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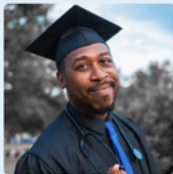
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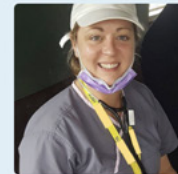
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# Angina

## Overview

Angina is chest pain resulting from inadequate blood flow to the heart muscle. If the flow is not restored, it can lead to further damage.

## General

### 1. Most common cause

- a. Coronary artery disease (CAD)
  - i. Atherosclerotic plaque ruptures
  - ii. Clot forms

### 2. Other causes

- a. Anemia
- b. Heart failure
- c. Stress/overexertion
- d. Abnormal rhythms

### 3. Types

- a. Stable – With exertion. Relieved by nitroglycerin
- b. Unstable – At rest. Lasts longer. Unrelieved by nitroglycerin.
- c. Variant – Unpredictable.

### 4. Desired Outcome

- a. Restore blood flow, decrease chest pain, and improve activity tolerance.

## Assessment

### 1. Subjective Data

- a. Chest Pain
- b. Dyspnea on Exertion

### 2. Objective Data

- a. Blood Pressure
  - i. Hypotension – ↓ cardiac output
  - ii. Hypertension – ↑ stress on the heart
- b. Arrhythmias
  - i. Bradycardias -↓ cardiac output
  - ii. Supraventricular Tachycardia -↑ stress on the heart
  - iii. Atrial Fibrillation – ↑ stress on the heart

- c. Other
  - i. Syncope
  - ii. Pale
  - iii. Diaphoretic

## Therapeutic Management

### 1. Medication Management (anticipated medications)

- a. Thienopyridines (clopidogrel)
- b. Heparin
- c. Renin-Angiotensin Blockade (ARBS or Ace inhibitors)
- d. Oxygen
- e. Morphine (only if indicated by facility)
- f. Beta Blockers
- g. Nitroglycerin (per facility policy)

### 2. EKG→ Rule out STEMI and monitor arrhythmias

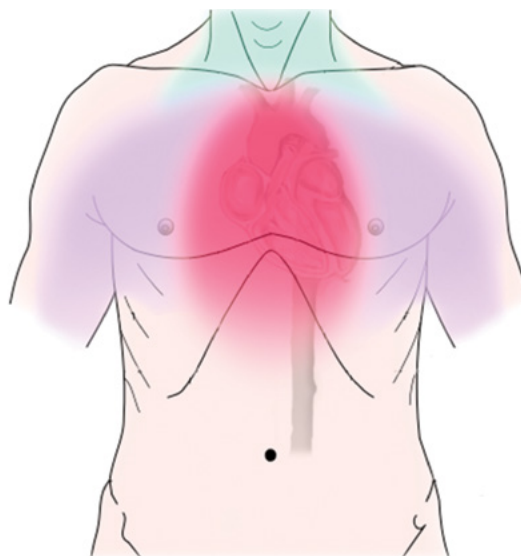
### 3. Monitor Vital Signs (HR, BP, SpO2) for changes

### 4. Cardiac Enzymes→ Determine myocardial damage

### 5. Cardiac Stress Test→ Determine myocardial stress point

### 6. Cluster Care – Rest to decrease myocardial O2 demands

Image 6.16 Angina Pectoris



By Ian Furst - Own work derivative of File:Aorta scheme.jpg and File:Gray1220.png, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=30655972>



# Heart Failure

## Overview

The heart is a pump, it circulates blood throughout the body. Heart failure = pump failure. Heart failure occurs when the heart cannot pump enough blood to supply the body's needs.

## General

1. **Pump Failure**→ Decreased perfusion forwards and Increased congestion backward
2. **Causes**
  - a. Myocardial Infarction→ Dead muscle can't pump
  - b. Hypertension→ ↑ afterload = ↑ stress on the heart muscle
  - c. Valve Disorders=Inefficient pump→ Blood not moving in the right direction
3. **Diagnostics**
  - a. BNP (Brain Natriuretic Peptide) → a hormone secreted by cardiomyocytes in response to stretching of the ventricles
  - b. Echocardiogram to detect ejection fraction and can diagnose valve disorder
  - c. Chest X-Ray to detect cardiomegaly and pulmonary edema
4. **Complications**
  - a. Volume Overload
  - b. Decreased Perfusion

## Assessment

1. **Right-Sided Heart Failure**
  - a. Decreased Pulmonary Perfusion
    - i. ↓ oxygenation
    - ii. ↓ activity tolerance
  - b. Increased Systemic Congestion
    - i. PERIPHERAL EDEMA
    - ii. ↑ Jugular Venous Distention (JVD)
    - iii. ↑ Preload
    - iv. Weight Gain
    - v. Fatigue
    - vi. Liver / GI Congestion

## 2. Left-Sided Heart Failure

- a. Decreased Systemic Perfusion
  - i. Skin pale or dusky
  - ii. ↓ PERIPHERAL PULSES
  - iii. Slow capillary refill
  - iv. ↓ renal perfusion
    1. ↓ urine output
    2. Kidney Injury / Failure
- b. Increased Pulmonary Congestion
  - i. Pulmonary edema
    1. COUGH
    2. PINK/FROTHY SPUTUM
    3. Crackles
    4. Wheezes
    5. Tachypnea
    6. SOB on Exertion
  - ii. Anxiety/restlessness

## Therapeutic Management

1. **The goal is to decrease the workload on the heart while still increasing cardiac output.**
  - a. Decrease Preload
  - b. Decrease Afterload
  - c. Increase Contractility

Image 6.19 Heart Failure X-Ray



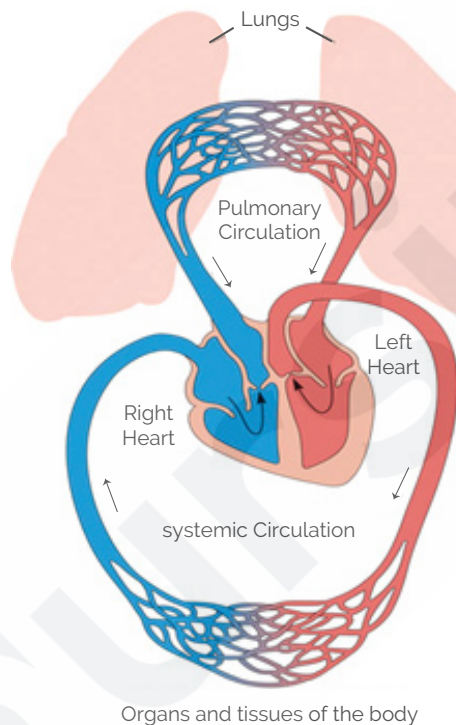
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## Cheatsheet 6.6 Right vs Left Heart Failure

## R v L HEART FAILURE

**Left Ventricle** is unable to pump blood into the systemic circulation causing a "back-up" into the pulmonary circulation.

**Right Ventricle** is unable to pump blood into the pulmonary circulation causing a "back-up" into venous circulation.

**Symptoms:**

- Shortness of Breath
- Dyspnea on Exertion
- Crackles
- Pink-Frothy Sputum
- Cyanosis
- Fatigue
- Orthopnea
- Tachycardia
- Confusion
- Restlessness

**Symptoms:**

- Jugular venous Distention
- Fatigue
- Ascites
- Anorexia
- GI distress
- Weight Gain
- Dependent Edema
- Venous Stasis





# Coronary Artery Disease

## Overview

Coronary artery disease occurs with the buildup of plaque in the main vessels. The primary causes are high blood pressure and cholesterol. The main symptom is chest pain.

## General

### 1. Major vessels

- Inner walls are damaged
- Inflammation occurs→ Plaque sticks to walls and clots form
- Blockage → loss of blood supply to the heart

### 2. Risk factors

- Smoking
- High blood pressure
- Obesity
- Diabetes
- Hyperlipidemia
- Family history

### 3. Complications

- Acute coronary syndrome→ plaque breaks off and occludes a coronary artery
  - STEMI (ST-segment elevation myocardial infarction) → "widowmaker"- Near or complete blockage
  - NSTEMI (non-ST-Segment elevation myocardial infarction) → Partial blockage
  - Unstable angina
  - Concerned for → cardiac arrest

## Assessment

### 1. Presentation

- Chest pain
- Arrhythmia
- Shortness of breath
- Elevated blood pressure

### 2. Healthcare provider orders

- Electrocardiogram (EKG)
- Cholesterol levels
- CT scan→ visualize vessel occlusion and stenosis
- Angiogram→ view inside vessels
- Stress test→ view blood flow

## Therapeutic Management

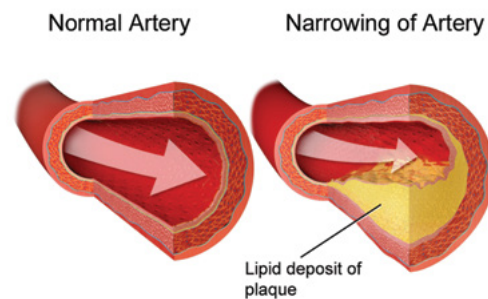
### 1. Medications

- Cholesterol medications→ Statins to decrease plaque in blood
- Anticoagulants→ avoid blood clotting
- Beta-blockers→ Decrease the workload of the heart
- Calcium channel blockers→ Relax vessels, allow blood through
- Nitroglycerin→ Open arteries, allow blood through→decrease chest pain

### 2. Procedures

- Angioplasty→go in through vein to open vessels
- Stent placement→keep the vessel open
- Coronary artery bypass surgery→ new vessel pathway around the blockage

Image 6.18 Coronary Artery Disease



Coronary Artery Disease

By BruceBlaus. When using this image in external sources it can be cited as: Blausen.com staff (2014). "Medical gallery of Blausen Medical 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.010. ISSN 2002-4436. - Own work, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=29140355>



# Hypertension

## Assessment

### 1. Assessment

- a. Risk Factors
- b. “Silent Killer” → Asymptomatic until end-organ damage occurs
  1. Stroke
  2. MI
  3. Renal Failure
  4. Heart Failure
- c. Later signs → Vision changes, frequent headaches, dizziness, and chest pain/angina

## Therapeutic Management

### 1. Therapeutic Management

- a. Medication therapy → ACE Inhibitors, Beta-Blockers, calcium channel blockers, diuretics
- b. Diet & Lifestyle modifications

### 2. Nursing Priorities

- a. Perfusion
  - i. Administer BP meds → CHECK BP/HR FIRST
  - ii. Assess for end-organ damage → renal and neuro status
  - iii. Strict I&O
  - iv. Assess for CV changes



# Cardiogenic Shock

## Overview

Complete pump failure (heart) causing loss of oxygenated blood flow to the body.

## General

### 1. Causes

- a. Myocardial infarction (MI)
- b. End-stage cardiomyopathy
- c. Papillary muscle or valve rupture
- d. Cardiac tamponade
- e. Pulmonary embolism (PE)

## Assessment

### 1. Sudden, severe, extreme heart failure

### 2. Decreased Perfusion

- a. ↓ CO, ↓ BP
- b. ↑ HR (compensation)
- c. ↑ SVR (compensation)
- d. Weak, thready pulses (pump isn't pumping effectively and strong)
- e. Cool, diaphoretic skin
- f. Pale, dusky, cyanotic, or mottled skin
- g. ↓ urine output
- h. ↓ LOC, anxiety

### 3. Volume Overload (volume backs up because the pump can't pump)

- a. ↑ CVP
- b. JVD
- c. Pulmonary Edema → Crackles, pink, frothy sputum, sudden, severe SOB

## Therapeutic Management

### 1. Treat Cause of the pump failure

- a. Revascularization for MI (Percutaneous Coronary Intervention, Coronary Artery Bypass Graft)
- b. Thrombolytics or surgical removal for PE
- c. Pericardiocentesis for cardiac tamponade

### 2. Improve Contractility

- a. Dopamine – may ↑ HR
- b. Dobutamine

### 3. Decrease Afterload

- a. Dobutamine

### 4. Diuretics

- a. Furosemide – for Pulmonary edema
- b. Caution – may ↓ BP



# Myocardial Infarction

## Overview

Sudden restriction of blood supply to a portion of the heart causing ischemia and death to the muscle tissue

## General

1. Causes
  - a. Coronary Artery Disease and thrombosis

## Assessment

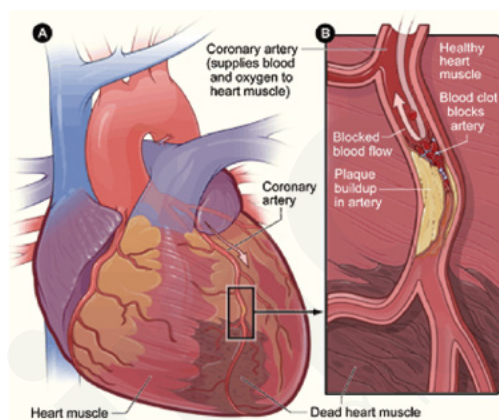
1. **Subjective Data**
  - a. Chest pain unrelieved by rest
  - b. Skin pale, diaphoretic, mottled, nausea, anxiety, SOB, and palpitations that worsen with activity
2. **Objective Data**
  - a. Might be hypotensive/bradycardic
  - b. ST-elevation on 12-Lead (STEMI)
  - c. Elevated Troponins (most sensitive), elevated CK-MB & CK

## Therapeutic Management

1. **Medication Management (anticipated medications)**
  - a. Thienopyridines (clopidogrel)
  - b. Heparin
  - c. Renin-Angiotensin Blockade (ARBs or ACE inhibitors)
  - d. Oxygen
  - e. Morphine (only if indicated by facility)
  - f. Beta Blockers
  - g. Nitroglycerine (per facility policy)
2. **Monitor EKG**
3. **Rest – decrease O<sub>2</sub> demands of the heart**
4. **Anticipate Provider Orders**

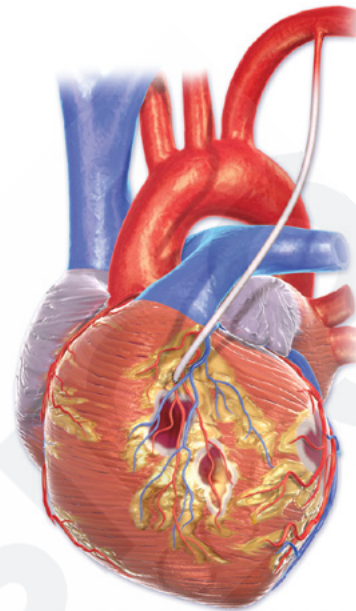
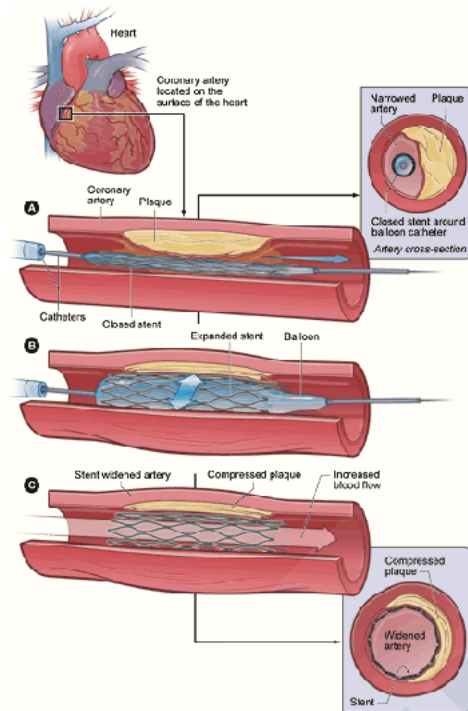
- a. 12-Lead EKG
- b. Cardiac Enzymes q3h x 4
- c. Thrombolytics unless contraindicated
- d. Percutaneous Transluminal Coronary Angioplasty (PTCA)--> opens clogged arteries

Image 6.17 Myocardial Infarction



Cheatsheet 6.5 CV Intervention - Nursing Care

## CV INTERVENTION - NURSING CARE



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### Percutaneous Coronary Intervention (PCI)

### Coronary Artery Bypass Graft (CABG)

Although the procedures are different, the concepts are the same:

#### PERFUSION

- Pulse Checks
- Vital Signs
- Pain Assessment
- Skin Assessment
- Give BP Meds
- Leg Positioning

#### CLOTTING

- Give Anticoagulant
- Monitor Access Site
- Monitor for Bleeding
- Check Coag Studies
- Check CBC (H/H)
- Assess for DVT

#### PATIENT EDUCATION

- Incentive Spirometer
- Diet & Lifestyle Changes
- Medication Instructions
- Activity Restrictions
- Bleeding Precautions
- When to notify HCP



# Distributive Shock

## Overview

Distributive Shocks – caused by an immune or inflammatory response that interferes with vascular tone, leading to massive peripheral vasodilation.

## General

### 1. Types

- a. *Anaphylactic*
  - i. Allergic reaction
  - ii. Inflammatory cytokines
- b. *Neurogenic*
  - i. Spinal cord injury
  - ii. Loss of SNS activity
- c. *Septic*
  - i. Systemic infection
  - ii. Inflammatory cytokines

## Assessment

### 1. Types

- a. Anaphylactic
  - i. Symptoms
    - 1. Hives, rash, swelling of arms, trunk, or face/mouth
    - 2. Exposure to allergen
    - 3. ↓ SpO<sub>2</sub>
    - 4. ↓ BP
    - 5. ↑ HR
    - 6. ↑ RR, wheezes
    - 7. Warm, flushed skin
  - ii. Treatment
    - 1. Epinephrine – relaxes airway muscles
    - 2. Corticosteroids – ↓ inflammation
    - 3. Bronchodilators – protect the airway

### b. Neurogenic

- 1. Symptoms
  - a. Spinal cord injury in the last 24 hours
  - b. Warm flushed lower extremities
  - c. ↓ BP
  - d. ↓ HR (occasional)
  - e. Priapism (due to vasodilation)

### 2. Treatment

- a. Therapeutic hypothermia = neuroprotective

### c. Septic

- 1. Symptoms
  - a. ↓ LOC
  - b. ↓ BP
  - c. ↑ HR
  - d. Warm, flushed skin
  - e. ↑ Temperature
  - f. s/s infection

### 2. Treatment

- a. IV antibiotics (blood cultures first)
- b. IV fluids to ↑ preload
- c. Corticosteroids only if vasopressors ineffective
- d. Decompensated Shock
  - 1. Symptoms
    - a. Refractory low BP
    - b. ↓ LOC
    - c. ↓ SpO<sub>2</sub>
    - d. ↓ HR
  - 2. Treatment
    - a. Vasopressors
    - b. Intubation for airway protection





# Cardiomyopathy

## Overview

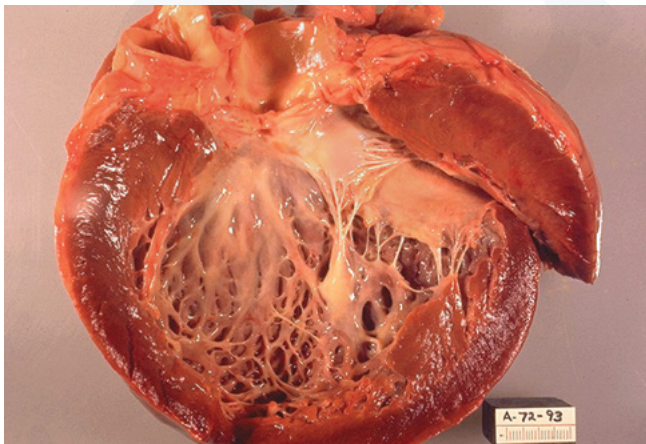
Abnormality of the heart muscle leads to functional changes

## General

### 1. Types

- a. Dilated
  - i. 4 chambers enlarged
  - ii. Walls thin, less force
  - iii. ↓ contractility, ↓ CO
- b. Hypertrophic
  - i. Thick ventricle muscle
  - ii. Stiff contraction
  - iii. Less space to fill
  - iv. ↓ Preload, ↓ CO
- c. Restrictive
  - i. Ventricles rigid
  - ii. Can't stretch to fill
  - iii. ↓ SV, ↓ CO

Image 6.21 Cardiomyopathy



### 2. Causes

- a. Prolonged untreated hypertension
- b. Congestive Heart Failure
- c. Congenital disorders

## Assessment

### 1. S/S Heart Failure

- a. Fatigue
- b. SOB
- c. Dysrhythmias
- d. Extra heart sounds (S3/S4)
- e. Poor perfusion
- f. Volume overload (JVD and pulmonary edema)

### 2. Echocardiogram or Chest X-ray

- a. Heart is visibly enlarged or thickened

## Therapeutic Management

### 1. No cure, only supportive

### 2. Encourage frequent rest

### 3. Minimize Stress

### 4. Manage HTN

- a. DASH diet
- b. ACE-Inhibitors (Angiotensin-converting enzyme)
- c. ARB's (Angiotensin receptor blockers)
- d. Beta-Blockers
  - i. ↓ force of contraction
  - ii. ↓ workload
  - iii. ↓ O2 demands

### 5. Ventricular Assist Devices

- a. Help eject blood from LV to the aorta





# Atrial Fibrillation

## Overview

### 1. Atrial fibrillation

- a. Multiple, disorganized cells produce additional electrical impulse in atria
  - i. Causes atria to quiver at a fast rate <300 bpm→ The heart is unable to effectively contract which causes pooling of blood in the atria and HIGH risk for stroke
  - ii. AV node blocks some of the electrical impulses from reaching the ventricles→ Rapid, irregular ventricular contractions

Image 6.12 Atrial Fibrillation



By J. Heuser - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=465397>

## General

### 1. Characteristics of Atrial fibrillation

- a. Rhythm→ Irregular
- b. Rate→ Atrial rate >300 bpm, Wavy baseline
  - i. Ventricular rate→ 60-100 bpm, >100 bpm→ “Rapid Ventricular Rate” (RVR)
- c. P: QRS ratio→ No obvious P waves
- d. A wavy baseline that is not measurable
- e. PR interval→ Not measurable
- f. QRS complex→ 0.06-0.12 seconds

## Assessment

1. **Client Presentation**
  - a. Palpitations, fatigue, lightheaded/Syncope
2. **Acute or chronic**
  - a. If chronic→ Monitor rate/meds
  - b. If acute→ Convert to NSR
3. **Atrial and ventricular rates→ RVR**
4. **Decreased Cardiac Output→ Syncope, hypotension**
5. **PT/INR- If taking Coumadin**

## Therapeutic Management

1. **Nursing Interventions**
  - a. Acute or chronic, 12 Lead EKG, Restore NSR, Assess for s/s of stroke
2. **Control ventricular rate**
  - a. Medications
    - i. Antiarrhythmics
    - ii. Beta-blockers
    - iii. Calcium Channel Blockers
  - b. Transesophageal echocardiography/ Cardioversion
  - c. Ablations
3. **Decrease the risk for stroke**
  - a. Anticoagulants→ Coumadin (Warfarin), Xarelto (Rivaroxaban), Eliquis (Apixaban)



# Thrombophlebitis

## Overview

Thrombus (clot) formation with associated inflammation in extremity.

## General

### 1. Risk Factors

- a. *Virchow's Triad*
  - i. Venous stasis
  - ii. Damage to the inner lining of the vessel
  - iii. Hypercoagulability of blood
- b. *Medical History*
  - i. History of thrombophlebitis
  - ii. Pelvic surgery
  - iii. Obesity
  - iv. Heart failure, MI
  - v. A-fib
  - vi. Immobility
  - vii. Pregnancy

## Assessment

### 1. Unilateral findings on the affected side

- a. Pain
- b. Warm skin
- c. Redness
- d. Tenderness
- e. Febrile state

### 2. Confirm clinical picture with diagnostics:

- a. Ultrasound to visualize
- b. D-Dimer → product of fibrin degradation present in the blood after a blood clot is degraded by fibrinolysis (positive=clot)

Image 6.22 Thrombophlebitis Symptoms



By James Heilman, MD - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=9444797>

## Therapeutic Management

### 1. If the client has confirmed DVT:

- a. NO SCD/TED, NO massage, Bedrest → Could dislodge the clot

### 2. Initiate anticoagulant therapy

- a. Heparin → Monitor PTT q6h
- b. Coumadin (warfarin) → Monitor PT/INR

### 3. IVC filter

- a. Sits in Inferior Vena Cava
- b. Collects clots before they reach the heart/lungs
- c. Monitor for s/s Emboli
- d. Heart – MI → Chest Pain
- e. Lungs – Pulmonary Embolism → Anxiety, SOB, ↑ HR, ↑ RR, chest pain
- f. Brain – Stroke → Facial droop, arm weakness, speech Difficulty
- g. Monitor distal pulses
- h. Clotting Prevention/Monitoring
  - i. Monitor circumference of limb BID
  - ii. SCD/TED + enoxaparin sodium (anti-coagulant), if ordered by provider
  - iii. Passive ROM
  - iv. Early ambulation



# Hypovolemic Shock

## Overview

1. Hypovolemic Shock – loss of blood volume leading to decreased oxygenation of vital organs
2. The body's compensatory mechanisms fail and organs begin to shut down.

## Assessment

### 1. Symptoms

- a. Worsening hypotension→ low volume
- b. Tachycardia→ Body is working hard to pump the volume that is there
- c. Weakness
- d. Tachypnea
- e. Decreased LOC
- f. Inadequate urinary output→ low volume=low output
- g. Weak pulse
- h. The body tries to compensate and if it can't organ failure occurs

### 2. Identify Cause.

- a. Some causes are vomiting/diarrhea x days, severe burns, traumatic injury, hemorrhage (surgical, obstetric)

## Therapeutic Management

### 1. Treat Cause

- a. OR for repair
- b. Meds for vomiting/diarrhea

### 2. Replace Volume

- a. Crystalloid – LR, NS
- b. Colloid – Blood Products
- c. Rapid Infuser

### 3. Support Perfusion

- a. Hemodynamic Monitoring
- b. Vasopressors

### 4. Life Support

- a. Decreased LOC = may need airway protection & ventilation



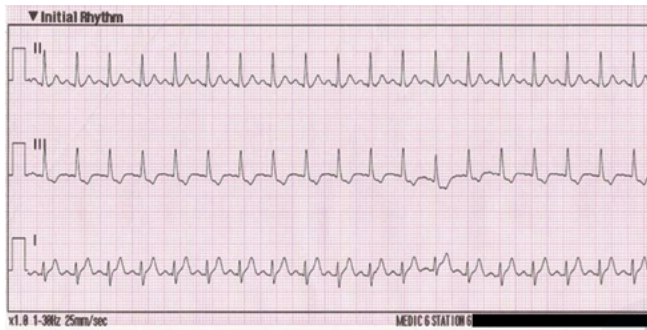
# Sinus Tachycardia

## Overview

### 1. Characteristics of sinus tachycardia

- a. Rhythm → Regular
- b. Heart rate → >100
- c. P: QRS ratio → 1:1
- d. PR interval → 0.12-0.20 seconds
- e. QRS complex → 0.06-0.12 seconds

Image 6.11 Sinus Tachycardia



By User:MoodyGroove - en.wikipedia.org, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=3961884>

## General

### 1. Client Presentation

- a. Stable
- b. Unstable → Rapid heartbeat, palpitations, lightheaded, decreased cardiac output

### 2. Cause

- a. Fever, dehydration, hypotension, anemia, anxiety/fear, pain

### 3. Nursing Interventions

- a. Determine if stable or unstable and treat the cause of tachycardia

## Therapeutic Management

### 1. Find and treat the cause

### 2. Stable

- a. Vagal Maneuvers, medications (Beta-Blockers, Calcium Channel Blockers, Adenosine)

### 3. Unstable

- a. Synchronized cardioversion



# Cataracts

## Overview

A cataract is a clouding of the lens in the eye which leads to a decrease in vision. If left untreated can lead to blindness.

## General

### 1. Cataract

- a. The lens has lost transparency and distorts image projected onto the retina

### 2. Diagnosis

- a. Visual acuity testing→ will show a decreased visual acuity
- b. Eye exam→ Will show a cloudy lens

## Assessment

### 1. Early findings

- a. Slightly blurred vision, decreased color perception

### 2. Later findings

- a. Blurred vision, double vision, difficulty with ADLs

### 3. Vision loss is gradual

### 4. Pupil appears white

Image 6.88 Congenital Cataracts



## Therapeutic Management

### 1. Surgery

- a. Only curative method

### 2. Care post-surgery

- a. Eye drops several times a day for 2-4 weeks
- b. Mild itching and slight swelling is normal
- c. Pain control
- d. Prevent increases in intraocular pressure

### 3. Side effects and complications

- a. Significant swelling
- b. Bruising
- c. Infection
- d. Pain
- e. Bleeding or increased discharge
- f. Bloodshot sclera
- g. Decreased vision
- h. Flashes of light or floating shapes



# Cirrhosis

## Overview

1. Chronic, irreversible liver disease
2. Inflammation and fibrosis of liver cells (hepatocytes) leads to the formation of scar tissue within the liver, this causes obstruction of hepatic blood flow and impedes proper liver function

## General

### 1. Impaired Liver Function

- a. Liver is sick so it is not functioning properly
  - i. Impaired protein metabolism
  - ii. Increased drug toxicity because the liver cannot metabolize
  - iii. ↓ Coagulation factors, ↑ Ammonia levels, ↑ Bilirubin levels
  - iv. ↑ LFT's (ALT, AST, ALP)
  - v. Impaired blood sugar regulation

### 2. Complications

- a. Hepatic Encephalopathy → ↑ Ammonia causes edema in cerebral tissue
- b. Bleeding Risk → ↓ Clotting factors
- c. Portal Hypertension → Obstruction of blood flow increases pressure in the portal vein and it backs up into GI circulation
- d. Esophageal Varices → Dilated, thin veins in the esophagus due to portal hypertension that can rupture and bleed → Life-threatening emergency

## Assessment

### 1. Malaise & general fatigue

### 2. Anorexia

### 3. ↑ Bilirubin levels

- a. Jaundice with scleral icterus, dark urine, and clay-colored stools

### 4. Impaired protein metabolism

- a. Causes edema, ascites, and increased ammonia → Hepatic encephalopathy which will present with disorientation, altered LOC, and asterixis (flapping hand tremor)

### 5. Inflammation

- a. Pain in RUQ
- b. Hepatomegaly
- c. Splenomegaly
- d. Portal hypertension
  - i. Hemorrhoids
  - ii. Varicose Veins
  - iii. Esophageal varices that can cause a massive GI bleed and vomiting blood

### 6. Impaired Coagulation

- a. Anemia
- b. Bleeding
- c. Bruising easily

## Therapeutic Management

### 1. Medications

- a. Analgesics
- b. Vitamin K for clotting factors
- c. Antacids to ↓ irritation on the esophagus
- d. Lactulose to decrease ammonia levels
- e. Blood products if bleeding
- f. Diuretics to remove fluid

### 2. Paracentesis to drain abdominal fluid

### 3. Dietary Restrictions → Fluid restriction, ↓ Protein intake, ↓ Na intake

### 4. Esophageal Varices

- a. Endoscopy → cauterize, clip, or band varices to prevent bleeding
- b. Sengstaken-Blakemore OR Minnesota tube – balloon inflated in the esophagus to put pressure on bleeding varices



## Cheatsheet 6.14 Cirrhosis Nursing Care

# CIRRHOSIS NURSING CARE

CHRONIC, PROGRESSIVE DISEASE OF THE LIVER RESULTING IN LIVER CELL DESTRUCTION AND SCARRING.

## COMPLICATIONS

- **Ascites**
  - Fluid accumulation in the peritoneal cavity.
- **Portal Hypertension**
  - Elevated pressure in the portal vein because of blood flow obstruction through the liver.
- **Esophageal Variceal Bleeding**
  - Blood flow shunts to the weaker veins in the esophagus. These fragile veins can rupture.
- **Hepatic Encephalopathy**
  - Accumulation of ammonia due to liver failure can lead to neurologic decline.
- **Hepatorenal Syndrome**
  - Renal failure associated with hepatic failure.
- **Coagulation Defects**
  - Liver is unable to synthesize coagulation factors making the client prone to bleeding.

## MAJOR ASSESSMENT FINDINGS

### Neurological

Encephalopathy  
Asterixis

### GI

Ascites  
Esophageal Varices  
GI Bleeding  
Hepatomegaly  
Pain  
Nausea/Vomiting  
Malnutrition

### Hematologic

Anemia  
DIC  
Splenomegaly  
Thrombocytopenia



### Cardiopulmonary

Fatigue  
Spider Angioma  
Edema  
Portal Hypertension  
Dyspnea  
Hypoxemia  
Hyperventilation

### Integumentary

Jaundice  
Spider Angiomas  
Ecchymosis/Petechia

### Fluid and Electrolyte

Ascites  
Hypokalemia  
Water Retention  
Edema

## NURSING CARE

Administer	Monitor	Prepare	Other
Supplemental Vitamins	Edema	Patient for Paracentesis	Restrict Na
Enteral Feedings	I&O, Weight	Patient for Shunting	Elevate HOB
Diuretics	Level of Consciousness		Gastric Intubation if Indicated
Blood Products	Bleeding		Avoid Hepatotoxic Medications
Lactulose	Coagulation Times		
	Abdominal Girth		



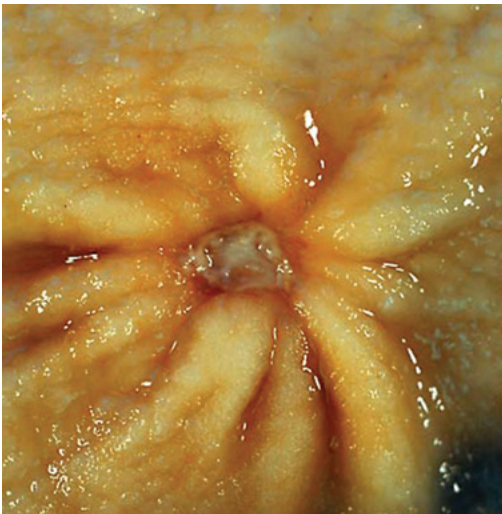


## Peptic Ulcer Disease

### General

1. **Causes**
  - a. Helicobacter pylori, frequent use of NSAIDs, smoking, and alcohol use
2. **Diagnosis is done with an upper GI Series x-rays or EGD (Esophagogastroduodenoscopy)**

Image 6.44 Peptic Ulcer Disease



### Assessment

1. **Nausea/Vomiting**
2. **Abdominal Pain**
  - a. Usually upper abdominal pain
  - b. Often burning or sharp pain
  - c. Gastric Ulcer→ Gnawing, sharp 30-60 minutes after a meal
  - d. Duodenal Ulcer→ 1.5 to 3 hours after eating, pain may also be relieved by eating
3. **Hematemesis (gastric)**
  - a. Vomiting of blood
4. **Melena (duodenal)**
  - a. Dark black tarry feces

### Therapeutic Management

1. Avoid aspirin and NSAIDs because they increase bleeding risk
2. Monitor H&H and assess for bleeding
3. Medications→ H2 receptor antagonists, proton pump inhibitors, antacids, and sucralfate (Carafate) → take 30-60 minutes before meals
4. Surgical options
  - a. Vagotomy→ Cut Vagus nerves, ↓ Parasympathetic response= ↓ gastric acid secretion
  - b. Gastric resection / Gastrectomy→ Remove all or part of the stomach to remove ulcerated tissue
  - c. Billroth I, Billroth II→ Remove a portion of the stomach and reattach to the duodenum (I) or jejunum (II)
  - d. Post-Op:
    - i. HOB 45°
    - ii. Clear Liquids x 3-7 days
    - iii. Assess Bowel sounds
    - iv. To help the risk for Dumping Syndrome (rapid influx of gastric contents into the small intestine) avoid sugar or fatty foods, eat smaller meals, and do not consume fluids with meals

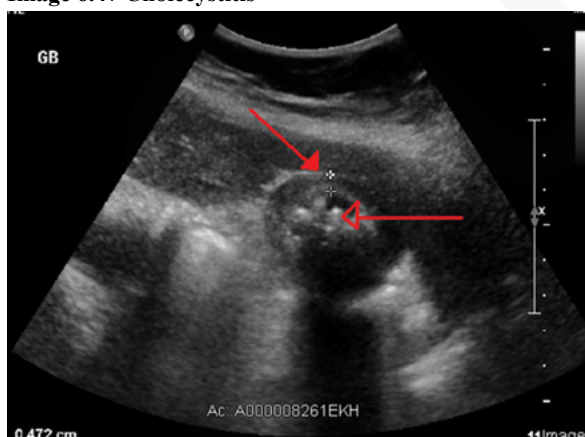


# Cholecystitis

## Overview

1. **Acute or chronic inflammation of the gallbladder.**
  - a. It is caused by cholelithiasis (gallstones), duct obstruction, and infection
2. **Gallbladder stores and secretes bile into the duodenum to aid in digestion of fats**
3. **Uncorrected can lead to liver damage**
  - a. Assessment
  - b. N/V
  - c. RUQ pain→ Occurs 2-4 hours after high fat meals and lasts 1-3 hours
  - d. Murphy's Sign
    - i. Pain with expiration while examiners hand is placed below the costal margin on right side at midclavicular line.
    - ii. The client then asked to inspire and if the client is unable to inspire due to pain, the test is positive.
  - e. Rebound tenderness over RUQ

Image 6.47 Cholecystitis



By James Heilman, MD - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=15996764>

## Therapeutic Management

1. Decrease gallbladder stimulation→ NPO, nasogastric decompression, avoid gas-forming foods
2. Antiemetics, analgesics
3. Cholecystectomy
  - a. Removal of gallbladder
  - b. Abdominal splinting when coughing
  - c. Clear liquids post-op, advance as tolerated/ordered
  - d. T-tube drainage
    - i. Maintain patency of the duct
    - ii. High Fowler's position
    - iii. Report drainage >500mL



# Inflammatory Bowel Disease

## Overview

Autoimmune inflammatory conditions affecting the GI tract, periods of remissions and exacerbations occur

## General

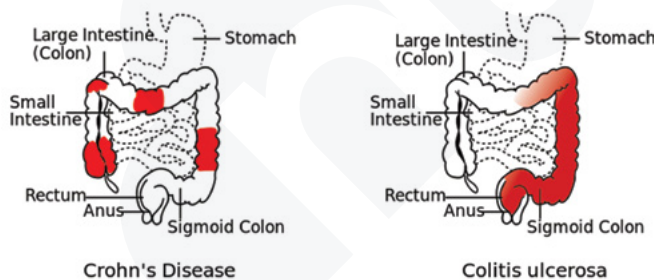
### 1. Ulcerative Colitis

- Affects colon and rectum
- Poor absorption of nutrients
- Edema + Lesions + Ulcers
- 10-20 Stools/day → Blood & mucus
- Avoid foods that may exacerbate symptoms
  - Raw vegetables and fruits, nuts, popcorn, whole-grains, cereals, and spicy foods

### 2. Crohn's

- Affects entire GI tract
- May affect other body systems (especially skin and lymphatic system)
- Thickening + scarring + abscesses
- 5-6 Stools/day → Pus & mucus

Image 6.46 Comparison of Inflammatory Bowel Diseases



By Own work - google search: "crohn Colitis ulcerosa", CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=39701853>

## Therapeutic Management

### 1. Major medication classes

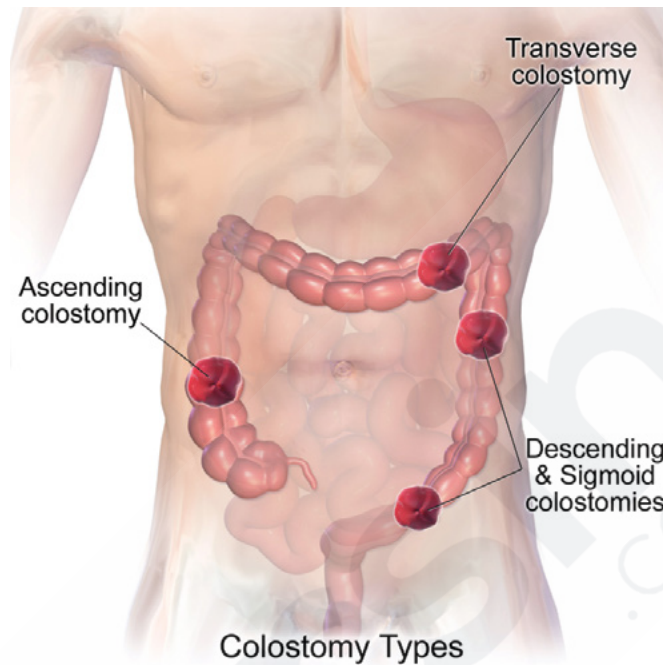
- Corticosteroids → i.e. Methylprednisolone
  - Decreases inflammation
  - The risk for Cushing's Syndrome with chronic use
- Salicylates → i.e. Sulfasalazine
  - Inhibits pro-inflammatory chemicals (prostaglandins, interleukin-I, Tumor Necrosis Factor)
- Immunomodulators → i.e. Azathioprine or Methotrexate
  - Decreases immune and inflammatory response
  - Helps decrease the need for corticosteroids
- Antidiarrheals → i.e. Loperamide
  - Decrease loss of fluid and electrolytes

### 2. Surgical options

- Bowel resection or Colectomy
  - Ulcerative Colitis – curative
  - Crohn's – palliative
- Surgical removal of abscesses

Cheatsheet 6.12 Colostomy Care

## COLOSTOMY CARE



### Stoma Locations

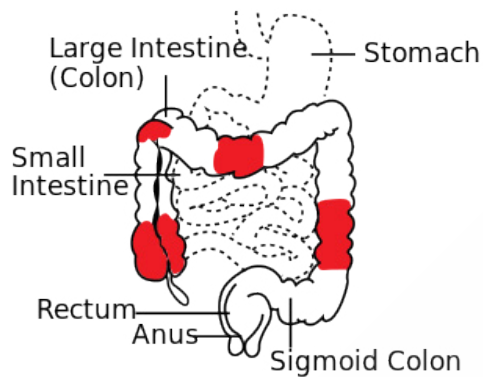
Patient Care	Patient Care
<p>Assess stoma appearance. Normal color is pink to red. Report stoma that is pale, dark, purple or brown.</p> <p>Stoma appliance (bag) should be cut 1/16 - 1/8 in larger than the stoma.</p> <p>Cleanse stomal area and keep dry.</p> <p>Apply skin barrier before applying appliance.</p> <p>Empty appliance frequently to avoid complications. Generally when 1/3 full.</p>	<p>Special attention needs to be paid to client diet:</p> <p>Foods that increase gas: beer, broccoli, brussel sprouts, cabbage, carbonated drinks, beans, dairy, spinach</p> <p>Foods that thicken stool: applesauce, banana, bread, cheese, yogurt, rice, pasta</p> <p>A small needle sized hole can be made in the pouch to allow flatus to escape. Seal with a bandaid.</p>

By BruceBlaus. When using this image in external sources it can be cited as: Blausen.com staff. "Blausen gallery 2014". Wikiversity Journal of Medicine. DOI:10.15347/wjm/2014.010. ISSN 20018762. - Own work, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=33041231>

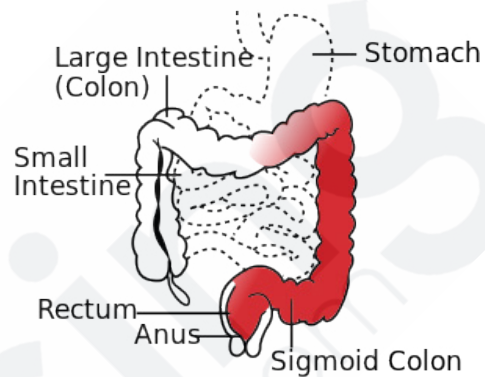
## Cheatsheet 6.13 Ulcerative Colitis vs. Crohn's Disease

# ULCERATIVE COLITIS VS. CROHN'S DISEASE

Crohn's Disease and Ulcerative Colitis are two forms of Inflammatory Bowel Disease - autoimmune diseases affecting the GI tract. Here's how to tell them apart:



Crohn's Disease



Colitis ulcerosa

By Own work - google search: "crohn Colitis ulcerosa", CC BY-SA 3.0,  
<https://commons.wikimedia.org/w/index.php?curid=39701853>

## CROHN'S DISEASE:

- Affects entire GI tract
- May affect other body systems
  - Especially skin & lymphatic system
- Thickening + Scarring + Abscesses
- 5-6 Stools/day
  - Pus & mucus

## ULCERATIVE COLITIS:

- Affects colon & rectum
  - Progressive from rectum to cecum
- Poor absorption of nutrients
- Edema + Lesions + Ulcers
- 10-20 Stools/day
  - Blood & mucus



# Appendicitis

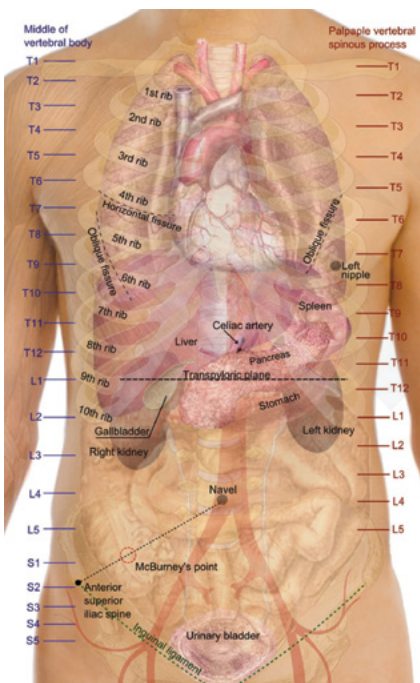
## General

1. Unknown exact cause
2. Major risk is rupture → pus and possibly fecal matter spill into peritoneum causing peritonitis, and sepsis

## Assessment

1. Abdominal pain at McBurney's point
2. Pain descends to RLQ
3. rebound tenderness
4. ↑ WBC, fever
5. Fever
6. Abdominal guarding
7. SUDDEN RELIEF OF PAIN SIGNIFIES A RUPTURE → Medical emergency and requires surgical intervention immediately

Image 6.45 McBurney's Point - Appendicitis



## Therapeutic Management

1. Avoid heat application which can lead to rupture
2. Avoid stimulation of peristalsis so keep NPO
3. May require Appendectomy--? Keep NPO
  - a. NG tube for decompression
  - b. Post-Op Care → Monitor VS, assess for abdominal distention, and clear Liquids, advance diet as tolerated





# Pancreatitis

## Overview

1. Inflammation of the pancreas
2. Autodigestion of pancreas results from long-term damage

## General

### 1. Causes

- a. Alcohol abuse, gallbladder disease, obstruction of the ducts, hyperlipidemia, peptic ulcer disease (PUD)

### 2. Types

- a. Acute – occurs suddenly with most clients recovering fully
- b. Chronic – usually due to long-standing alcohol abuse with loss of pancreatic function

## Assessment

1. Abdominal pain with sudden onset, located in the mid epigastric and left upper quadrant
2. N/V
3. Weight loss (malabsorption)
4. Abdominal tenderness
5. Abnormal Labs=↑ WBC, bilirubin, ALP, amylase, lipase
6. Cullen's sign→ Bruising and edema around the umbilicus
7. Turner's sign→ Flank bruising- Indicative of pancreatic autodigestion or retroperitoneal hemorrhage
8. Steatorrhea – fatty, foul-smelling stools

Image 6.43 Cullen's Sign in Pancreatitis



By Herbert L. Fred, MD and Hendrik A. van Dijk - <http://cnx.org/content/m14904/latest/>, CC BY 2.0, <https://commons.wikimedia.org/w/index.php?curid=5038484>

## Therapeutic Management

1. Suppress Pancreatic secretions through NPO diet and NG tube insertion to decompress the stomach
2. IV hydration
3. TPN for prolonged exacerbations to provide adequate nutrition
4. Endoscopic Retrograde Cholangiopancreatography (ERCP) to remove gallstones→ Camera inserted to visualize common bile duct
5. Surgery
  - a. Whipple – remove a portion of pancreas (for mass or tumor)
  - b. Pancreatectomy – remove the pancreas, which will require Insulin, glucagon, and pancreatic enzyme supplementation
  - c. Cholecystectomy – if the source is gallbladder disease
6. Medications for pain and to control symptoms→ Analgesics, H2 blockers, proton pump inhibitors, insulin, and anticholinergics





# Hepatitis

## General

### 1. Hepatitis A (HAV)

- Health care workers at risk
- Transmission is fecal-oral, person-to-person, and poorly washed hands/utensils
- Most contagious 10-14 days prior to the onset of symptoms and is self-limiting
- Prevention→ strict hand washing, Standard precautions, and Hepatitis A vaccine

### 2. Hepatitis B (HBV)

- Transmission by blood or body fluids through IV drug use, sexual contact, or needle Stick
- Prevention→ Standard Precautions, hand washing, blood screening, Hepatitis B vaccine, needle precautions, safe sex practices

### 3. Hepatitis C (HCV)

- Transmission→ Blood-borne, IV drug users, needle Stick
- Prevention→ Standard precautions, needle safety, blood screening, NO Vaccine available

### 4. Hepatitis D (HDV)

- Opportunistic infection associated with Hepatitis B Virus (HBV)

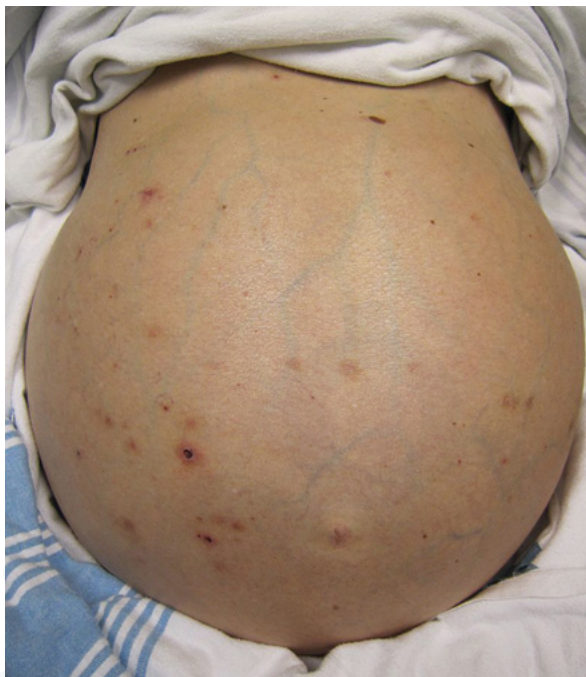
### 5. Hepatitis E (HEV)

- Fecal/Oral route of transmission, common in underdeveloped countries

## Assessment

- Preicteric Stage→ Flu-like symptoms, pain, and low-grade fever
- Icteric Stage
  - ↑ Bilirubin→ causes jaundiced skin & eyes, dark urine, and pruritus
  - Clay-colored stool (lack of bile secretion)
  - Elevated liver function tests (LFT's) → AST, ALT, ALP, and Ammonia
- Posticteric Stage→ Recovery phase, laboratory values return to normal, pain relief, increased energy

Image 6.48 Ascites in Liver Failure



By James Heilman, MD - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=15335623>

Image 6.49 Jaundiced Eyes



## Therapeutic Management

- Supportive therapy to address symptoms
  - Lactulose for ↑ Ammonia levels
  - Antiemetics
  - Antihistamines→ can help treat hep C virus
- Antiviral therapy



# Urinary Tract Infection

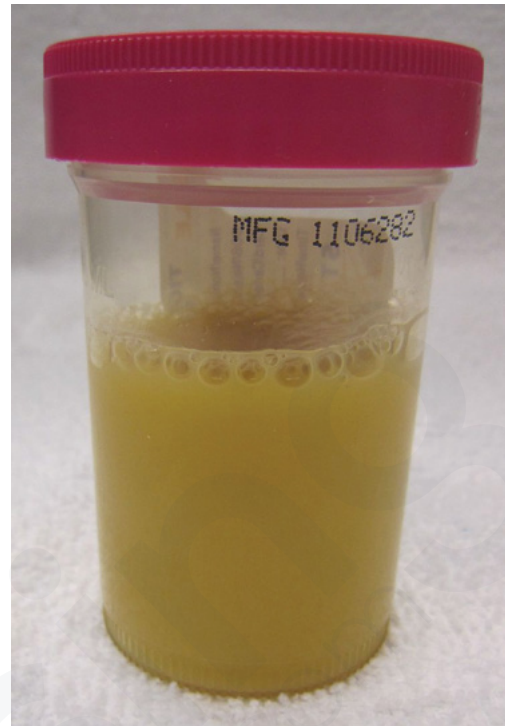
## Overview

1. Infection anywhere within the urinary tract (Kidneys → Ureters → Bladder → Urethra) leading to inflammation
2. Pathogens gain entrance via perineal area or via the bloodstream
  - a. Indwelling catheters – Catheter-Associated UTI (CAUTI)
  - b. Older males are more prone due to urinary stasis caused by an enlarged prostate

## Assessment

1. Urine will be cloudy, strong odor (pyuria), burning with urination, and urinary frequency and will increase
2. Confusion (altered mental status) and lethargy, especially in the elderly
3. ↑ Temp, ↑ WBCs
4. Urine cultures reveal bacteria

Image 6.52 Cloudy Urine in UTI



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## Therapeutic Management

1. Urine and Blood cultures BEFORE antimicrobials
2. Antimicrobials
3. Antispasmodic for bladder pain → Oxybutynin
4. Analgesics → Pyridium specifically provides relief of pain and burning with urination

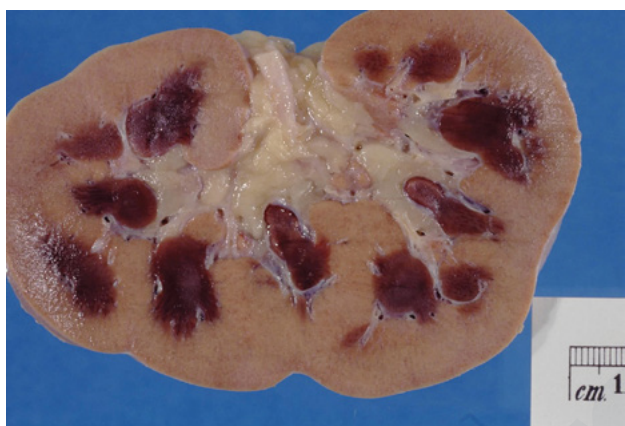


# Acute Kidney Injury

## Overview

1. Sudden onset of renal damage
2. Loss of renal function due to poor circulation or renal cell damage
3. Usually reversible may resolve on its own, but can lead to permanent damage if not reversed quickly

Image 6.50 Kidney Damage



## General

### 1. Causes

- Prerenal*
  - Decreased blood flow to the kidneys, accounts for a majority of cases → Hypotension, Hypovolemia, ↓ Cardiac Output (i.e. Heart Failure, Shock)
- Intrarenal*
  - Damage within the kidney itself → Tubular necrosis, infection, obstruction, contrast dye, nephrotoxic medications
- Postrenal*
  - Damage between the kidney and urethral meatus backs up, causing damage to kidneys → due to infection, calculi, or obstruction

### 2. Phases

- Onset → Note a decrease in baseline urine output
- Oliguric → Decreased urine output <400 mL/day. This is the sickest phase where there is a ↑ BUN/Creatinine and ↓ Glomerular Filtration Rate (GFR)
- Diuretic → Beginning to recover, there is a gradual increase in urine output followed by diuresis
- Recovery → has decreased edema, electrolytes normalize, and GFR increases

## Assessment

- Signs and symptoms result from the inability of the kidneys to regulate fluid and electrolytes
- Azotemia (retention of nitrogen wastes in the blood) → ↑ BUN/Creatinine
- ↓ Glomerular Filtration Rate (GFR)
- Decreased urine output in the oliguric phase which should see an increase in diuretic phase
- Signs of volume overload (HTN, peripheral edema, pulmonary edema)
- s/s infection if that was the source
- Metabolic acidosis → Kidneys not holding  $\text{HCO}_3^-$
- Electrolyte abnormalities → ↑ Potassium, ↓ Sodium, ↑ Phosphate, ↓ Calcium

## Therapeutic Management

### 1. Oliguric Phase

- Restrict fluid intake because there is volume overload, give diuretics for volume overload, and identify & treat the cause

### 2. Diuretic Phase

- Replace fluids and electrolytes and especially watch potassium & sodium levels

### 3. If not recovering, may need dialysis



# Chronic Kidney Disease

## Overview

1. Progressive, irreversible loss of renal function with an associated decline in GFR  $<60$  mL/min
2. All body systems affected
3. Dialysis is required
4. End-Stage Renal Disease (ESRD) = GFR  $<15$  mL/min

## General

1. **Causes**
  - a. DM, HTN, unreversed acute kidney injury, glomerulonephritis, and autoimmune disorders
2. **Diagnostics**
  - a. GFR = Glomerular Filtration Rate
    - i. mL / min
    - ii. Normal  $>90$  mL/min
  - b. Ultrasound shows scarring/damage
  - c. ↓ Urine output (could be anuric)
  - d. ↑ BUN, Creatinine

## Assessment

1. CKD affects every body system
2. Azotemia (buildup of nitrogen in the blood→ urea)--> ↑ BUN, creatinine, uremia
3. Cardiac (related to RAAS effects) → Volume overload, HTN, and CHF
4. Respiratory → Pulmonary edema (vol. overload)
5. Hematologic = ↓ erythropoietin so there is anemia and thrombocytopenia
6. Gastrointestinal→ Anorexia (due to Azotemia) and N/V (due to metabolic acidosis)
7. Neurological (cerebral edema & uremic encephalopathy) → Lethargy, confusion, and coma
8. Urinary→ ↓ Urine output and proteinuria (protein leakage because the kidney is not functioning properly)
9. Skeletal→ Osteoporosis occurs because of an imbalance of calcium and phosphorus needed for healthy bones. The kidneys are not functioning and filtering properly.

## Therapeutic Management

1. Epoetin alfa = synthetic erythropoietin
2. Avoid administering Aspirin or NSAIDs (risk for interstitial nephritis)
3. Monitor potassium levels
  - a. Hyperkalemia → EKG changes (peaked T waves, flat P, wide QRS, blocks, asystole)
  - b. Continuous cardiac monitoring
  - c. Low potassium diet
  - d. Potassium lowering medications (Kayexalate, insulin/dextrose, calcium gluconate)
4. Phosphate binders to lower phosphorus levels→ Given BEFORE meals
5. Calcium supplements to treat the hypocalcemia
6. Hemodialysis or Peritoneal Dialysis





# Pelvic Inflammatory Disease

## Overview

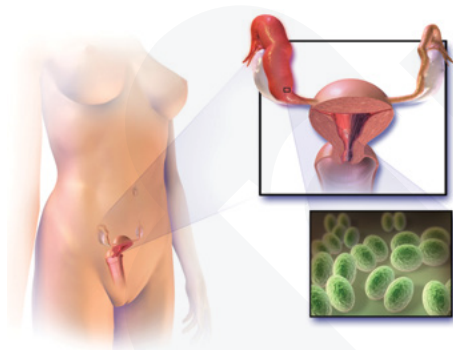
Pelvic inflammatory disease is an infection of the female reproductive tract, it's caused by alterations in the cervical mucus, which can be fatal if untreated.

## General

## Overview

1. Infection of reproductive tract → moves to the pelvis and bacteria moves to the uterine cavity and leads to inflammation and scarring
2. Causes → STDs (most common), vaginal flora overgrowth, infection of pelvic structures
3. Risk factors are risky sexual practice, multiple sexual partners, recent IUD (foreign body) placement, and history of STD
4. Complications → Infertility, ectopic pregnancy, and sepsis/death

Image 6.55 Pelvic Inflammatory Disease



By BruceBlaus. When using this image in external sources it can be cited as: Blausen.com staff (2014). "Medical gallery of Blausen Medical 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.010. ISSN 2002-4436. - Own work, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=30462649>

## Assessment

1. Assessment
  - a. Abdominal pain
  - b. Abnormal vaginal bleeding/discharge → Spotting, yellow or green vaginal discharge
  - c. Pain with urination, intercourse
  - d. Fever / chills / malaise

## Diagnosis

Diagnosis is based on clinical history, physical exam, and lab tests which include gram stain to identify the organism and a culture and sensitivity to choose the right antibiotic

## Therapeutic Management

1. Interventions
  - a. Antibiotics
  - b. Pain control with mild analgesics – NSAIDs
  - c. Positioning → Semi-fowler's to help with drainage of infection



# Dialysis & Other Renal Points

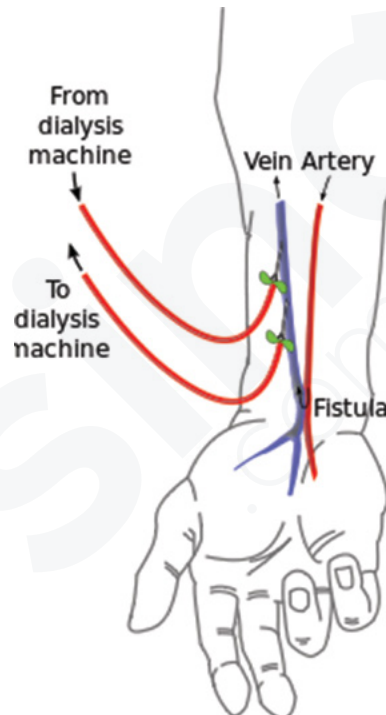
## General

### 1. Hemodialysis

- a. *The purpose is to clear waste and toxins* (urea, creatinine, uric acid) from the blood and regulates electrolytes
- b. *Complications*
  - i. Hypotension / Hypovolemic Shock – pulling off 1-4 L of fluid in 2-4 hours
  - ii. Air embolus
  - iii. Electrolyte Imbalance
  - iv. Sepsis
  - v. Hemorrhage from site
- c. *Medication Precautions*
  - i. HOLD antihypertensives and medications that might drop blood pressure (verify with the provider)
  - ii. HOLD medications that will be removed by dialysis (contact pharmacy with questions, verify with the provider)
- d. *Nursing Priorities*
  - i. Monitor vital signs and EKG closely throughout (risk for hypotension or EKG changes)
  - ii. Monitor labs values closely
  - iii. Weigh the client before and after dialysis to estimate fluid loss (1 kg = 1L)
  - iv. Assess for bleeding from the site
- e. *Vascular Access*
  - i. Types
    1. Graft (artificial 'vessel' loop)
    2. Fistula (allows higher velocity/volume in veins)
    3. External Dialysis Catheter (usually temporary)
  - ii. Do NOT insert IVs or take NIBP on the extremity with active fistula or graft
  - iii. Assess pulses and capillary refill in the affected extremity

- iv. Monitor fistulas and grafts closely for clots
  1. Bruit: listen for a swooshing sound
  2. Thrill: feel the vibrations
  3. If bruit and thrill are absent notify the provider
- v. Protect Vascular Access → their LIFELINE!

Image 6.53 AV Fistula for Dialysis

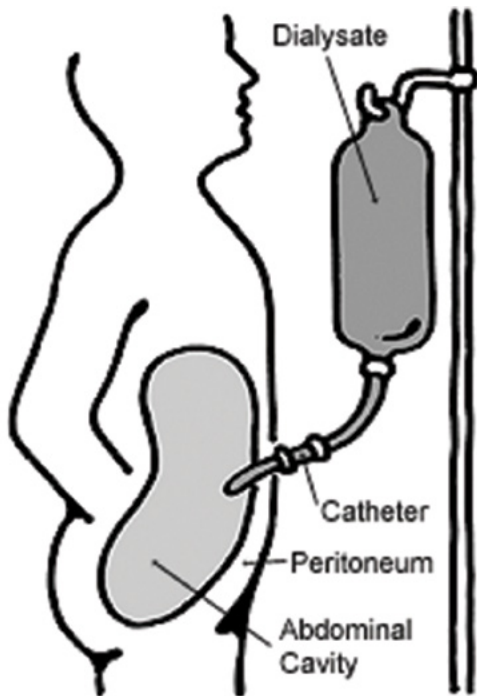


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### 2. Peritoneal Dialysis

- a. Peritoneum acts as a semipermeable membrane for dialysis
  - i. Contraindications are peritonitis and abdominal surgery
  - ii. Can be continuous (24/7) or intermittent and can be done at home
- b. The client is at risk for peritonitis (infection of the peritoneum) which can be prevented with strict sterile technique and will show as a cloudy outflow

Image 6.54 Peritoneal Dialysis



### 3. Contrast Dye

- a. The dye is damaging to kidneys, so fluids should be increased to flush out post-procedure unless contraindicated
- b. Contrast Dye + glucophage (Metformin) = Lactic Acidosis, so hold before CT scan and for 48 hours post-scan

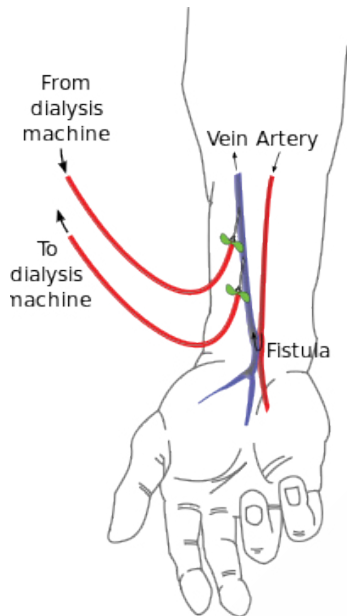
### 4. Cystoscopy

- a. Camera inserted to examine the bladder and take a biopsy
- b. Coagulation studies should be assessed first, then, post-procedure, the site should be assessed for bleeding and pressure applied to the site

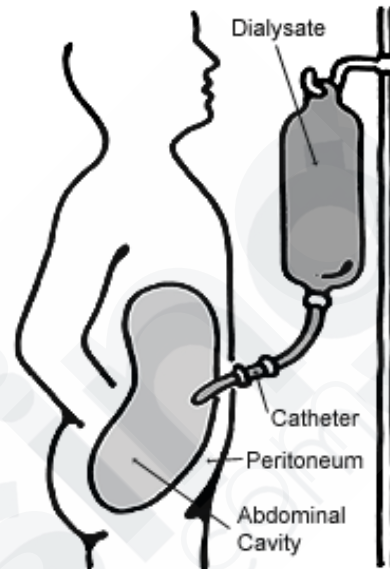


## Cheatsheet 6.15 Types of Dialysis

## TYPES OF DIALYSIS



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Dialysis is the process of using a semipermeable membrane to perform many of the functions of the kidneys that they are no longer able to perform. This includes clearing waste and toxins, removing urea, creatinine, and uric acid, and regulating electrolytes and acid-base balance.

## HEMODIALYSIS

Pulls blood from the patient into a machine with a filter, which acts as the semipermeable membrane, then returns the blood to the patient.

- Requires Vascular Access
- Risk for hypovolemic shock

**Safety:**

- Protect vascular access (Limb Alert - no BP or sticks)
- Pharmacologic considerations
- Monitor VS closely

## PERITONEAL DIALYSIS

Instills dialysate fluid into the peritoneum, which acts as the semipermeable membrane, then the fluid is extracted.

- Can be done at home
- Risk for peritonitis

**Safety:**

- Prevent infection (hand hygiene and sterile technique)
- Monitor for infection (peritonitis)



# Menopause

## Overview

1. ↓ Reproductive hormones
2. Diagnosed after 12 months of amenorrhea and marks the end of the reproductive period
3. Average around 50 years old

## Assessment

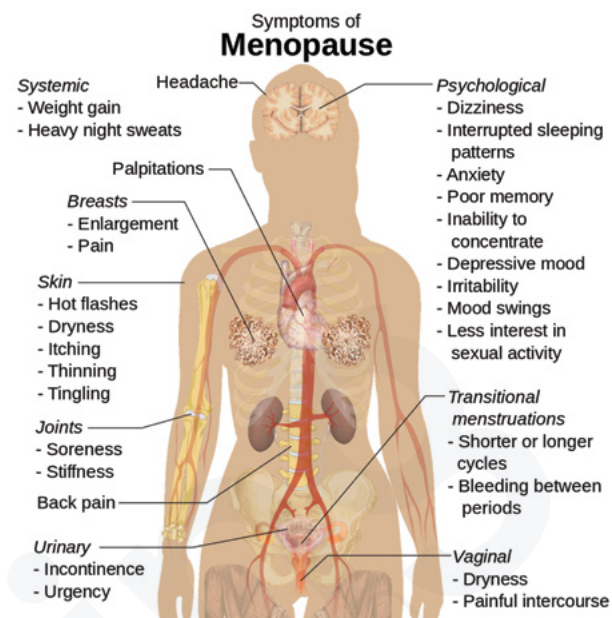
### 1. Symptoms

- a. Can start up to 6 years before the final period, and continues for a variable number of years after
- b. Wide range of symptoms
  - i. Hot flashes (most common)
  - ii. Insomnia
  - iii. Weight gain, bloating
  - iv. Mood changes, depression
  - v. Breast pain, headaches
  - vi. Osteoporosis
  - vii. Reproductive, urinary changes
    1. Irregular menses
    2. Vaginal dryness, painful intercourse
    3. Prolapse of reproductive and urinary structures

### 2. Lab testing seen with endocrine changes

- i. ↑ FSH → Indicates that menopause has occurred
- ii. ↓ Estrogen and inhibin

Image 6.56 Menopause



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## Therapeutic Management

1. Hormone replacement therapy for severe cases
2. Symptom management



# Blood Transfusions

## Overview

1. Four types of products→ Packed Red Blood Cells (PRBCs), cryoprecipitate, fresh frozen plasma, and platelets
2. Must match donor type→ ABO type, Rh status, and special antibodies

## General

1. **PRBCs aka “Unit of Blood”** → Given for anemia
2. **FFP (Fresh Frozen Plasma)**
  - a. Contains clotting factors
3. **Platelets**
  - a. Given for thrombocytopenia and often pre-procedure for clients with Platelets <50. Re-check 1-hour post-transfusion.
4. **Cryoprecipitate**
  - a. Contains fibrinogen and is commonly used for hemorrhage and disseminated Intravascular Coagulation (DIC)
5. **Prepare to transfuse**
  - a. Type and crossmatch/screen
  - b. Pre-transfusion vitals
  - c. Administration materials
    - i. The special blood IV tubing
    - ii. 0.9% normal saline
    - iii. Access to emergency medications
6. **Begin transfusion**
  - a. Independent double-check completed by two RNs
  - b. Initiate infusion at a slow rate for the first 10-15 minutes
  - c. Monitor for Reaction
7. **Transfusion Reactions**
  - a. Present similarly to anaphylaxis and can occur up to 24 hours after transfusion
8. **Delayed Transfusion Reactions**
  - a. Caused by antibody mismatch and can be potentially fatal

## Assessment

1. Transfusion reactions most commonly occur in the first 10-15 minutes, and symptoms are pruritus, rash, fever, chills, low back pain, and anxiety
2. Delayed transfusion reactions occur in clients who have received transfusions before, or if there are undetectable antibodies below the threshold of screening
3. Post-Transfusion→ Redraw Complete Blood Count (CBC)

## Therapeutic Management

1. **Transfusion Reactions**
  - a. Immediately STOP transfusion, SAVE the blood product for lab
  - b. Treatment similar to anaphylaxis
    - i. Notify provider
    - ii. Anti-histamines (diphenhydramine)
    - iii. Acetaminophen
    - iv. Consider furosemide for fluid overload and to maintain kidney function
  - c. Monitor airway patency
  - d. Maintain IV access
  - e. Report to the blood bank



## Acquired Immune Deficiency Syndrome

### General

1. A condition caused by the HIV virus (late-stage HIV infection)
2. Interferes with and destroys T4 Lymphocytes, which causes an increase in susceptibility to infection
3. At risk for opportunistic infections/conditions such as tuberculosis, pneumonia, cancers, and candidiasis

### Assessment

1. Frequent infections, wasting syndrome, skin breakdown, stomatitis, malnutrition, and dehydration
2. Leukopenia ( $\downarrow$ WBCs)
3. Kaposi's sarcoma  $\rightarrow$  A tumor causes lesions to grow in the skin and lymph nodes, characterized by purple/red lesions on skin and organs
4. Candidiasis in the mouth (thrush)

### Therapeutic Management

1. Respiratory support
2. Nutritional support  $\rightarrow$  Small frequent meals, premedicate to avoid nausea, and provide favorite foods
3. Monitor fluid and electrolyte balance
4. Assess for infection
5. Initiate strict infection control precautions and observe hand hygiene

Image 6.62 Symptoms of AIDS

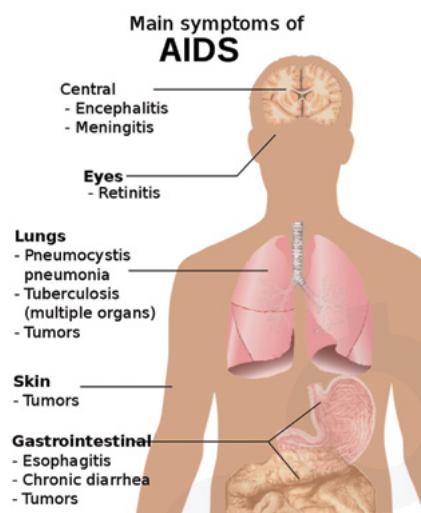
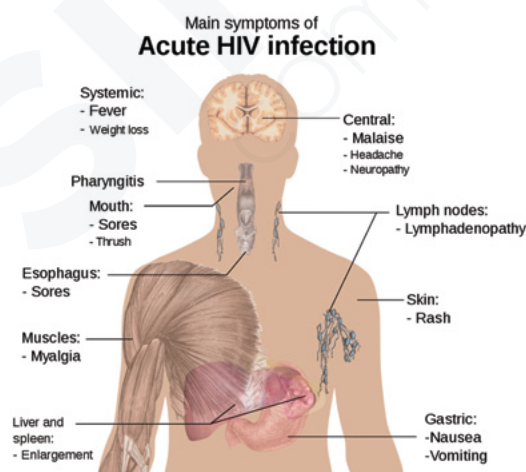


Image 6.63 Symptoms of HIV





# Sickle Cell Anemia

## Overview

1. A hereditary disorder that primarily affects African Americans by a recessive trait
  - a. If both parents are carriers there is a 25% of their offspring having SCA, 50% chance of being a carrier, and only a 25% chance of no inheritance

## General

1. **The genetic mutation leads to rigid, misshapen RBCs**
  - a. Affects hemoglobin's ability to carry oxygen and the misshapen RBCs get stuck within the blood vessels, causing an obstruction
2. **Can lead to Sickle Cell Crisis – 2 kinds**
  - a. *Micro-occlusions* → *Vasoocclusive Crisis*
    - i. ↓ Blood flow to tissue = hypoxia, ischemia, infarction
      1. Joint pain
      2. Stroke
      3. Acute Chest Syndrome
    - ii. Sequestration
      1. Pooling of blood
      2. Usually in spleen
  - b. *Acute Exacerbation*
    - i. Caused by hypoxia, exercise, high altitude, fever, temperature extreme

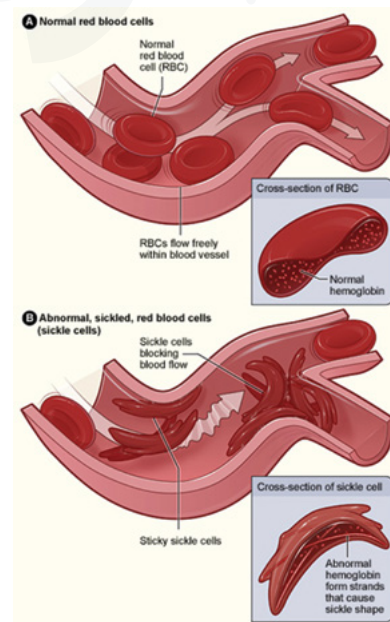
## Assessment

1. **Pallor and fatigue**
2. **Severe Pain**
  - a. Due to micro-occlusions → Symptoms match the location of the occlusion

## Therapeutic Management

1. **Hemodilution**
  - a. Dilute blood to 'wash out' sickled cells
  - b. Give IV Fluids for hydration
  - c. Blood transfusions → give properly shaped/ functioning RBCs
2. **Oxygen Supplementation**
  - a. Increase oxygen delivery to the tissues if the client is hypoxic!
3. **Pain Relief** → This pain is severe
4. **Hydroxyurea**
  - a. A medication used for clients with a history of frequent crisis
  - b. Shown in infants to increase potential for preserving fetal hemoglobin (a form of Hgb plentiful in gestation), which increases availability of oxygen to the tissues, thereby reducing complications of SCD

Image 5.3 Sickle Cell Anemia





## Disseminated Intravascular Coagulation

### Overview

Widespread activation of the clotting cascade where the body clots and bleeds, the normal clotting cascade is disrupted and the clotting factors are used up. This causes severe bleeding and massive hemorrhage.

### General

Risk Factors – anything that initiates the clotting cascade which then will overreact. The leading cause of DIC is infection.

### Assessment

1. Pallor, dyspnea, chest pain, anxiety, confusion
2. Ecchymosis → Petechiae, purpura, and hematomas
3. Bleeding from every orifice
4. Abnormal Labs show a prolonged PTT, PT, thrombin time, and ↓ Platelets
5. Tachycardia and hypotension

### Therapeutic Management

1. Determine and treat underlying cause immediately
2. Replace clotting factors, fresh frozen plasma, vitamin K, factor VII
3. Administer Heparin drip if excessive clotting → This will STOP the consumption of clotting factors





# Anaphylaxis

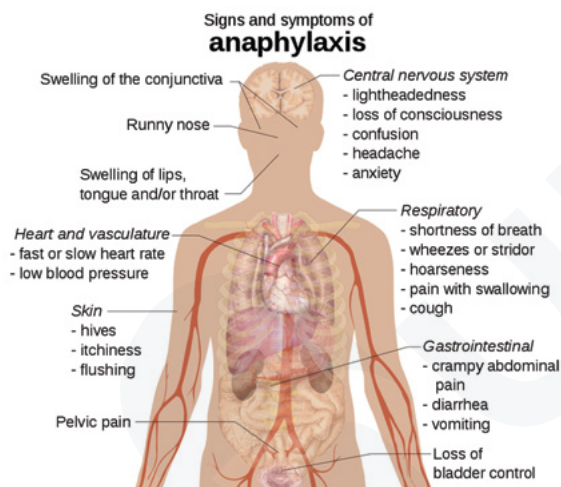
## General

Massive allergic response → histamine release from damaged cells causes swelling, inflammation, and massive vasodilation that can lead to distributive shock

## Assessment

1. Urticaria (hives)
2. Angioedema (facial swelling) → lips, tongue, mouth, throat, and risk for airway compromise
3. Skin flushing
4. Anaphylactic Shock → Hypotension and cardiac arrest

Image 6.64 Symptoms of Anaphylaxis



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## Therapeutic Management

1. Monitor respiratory and cardiovascular status
2. Administer Epinephrine IM immediately
  - a. Adults – 0.3 mg 1:1000
  - b. Children – 0.15 mg 1:1000
  - c. EpiPen Auto-injector
  - d. Goal = prevent life-threatening airway collapse or shock
3. Administer Oxygen, antihistamines, corticosteroids, and IV fluids as needed to support hemodynamics





# Leukemia

## Overview

1. The proliferation of abnormal, undeveloped WBCs, which are needed for infection control/immunity
2. Diagnosed by blood tests and bone marrow biopsy

## General

1. Characterized by type of WBC affected
  - a. Acute Lymphocytic Leukemia (ALL) → 2-4 years of age
  - b. Chronic Lymphocytic Leukemia (CLL) → 50-70 years of age
  - c. Acute Myelogenous Leukemia (AML) → peaks at 60 years of age
  - d. Chronic Myelogenous Leukemia (CML) → Incidence increases with age

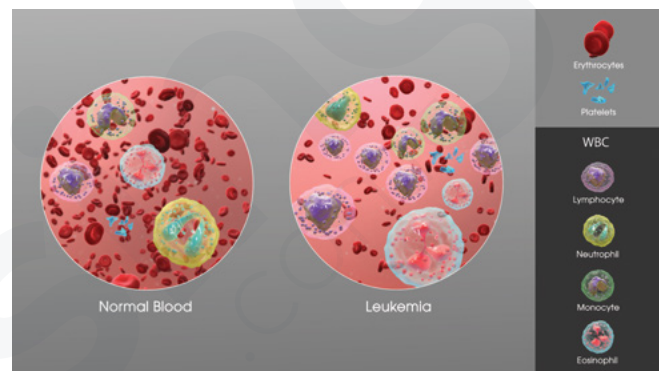
## Assessment

1. Weight loss
2. Fever
3. Infections
4. Pain in bones and joints
5. Night sweats
6. Aplastic Anemia → Pallor, fatigue, and easy bleeding and bruising
7. ↑ WBC in CLL and CML
8. ↓ WBC in ALL and AML
9. Philadelphia chromosome in the majority of CML clients
10. Mouth sores from chemo

## Therapeutic Management

1. Chemotherapy and radiation
2. Bone Marrow Biopsy → Apply pressure to the biopsy site
3. Initiate neutropenic precautions (Strict handwashing, limit visitation, no fresh fruits or flowers)
4. Plan activities to provide time for rest
5. Instruct a client on oral hygiene (Rinse mouth with saline, avoid lemon or alcohol-based mouthwashes)

Image 6.58 Leukemia



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# Thrombocytopenia

## Overview

1. A decrease in the circulating platelets ( $<100,000/\text{mL}$ )

## General

### 1. Causes

- a. Aplastic Anemia which will cause a decreased production
- b. Autoimmune Disorders which will cause an increase in destruction
- c. Medication-induced ie. Heparin-Induced, cytotoxic drugs, some antibiotics

## Assessment

### 1. Abnormal Labs

- a. ↓ Platelet count
- b. ↓ Hgb, Hct

### 2. Bleeding because there are not enough platelets to clot.

- a. This will show as petechiae, epistaxis, GI bleeding (Hematemesis, Melena, Occult blood in the stool), hematuria, and hemoptysis

## Therapeutic Management

1. Platelet transfusions
2. Bleeding precautions→ Avoid invasive procedure, soft-bristled toothbrush, and avoid medications that interfere with coagulation (i.e. Aspirin, Heparin)

Image 6.57 Petechiae



By Mdscottis - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=24734024>

Cheatsheet 6.16 Blood Compatibility Chart

# BLOOD COMPATIBILITY CHART

	DONOR BLOOD TYPE							
	O-	O+	B-	B+	A-	A+	AB-	AB+
PATIENT BLOOD TYPE	AB+	✓	✓	✓	✓	✓	✓	✓
	AB-	✓		✓		✓	✓	
	A+	✓	✓			✓	✓	
	A-	✓				✓		
	B+	✓	✓	✓	✓			
	B-	✓		✓				
	O+	✓	✓					
	O-	✓						



# Lymphoma

## General

1. Cancer of the lymphatic system affecting lymphocytes, which impairs immune response
2. Classified by Type
  - a. Hodgkin's Lymphoma → Presence of Reed-Sternberg cells
  - b. Non-Hodgkin's Lymphoma → Absence of Reed-Sternberg cells, 90% of Lymphomas
3. Tumors may form in/around the lymph nodes
4. Lymphocytes affected → can travel/metastasize through the lymphatic system

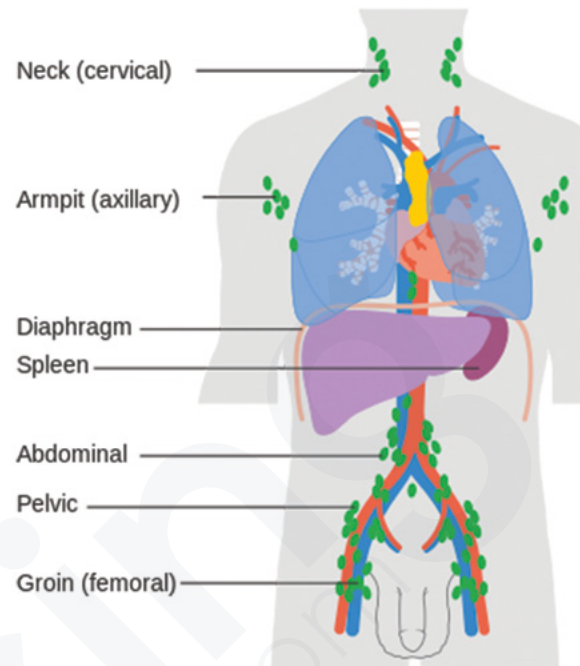
## Assessment

1. Painless swelling of lymph nodes
2. Persistent fatigue
3. Fever
4. Night sweats
5. Shortness of breath
6. Unexplained weight loss
7. Enlarged liver or spleen
8. Risk for Infection

## Therapeutic Management

1. Official diagnosis with lymph node biopsy → Hold pressure over the biopsy site
2. Chemotherapy and radiation
3. Monitor for s/s metastasis (high-risk because it travels through the lymphatic system in the body)

Image 6.59 Lymphoma



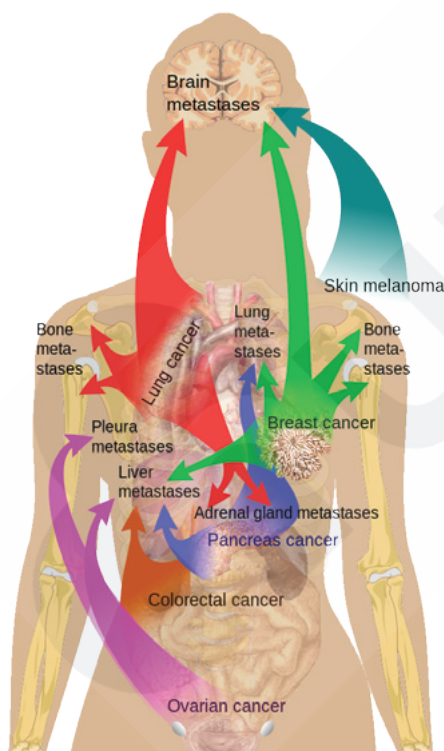
By Cancer Research UK - Original email from CRUK, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=34334121>

Cheatsheet 6.17 Cancer Quick Tips

## CANCER QUICK TIPS

### WARNING SIGNS OF CANCER (CAUTION)

- Change in bowel pattern
- A sore that does not heal
- Unusual bleeding
- Thickening of breast, testicle, skin
- Indigestion
- Obvious change in mole
- Nagging cough



### COMMON SITES FOR METASTASIS

### CANCER STAGING

Stage 0	Carcinoma in situ
Stage I	Local tumor growth
Stage II	Limited spreading
Stage III	Regional spreading
Stage IV	Metastasis to other organs



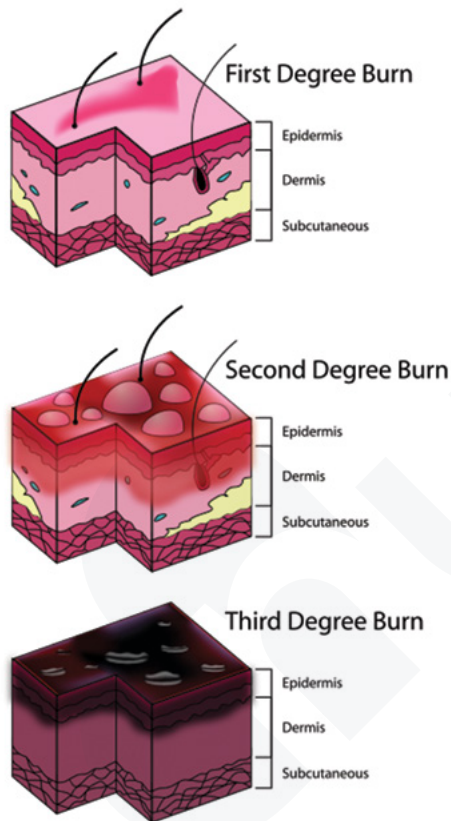
# Burn Injuries

## General

### 1. Degrees

- a. *First Degree* – skin intact, reddened, painful
- b. *Second Degree* – Partial Thickness, broken skin, pain, pink/red, blisters
- c. *Third Degree* – Full Thickness, often painless, white/black eschar
- d. *Fourth Degree* – Muscle and/or bone exposed. Common in electrical burns.

Image 6.70 Stages of Burns



By The original uploader was K. Aainsqatsi at English Wikipedia (Original text: K. Aainsqatsi) - Transferred from en.wikipedia to Commons. (Original text: self-made), CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=2584650>

Image 6.71 First Degree Burn



Image 6.72 Second Degree Burn



By The original uploader was Snickerdo at English Wikipedia - Transferred from en.wikipedia to Commons., CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=3358773>

Image 6.73 Third Degree Burn



By Clifford Sheckter, Arhana Chattopadhyay, John Paro and Yvonne Karanas - Direct source. Full paper., CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=68491398>



Image 6.74 Fourth Degree Burn



By goga312. Original uploader was Goga312 at ru.wikipedia - Transferred from ru.wikipedia(Original text : собственная работа), CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=7771672>

## Assessment

1. On Arrival to ED/Hospital
  - a. Determine the total body Surface Area (TBSA) Burned
2. 1st and 2nd degree = very painful
3. 3rd and 4th may be painless due to nerve damage
4. Impaired temperature regulation
5. Hypovolemia due to third spacing/capillary leak so the client will have ↑ HR, ↓BP

## Therapeutic Management

1. **Fluid Resuscitation**
  - a. Parkland Burn Formula
    - i.  $4 \times \text{TBSA} (\%) \times \text{kg}$
    - ii. Half over 8 hours
    - iii. Half over 16 hours
  - b. Titrate to Urine Output 30-50 mL/hr
  - c. Assess for edema
2. **Administer Antibiotics**
3. **Aggressive Wound Care**
4. **Pain Management – typically with opioid analgesics, PCA if able**
5. **Optimize Nutrition Intake to promote healing**
  - a. May require NG Tube for feeds or PICC line for TPN
6. **Skin Grafting**
  - a. Autologous – taken from healthy tissue on the client
  - b. Allogeneic – another human donor
  - c. Meshed and stretched over wound

Cheatsheet 6.21 Burn Staging

## BURN STAGING

### First Degree

Reddened, painful, intact skin



### Second Degree

Partial Thickness, broken skin, pain, pink/red, blisters



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### Third Degree

Full thickness, often painless, white/black eschar



By Clifford Shekter, Arhana Chattopadhyay, John Paro and Yvonne Karanas - Direct source, Full paper., CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=68491398>

### Fourth Degree

Muscle and/or bone exposed. Common in electrical burns



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# Herpes Zoster - Shingles

## Overview

Viral Infection caused by Herpes Zoster virus

## General

1. Most common in elderly clients with a history of chickenpox or the chickenpox vaccine
2. Highly contagious

## Assessment

1. Vesicular rash that follows the dermatome and is usually unilateral
2. Painful, itchy
3. Fever, Malaise, Fatigue

Image 6.77 Shingles Progression

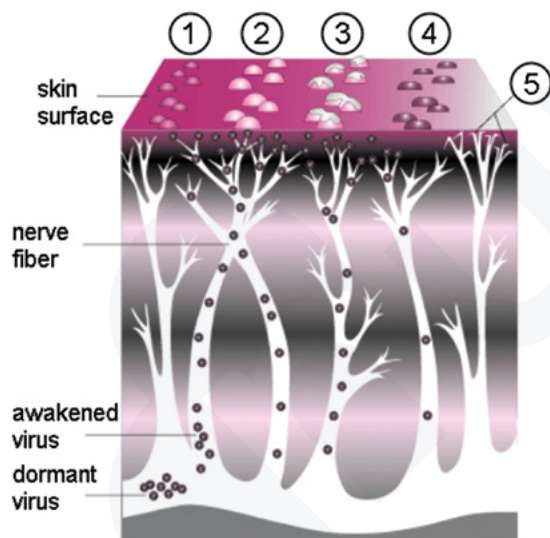


Image 6.78 Shingles Dermatomome on Chest



By Fisle - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=2558194>

## Therapeutic Management

1. Contact isolation or airborne isolation if disseminated rash
2. Assess neurological status and s/s infection
3. Medications → Antivirals, NSAIDs, the shingles vaccine (prevention)



# Pressure Ulcers

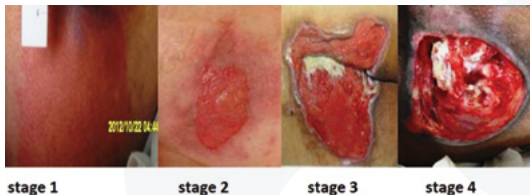
## Overview

1. Ulcerations in the skin varying in size and depth
2. Due to the compression of tissue for an extended period of time

## General

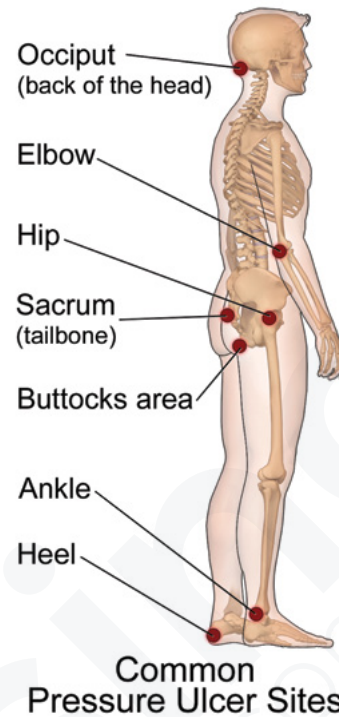
1. Stage I→ Skin intact, non-blanchable redness
2. Stage II→ Partial thickness loss of skin
3. Stage III→ Full-thickness skin loss extends to the dermis and SubQ tissue
4. Stage IV→ Full-thickness skin loss, muscle and bone undermining and tunneling, and eschar or slough may be present
5. Deep Tissue Injury→ Injury to SubQ tissue under intact skin, Dark purple or brown
6. Unstageable→ Wound completely covered by eschar or slough – unable visualize or determine depth/thickness

Image 6.75 Pressure Ulcer Staging



By Babagolzadeh - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=23432205>

Image 6.76 Common Pressure Ulcer Sites



By BruceBlaus - Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=61131815>

## Assessment

1. Check bony prominences with every turn. If redness present, press with finger to ensure blanching (turning white)
2. Albumin level to assess nutrition

## Therapeutic Management

1. Consult Wound Care specialty nurse
2. Do NOT massage reddened area
3. Intervene as needed for malnutrition and immobility
4. Turn q2h or more often
5. Keep skin clean and dry
6. Minimize sheets under the client
7. Utilize specialty beds or surfaces
8. Offload bony prominences with pillow or wedge
9. Keep client's skin dry

## Cheatsheet 6.22 Pressure Ulcer Staging

## PRESSURE ULCERS



Stage 1



Stage 2



Stage 3



Stage 4

## STAGING

Stage I	Intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.
Stage II	Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister. Presents as a shiny or dry shallow ulcer without slough or bruising.
Stage III	Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.
Stage IV	Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.
Unstageable	Full thickness tissue loss in which actual depth of the ulcer is completely obscured by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed. Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore stage, cannot be determined.
DTI	A purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.

## Treatment

- Identify at risk patients and institute precautions and assessments.
- Keep skin dry, sheets wrinkle free, turn and reposition frequently.
- Assess and document status of ulcer.
- Treatment may include creams, dressings, debridement, grafting, vacuum assisted suction.

Image Credit: By Babagolzadeh (Own work) [CC BY-SA 3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>)], via Wikimedia Commons





## Addison's Disease

### Overview

1. Hyposecretion of adrenal cortex hormones
2. Decreased levels of glucocorticoids and mineralocorticoids lead to electrolyte imbalances and decreased vascular volume

### General

1. **Adrenal Cortex**
  - a. Glucocorticoids (ie. cortisol) are in charge of glucose, fat metabolism, and anti-inflammatory
  - b. Mineralocorticoids (ie. aldosterone) whose deficiency leads to hyponatremia, hyperkalemia
  - c. Sex hormones (Androgens) i.e Testosterone, Estrogen which controls physical features and hair distribution
2. **Adrenal Medulla**
  - a. Epinephrine (Adrenaline), Norepinephrine (Noradrenaline), Fight or Flight Response

### Assessment

1. **Cardiovascular**
  - a. Hypotension, tachycardia
2. **Metabolic**
  - a. Weight loss
3. **Integumentary**
  - a. Hyperpigmentation (bronzing)
4. **Electrolytes**
  - a. Hyperkalemia, hypercalcemia, hyponatremia, and hypoglycemia
5. **Addisonian Crisis**
  - a. Acute exacerbation
  - b. Severe electrolyte disturbance

### Therapeutic Management

1. **Replace adrenal hormones**
  - a. Corticosteroids → Hydrocortisone, prednisone
2. **Addisonian Crisis**
  - a. Monitor electrolytes and cardiovascular status closely
  - b. Administer adrenal hormones as ordered
  - c. Administer electrolyte replacement as needed

Image 6.65 Addison's Disease



By Petros Perros - A 69-Year-Old Female with Tiredness and a Persistent Tan, CC BY 2.5, <https://commons.wikimedia.org/w/index.php?curid=8256006>



## Cheatsheet 6.18 Addison's vs. Cushing's

## ADDISON'S VS. CUSHING'S

## ADRENAL GLAND DISORDERS

The Adrenal Glands sit on top of the kidneys. The Adrenal Cortex secretes glucocorticoids, mineralocorticoids, and androgen hormones. Addison's and Cushing's Disease are conditions of either too little (hypo) or too much (hyper) secretion of hormones from the adrenal cortex.



Body System	Addison's (Hypo)	Cushing's (Hyper)
<b>Cardiovascular</b>	Hypotension Tachycardia	Hypertension Volume Overload
<b>Metabolic</b>	Weight Loss	Moon Face Buffalo Hump
<b>Integumentary</b>	Hyperpigmentation (bronze skin)	Fragile Skin Striae on Abdomen
<b>Electrolytes</b>	Hypercalcemia Hypoglycemia Hyperkalemia Hyponatremia	Hypocalcemia Hyperglycemia Hypokalemia Hypernatremia



# Cushing's Syndrome

## Overview

Hypersecretion of glucocorticoids leading to elevated cortisol level

## General

### 1. Causes

- a. Adrenal or pituitary tumor and the pituitary gland controls adrenal hormones
- b. Overuse or chronic use of corticosteroids

### 2. Cushing's syndrome

- a. Excess cortisol
- b. Excess aldosterone
- c. Excess androgens

## Assessment

1. **Cardiovascular**→ Hypertension, signs of heart failure
2. **Metabolic**→ Redistribution of fats, moon face, and buffalo hump
3. **Integumentary**→ Excess hair, striae on the abdomen, fragile skin, and peripheral edema
4. **Electrolytes**→ Hypokalemia, hypocalcemia, hypernatremia, hyperglycemia
5. **Decreased Immune Response**

## Therapeutic Management

1. Remove adrenal or pituitary tumor
2. Decrease dose or stop corticosteroid use
3. Monitor Electrolytes and Cardiovascular Status→ Replace electrolytes as needed
4. Safety → Protect from Injury
  - a. Risk for Osteoporosis (hypocalcemia)
  - b. Risk for Infection
  - c. Risk for Skin breakdown

Image 6.66 Cushing's Syndrome Signs



By Ozlem Celik, Mutlu Niyazoglu, Hikmet Soylu and Pinar Kadioglu - <http://mrmjournal.biomedcentral.com/articles/10.1186/2049-6958-7-26>, CC BY 2.5, <https://commons.wikimedia.org/w/index.php?curid=47877334>



# Diabetic Ketoacidosis

## General

1. Type I Diabetes Mellitus – Acute Exacerbation with severe Hyperglycemia with Ketoacidosis
  - a. The body has NO insulin → can't get glucose into cell → breaks down fatty acids for energy → Ketones (Acids)

## Assessment

1. **Ketoacidosis**
  - a. Acidosis (pH <7.35, HCO<sub>3</sub><sup>-</sup> <22)
  - b. Ketones in Urine
  - c. Fruity Breath (due to ketones)
  - d. Kussmaul Respirations
    - i. Trying to breathe off CO<sub>2</sub> to compensate for acidosis
    - ii. Clients can tire easily
  - e. Hyperkalemia → potassium leaves the cell to compensate for acidemia
2. **Hyperglycemia**
  - a. Blood Glucose 400-600 mg/dL
  - b. Severe Dehydration
    - i. Osmotic Diuresis
    - ii. Polyuria
  - c. ↑ BUN, Creatinine
  - d. Altered LOC (cellular dehydration)

## Therapeutic Management

1. First nursing action = begin fluid replacement and check electrolytes
2. Treatment Priority = correct acidosis
  - a. Insulin therapy → helps the body stop the breakdown of fatty acids
  - b. Without insulin, DKA will continue to progress, despite the fluid replacement
  - c. Insulin therapy continues until the anion gap acidosis has fully resolved

3. Continue replacing fluids as needed to help manage the dehydration caused by the hyperosmolarity
4. Monitor neurological status
5. Monitor and treat electrolyte imbalances

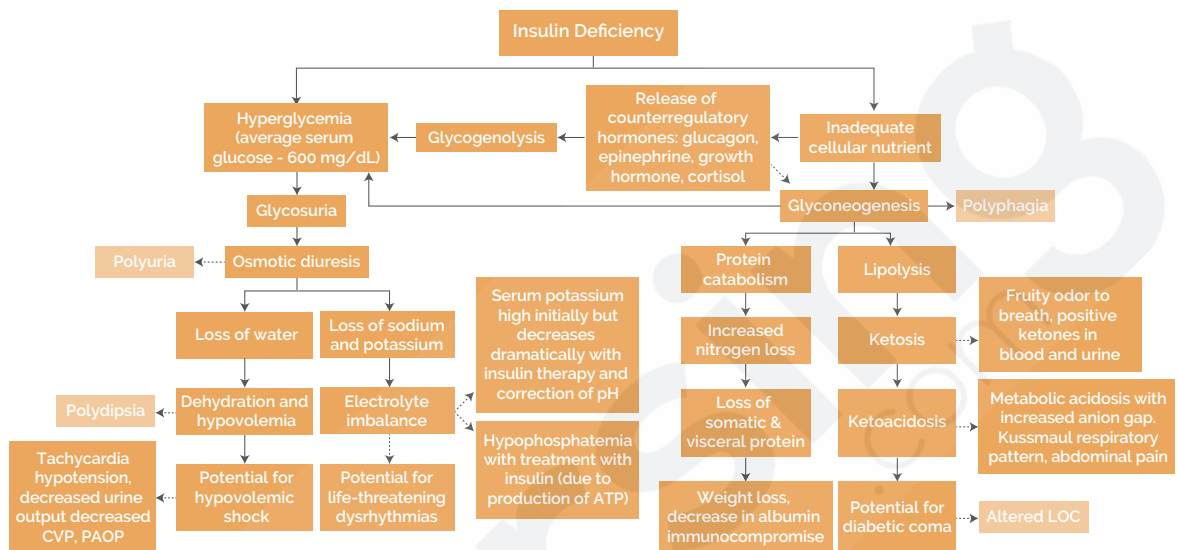
## Cheatsheet 6.20 DKA vs HHNS

## DKA vs HHNS

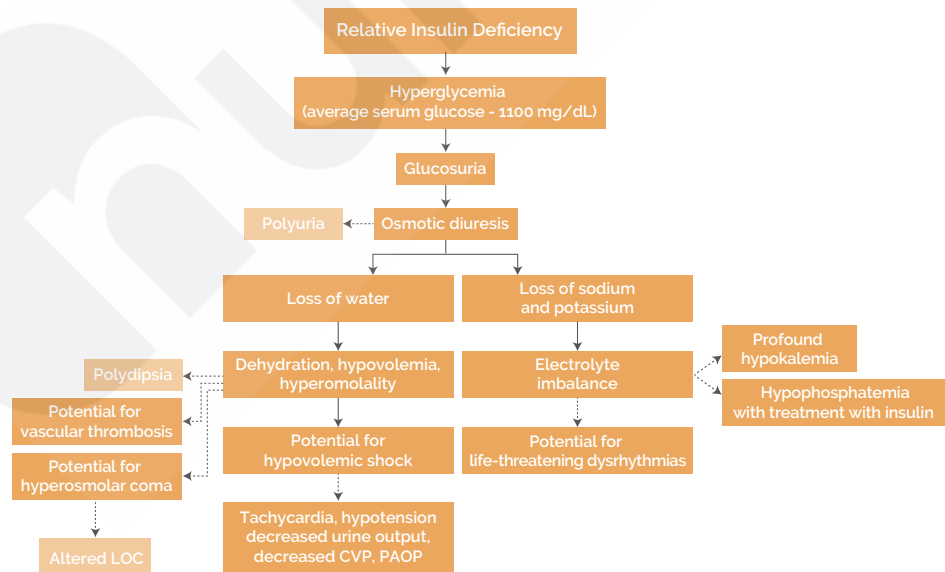
**DKA:** (Type I) hyperglycemic crisis associated with metabolic acidosis and elevated serum ketones.

**HHNS:** (Type II) hyperglycemic crisis with the absence of ketone formation.

## DKA PATHOPHYSIOLOGY



## HHNS PATHOPHYSIOLOGY





# Diabetes Insipidus

## Overview

Hyposecretion or failure to respond to antidiuretic hormone (ADH) from the posterior pituitary, which leads to excess water loss

## General

1. Urine output → 4L to 30L in a 24 hour period
2. Excessive dehydration
3. Causes
  - a. Neurogenic → stroke, tumor
  - b. Infection
  - c. Pituitary surgery (pituitary gland secretes ADH)

## Assessment

1. Polyuria → Excessive urine output → dilute urine, Urine Specific Gravity  $<1.006$
2. Polydipsia (extreme thirst)
3. Hypotension leading to cardiovascular collapse
4. Tachycardia
5. Hypernatremia, neurological changes

## Therapeutic Management

1. Water replacement
  - a. PO Free Water (plain water)
  - b. D5W if IV replacement required
2. Hormone replacement → DDAVP (Desmopressin/ Vasopressin) → Synthetic ADH
3. Monitor urine output hourly (Report UO  $>200\text{mL}/\text{hour}$ ), monitor urine specific gravity
4. Daily weight monitoring



# Diabetes Mellitus

## Overview

1. A pancreatic disorder resulting in insufficient or lack of insulin production leading to elevated blood sugar
2. Insulin is the “key” to allow glucose to enter cells and be used for energy

## General

1. **Type I**
  - a. Autoimmune disorder
  - b. Body attacks beta cells in the pancreas (responsible for insulin production)
  - c. The pancreas makes NO insulin, the client is insulin-dependent
  - d. Ketosis due to gluconeogenesis (body making glucose from fat cells), since it can not use the glucose in the blood because the “key” is missing
2. **Type II**
  - a. Beta cells do not produce enough insulin for the body’s needs
  - b. OR – Body becomes resistant to insulin
  - c. Lifestyle-related
  - d. May or may not require insulin, depending on the severity

## Assessment

1. **Vascular and Nerve Damage**
  - a. Related to inflammation and hyperosmolarity in vessels
  - b. Poor circulation → because the blood is thick with glucose
  - c. Poor wound healing
  - d. Retinopathy → blurry vision
  - e. Neuropathy → decreased sensation, especially in feet/toes
  - f. Nephropathy → may result in Chronic Kidney Disease

## 2. The Three P’s

- a. Polyuria
- b. Polydipsia
- c. Polyphagia

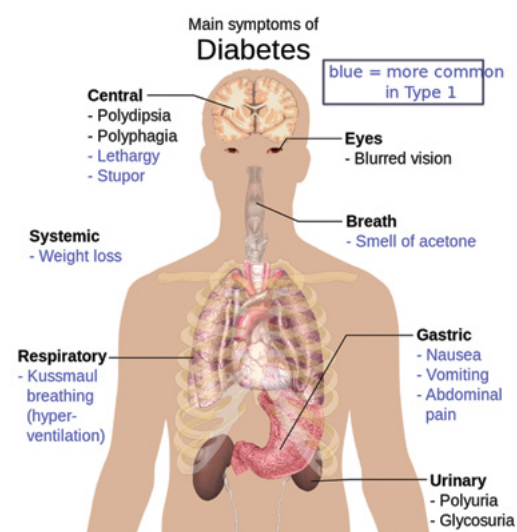
## 3. Elevated HgbA1c > 7.0

- a. A measure of the average blood sugar over the last 3 months

## 4. Complications

- a. Dawn Phenomenon → Reduced insulin sensitivity between 5-8am that can be helped with evening insulin administration
- b. Somogyi Phenomenon → Nighttime hypoglycemia results in rebound hyperglycemia in the morning hours, which can be helped with a bedtime snack
- c. Diabetic Ketoacidosis (DKA) → Acute exacerbation of Type I Diabetes Mellitus (hyperglycemia resulting in the spilling of sugar into the urine)
- d. Hyperglycemic Hyperosmolar Nonketotic State (HHNS) → Acute exacerbation of Type II Diabetes Mellitus ( Caused by increased blood sugar levels which leads to ↑ osmotic pressure in vessels → cellular dehydration)

Image 6.68 Symptoms of Diabetes Mellitus





## Therapeutic Management

### 1. Oral Antidiabetic Agents

- a. For Type II Diabetics
- b. Glucophage (Metformin) = most common
- c. Glipizide (Glucotrol)

### 2. Insulin

- a. Required for Type I
- b. Type II may require insulin if diet, exercise, and oral antidiabetic agents aren't enough
- c. Most at risk for hypoglycemia during insulin peak times
- d. ONLY Regular insulin can be given by IV
- e. Mixing Regular and NPH
  - i. Clear before Cloudy
  - ii. Inject the air into cloudy → Inject the air into clear and draw up clear → draw up cloudy
  - iii. Avoids cross-contamination or errors in drawing up
- f. "Insulin Reaction" → hypoglycemia
  - i. Cool, clammy, diaphoretic
  - ii. 15-15 Rule: Give 15 g sugar (4 oz. juice or soda) and recheck in 15 minutes

### 3. Diet and Exercise

- a. May improve insulin response for Type II Diabetics AND can help stabilize blood sugars in Type I Diabetics.



# Hyperglycemic Hyperosmolar Nonketotic Syndrome (HHNS)

## General

1. Type II Diabetes Mellitus – Acute Exacerbation
  - a. The body has just enough insulin to prevent fatty acid breakdown, but there is severe hyperglycemia without ketoacidosis

## Assessment

1. **Hyperglycemia**
  - a. Blood sugar > 600 mg/dL (usually higher)
  - b. Negative Ketones
  - c. Glycosuria (glucose dumps in urine)
2. **Hyperosmolarity**
  - a. PROFOUND Dehydration
  - b. Altered LOC
  - c. Dry mucous membranes
  - d. ↑ BUN, Creatinine

## Therapeutic Management

1. Identify and treat the cause
2. #1 Priority = replace fluids, which MIGHT RESOLVE the hyperglycemia as well
3. Insulin Therapy
4. Monitor neurological status
5. Monitor and treat electrolyte imbalances

Image 6.69 Priority Fluid Replacement for DKA/HHNS





# Hyperthyroidism

## Overview

1. Excess secretion of thyroid hormone (TH) from thyroid gland
2. Results in Increased Metabolic Rate

## General

### 1. Causes

- a. Graves Disease (autoimmune)
- b. Excess secretion of TSH from Pituitary
- c. Thyroid, Pituitary, or Hypothalamic Tumor
- d. Medication Reaction

### 2. Thyroid Storm (Thyroid Crisis)

- a. Acute Exacerbation due to infection, stress, trauma

## Assessment

### 1. Hormone changes

- a. ↑ T3, T4, Free T4 hormones
- b. ↓ TSH

### 2. Positive radioactive iodine uptake scan

### 3. Possible presence of a goiter

### 4. Cardiac changes

- a. Tachycardia, HTN, palpitations

### 5. Neurological changes

- a. Hyperactive reflexes, hand tremor
- b. Emotional instability, agitation

### 6. Sensory changes

- a. Exophthalmos (bulging eyes)
- b. Blurred vision

### 7. Integumentary changes

- a. Fine, thin hair

### 8. Reproductive changes

- a. Amenorrhea
- b. Change in Libido
  - i. Some clients experience increased libido, while others report decreased libido

### 9. Metabolic changes

- a. Hypermetabolic
- b. ↑ Temperature
- c. Heat intolerance
- d. Weight Loss
- e. Hypocalcemia
  - i. Due to excess Calcitonin

### 10. Thyroid Storm (Thyroid Crisis)

- a. Febrile state
- b. Tachycardia, HTN
- c. Tremors
- d. Seizures

## Therapeutic Management

### 1. Provide rest in a cool, quiet environment

### 2. Cardiac monitoring as ordered

### 3. Maintain patent airway

### 4. Provide eye protection for exophthalmos

- a. Regular eye exams
- b. Eye drops for moisture

### 5. Medications

- a. Antithyroid medications → propylthiouracil or methimazole
- b. Radioactive Iodine 131 → taken up by thyroid gland
  - i. Destroys some thyroid cells over 6-8 weeks
  - ii. Avoid in pregnancy
  - iii. Monitor for hypothyroidism

### 6. Surgical Removal of Thyroid (Thyroidectomy)

- a. Monitor airway (swelling)
  - i. Assess for obstruction, stridor, dysphagia
  - ii. Have tracheotomy equipment available
- b. Maintain upright position
- c. Assess for bleeding
- d. Monitor for hypocalcemia
  - i. Removal of the parathyroid glands causes a decrease in (parathyroid hormone), which helps to maintain blood calcium levels.

### 2. Have calcium gluconate available PRN

- e. Minimal talking after surgery



# Hypothyroidism

## Overview

Hyposecretion of thyroid hormone that results in a decreased metabolic rate

## General

### 1. Causes

- a. Hashimoto's Thyroiditis
- b. Iodine Deficiency
- c. Thyroidectomy

### 2. Myxedema Coma

- a. Acute Exacerbation
- b. Life-threatening state of decreased thyroid production
- c. Caused by acute illness, rapid cessation of medication, or hypothermia

## Assessment

1. Hypometabolic state
2. Goiter – enlarged thyroid due to iodine deficiency
3. ↓ T3, T4, Free T4 hormones
4. ↑ TSH levels
5. Cardiovascular → Bradycardia, hypotension, anemia
6. Gastrointestinal → Constipation
7. Neurological → Lethargy, fatigue, weakness
8. Integumentary → Dry skin, loss of body hair
9. Metabolic → Cold intolerance, anorexia, weight gain, edema, hypoglycemia

Image 6.67 Symptoms of Hypothyroidism



By Herbert L. Fred, MD and Hendrik A. van Dijk - <http://cnx.org/content/m15004/latest/>, CC BY 2.5, <https://commons.wikimedia.org/w/index.php?curid=30826141>

## Therapeutic Management

1. Medication Therapy
  - a. Levothyroxine (Synthroid)
  - b. Monitor – possible overdose
2. Cardiac Monitoring
3. Maintain open airway, especially with goiter → Have tracheotomy supplies available
4. IV fluids to support hemodynamics
5. Administer glucose/dextrose as needed
6. Encourage nutrition intake
7. Assess thyroid hormone levels



## SIADH (Syndrome of Inappropriate Antidiuretic Hormone)

### Overview

1. Excess secretion of ADH from the posterior pituitary
2. Hyponatremia (excess water diluting sodium)
3. Water intoxication

### Assessment

1. Fluid Volume Excess → Hypertension, JVD, Crackles
2. Hyponatremia → Altered LOC, coma, seizures
3. Concentrated Urine → Decreased urine output, urine Specific Gravity > 1.036
4. Diluted blood circulation so decreased BUN, decreased Hematocrit

### Therapeutic Management

1. Frequent cardiac monitoring
2. Frequent neurological examination
3. Monitor I&O and fluid restriction
4. Daily weight
5. Sodium supplement
6. Medication → Hypertonic saline, diuretics, electrolyte replacement



# Fractures

## General

### 1. Types of fractures

- Closed* – skin intact
- Open/Compound* – bone pierces the skin
- Transverse* – broken straight across
- Spiral* – fracture from twisting force
- Comminuted* – multiple pieces of bone
- Impacted* – from the vertical force on long bone
- Greenstick* – incomplete fracture, common in children
- Oblique* – diagonal fracture
- Displaced* – bones no longer aligned

### 2. Strain

- Excessive stretching of the muscle

### 3. Sprain

- Excessive stretching of a ligament

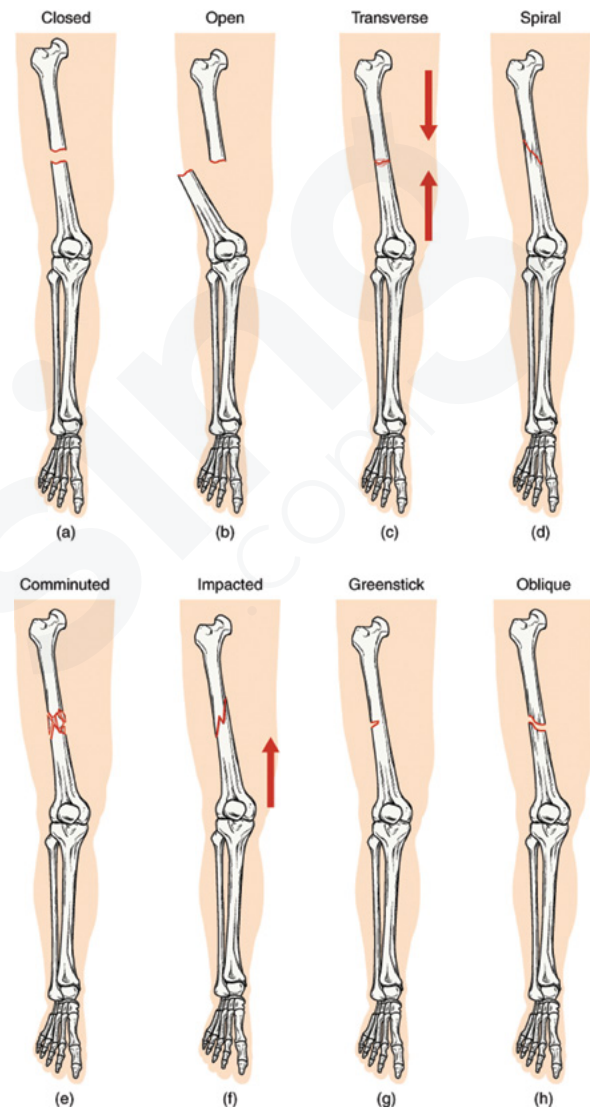
### 4. Complications

- Fat Embolism (when a piece of fat from bone marrow moves through the bloodstream to lungs) is a risk with long-bone fractures.
- Compartment Syndrome is when increased pressure within the compartment in the extremity after a fracture or crush injury cuts off circulation to muscles and nerves

### 3. Compartment Syndrome

- Pale skin
- Extreme swelling
- Loss of pulses or sensation distal to the injury

Image 6.86 Fractures



By OpenStax College - Anatomy & Physiology, Connexions Web site. <http://cnx.org/content/col11496/1.6/>, Sep 7, 2015., CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=30127535>

## Assessment

### 1. Fracture

- Assess distal circulation→ Pulses, skin temperature, color
- Assess distal nerve function→ Numbness and tingling
- May see ecchymosis over the fractured area

### 2. Fat Embolism

- Anxiety, restlessness
- Tachycardia, hypotension
- Tachypnea, dyspnea
- Petechial rash



## Therapeutic Management

### 1. RICE

- a. Rest
- b. Ice
- c. Compression
- d. Elevation

### 2. Cast

- a. Stabilization of bone for healing.
- b. Monitor extremity for:
  - i. Swelling
  - ii. Pain
  - iii. Discoloration
  - iv. Sensation
  - v. Circulation distal to cast

### 3. Traction

- a. Force applied in the opposite direction to realign and immobilize the fracture
- b. Ensure proper alignment of the body
- c. Buck's Traction – force applied to splint
- d. Skeletal Traction – pin inserted through bone to hold traction force
- e. Weights should hang freely from bed
  - i. Do not set them on the floor
  - ii. Do not remove weights without provider order
  - iii. Support weight when sliding up in bed

### 4. Fat Embolism

- a. No specific treatment
- b. Support hemodynamics
- c. Corticosteroids
- d. Monitor in ICU

### 5. Compartment Syndrome

- a. Emergent intervention required to prevent loss of limb
- b. Fasciotomy required to relieve pressure



# Osteoporosis

## Overview

Bone demineralization leading to a decrease in bone mass/density

## General

1. Bone resorption occurs faster than formation leading to Ca loss from bones and ↓ bone density
  - a. Possible Calcium or Vitamin D absorption issues
2. More common in post-menopausal due to ↓ estrogen
3. Can be caused by steroid use because this increases the bone resorption rate

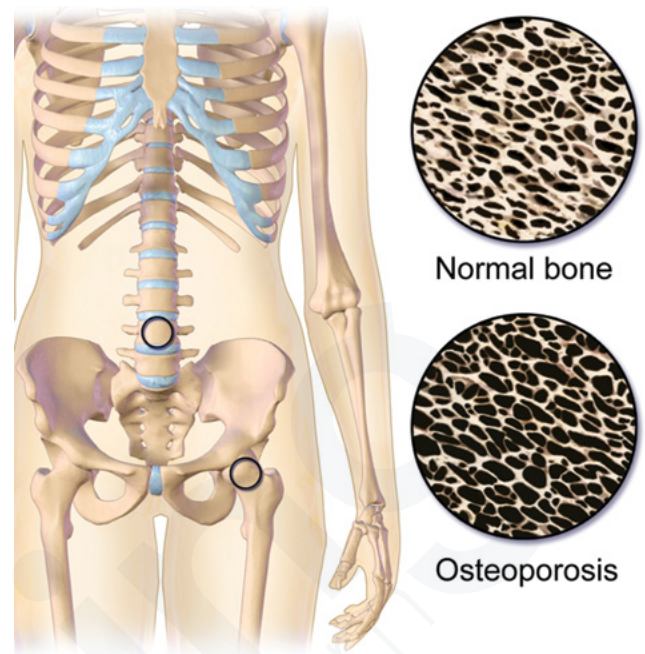
## Assessment

1. ↓ Dietary Ca<sup>+</sup> intake
2. Kyphosis of spine
3. Bone pain
4. Fractures of pelvic or hip
5. Pathological fractures are those that occur without trauma.

## Therapeutic Management

1. Ca<sup>+</sup> intake and supplementation
2. Vitamin D intake because vitamin D is necessary for the absorption of Ca<sup>+</sup>
3. Weight-bearing exercises (PT/OT)
4. Medications→ should be taken 30 minutes prior to eating ie. Alendronate (Fosamax)/Risedronate (Actonel)

Image 6.85 Osteoporosis



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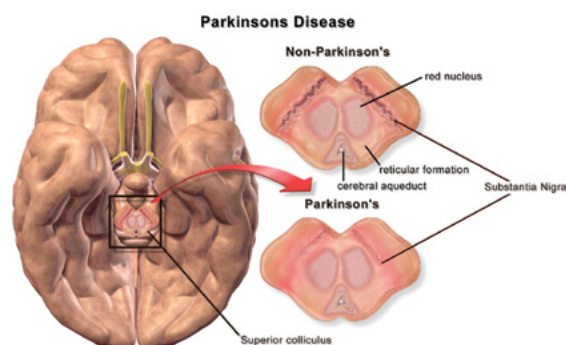


# Parkinson's Disease

## Overview

1. Degenerative neurological disorder
2. Atrophy of substantia nigra → depletion of dopamine → Less and less capable of controlled movement

Image 6.39 Parkinsons Pathophysiology



Blausen.com staff (2014). "Medical gallery of Blausen Medical 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.010. ISSN 2002-4436. - Own work, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=27924394>

## General

1. Slow, progressive disease, no cure
2. Progressively debilitated and self-care dependent

## Assessment

1. **Classic Signs:**
  - a. Pill rolling – tremors in hands (as if rolling a pill between fingers)
  - b. Shuffling Gait
  - c. Lip Smacking
  - d. Bradykinesia – slow movements due to muscle rigidity
  - e. Resting tremor
  - f. Akinesia → loss of voluntary movement
  - g. Blank facial expression
  - h. Stooped stance
  - i. Drooling
  - j. Dysphagia

## Therapeutic Management

1. **Medication therapy**
  - a. Dopaminergic
  - b. Dopamine agonists → Levodopa-Carbidopa
  - c. Anticholinergics
2. **The goal is to increase the levels of available dopamine in the CNS**



# Ischemic Stroke

## Overview

Lack of blood flow to brain tissue caused by a blood clot in the cerebral vessels.

## General

### 1. Pathophysiology

- a. A blood clot in a vessel in the brain
- b. No flow past clot
- c. Not immediately seen on CT scan (24 hours), MRI for a better view

### 2. Presentation dependent on the location of the clot

- a. MCA – classic FAST symptoms → contralateral manifestations
- b. Basilar – decreased LOC, loss of vision, abnormal pupil response
- c. Brainstem – loss of BP regulation, Respiratory Failure, dysphagia

Image 6.41 Ischemic Stroke



By INFARCT.jpg: Lucien Monfilsderivative work: Suraj - INFARCT.jpg, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=16444670>



## Multiple Sclerosis

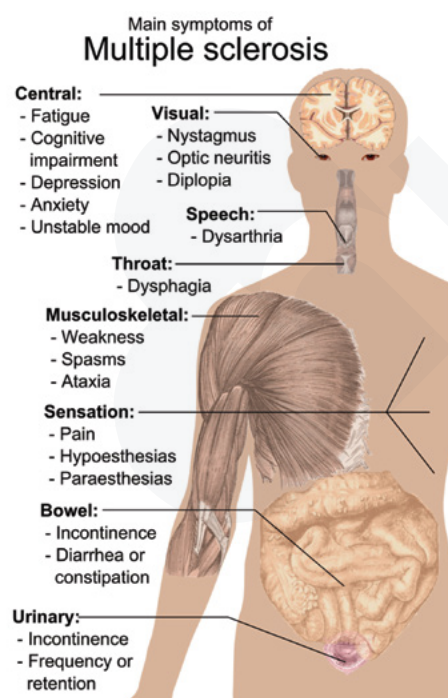
### Overview

1. Chronic, progressive demyelination of neurons in the CNS
2. Memory Aid: Multiple Sclerosis → Myelin Sheath

### Assessment

1. Fatigue
2. Tremors
3. Weakness
4. Spasticity of muscles → Can be painful
5. Bowel and Bladder dysfunction → Incontinence, diarrhea, or constipation
6. Decreased peripheral sensation (pain, temperature, touch) → High risk for injury
7. Visual disturbances
8. Emotional instability

Image 6.38 Multiple Sclerosis Symptoms



### Therapeutic Management

1. No cure → supportive therapy, analgesics, muscle relaxants
2. Energy conservation
3. Provide bowel and bladder training
4. Maintain adequate fluid intake of 2000 mL/day
5. Encourage activity independence
6. Regulate temperatures on water heaters, baths, and heating pads → Risk for burns
7. Ensure in-home safety (rugs, cords, etc) → Risk for falls



# Hemorrhagic Stroke

## General

### 1. Pathophysiology

- a. Bleed in/around the brain due to ruptured vessel
- b. Hypertension → weakened vessel (i.e. aneurysm rupture) No flow past point of bleed
- c. Visible immediately on CT scan
- d. Presents as “worst headache of my life” (especially Subarachnoid Hemorrhage)

### 2. Risk Factors

- a. Hypertension, substance abuse (cocaine), anticoagulant therapy, trauma

### 3. Complications

- a. Blood = irritant to tissues
- b. Seizures
- c. Vasospasm – vessels clampdown → Cause more ischemia

Image 6.40 Hemorrhagic Stroke



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# Meningitis

## Overview

Inflammation of the membranes around the brain and spinal cord caused by a virus, bacteria, fungus, or protozoa

## General

### 1. CSF is analyzed to determine diagnosis

- a. Cloudy
- b. ↑ WBC
- c. ↓ Glucose

## Assessment

### 1. Fever

### 2. Altered level of consciousness

### 3. Nuchal rigidity

- a. Kernig's sign → Severe stiffness of the hamstrings causes an inability to straighten the leg when the hip is flexed to a 90-degree angle
- b. Brudzinski's sign → Severe neck stiffness causes a client's hips and knees to flex when the neck is flexed.

### 4. Lethargy

### 5. Increased Intracranial Pressure

### 6. Photophobia

### 7. Seizures

## Therapeutic Management

### 1. Place in droplet isolation

### 2. Analgesics

### 3. Antibiotics

- a. Consider Blood-Brain-Barrier



## Seizure Causes

### Overview

1. **Abrupt, abnormal, excessive, uncontrolled electrical activity in neurons of the brain**
2. **Types**
  - a. *Generalized – both hemispheres*
    - i. Tonic-clonic → Stiffening (contraction), jerking/twitching, and loss of consciousness
    - ii. Absence → staring off into space, unaware of surroundings, lasts <30 seconds
    - iii. Tonic – Contraction/Tensing of muscles
    - iv. Clonic – Jerking/Twitching
    - v. Myoclonic – sudden jerk of muscles
    - vi. Atonic → All muscles suddenly go limp (High fall risk)
  - b. *Focal – Localized – one hemisphere*
    - i. Simple → Twitching or sensory changes, client remains conscious
    - ii. Complex → Twitching or outbursts (laugh or cry), loss of consciousness/awareness
3. **Status epilepticus**
  - a. A persistent seizure with no breaks between episodes and a **MEDICAL EMERGENCY**



## Seizure Assessment

### Assessment

1. Before Seizure → assess risk factors for medication compliance and assess for Aura, which is a sensation that warns of impending seizure
  - i. Different for every client → Some see colors, smell metal, or feel tingly
2. During a seizure, assess and document the type, onset, duration, and complications (biting tongue, aspiration, or injury)
3. Postictal State → period AFTER seizure where there is some memory loss, sleepiness, impaired speech, disorientation, agitation

Image 6.42 Generalized Seizure



By [http://wellcomeimages.org/indexplus/obf\\_images/2b/0f/0a119c657a876dab0f1c6a9e8793.jpg](http://wellcomeimages.org/indexplus/obf_images/2b/0f/0a119c657a876dab0f1c6a9e8793.jpg) Gallery: <http://wellcomeimages.org/indexplus/image/L0074938.html> Wellcome Collection gallery (2018-03-23): <https://wellcomecollection.org/works/djrxds6> CC-BY-4.0, CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=36302736>



## Seizure Therapeutic Management

### Overview

1. **EEG Diagnostics**
  - a. Tests types of brainwaves where seizures are occurring and the severity
2. **Medications**
  - a. Antiepileptic drug → Stop seizures:
    1. Lorazepam (Ativan) → First-line drug, 2 mg IV push during seizure
    2. Diazepam (Valium)
    3. Phenobarbital
  - b. Prevent seizures → Phenytoin (Dilantin), Fosphenytoin (Cerebyx), Levetiracetam (Keppra), Lacosamide (Vimpat)
3. **Procedures**
  - a. Surgical removal of lesion
  - b. Cutting connections in brain
  - c. Deep Brain Stimulation
    - i. Corpus callosotomy surgery
    - ii. Extratemporal resection



# Seizure Nursing Care

## Overview

### 1. Before

- a. Give all medications on time
- b. Seizure precautions if at risk
- c. Verify order of PRN dosing and ensure that medication is readily available.

### 2. During

- a. Maintain client airway
  - i. Turn client to side in case of vomit
  - ii. Have oxygen and suction equipment available
  - iii. DO NOT force anything into the mouth during a seizure (including bite block)
- b. Protect from injury
  - i. Bed to the lowest position
  - ii. Padded side rails
  - iii. Loosen restrictive clothing
  - iv. DO NOT try to restrain the client
- c. Notify MD of type, onset, duration

### 3. After

- a. Keep safe while Postictal



# Intracranial Pressure ICP

## Overview

### 1. Intracranial Pressure

- Pressure within the cranium
- Normal = 5-15 mmHg
- Intervention required at >20 mmHg

## General

### 1. Causes

- Tumor or mass
- Bleeding from stroke or trauma
- Hydrocephalus
- Trauma → edema
- Ischemic stroke → edema

### 2. Brain Herniation

- ICP increases to the point that brain tissue squeezes through/across a structure in the skull → Permanent Damage can lead to brain death

## Assessment

### 1. Altered LOC

- Confusion
- Stupor
- May be subtle

### 2. Pupillary changes

- Fixed and dilated indicates prolonged increased ICP

### 3. Babinski Reflex

- Positive response = bad

### 4. Posturing

### 5. Seizures

### 6. Cushing's Triad → impending herniation

- Abnormal respirations
- Widened pulse pressure
- Bradycardia

### 7. Elevated Temp (loss of regulation)

## Therapeutic Management

- Avoid sedative or CNS depressant
- Hyperventilation → "Permissive Hypocapnia" for cerebral vasoconstriction
- Osmotic Diuretics → Mannitol to decrease swelling
- Hypertonic Saline (1.5% or 3%) to decrease swelling
- Corticosteroids to decrease inflammation
- Craniectomy (AKA "Bone Flap") to make room for the brain to swell
- External Ventricular Drain (AKA "EVD" "Bolt") to drains CSF when ICP elevated
  - A "Bolt" is only capable of measuring intracranial pressures
  - EVD is able to measure pressure and drain CSF through the ventriculostomy



## Routine Neuro Assessments

### Assessment

#### 1. Level of Consciousness

- Assess alertness
- Assess orientation, Person, place, time, situation
- Assess response to stimuli
  - Start with verbal
  - Then light touch
  - Deep touch/shaking
  - Painful (nail beds)
  - Deep pain (sternal rub)

#### 2. Glasgow Coma Scale

- Can never be zero (0)
- Worst score is 3, with best being 15
- In each category, give the highest score, and then add all three scores up

##### i. Best Eye Opening

- 4 – spontaneous
- 3 – to voice
- 2 – to pain
- 1 – no response

##### ii. Best Verbal Response

- 5 – oriented
- 4 – disoriented, converses
- 3 – inappropriate words
- 2 – incomprehensible speech
- 1 – no response / intubated

##### iii. Best Motor Response

- 6 – follows commands
- 5 – localizes to pain (when pain response initiated, client reaches toward pain)
- 4 – withdraws from pain (when pain response initiated, client reaches toward pain, but cannot cross the midline, or the middle, of the body)

- 3 – abnormal flexion (“decorticate”)
- 2 – abnormal extension (“decerebrate”)
- 1 – no movement

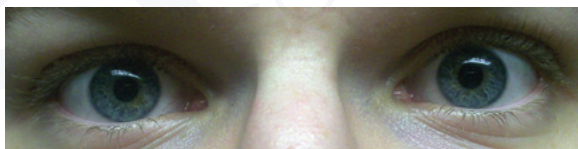
#### d. Example:

- A client who opens their eyes to voice (3), is disoriented (4) and follows commands (6) can be given a GCS of 13.
- A client who does not open their eyes (1), does not respond verbally (1) and who is decorticate (3) receives a GCS of 5.

#### 3. Pupil Assessment

- Equal, Round, Size
- Reactive to Light→ Should constrict briskly, and equally on both sides when the light shined in eyes
- Accommodation→ Should constrict when focusing from far to near

Image 6.34 Normal Pupils



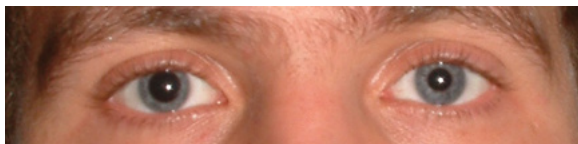
By Guy91 at the English language Wikipedia, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=16644397>

Image 6.35 Constricted Pupils



By Anonymous - Anonymous, CC0, <https://commons.wikimedia.org/w/index.php?curid=22179521>

Image 6.36 Unequal Pupils



By Radomil talk - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=1348100>

**Image 6.37 Dilated Pupils**



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#### **4. Strength x 4 Extremities**

- a. 5 – full strength
- b. 4 – overcomes some resistance
- c. 3 – overcomes gravity, no resistance
- d. 2 – cannot overcome gravity
- e. 1 – no movement at all

### **Therapeutic Management**

- 1. Notify provider of any acute changes
- 2. May need STAT CT or MRI to rule out possible increased intracranial pressure or stroke



## Cheatsheet 6.9 Routine Neuro Assessments

## ROUTINE NEURO ASSESSMENTS

**Pupils Equal, Round, and Reactive to Light and Accommodation (PERRLA) + Size in mm**



## LEVELS OF CONSCIOUSNESS

Normal	A&O x 4, Alert
Confused	A&O x <3, unable to answer
Delirious	Confused and agitated
Somnolent	Excessively sleepy or drowsy
Obtunded	Awake, but slow or no response to surroundings
Stuporous	Sleep-like, no spontaneous activity, withdraws to pain
Coma	NO response to stimuli, unable to arouse

## GLASGOW COMA SCALE

SCORE	1	2	3	4	5	6
Eyes	No opening	Open to pain	Open to voice	Open spontaneously	-	-
Verbal	No response	Incomprehensible sounds	Inappropriate words	Disoriented	Oriented	-
Motor	No response	Abnormal Extension	Abnormal Flexion	Withdraws to Pain	Localizes to Pain	Follows Commands

## MUSCLE STRENGTH

SCORE	ABILITY
0	No muscle contraction
1	Muscle twitch
2	Movement without gravity
3	Movement against gravity
4	Movement against resistance
5	Full Strength



## Alveoli & Atelectasis

### Overview

Atelectasis is the collapse of a lung or lung lobe due to the deflating of the alveoli

### General

1. Alveoli deflate, Collapse of the lung
2. Common after surgery → Shallow breathing
3. Excessive pulmonary secretions

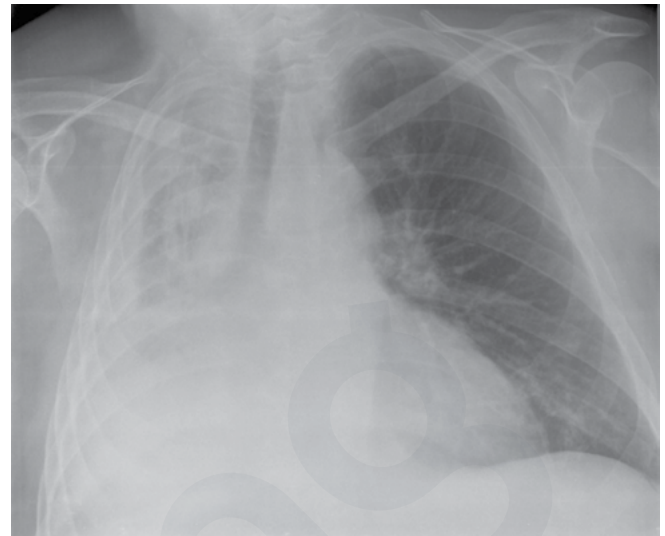
### Assessment

1. Diminished breath sounds on the affected side
2. Chest pain with breathing
3. Fever
4. Chest X-ray shows collapse (white)

### Therapeutic Management

1. *CPT (Chest Physiotherapy)* → Vibrations to loosen secretions
2. *IPPB (Intermittent Positive Pressure Breathing)* → Positive pressure to open alveoli
3. *IS (Incentive Spirometer)* – Slow deep breaths
  - a. ↑ volume = reinflate alveoli
4. *Position Changes* → Mobilize secretions
5. *Invasive Mechanical Ventilation*

Image 6.23 Atelectasis



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# Chronic Obstructive Pulmonary Disease - COPD

## Overview

Chronic obstruction of airflow due to emphysema and chronic bronchitis

## General

1. **Emphysema**
  - a. Destruction of alveoli due to chronic inflammation
  - b. Decreased surface area for gas exchange
2. **Chronic Bronchitis**
  - a. Chronic airway inflammation with productive cough
  - b. Excessive sputum production

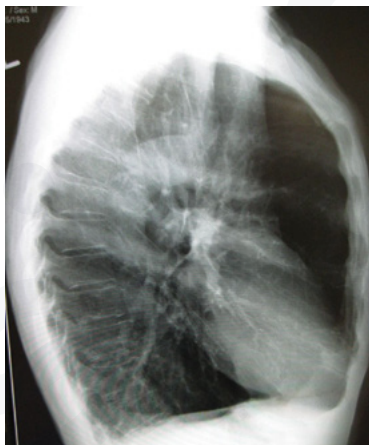
## Assessment

1. **Barrel chest**
  - a. Expanded rib cage due to increased work when breathing and air trapping
2. **Accessory muscle use**
3. **Adventitious breath sounds**
  - a. Diminished
  - b. Crackles
  - c. Wheezes
4. **Congestion on Chest X-ray**
5. **ABG** → ↓ pH, ↑ pCO<sub>2</sub>, ↓ PaO<sub>2</sub>

## Therapeutic Management

1. **Do NOT give O<sub>2</sub> > 2 Lpm**
  - a. A stimulus to breathe = ↓ O<sub>2</sub>
2. **Chest Physiotherapy (CPT)**
  - a. Loosen secretions
3. **Increase fluid intake (3 L / day) → Thin secretions**
4. **Medications** → **Bronchodilators, corticosteroids**

Image 6.25 COPD



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# Asthma

## Overview

1. Inflammatory disorder of airways
2. Stimulated by triggers (infection, allergens, exercise, irritants)
3. Status Asthmaticus – a life-threatening condition → Asthma unresponsive to treatment

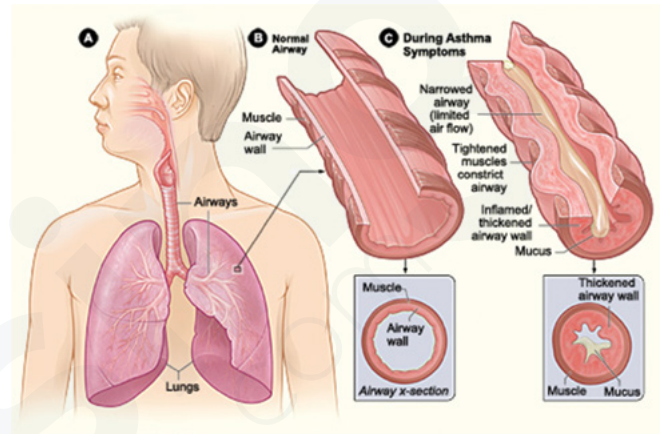
## Assessment

1. **Symptoms**
  - a. Narrowed airways → Wheezing/crackles
  - b. ↓ gas exchange → Restless/anxious
  - c. Inflammation of airways → Diminished breath sounds and tachypnea
2. **Diagnostics**
  - a. Peak Flow Rate
    - i. The volume of expired air
    - ii. Stable = 80-100% baseline
    - iii. Caution = 50-80% baseline
    - iv. Danger = <50% baseline
  - b. Pulmonary Function Tests

## Therapeutic Management

1. High-Fowler's or position of comfort
2. Administer O<sub>2</sub>
3. Medications
  - a. Bronchodilators
  - b. Corticosteroids
  - c. Leukotriene Modulators (Montelukast/Singair)

Image 6.24 Asthma





## Artificial Airways

### General

#### 1. Purpose

- Protect airway when the client can't
- Provide route for mechanical ventilation

### Assessment

- Assess Airway
- Assess Breathing
- Assess Level of Consciousness
- Choose correct airway
- Call for help for advanced airway

### Therapeutic Management

#### 1. Nasopharyngeal Airway

- AKA "Nasal Trumpet"
- Client's can't clear secretions
- Breathing independently
- Conscious

#### 2. Oropharyngeal Airway

- AKA "Oral Airway"
- Client can't protect airway
- Unconscious

#### 3. Endotracheal Tube

- AKA "ET Tube" / "intubation"
- Client can't protect airway
- Not breathing or requires ventilation
- May be conscious or unconscious before intubation

#### 4. Tracheostomy Tube

- AKA "Trach"
- Client has to be "weaned" (discontinued) from the ventilator slowly
- Long term requirement for the following:
- Neuromuscular
- Tracheal damage

Image 6.30 Tracheostomy

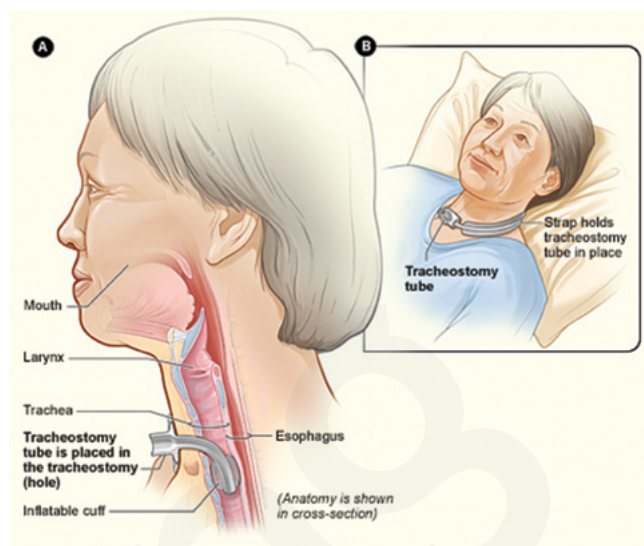
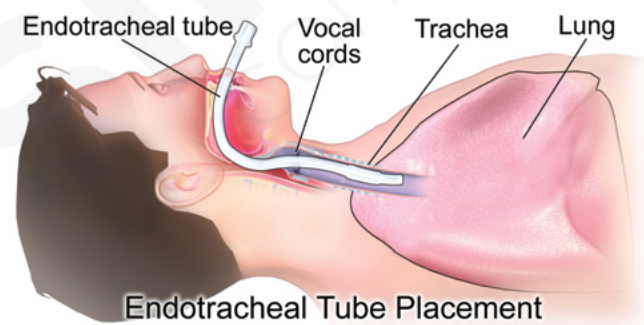


Image 6.31 Endotracheal Tube

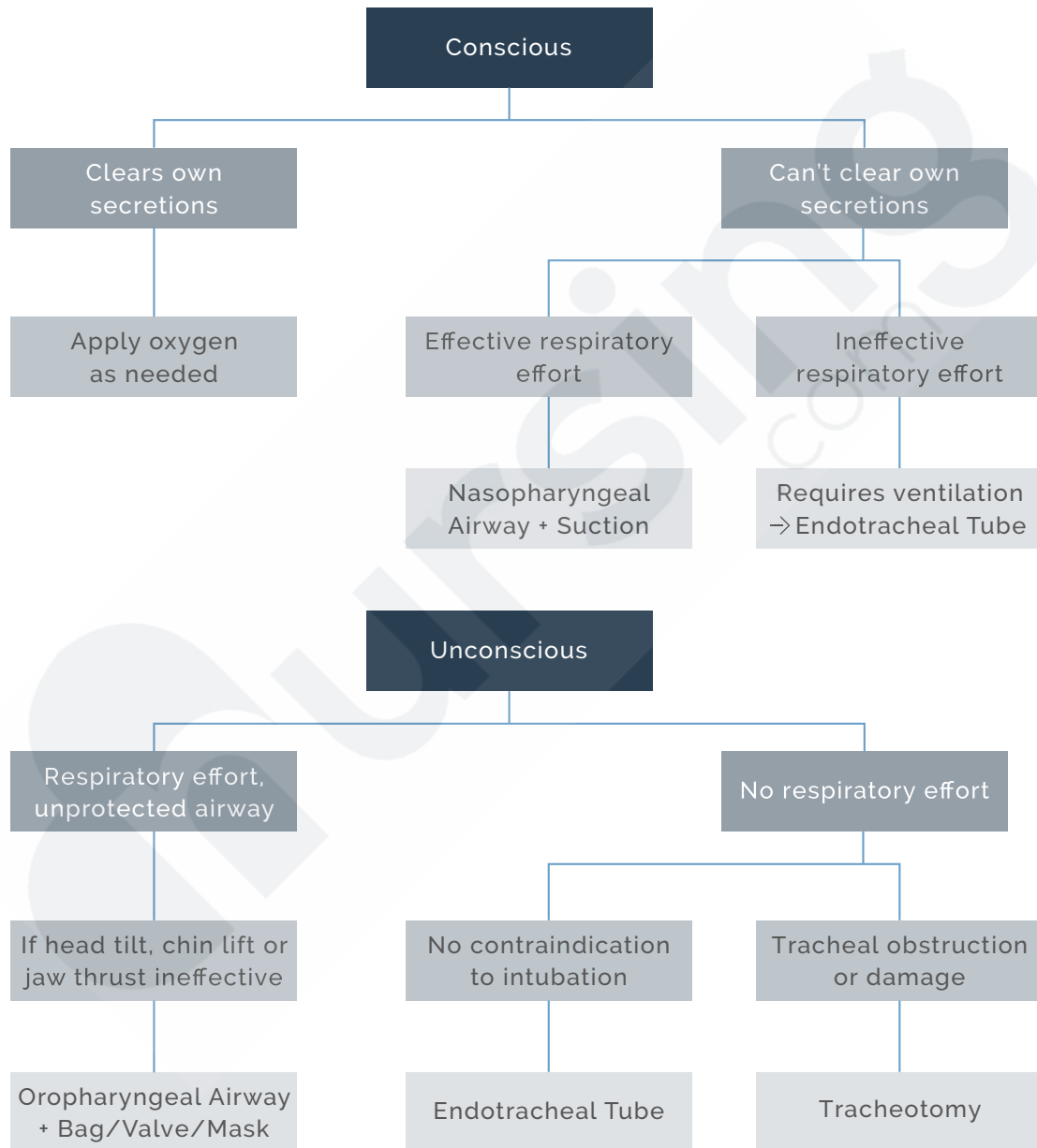


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Cheatsheet 6.8 Artificial Airways Decision Tree

## ARTIFICIAL AIRWAYS DECISION TREE

Use this decision tree to determine which of the four artificial airways is most appropriate for your patient's situation.







# Tuberculosis

## Overview

1. Lung infection → pneumonitis and granulomas
2. Noncompliance → multi-drug resistance (MDR-TB)
3. Airborne transmission (infectious particles aerosolized)

## General

### 1. Risk Factors

- a. Foreign travel
- b. Living in tight quarters → College, prison, homeless Shelters

### 2. Diagnostics

- a. Chest X-ray shows granulomas
- b. TB Skin Test
  - i. Anyone → 15 mm induration
  - ii. High Risk → 10 mm induration
  - iii. Immunocompromised → 5 mm induration
- c. Quantiferon Gold (gold standard)
- d. Sputum Cultures
  - i. Mycobacterium tuberculosis

## Assessment

1. Night sweats
2. Weight Loss
3. Chills
4. Fatigue
5. Persistent cough → Hemoptysis (coughing up blood)
6. Chest Pain
7. Anorexia

## Therapeutic Management

### 1. Negative Pressure Room

- a. RIPE Therapy:
  - i. Rifampin
  - ii. Isoniazid
  - iii. Pyrazinamide
  - iv. Ethambutol
- b. Treatment for 6-12 months → Risk of transmission reduced after 2-3 weeks of medication regimen



# Pneumonia

## Overview

1. Inflammatory condition of the lungs
2. Primarily affecting the alveoli→ May fill with fluid or pus
3. Infectious vs Noninfectious
  - a. Infectious→ Bacterial, Viral
  - b. Non-infectious→ Aspiration

## General

1. **Diagnosis**
  - a. Chest X-ray
  - b. Sputum culture to identify the organism

## Assessment

1. **Viral**
  - a. Low-grade fever
  - b. Nonproductive cough
  - c. WBCs normal to low elevation
  - d. Chest X-ray shows minimal changes
  - e. Less severe than bacterial
2. **Bacterial**
  - a. High fever
  - b. Productive cough
  - c. WBCs elevated
  - d. Chest X-ray shows infiltrate
  - e. More severe than viral
3. **Both**
  - a. Chills
  - b. Rhonchi/Wheezes
  - c. Sputum production

## Therapeutic Management

1. **Medications**
  - a. Antibiotics
  - b. Analgesics
  - c. Antipyretics
2. **Supplemental O<sub>2</sub>**
3. **Assess and maintain the respiratory status**
4. **Encourage activity as soon as possible**
5. **Instruct on chest expansion exercises→ Incentive spirometry, turn, cough, deep breathe**
6. **Encourage 3 L/day of fluids unless contraindicated→ Thin secretions**



# Influenza

## Overview

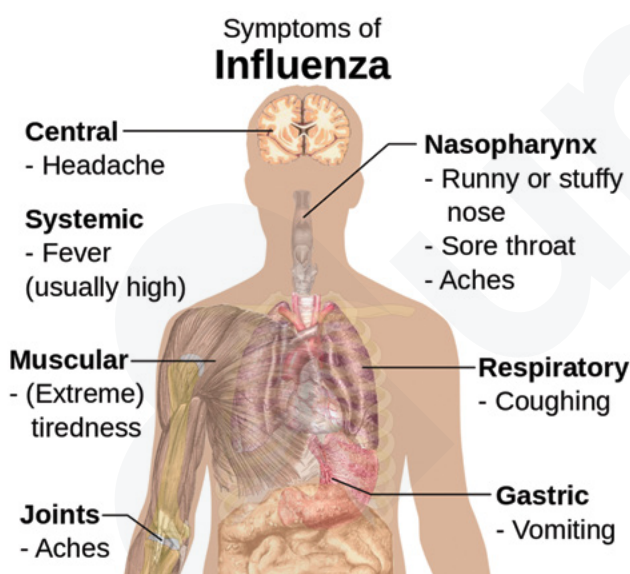
Influenza = virus (multiple strains), increasing severity → Spread through droplet contact

## Assessment

### 1. Symptoms

- a. Sudden onset
- b. Last 6-7 days
- c. Aches – head, muscles, body
- d. Fatigue
- e. Runny nose, sore throat, cough
- f. Vomiting
- g. High fever (102-104°F)

Image 6.26 Influenza Symptoms



## Therapeutic Management

### 1. Vaccine

- a. Indicated annually for:
  - i. Healthcare workers
  - ii. Elderly
  - iii. Children > 6 mo
  - iv. Pregnant
  - v. Immunocompromised → do NOT give immunocompromised clients the nasal spray vaccine
- b. Contraindications:
  - i. Severe allergy to the flu vaccine, eggs, or latex
  - ii. History of Guillain-Barre
  - iii. Recent bone marrow or organ transplant (< 6 mo)

### 2. Anti-Virals

- a. Oseltamivir (Tamiflu)
  - i. Within 48 hours of onset, best within 24 hours



# Cognitive Impairment Disorders

## Overview

Includes Autism-spectrum disorder (ASD), attention-deficit hyperactivity disorder (ADHD), Dementia, Alzheimer's Disease

## General

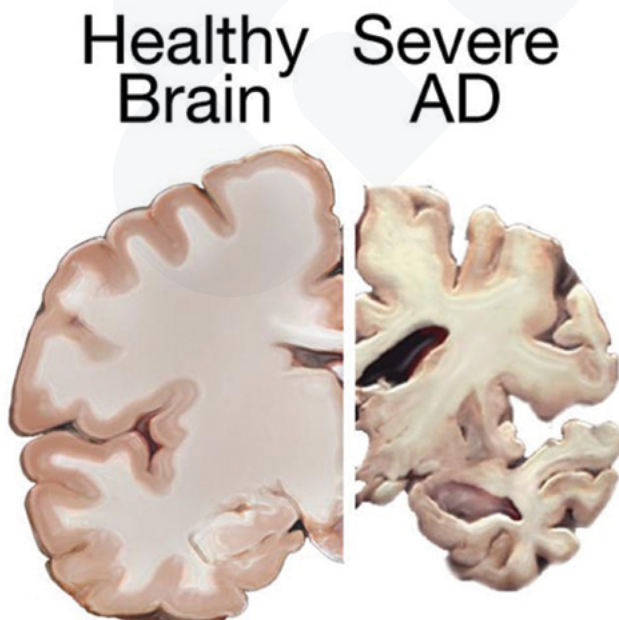
### 1. Dementia

- a. A broad category of brain diseases that are gradual and long-term which result in self-care deficits, largely affecting a client's ability to function.
  - i. Various types can affect people of varying ages and it can progress at different rates.
  - ii. This results in judgment impairments and issues in problem solving and behavior.

### 2. Alzheimer's Disease

- a. Alzheimer's is a TYPE of dementia and is an irreversible form caused by nerve cell deterioration.
  - i. There is a steady, progressive decline in functional capacity.

Image 7.2 Brain Atrophy in Alzheimers



## Assessment

1. **Apraxia** - difficulty performing motor tasks
2. **Aphasia** - difficulty progressing to inability to speak and understand what is being said to them
3. **Agnosia** - doesn't recognize familiar people or objects
4. **Amnesia** - memory loss

## Therapeutic Management

### 1. Caregiver stress

- a. Role strain – i.e. child caring for a parent
- b. Sadness due to loved one not recognizing them

### 2. Safety

- a. Wandering can be an issue. Units should be locked/secured, clients should be supervised.
- b. Watch water temperature – may burn themselves
- c. Remove anything toxic or hazardous from easy access
- d. Watch for agitation
  - i. Remove things that increase agitation
- e. Decrease stimuli/reassure the client
- f. Never argue
- g. Use a calm, reassuring voice with gentle touch (when appropriate)
- h. Watch for sundowning
  - i. Increased confusion at night

### 3. Communicate

- a. Maintain eye contact
- b. Stand in front of them, be calm, firm, and direct with communication and tasks
- c. Simple one-step tasks/direction
- d. Use short, simple words
- e. Always identify them and yourself
- f. Reorient as needed, which may be frequent

### 4. Promote their current abilities

- a. Keep familiar things around them
- b. Continually reinforce what they know and can do at this point in time
- c. Promote independence, supervise to ensure ADL's are taken care of

- d. Utilize familiar simple games and activities they enjoy
  - i. Coloring, reading books they enjoy
  - ii. Talk about their memories
  - iii. Maintain routine
  - iv. Pay attention to fatigue, memory strain, and agitation and provide ample time for rest
  - v. Keep a calendar and clock on the wall and refer to it when discussing the date/time



# Mood Disorders

## Overview

Mood - emotional states are subjective and difficult to define and are long term.

## General

### 1. Mood disorders

- a. Emotional *extremes* and *challenges* regulating moods (think long-term)
  - i. Example: Bipolar disorder and depressive disorders

## Assessment

1. Bipolar includes periods of mania and depression with normal periods in between
  - a. Extremely high highs
  - b. Extremely low lows
  - c. Inability to self-regulate
2. Mania definition: a mood disorder marked by hyperactive, wildly optimistic state
3. Depression: 5+ depressive symptoms for 2+ weeks

## Therapeutic Management

### 1. Goals

- a. Manage acute episodes
- b. Provide support and resources for long-term management

### 2. Meds

- a. Anti-anxiety medication can be used during manic episodes. Caution should be used with clients who have a history of substance abuse
- b. Antipsychotics:
  - i. olanzapine (Zyprexa), aripiprazole (Abilify), risperidone (Risperdal)

### c. Mood stabilizer

- i. Lithium
  1. Clients will need regular labs to check the therapeutic level
  2. Toxicity can result if stable sodium intake and fluid intake (2-3L/day) is not maintained
- d. sodium valproate (Depakote), lamotrigine (Lamictal), carbamazepine (Tegretol) are given to clients with mood disorders

### 3. Interventions for Mania

- a. Make sure the environment is safe, watch for dangerous hyperactivity
- b. Reorient as necessary
- c. Promote appropriate sleep/wake cycles
- d. Controlled, calm, focused interactions to help control the hyperactive personality
- e. High-calorie finger foods because they are manic and hyperactive
- f. Set boundaries related to behaviors
- g. Ensure medication compliance





# Depression

## Overview

State of low mood and aversion to activity that can affect a person's thoughts, behaviors, feelings, and sense of wellbeing

## General

### 1. Can be mild, moderate, or severe

- a. Mild: lasts 2 weeks or less
- b. Moderate: more persistent, negative thinking and suicidal thoughts may occur
- c. Severe: intense and pervasive, may include delusions and hallucinations

## Assessment

1. Some combination of the following symptoms may be present, especially in major depressive disorder
  - a. Depressed mood most of the day
  - b. Diminished interest or pleasure in activities
  - c. Significant unintentional weight loss
  - d. Insomnia or hypersomnia
  - e. Psychomotor agitation
  - f. Fatigue or loss of energy
  - g. Feelings of worthlessness, or excessive or inappropriate guilt
  - h. Difficulty concentrating or making decisions
  - i. Recurrent thoughts of death or suicide, with or without a plan
  - j. Low self-esteem
  - k. Feelings of hopelessness
  - l. Poor appetite or overeating
2. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning

## Therapeutic Management

1. #1 priority is assessing the risk for self-harm:
 

"Have you had any thoughts of hurting yourself?"

  - a. If they say yes then ask, "do you have a plan?"
2. Ensure a safe environment
  - a. Removing anything from their room that they could potentially use to harm themselves
3. Promote appropriate intake – focus on higher-calorie foods frequently
  - a. They may go long periods without eating so maximize intake when they actually do eat.
4. May need reminding/encouragement to maintain basic personal hygiene (ADL's)
5. Encourage expression of feelings and focus on their strengths
6. Validate their feelings of loss/frustration/sadness
7. Promote spending time with them to show them they are a priority to you
8. Engage the client in activity toward progress
  - a. One-on-one situations, eventually progressing to group discussions
  - b. Start with gross motor activities
  - c. Suggest activities that are easy to complete, non-competitive, and that offer a sense of accomplishment when complete ( coloring, drawing, playing cards, easy games)
9. Promote appropriate sleep-wake cycles



# Suicidal Behavior

## Overview

Clients with a consistent feeling of hopelessness, guilt, and worthlessness that are so overwhelming that they don't want to live anymore and attempt to end their life

## General

- 1 At Risk Clients
  - a People with a previous history of suicide, family history of suicide, mental illness history
    - i. Personality disorders
    - ii. Substance abuse
    - iii. Psychosis
    - iv. People with depression
    - v. People with terminal illness
    - vi. People with disabilities
    - vii. Elderly and adolescents

## Assessment

1. **Objective information**
  - a. When they give away important, prized possessions
  - b. Creating a will or changing an existing one
  - c. Sleep disturbances
  - d. Difficulty concentrating, loss of interest in things
  - e. Asking about methods to end one's life
  - f. Writing notes to loved ones
  - g. Sudden massive improvements in previously very depressed clients
    - i. Clients may have motivation/energy, or relief because they came up with a plan or made a decision.
    - ii. Observe the client more closely for potential increased probability of carrying out the plan.

## Therapeutic Management

1. **Assessment**
  - a. Assess clients with a history of depression for risk for suicide and self-harm
2. **Safety is Essential**
  - a. Inpatients admitted with suicide attempts are not to be left alone, any items that could be used for self-harm are removed from their room
3. **Initiate suicide precautions**
  - a. Typically includes removing all objects that could be used to harm self from the room
4. **Begin Sitter or 1:1 supervision**
  - a. Never leave the client alone
5. **Other Therapeutic Management**
  - a. Establish a suicide contract
  - b. Establish rapport and trust
  - c. Provide positive reinforcement
  - d. Involve the support system the client identifies
  - e. Encourage therapy (individual, group)



## Post-Traumatic Stress Disorder (PTSD)

### Overview

A mental illness that results after someone experiences trauma.

### General

1. The client might relive the trauma, frequently dream about it, or have flashbacks
2. Traumatic events that cause PTSD include anything traumatic to the client such as rape, accidents, wartime experiences, or natural disasters

### Assessment

1. The client might experience sleep issues such as insomnia, nightmares, and flashbacks
2. The client might develop mental health issues such as depression or anxiety
3. The client might avoid triggers
  - a. A trigger is a situational, audible, or visual experience (among others) which invokes an anxiety-driven or fear response, similar to the original occurrence or cause of the PTSD.
  - b. For example, if a client was subjected to violence at a particular location, they may avoid that location or similar locations, knowing that the situation may cause anxiety-like symptoms.
4. The client might have guilt related to the event
  - a. For example, if they survived and others did not, the client might have thoughts that they could have done something differently.

### Therapeutic Management

1. Validate the client's feelings and promote coping mechanisms that work for them
2. Offer relaxation techniques
3. Encourage outpatient therapy and support groups
4. Therapy/service animals may help clients



# Anxiety

## Overview

- A sense of worry or nervousness, typically about an upcoming event with an uncertain outcome.
- Anxiety is a normal part of life, but becomes concerning when it is persistent, chronic, and/or is a response to normal life activities.

## General

### 1. Types of anxiety

- a. Normal: healthy
- b. Acute: sudden, related to an event/threat (also normal)
- c. Chronic: consistent, related to normal daily activities

## Assessment

### 1. Levels

- a. Mild: can be healthy, motivating, and produce growth
- b. Moderate: can still function and solve problems/issues
- c. Severe: individual needs someone to refocus them
- d. Panic: dread, impending doom, and lack of rational thoughts - this can lead to exhaustion

## Therapeutic Management

### 1. Therapeutic interventions

- a. Ensure safety
- b. Provide a calming and safe environment
- c. Establish trust and acknowledge the anxiety
- d. Encourage expression of thoughts, feelings, and problem-solving
- e. Promote their coping mechanisms; do not critique/criticize
- f. Provide gross motor activities to reduce stress
  - i. Definition: movement and coordination of arms, legs, and large body parts
  - ii. Examples: running, walking, jumping

- g. Give anti-anxiety meds PRN

### 2. Interventions for an acute anxiety attack

- a. Decrease stimuli and maintain a calm environment
  - i. Overstimulation makes it worse
- b. Encourage the client to identify and discuss feelings and their causes
  - i. This helps them to see connections between the behaviors and their resulting feelings
- c. Listen/watch for indications of risk for self-harm like helplessness and hopelessness
  - i. Safety is the priority



# Hemophilia

## Overview

1. Impairment of the body's ability to control blood clotting due to deficiency in specific clotting proteins.
2. X-linked recessive disorder (hereditary disorder)
  - a. Carrier females pass to a male

## General

1. **Types**
  - a. *Hemophilia A (deficiency of factor VIII)*
  - b. *Hemophilia B (deficiency of factor IX)*
  - c. *Hemophilia C (deficiency of factor XI)*
2. **Clotting Cascade**
  - a. Missing coagulation factors which prevent fibrin formation
  - b. Hemophiliacs bleed for a long time because they can NOT clot

## Assessment

1. **Common concerns are epistaxis (nose bleeds) and prolonged bleeding due to trauma**
2. **Frequent bruising**
3. **Areas of concern**
  - a. *Bleeding in the brain*
    - i. Visual changes
    - ii. Headaches
    - iii. Change in LOC
    - iv. Slurred speech
  - b. *GI Bleed*
    - i. Hematemesis – throwing up blood
    - ii. Melena – black stools = upper GI bleed.
4. **Normal PT and thrombin time, prolonged PTT**

## Therapeutic Management

1. **Goal of Therapy**
  - a. Replace missing clotting factors
  - b. Prevent bleeding
  - c. Prevent long term problems with joints
2. **Medications**
  - a. Replace the missing factor→ Slow IV push
  - b. DDAVP→ Increases the body's production of clotting factor and is ONLY used in mild Hemophilia A
3. **Many clients will have a metaport for access**
  - a. Be sure to maintain sterility when accessed
  - b. Only access when following policies or orders



# Congenital Heart Defects

## Overview

1. *Congenital heart defects*
  - a. Abnormalities in the structure of the heart
  - b. Caused by improper development during gestation
2. *Associated with*
  - a. Chromosomal abnormalities, syndromes, congenital defects.
3. *Risk factors*
  - a. Parent or sibling has a heart defect
  - b. Maternal diabetes
  - c. Maternal use of alcohol and illicit drugs
  - d. Exposures to infections in utero (rubella)

## General

1. Congenital Heart Defects can be classified by answering the following question:
  - a. How does it affect hemodynamics (blood flow patterns) in the heart?
    - i. *Increased pulmonary blood flow*
      1. Atrial Septal Defect
      2. Ventricular Septal Defect
      3. Patent ductus arteriosus
      4. Atrioventricular canal
    - ii. *Decreased pulmonary blood flow*
      1. Tetralogy of Fallot
      2. Tricuspid atresia
    - iii. *Obstruction to blood flow*
      1. Coarctation of the aorta
      2. Aortic stenosis
      3. Pulmonic stenosis
    - iv. *Mixed blood flow*
      1. Transposition of great arteries
      2. Truncus arteriosus
      3. Hypoplastic Left Heart

## Assessment

1. General Signs and Symptoms
  - a. Murmurs
  - b. Additional heart sounds
  - c. Irregular rhythms
  - d. Clubbing of fingers and toes
  - e. Failure to thrive
2. Signs of Heart Failure
  - a. *Poor myocardial function*
    - i. Tachycardia
    - ii. Gallop rhythm
    - iii. Sweating (while feeding)
    - iv. Decreased urinary output
    - v. Fatigue
    - vi. Pale, cool extremities
    - vii. Hypotension
    - viii. Cyanosis
  - b. *Respiratory congestion (left-sided heart failure)*
    - i. Tachypnea
    - ii. Dyspnea
    - iii. Grunting
    - iv. Retractions
    - v. Nasal flaring
    - vi. Exercise intolerance (older children)
    - vii. Feeding intolerance (infants)
    - viii. Cyanosis
    - ix. Cough
    - x. Wheezing
  - c. *Systemic congestion*
    - i. Weight gain
    - ii. Enlarged liver
    - iii. Peripheral edema
      1. Periorbital
      2. Sacral (infants lying down)

## Therapeutic Management

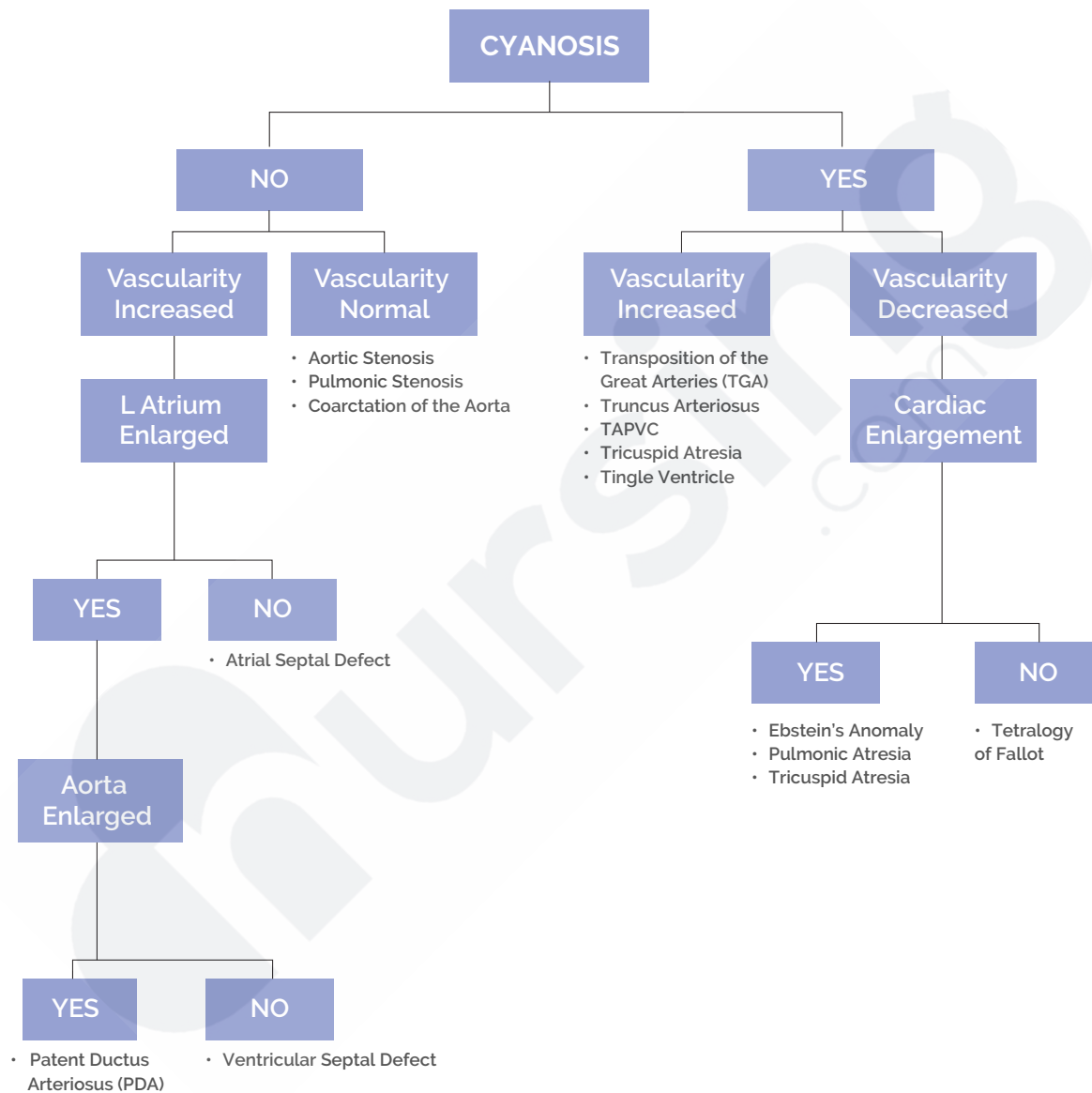
1. Surgery
2. Cardiac catheterization
3. Common Medications
  - a. Digoxin



- i. Signs of toxicity
  - ii. Medication orders must specify HR parameters for holding medication.
    - 1. This is due to HR variations with age.
  - b. Ace Inhibitors, beta-blockers, diuretics
- 4. Nursing Care
  - a. *Decrease Cardiac Demands*
    - i. Conserve energy for feeds
    - ii. Minimize stress
  - b. *Minimize Respiratory Distress*
    - i. Elevate the head of the bed
    - ii. Administer Oxygen
  - c. *Support Adequate Nutrition*
    - i. Feed infants every 3 hours → do not last longer than 30 minutes
    - ii. High-calorie formulas
  - d. *Monitor Fluids and Electrolytes*
    - i. Daily weight
    - ii. Strict I's & O's
    - iii. Potassium

Cheatsheet 5.3 Congenital Heart Defects

# CONGENITAL HEART DEFECTS





## Gestational Diabetes

### Overview

1. Pregnancy can cause insulin resistance because increased weight and hormones cause higher blood sugars
2. but needs a source for glucose.
3. If the mother has high blood sugar, the glucose will cross the placenta.
  - a. In response to the mother's hyperglycemia, the fetus's body produces more insulin causing excessive growth.
  - b. Maternal insulin will not cross the placenta, only the glucose.

### Assessment

1. **Maternal changes are as follows:**
  - a. 1st trimester: insulin needs are reduced
  - b. 2nd and 3rd trimester: insulin resistance occurs when hormones increase
    - i. Insulin needs increase
  - c. Right after placenta delivers: hormones and insulin requirements decrease
    - i. Gestational diabetics should no longer require insulin or diet management post-delivery
2. **Newborn changes/issues**
  - a. The baby grows faster and larger, but their function is still reflective of age and not size
  - b. Macrosomic = 4000g
3. **Assessments**
  - a. Screen for glucose and protein in urine at regular prenatal visits (glucosuria and ketonuria)
  - b. Check blood sugar between 24-28 weeks with glucola testing
  - c. High-risk patients may be screened at the beginning of pregnancy.

### Therapeutic Management

1. Ideal to control with diet and exercise
2. Monitor for typical DM complications (signs of infection, HTN, edema, proteinuria)



# Preeclampsia

## Overview

1. Hypertensive disorder (140/90)
2. Proteinuria
3. After 20 weeks gestation

## General

1. A woman may or may not be symptomatic but will have elevated blood pressures and proteinuria
  - a. Proteinuria -  $>300$  mg in a 24 hr urine specimen and a Protein:Creatinine Ratio of  $>0.3$
2. Blood pressures
  - a. 140/90 or more for two occurrences
    - i. 4 hours apart
  - b. Or a systolic 160 mmHg or more
  - c. Or a diastolic of 90 mmHg or more
    - i. 140/90 & 160/90 are both classified as preeclamptic hypertension

## Assessment

1. **So what does this client look like?**
  - a. A sudden increase in edema
    - i. Displayed in hands and face
  - b. Sudden weight gain
    - i. Occurs in excess fluid retention
  - c. Complaints of headache, epigastric, or RUQ pain
  - d. Vision changes
    - i. A serious symptom of preeclampsia
    - ii. From swelling and irritation of the brain and the CNS
  - e. Proteinuria → MUST be present to be preeclampsia
2. **Fetal assessment**
  - a. Intrauterine growth restriction (IUGR)
    - i. Placental blood flow is not at its best

## Therapeutic Management

1. Delivery of the baby is the only treatment
2. Magnesium sulfate is given prophylactically
  - a. Seizure prevention
3. Some antihypertensive drugs might be given to manage BP



# Infections in Pregnancy

## Overview

1. Specific infections during pregnancy are more concerning due to potential transmission to the fetus (via placenta or during delivery), which can have detrimental effects on the newborn

### 2. TORCH

- a. T - Toxoplasmosis
- b. O - Other
  - i. ie: Group B strep (GBS), HIV, Syphilis
- c. R - Rubella
- d. C - Cytomegalovirus
- e. H - Herpes simplex

## General

### 1. Toxoplasmosis

- a. Parasitic disease transmitted to mother while handling cat litter, undercooked or raw meat, or gardening; transmitted to fetus via the placenta
- b. Mother is typically asymptomatic but may have a rash or flu-like symptoms for anywhere from a few weeks to months
- c. Fetal death, spontaneous abortion, and neuro complications may result
- d. Educate the mother to never change cat litter

### 2. Other

- a. *Group-B Strep*
  - i. All women screened for this during the prenatal period by a vaginal swab 35-37 weeks
  - ii. All women have the bacteria but the results will depend on the amount that is colonized
  - iii. Prophylactic antibiotics (penicillin or ampicillin) given during labor to women who screen positive
  - iv. Main cause of bacterial infections in newborns, which causes sepsis
- b. *HIV*
  - i. Delivery by c/s to limit transmission
  - ii. Infants are given antiretrovirals

### c. *Syphilis*

- i. Woman given penicillin and fetus receives penicillin after delivery

### 3. Rubella

- a. Transmitted via placenta
- b. Most dangerous/serious if mother acquires this infection in 1st trimester
- c. Brain damage, hearing loss, miscarriage, stillbirth, and various congenital defects may result
- d. Assess the mother's immunity by drawing titer. If her titer is non-immune, then vaccinate immediately after delivery because it is a live vaccine.
  - i. The vaccine will protect for future pregnancies

### 4. Cytomegalovirus (CMV)

- a. A very common, asymptomatic virus transmitted through bodily fluids
- b. Transmitted via placenta or during delivery and can cause intrauterine growth restriction, seizures, blindness, hepatomegaly, splenomegaly, jaundice, hearing loss, microcephaly, and/or death

### 5. Herpes Simplex

- a. Transmitted during birth, if active lesions present. A c-section should be done if active lesion to prevent transmission
- b. Acyclovir may be given around 36 weeks to prevent an outbreak during labor and delivery
- c. Serious neonatal complications (death, neurologic issues, etc.)



# Newborn Physical Exam

## Overview

1. These are the first physical assessments – establishing a baseline is important!
2. Assess for temperature stability and note ALL abnormalities

## General

1. Keep baby warm!
  - a. It's imperative that nursing interventions are made to maintain temperature stability
2. The intrauterine – extrauterine transition period
  - a. 3 phases
    - i. Reactivity
      1. *Most alert and is the best feeding time*
      2. *First hour*
    - ii. Decreased responsiveness
      1. Sleepy
      2. Second hour
    - iii. Reactivity
      1. Second reactivity
      2. Hour 2-6
      3. Alert

## Assessment

1. General observations
  - a. Newborns should have a flexed posture & coordinated movements
  - b. Count extremities, fingers, toes
  - c. Check for anus → *not patent then DO NOT feed*
    - i. ***If no anus is found, this results in an emergent surgery!***
  - d. Urinary meatus on the penis if male
    - i. Hypospadias is meatus on the under portion
      1. ***NO CIRCUMCISION can be performed on these clients***
  - e. Check for hip dysplasia (hip pops)

- i. Assessed with the Ortolani maneuver
  1. Rotate thighs outward and feel for clicks at the hips,
  2. NO clicking or crepitus is a normal finding
  3. Any clicking or crepitus is indicative of hip dysplasia
  4. Hip dysplasia is also checked by putting the infant prone and looking for symmetrical butt creases
    - a. Symmetry indicates no dysplasia

## 2. Vital signs

- a. Some newborns may present with *slight/subtle tremors*
  - i. Can be normal or can be due to drugs withdrawal, hypocalcemia, or hypoglycemia
- b. Listen to *apical pulse* for 1 full min
  - i. 120-160 BP resting is a normal finding
- c. Listen to *respirations* for 1 full min
  - i. 30-60 RR is a normal finding
- d. Axillary temp
  - i. 97.8-99F is a normal finding

## 3. Head

- a. Measure head, weight, length
- b. Fontanels (soft spot) anterior (back of the head) and posterior (top of the head)

## 4. Eyes

- a. Weak eye muscle
- b. Newborns may have strabismus or disconjugate gaze

## 5. Ears

- a. No pits or skin tags

## 6. Mouth

- a. Assess for an intact palate, no teeth

## 7. Chest

- a. Assess for clavicular fractures from birth
- b. Breast tissue swelling might be observed
- c. May note secretions from the nipple

## 8. Umbilical cord

- a. Assess for 2 arteries and 1 vein
  - i. Assess for meconium staining on the cord



b.

## AVA

- Way to remember how many arteries and veins in the umbilical cord – 2 **A**rteries & 1 **V**ein

**A** Artery

**V** Vein

**A** Artery

### 9. Genitalia

- Female
  - blood-stained discharge may be present due to a sudden decrease of estrogen
  - might be swollen, prominent labia majora
- Male
  - Hydrocele – excess fluid in the scrotum

### 10. Skin

- Should have creases on hands and feet
  - More creases indicate an older gestational age

### 11. Possible skin findings in a newborn:

- Erythema toxicum*
  - Normal newborn rash → Red spots that pop up and move to different spots
- Acrocyanosis*
  - Blue extremities
  - Normal for the first few days
- Lanugo*
  - Fine body hair
- Harlequin Sign*
  - Red/pink on one half of body
  - Other half is normal or pallor is present
  - Indicative of cardiac issues or sepsis
- Milia*
  - Small white sebaceous glands
  - Typically noted on the face
- Vernix caseosa*
  - Protective mechanism
  - White, cheese-looking substance

iii. Term

- Preterm – typically covered
- Term – typically only in folds
- Postterm – absent

g. *Stork bites*

- Nape of neck, nose, eyelids
- Dark red – pale pink

h. *Port-wine stain*

- Nevus vasculosus, typically on the face
- Flat, red-purple
- Technically a capillary angioma below the skin

i. *Mongolian spots*

- On the back, bottom
- Black – blue
- Flat, wavy borders and irregular shape
- More common in darker races (African, Asian, Native American)

## Cheatsheet 4.8 Newborn Assessment

## NEWBORN ASSESSMENT

## APGAR Score

Appearance		1 Minute	5 Minutes
Pink torso and extremities	2		
Pink torso, blue extremities	1		
Blue all over	0		
Pulse		1 Minute	5 Minutes
> 100	2		
< 100	1		
Absent	0		
Grinace		1 Minute	5 Minutes
Vigorous cry	2		
Limited cry	1		
No response to stimulus	0		
Activity		1 Minute	5 Minutes
Actively moving	2		
Limited movement	1		
Flaccid	0		
Respiratory Effort		1 Minute	5 Minutes
Strong loud cry	2		
Hypoventilation, irregular	1		
Absent	0		
<b>Total:</b>			

8-10 normal, 4-6 moderate depression, 0-3 aggressive resuscitation

## Normal Measurements

**Weight:** 6-10 lbs.  
**Length:** 18-22 in.  
**Head circumference:** 33-35 cm.  
**Chest circumference:** 30-33 cm.

## Meds and Labs

**Vitamin K:** prevent hemorrhage  
**Optic Antibiotic:** prevent newborn blindness  
**PKU Level:** within 24 hrs after feeding begins  
**Coombs' Test:** if mother Rh-neg.  
**Immunizations:** Hep-B can be given

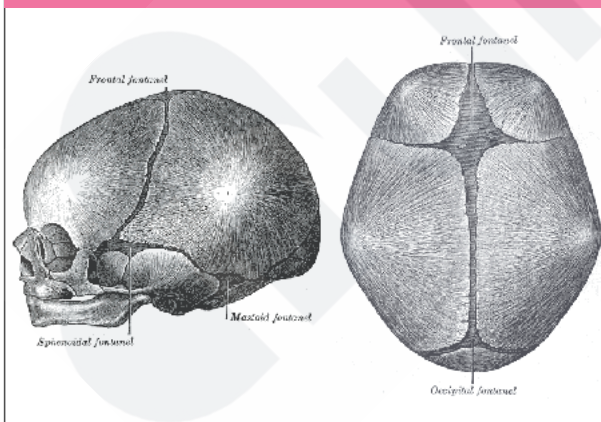
## Newborn Assessment

**Appearance:** pink, loud cry, well-flexed, full ROM**Fontanelles:**anterior (diamond-shaped),  
posterior (triangular)**Mouth:**assess for cleft  
lip or palate**Heart:**assess for  
murmur**Respirations:**

assess breathing

**Umbilical Cord:**1 vein, 2 arteries  
clamped**Extremities:**equal length  
10 fingers and toes**Genitalia:**male: testes palpable  
female: discharge of blood or mucus normal

## Fontanelles



## Possible Complications During Delivery

Meconium Aspiration  
 Cord Presentation  
 Breech Presentation

Limb Presentation  
 Postpartum Hemorrhage



# Chorioamnionitis

## Overview

1. Intrauterine infection of the chorion, amnion or fetal membranes.
2. Classified with high maternal fever, fetal tachycardia, maternal tachycardia, or foul smell.

## General

### 1. Causes

- a. Intrauterine or invasive procedure
  - i. Cervical exams (foreign body inserted causing infection)
  - ii. Amniocentesis (because a foreign needle is inserted in the sac)
  - iii. Prolonged rupture of membranes (more opportunity for bacteria to enter)

### 2. Can result in endometritis and sepsis

## Assessment

### 1. Diagnostics

- a. Fever over 100.4° F + two of the following:
  - i. Leukocytosis
  - ii. Maternal tachycardia
  - iii. Malodorous amniotic fluid
  - iv. Fetal tachycardia

### 2. Monitor vitals of mother and fetus for S/S of sepsis or fetal distress

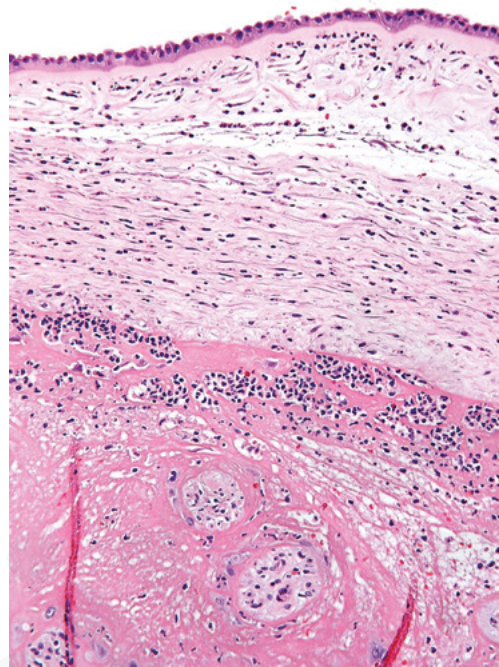
- a. Maternal tachycardia
- b. Maternal temperature
- c. Fetal tachycardia or decelerations

### 3. Draw blood cultures promptly if suspected – *BEFORE* antibiotics are initiated

### 4. Mother treated primarily with ampicillin and gentamicin.

### 5. After delivery, the infant might be treated also depending on symptoms

Image 4.4 Chorioamnionitis



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