovudine
    - Stops RNA - DNA conversion
- Delavirdine & meds ending “-vir”
    - Stop replication
- Interleukin
    - Enhances immune response and reduces cancer cells
- Alternative therapy:
    - Vitamins, herbals and shark cartilage can help with manifestations

★ **Management of Care**

- Assess ALL risk factors
    - Safety, addiction, sex and drug use
- Monitor fluid/electrolyte and nutrition
- Assess skin and pain level
- Monitor vitals
    - ESPECIALLY temperature
    - CD4+ Count
- RR, confusion, dementia and vision changes should be watched
- Provide oxygen and analgesics as needed/prescribed

★ **Client Safety Education**

- Frequent hand hygiene
- Avoid crowded areas or traveling out of country

        - Undercooked foods too
    - Keep home clean, avoid sick people, friends and family
    - Do not empty litter boxes
    - Wash dishes in hot water
    - Well-balanced diet
    - Adhere to STRICT antiretroviral dosing
    - Frequent follow-ups
    - Identify signs of infection quickly and report

Rheumatoid Arthritis

Autoimmune disorder where cells attack cells of the bone and causes inflammatory response and destruction of cartilage/bone.

- ★ **Assessment**
    - Risk Factors
        - Female
        - 30 - 60 yrs old
        - Genetics
        - bacterial/viral infection
            - Epstein-Barr virus
        - Stress and smoking
    - Findings
        - Pain at rest & movement
        - Pleuritic pain (pain at inspiration)
        - Fatigue, anorexia and weight loss
        - Paresthesias, fever, joint pain and weakness
        - Red sclera and enlarged swollen lymph nodes (lymphadenopathy)
        - SQ lumps under skin
        - Late:

- Swan neck and boutonniere deformities, bilateral and symmetrical swelling, warmth, deformed, and unable to complete ADL
- Ulnar drift (fingers bend towards pinky)

★ **Pharmacological Interventions**

- NSAIDs
  - Treatment starts here; pain, fever and anti-inflammatory effects
    - Watch GI effects, watch kidneys
  - Education:
    - Take with food and routinely
    - Observe for GI bleeding
    - Avoid alcohol
- Cox-2 blockers: Celecoxib
    - Less GI but higher cardiac disease
- Corticosteroids: Prednisone
  - Strong anti-inflammatory for acute attacks
    - Not for long term use
  - Observe weight and blood pressure
  - Education:
    - Avoid crowds, follow prescription, look for change in vision, and glucose levels
- DMARDs: Hydroxychloroquine, Mincycline, Etanercept, Infliximab, adalimumab, Methotrexate
  - Monitor allergic rxns and low WBC count, platelets, and increased AST/ALT
    - Education:
      - No pregnancy, report hair loss, avoid alcohol

★ **Diagnostics**

- Labs:
  - Anti-CCP Antibodies

- Positive in RA: detects antibodies to cyclic citrullinated peptide (anti-CCP)

- Rheumatoid factor antibody
  - Diagnostic level for RA is 1:40 to 1:60
    - High titers = severe disease
    - Other autoimmune diseases can increase RF count
- ESR
  - Elevated ESR = inflammation/infection in body
    - 20 - 40 = mild inflammation
    - 40 - 70 = moderate
    - 70 - 150 = severe
- C-reactive protein (CRP)
  - Can be done in place of ESR
  - Great for diagnosing and monitoring disease
  - Elevated levels = inflamed
- Antinuclear antibody titer (ANA)
  - + test (increased) = RA
  - Target Healthy tissue
    - Titer = normally 1:20 dilution
- WBCs
  - Elevated = inflammatory response

- Diagnosing
  - X-ray
    - Determines degree of joint destruction
    - Negates need for more expensive radiology tests
  - MRI
  - Arthrocentesis
    - Aspirate synovial fluid from joint and test for ANA, WBC, etc.

★ **Patient Care**

- Maximize physical activity, minimize pain, and monitor skin
- Monitor for Sjogrens Syndrome (excessive dry eyes and mouth)
- Provide referrals to PT & OT
- Facilitate use of assistive devices for safety
- Watch medication effectiveness
- Nutrition:
  - Eat high vitamins, protein and iron
  - East small frequent meals
- Client education:
  - Morning stiff = hot shower, pain in hands = heated paraffin, edema = cold therapy
  - Use non pharmacologic therapies to help
    - Hypnosis, acupuncture, music, yoga and spiritual

Systemic Lupus Erythematosus (SLE)

Autoimmune disorder, produces ANA, affects skin, lungs, kidney and heart.

Chronic infammatory disorder of the connective tissue, leading to inflammation and tissue damage

★ **Assessment and Clinical Manifestations**

- <u>Risk Factors</u>
  - Females, 20 - 40 yrs old (onset)
  - African American, Asian, hispanic and Native descent
- <u>Findings</u>
  - Fatigue
  - Alopecia
  - Blurred vision
  - Anorexia/weight loss
  - Depression, pain (in the joints) and weakness

- Reynauds phenomena (vasospasms = decreased blood flow to extremities)
- Fever, anemia, pericarditis, butterfly rash
    - With severe lupus; kidney, heart, lungs, GI and vasculature are affected
- Lymphadenopathy (enlarged lymph nodes)

★ **Diagnostics**

- Labs
    - Skin Biopsy
        - Used to diagnose DLE, looking for lupus cells and cellular inflamm.
    - Immunogenic Testing:
        - Diagnoses
            - Antinuclear antibodies (ANA) produced against one's own DNA
                - Positiver titers = 95%
                - ESR elevated: systemic inflammation
                - C3 & C4 (proteins that affect the immune system)
                    - Decreased; revealing depletion from Lupus
    - BUN and Creatinine
        - Increased (with kidney involvement)
    - Urinalysis
        - + for protein and RBCs (kidney involved lupus)
    - CBC:
        - Pancytopenia (RBC, WBC and platelets depleted)

★ **Management of Care**

- Assessment/Monitoring for:
    - Vitals, pain, ROM
        - High BP and edema

- I&O
- Diminished breath sounds
- Rubor, pallor, cyanosis of hands and feet
- Changes in LOC, seizures and psychosis

- Provide small, frequent meals for anorexia
- Limit salt intake
- Provide emotional support and therapy for client/family

★ **Medications**

- NSAIDs
  - Reduce inflammation and pain
- Corticosteroids: Prednisone
  - Immunosuppression and inflammation
    - Watch retention, high BP and kidney function
    - Gradually taper
  - May receive topical cream for butterfly rash
- Immunosuppressant Agents: Methotrexate, Azathioprine and Belimumab
  - Suppress immune response
  - Stimulate B-cells, reducing autoimmune response
    - Avoid live vaccines 30 days before
- Antimalarial: hydroxychloroquine
  - Suppression of synovitis: fever, fatigue, decreases risk of skin lesion from UV light
  - Need frequent eye exams

★ **Client Teaching**

- Avoid UV and sun exposure
- Use steroid cream for rash
- Watch for renal failure
- Report peripheral/periorbital edema promptly
- Avoid drying agents on skin

- Use mild protein shampoo
- Frequent rest periods
  - Avoid harsh products
- Avoid sick people and take rest periods

Discoid Lupus Erythmatosus (DLE)

Primarily affects the skin

Acid-Base and Oxygenation

Acid-Base Imbalance (ATI pg. 293)

★ **ABG Interpretation**

- **Respiratory Acidosis: Hypoventilation**
  - Results from
    - RR depression from opioids, poisons and anesthetics
      - S&S: BP, HR initially high then REVERSES as it worsens
      - Pale & cyanotic = shallow breaths
      - Ppl with sleep apnea
    - Increased carbon Dioxide
  - S&S
    - Confusion
    - Lethargy
    - Dyspnea
    - Pale/cyanotic skin
  - Values:
    - pH: < 7.35
    - PaCO2: > 45 mmHg
    - HCO3: 22-26
- **Respiratory Alkalosis: Hyperventilation**

- Results from
  - Fear, anxiety, hypoxemia from shock (CNS response), high altitude
    - S&S: RR up, deep RR, HR up
- S&S
  - SOB
  - Dizziness
  - Angine
  - Parasthesia
- Values
  - pH: > 7.45
  - PaCO2: < 35
  - HCO3: 22-26

- **Metabolic Acidosis: hypoventilation**
  - Results from
    - Diabetic ketoacidosis, kidney disease, starvation, lactic acidosis*, excessive intake of acids
      - S&S: HP down, weak peripheral pulse, rapid deep RR, BP low, and headache, dysrhythmias
  - S&S
    - Hypotension
    - Tachycardia BRADYCARDIA
    - Weak pulses
    - Dysrhythmias
    - Kussmaul respirations ↑RR
    - Fruity odor or breath
  - Values:
    - pH: < 7.35
    - PaCO2: 35-45

- HCO3: < 22

- **Metabolic Alkalosis**

  Treat underlying issue

  - Results from
    - Acid deficit and basic excess
      - S&S: HR up, BP low, numb, tetany, depressed skeletal muscles causing ineffective breathing
    - Acid overdose
  - S&S
    - Tachycardia
    - Dysrithmias
    - Muscle weakness
    - Lethargy
  - Values:
    - pH: > 7.45
    - PaCO2: 35 - 45
    - HCO3: >26 (28)

★ **Diseases Related to Imbalances**

- Respiratory Acidosis
  - Guillain Barre
  - Myasthenia Gravis
  - Brain tumors and cerebral aneurysm
  - Stroke
  - Overhydration trauma
  - Sleep apnea
  - Obesity
  - Pulmonary embolism and edema
- Respiratory Alkalosis
  - Shock or early stage asthma/pneumonia

        - Entero Cerebral trauma
        - Salicylate toxicity
        - Excessive mechanical ventilation
    - Metabolic Acidosis
        - Diabetic ketoacidosis
            - Give IV fluids c insulin
        - Lactic acidosis
        - Liver, kidney, and pancreas failure
        - Seizure activity
        - Dehydration
    - Metabolic Alkalosis
        - Cushing's syndrome
        - Hyperaldosteronism
        - GI suction
        - Nausea and vomiting
        - Antacid consumption

★ **Management of Care**

- Respiratory Acidosis
    - O2 therapy, ventilatory support, bronchodilators and mucolytics
    - Positioning and breathing techniques
    - Naloxone for opioid overdose
- Respiratory alkalosis
    - O2 therapy, anxiety reduction interventions
    - Rebreathing techniques
- Metabolic acidosis
    - Admin insulin if diabetic DKA (diabetic ketoacidosis)
    - Admin antidiarrheals and fluids if GI loss

        - Admin sodium bicarbonate if blood bicarbonate is low
        - Hemodialysis if client has kidney failure
    - Metabolic Alkalosis
        - Admin antiemetic, fluid and electrolyte replacement if GI losses
            - Discontinue causing agent if related to K+ depletion

Asthma

- ★ **Assessment and Clinical Manifestations**
    - Risk Factors:
        - Older adults
            - Susceptible to infections
            - Beta adrenergic receptors decrease w age
        - Genetics
        - smoking/2nd hand smoke
        - Allergies
        - Gerd*
        - Exposure to chemicals and dust
    - Findings:
        - Dyspnea, chest heightened ness
        - anxiety/stress
        - Wheezing, cough, mucous production
        - Barrel chest and use of accessory muscles to breathe
        - Prolonged exhalation
- ★ **Diagnostics**
    - Labs:
        - ABGs:
            - Hypoxemia
                - PaO2 less than 80 mmHg
            - Hypocarbia

- Decreased PaCO2 < 35 mmHg (early in attack)
- Hypercarbia
- Increased PaCO2 > 45 mmHg (later in attack)

- Sputum Culture
- Indicated infection

- Diagnostics:
- Pulmonary function test
- Most accurate
- Tests full inhale and exhale
- Decrease in FEV1 by 15-20 below expected value = common in asthma clients

- Chest X Ray
- Diagnoses changes in chest structure over time

★ **Medications**

- Bronchodilators (inhalers): Albuterol
- Rapid relief of acute asthma attack
- Tremors and high HR

- Take 30 min b4 exercise

- Anticholinergic: Ipratropium
- Long acting, prevents bronchospasms
- DRY DRY DRY

- Methylxanthines: Theophylline
- Only for when others do not work (narrow TI)
- Toxicity (Tachycardia, nausea and diarrhea)

- Long Acting B2 agonists: Salmeterol
- Asthma attack prevention (long term, frequent use)

- Corticosteroids, Leukotriene antagonists, Mast cell Stabilizers & Monoclonal antibodies [fluticasone & prednisone, montelukast, cromolyn, omalizumab]
- Treats Inflammation and used for prophylaxis

- Anaphylaxis, fluid retention, wt gain, decreased immunity/wound healing, hyperglycemia, canker sores

★ **Management of Care**

- High-fowlers - open lungs
- O2 therapy
- Monitor cardiac rate and rhythm for acute attack
- Remain calm and reassuring
- Provide rest periods for older adults

★ **Teaching**

- Identify and avoid triggers
- hard candies to relieve dry mouth
- Increase fluid intake
- Take prednisone with food
- Inhaler use**
- Avoid all medications if you have respiratory infection
- Report black tarry school or coffee ground emesis
- Use peak flow meter
  - Determines if airway is narrowing, even before symptoms emerge
  - Use three times, take highest number (not average)

Chronic Obstructive Pulmonary Disease (COPD) (ATI pg. 137)

Combination of emphysema and chronic bronchitis, this is irreversible.

★ **Assessment**

- Risk Factors
  - Older adults
  - Cigarette smoking
    - #1 risk factor
  - Alpha 1 - antitrypsin deficiency**
  - Pollution

- Findings
  - Dyspnea, productive cough (most severe in mornings), hypoxemia
  - Crackles and wheezes
    - Hyperresonance when percussing
  - Barrel chest and hyperresonance on percussion (with emphysema*)(due to trapped air)
  - Clubbing fingers/toes, pallor/cyanosis
    - Late stages
  - SPO2 in low 90s

★ **Medications**

- Same as Asthma***
  - Bronchodilators and anti inflammation
    - Review teaching
- Mucolytics: Guaifenesin PO, Dextromethorphan (in combo), nebulizer treatments (acetylcysteine and dornase alfa)
  - Loosens secretions

★ **Diganoses**

- PFTs
- Chest x-ray

★ **Management of Care**

- Upright or tripod position
- Same as asthma
- Stop smoking
- Deep breathing instead of spirometer
- Spirometer 10x an hour
- Encourage cough and suction to remove secretions
- O2 levels maintained between 88 - 92%
  - W/ 2-4 L of O2 NC
  - W/ 40% Venturi Mask

- Chronic COPD = less O2 needed
- + expiratory pressure device
  - removes airway secretions by inhaling and exhaling
- Exercise conditioning
  - Improves pulmonary status by strengthening lung walls
    - 20 min daily walk 2-3x weekly, w/ rest periods
- Pursed lip breathing and diaphragmatic breathing
  - Pursed lip = in through nose and out through mouth

★ **Nutrition**

- Soft, high-calorie foods encouraged
  - Dyspnea decreases energy so they need to eat
  - Increased work of breathing, increases caloric demands
- Increase fiber and fluids
  - Thins secretions
  - Increase calories
- Proper nutrition = aiding prevention of infection
- Iron and vitamin E are good
  - Avoid gas forming foods
- Small, frequent meals

★ **Complications**

- Respiratory Infection
  - From increased mucus production and poor O2 levels
    - Admin antibiotics, obtain influenza/pneumonia vaccine
  - Monitor: WBC, CRP and change in temperature
    - And decreased SAO2*
- Right-sided heart failure
  - S&S: Low O2 levels, cyanosis, JVD, dependent edema, and enlarged liver

- Monitor: RR, GI problems, HR and R, admin IV fluids and diuretics to maintain fluid balance

Respiratory/Oxygen Care

★ **Assessment**

- Early Findings
  - Tachypnea and tachycardia
  - Restlessness
  - Pale skin and mucous membranes
  - High BP, RR distress
- Late Findings
  - Confusion/stupor
  - Cyanotic skin and mucous membranes
  - Bradypnea and bradycardia
  - Low BP and cardiac dysrhythmias

★ **Interventions**

- **Nasal Cannula**
  - Safe, easy, comfortable and well tolerated
  - **FiO2 of 24-44%**
    - **Flow rate 1-6 L/min**
      - Provide humidity for 4+ L/min
      - Use water-soluble gel for dry nairs
- **Simple Face Mask**
  - **FiO2 40 - 60%**
    - **Flow rate 5-8 L/min**
  - FLow rate < 5 L/min can cause rebreathing of CO2
  - Poorly tolerated by clients with
    - anxiety/claustrophobia
  - Use caution with high risk aspiration and airway obstruction

- **Partial Rebreather Mask**
  - **FiO2 40 - 75%**
    - **Flow rate 6-11 L/min**
  - Reservoir bag attached w no valve
    - Allows rebreathing of ⅓ exhaled air along with room air
  - Complete deflation when inspiring causes CO2 build up*
    - Prevent deflation —> at risk for suffocation
- **Non-Rebreather Mask**
  - **FiO2 80-90%**
    - **Flow rate 10 - 15 L/min**
  - Keep bag ⅔ full during inspiration and expiration
  - Delivers highest O2 concentration possible
  - One way valve allows maximum O2 inhalation
    - Prevents air room from entering mask and air they exhale
- **Venturi Mask**
  - **FiO2 24-60%**
    - **Flow rate 4-12 L**
  - Different sized adapters = specific amounts of air to mix with O2
  - Delivers most PRECISE O2 concentration
    - Best for chronic lung disease patients
    - Provides high humidity
- **Aerosol Mask Face Tent and Tracheostomy**
  - **FiO2 24-100%**
    - **Flow rate at Least 10 L/min (over 15 usually)**
    - **Provide high humidification**
  - Use full for clients with facial trauma, burns or thick secretions
- **T Piece**
  - **FiO2 24-100%**
    - **Flow rate at least 10 L**

- Used for clients with laryngectomy, tracheostomy and endotracheal tubes
- High humidification required

★ **Management of Care**

- Semi Fowler's or Fowler's for breathing and chest expansion promotion
- Provide O2 therapy at lowest flow rate that will correct hypoxemia
- Assess skin integrity, RR, ABG, and Response to O2 therapy
- Specifics for RR distress
  - Fowler's
  - Focused RR assessment
  - Deep breathing and supplement O2
  - Stay with client, provide emotional support to decrease anxiety
  - Promote airway clearance
    - Coughing and suctioning

Comfort, Tissue Integrity and Pain

Fibromyalgia and Chronic Fatigue Syndrome

★ **Assessment**

- Risk Factors
  - Females: 30-50 yrs
  - Deep sleep deprivation
  - History of chronic fatigue syndrome, lyme disease, influenza like illness, trauma and rheumatologic conditions
    - Diagnosed when another painful diagnoses exists
- Findings
  - Severe chronic pain
  - Fatigue
    - Mild to severe fatigue lasting at least 6 months
  - Chest pain

        - Dysrhythmias
        - Sleep disturbances
        - Abdominal pain
        - GI disturbances
        - Numbness and tingling
        - Sensory sensitivity
        - Debilitating muscle pain (unseen physically)
        - Jaw pain
        - Depression

★ **Medications**

- SNRI-Norepinephrine reuptake inhibitors SNRIs and Anti-convulsants:
    - Pregabalin: anticonvulsant
    - Duloxetine: SNRI
        - Together; increase serotonin or epinephrine in the body, and decrease nerve pain
        - Causes drowsy and sleepiness
        - Don't drink alcohol
- NSAIDs
    - Decrease inflammation and pain
- Tricyclic antidepressants
    - Amitriptyline
        - Confusion and ortho hypotension
    - Nortriptyline
        - Confusion and ortho hypotension
    - Trazodone
        - All Induce sleep and decreases pain

★ **Education**

- Limit caffeine, alcohol and other substances that interfere with sleep
- Develop sleep routine

- Engage in regular low impact exercise
- Use complementary and alternative therapy (CAM)
  - Herbs, acupuncture, etc
- PT or local support groups

★ **Evaluation**

- Decreased pain
- Increased sleep

Tissue Integrity

Psoriasis and Dermatitis

★ **Assessment**

- **Psoriasis**
  - Psoriasis Vulgaris
    - Reddened thickened area with silvery white scales
  - Exfoliative psoriasis
    - Erythema and scaling from severe inflammatory rxn
      - No obvious lesions
      - Can cause dehydration and hypo/hyperthermia
  - Palmoplantar pustulosis
    - Reddened hyperkeratotic areas
    - Plaques form and pustules turn brown, peel and form a crust (this is cyclic)
- Lesion Classing
  - Mild: less than 5% of Body Surface Area (BSA)
  - Moderate: 5-10% BSA
  - Severe: > 10% BSA
    - Physical findings:
      - Scales, bleeding, pitting, crumbling nails
- **Dermatitis**

- Nonspecific eczematous dermatitis:
  - Thickened red areas
  - Dry, moist or crusted appearance
  - Pruritus
  - Symmetrical on the body
- Contact dermatitis
  - From direct exposure to allergen, chemical or mechanical irritant
  - Well demarcated rash and localized
- Atopic dermatitis
  - Chronic rash
  - Caused by allergens or skin disease
  - Rash with scaling
  - Pruritus, severe
  - All over body and along skin folds

★ **Medications**

- Topical Therapies
  - Corticosteroids: triamcinolone, betamethasone
    - Reduce secondary inflammation
    - Watch skin thinning
    - Recommend warm, moist, occlusive dressings of plastic wrap
- Tar preparations
  - Coal tar and tars made from trees
    - Juniper, birch, and pine
      - Suppress cell division/proliferation and reduce inflammation
      - They can sting, burn, stain, and smell
        - photosensitivity
- Vitamin D analogs: calcipotriene, calcitriol
  - Prevent cellular proliferation

        - Regulate cell division
            - Limit sun exposure, monitor itching, monitor hypercalcemia, monitor for cancerous skin lesions and anorexia
    - Vitamin A: tazarotene
        - Causes sloughing of skin cells
        - Contraindicated in pregnancy
        - Monitor for localized rxns, burning, inflammation and desquamation of the skin**
            - Discontinue if becomes pregnant
    - Systemic medications:
        - Cytotoxic: methotrexate, acitretin
            - Used for severe intractable cases
            - AST, ALT, BUN, creatinine
                - Watch toxicity, bleeding, bruising, fever
            - Can cause bone marrow suppression
        - Biologic: Adalimumab, etanercept, ustekinumab, alefacept, and infliximab
            - First line treatment
            - Moderate - severe psoriasis
            - Watch for latent TB and Hep B viruses
            - Inspect syringe for discoloration
            - Rotate injection sites
            - Protect med from light
            - Treatment is lifelong
            - Report signs of infection
            - Do NOT receive any live vaccines while taking the medication
        - Cyclosporine and azathioprine:
            - Immunosuppressant used when there are still lesions and other therapy does not work
        - Light Therapies

- PUVA Therapy*
    - Psoralen photosensitizing medication (methotrexale) followed by UV A light to decrease proliferation
    - Given 2-3x weekly
    - Make sure client wears eye protection and 24 hours after
- Narrow Band UV B Light therapy:
    - Used without medication, requires fewer treatments
- Laser Light Therapy:
    - Mild-moderate psoriasis to target lesions directly and decrease exposure to surrounding skin

■ Antihistamines (dermatitis);

- Diphenhydramine, cetirizine, fexofenadine
    - Relieve inflammation, redness, pruritus, and edema
    - Avoid use of occlusive dressings or infection is present
        - Watch retention
        - Causes lethargy, take at bedtime

■ Topical Immunosuppressants (dermatitis); tacrolimus, pimecrolimus

- For eczematous dermatitis that has been resistant to glucocorticoids
- Relieves inflammation
- Avoid if infection is present
- Stop when rash clears
- Avoid direct sunlight

★ **Patient Management**

- Teach coping strategies
- Discuss comfort;
    - Baths with emollients, oatmeal baths, emollient creams
        - To soften scales
    - Do not scratch or pick lesions

- Dermatitis:
  - Avoid fabric softener
  - Wash skin thorough after irritant exposure
  - Apply cool, damp compress to rash
  - Use colloidal baths to relieve itching

Pain

★ **Assessment**

- **Risk Factors**
  - Cultural/societal attitudes
  - Lack of knowledge
  - Fear of addiction
  - Exaggerated fear of respiratory distress
    - Infants, children, older adults, clients w substance abuse disorder
      - Age
      - Cognitively impaired
      - Genetic sensitivity
      - Anxiety and fear
- Findings
  - Moaning, crying, and decreased attention span
  - Increased BP, RR, and pulse
  - Grimacing, wrinkled forehead

★ **Medications**

- Non-opioid analgesics: acetaminophen
  - Mild to moderate pain
  - Prescribed following painful procedures
  - Ensure dose does not exceed 4g for clients 110kg +
- Opioid analgesics:
  - Tramadol, hydrocodone, codeine for **mild** pain

        - Hydromorphone, morphine, fentanyl, oxycodone, or methadone for **severe** pain
            - S&S: NARCS-U
        - Dose titrated upward progressively until client is relieved of pain
    - Adjuvant analgesics
        - Enhance effects of non-opioids and alleviate manifestation that aggravate pain
        - Anticonvulsants
            - Carbamazepine
        - Antianxiety agents
            - Diazepam
        - Tricyclic antidepressants
            - Amitriptyline
        - Antihistamine
            - Hydroxyzine
        - Glucocorticoids
            - Dexamethasone
        - Antibiotics
            - Ondansetron
        - Anesthetics
            - Ketamine

★ **Management of Care**

- Set a pain-relief or comfort-function goal with client
- Determine need for scheduled analgesia
- Plan to premedicate before painful procedures
    - Wound care, repositioning, invasive diagnostic testing
    - Chronic pain
        - Admin long-acting or controlled release opioid analgesics
        - Admin around the clock, NOT PRN

- Refer to pain management center, palliative, or hospice to treat pain

★ **Complications**

- Undertreatment of pain can lead to increased anxiety w acute pain and depression w chronic pain
- Overdose
  - Sedation, respiratory depression, and coma
  - Stop opioid and give naloxone if RR is <8 orr client is difficult to arouse

Patient Controlled Analgesia (PCA) Pumps

Medication delivery system allowing clients to self-administer safe doses of opioids

★ **Assessment**

- Less time for patient to identify need and delivery of medication
  - Increased sense of control and decrease of amount of medication needed

★ **Medications**

- Morphine and hydromorphone

★ **Teaching**

- Client should let nurse know if pump does not control pain
- small , frequent dosing ensures consistent plasma levels

★ **Complications**

- Inadvertent overdosing
  - ONLY CLIENT should push PCA button

Complex Module 1 Review
Olivia Runne 2022

Terms to Review:

Lactic Acidosis:

- Body produces too much lactic acid to metabolize fast enough
- This is a medical emergency
- Yellowing skin/eyes, rapid breathing, tachycardia, weakness, cramping and diarrhea

GERD:

- Stomach acid repeatedly flows back through lining of esophagus
    - Heartburn, chest pain, coughing and vomitting

Inhaler Teaching:

- Shake inhaler, tightly hold inhaler in mouth, breathe in while pressing down and releasing powder, hold breath for 10 seconds, wait five minutes and repeat second does
- Wash mouth out after use

Alpha 1 - antitrypsin deficiency:

- AAT is a protein that protects the lungs

Emphysema:

- Lung condition that causes shortness of breath
- Alveoli are damaged, over time the lung walls thin and weaken…possibly rupture

SAO2:

- Arterial Oxygen Saturation

Pruritus:

- Itchy skin derived from commonly dry skin

Osteoarthitis vs RA

- O: degenerative disorder
- RA: inlflammatory disease from automimmune deficiency

Buttonaire Deformaties (RA)

- Flexed finger tip, like a finger hump you cant straighten