# Little Rock Critical Care Program CCRN Review Renal Module

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## Renal Test Blueprint

| | | | |
|---|---|---|---|
| Renal is 6% of total CCRN exam | Topics covered include : | Acute Kidney Injury | Acute Renal Failure |
| Chronic Renal Failure | Life threatening electrolyte imbalances | Infections (e.g., kidney, urosepsis) | Acute genitourinary trauma |

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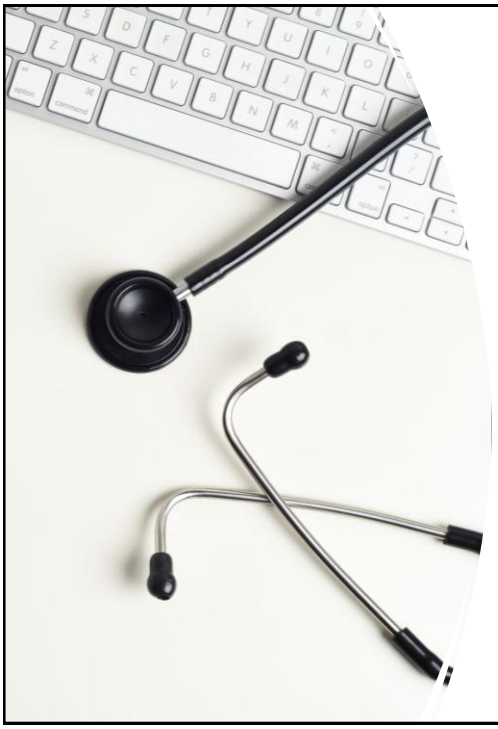

# Objectives

- Recognize normal and abnormal physical assessment findings
- Identify and monitor normal and abnormal diagnostic results
- Manage patients receiving renal medications and monitor response
- Recognize indications for and manage patients requiring renal therapeutic interventions
- Monitor patients post-operatively and follow protocols for renal procedures
- Recognize signs and symptoms of renal emergencies
- Advocate for and initiate renal interventions

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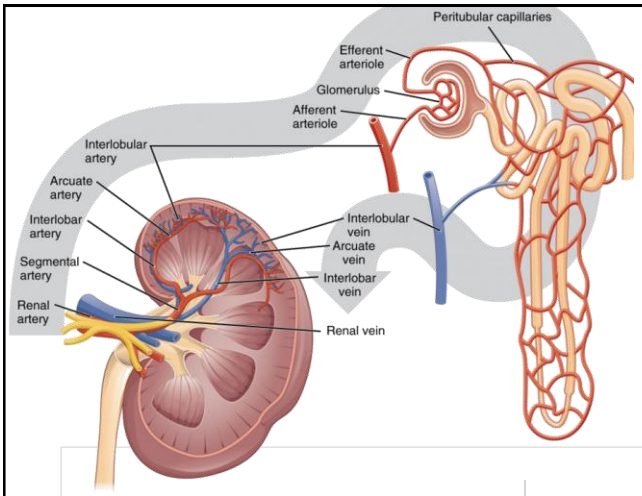


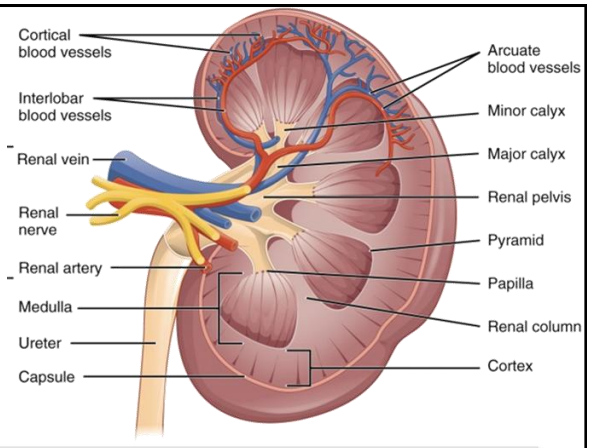


## Review of Renal Anatomy

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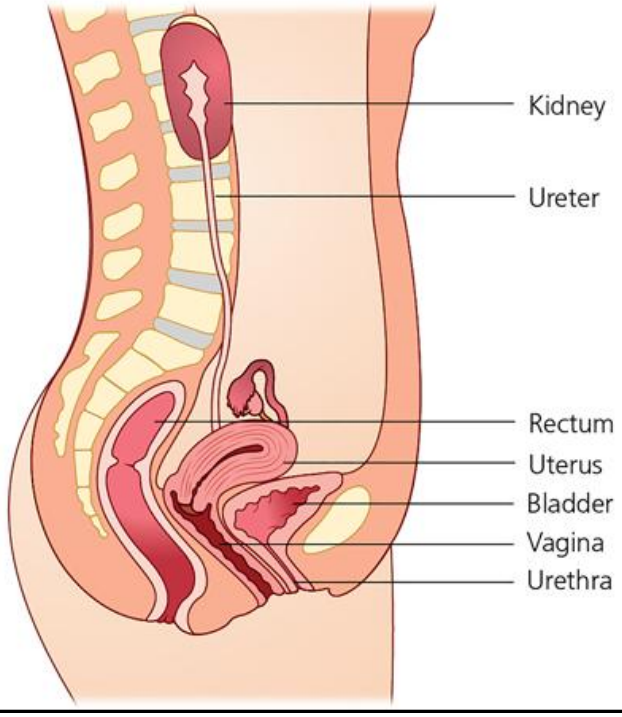
# Review of Female Genitourinary System

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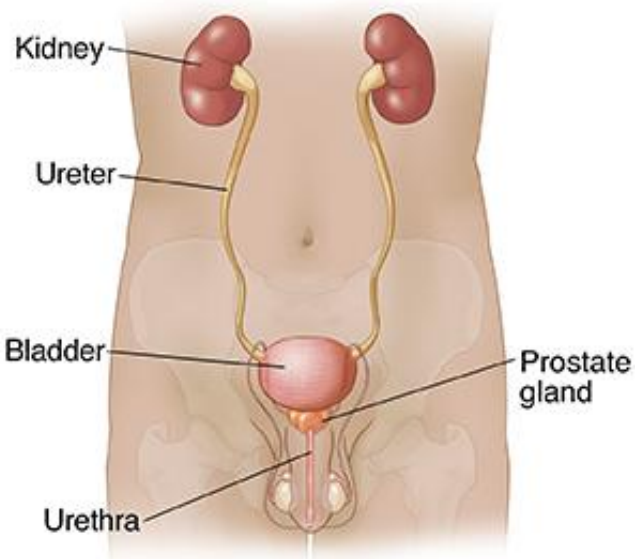
# Review of Male Genitourinary System

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# Concepts of Renal Function

- Nephrons are the functional unit of the kidney
- Each kidney contains approximately 1 million nephrons
- Approximately 25% of the cardiac output or 1200 ml of blood per minute is received by the kidneys
- Ability to dilute or concentrate urine, according to an individual's changing physiological needs, and to regulate electrolyte excretion.
- Renal tubule is responsible for reabsorption and secretion. Some substances such as glucose and sodium are reabsorbed until the plasma level reaches a specific concentration known as the renal threshold. Secretion allows substances such as hydrogen ions to be eliminated at a rate that exceeds glomerular filtration. Both reabsorption and secretion are controlled by the selective permeability of different areas of the renal tubule to water, sodium, and urea and the response of the distal collecting tubules in the kidney to hormones such as aldosterone, antidiuretic hormone, and parathyroid hormone.

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# Acute Renal Failure

Often referred to as Acute Kidney Injury (AKI)

**RIFLE Criteria for Renal Failure**

RISK- Serum Cr 1.5-1.9x baseline,
UOP<0.5ml/kg /hr x 6hrs

INJURY- Serum Cr 2.0-2.9x baseline,
UOP<0.5 ml/kg/hr x12hrs

FAILURE- Serum Cr >3x baseline,
UOP<0.5ml/kg/hr x12hrs

LOSS- AKI persisting>4 weeks

END-STAGE RENAL DISEASE-
AKI persisting >3 months.

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# Risk factors for Acute Renal Failure

- Comorbidities- Diabetes, heart failure, hypertension
- Nephrotoxic substances- Antibiotics, NSAIDs, ACE inhibitors, ARBs, antineoplastics, contrast media, and in certain situations, diuretics.
- Advanced age
- Conditions that require intensive care
- Peripheral artery disease

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## How can we prevent ARF?

| Monitor | Monitor | Monitor | Monitor |
|---|---|---|---|
| Monitor fluid balance (especially in patients requiring diuretics) | Monitor hemodynamics and avoid hypotension | Monitor BUN, Creatinine, GFR, BMP, serum albumin, CK, and ABGs | Monitor urine output |

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# PRERENAL FAILURE

- Perfusion to kidneys is reduced, but there is no destruction to tubular membranes
- Most common type of renal failure
- Rarely requires hemodialysis
- Etiologies- Impaired cardiac output, vasodilation, vasoconstriction, intravascular volume depletion

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# Pharmacological Considerations for Prerenal Failure

NSAIDs- block production of prostaglandins in arterioles, which results in arteriole constriction, thus decreasing inflow of blood into glomerulus and decreasing GFR. CAN RESULT WITH NORMAL DOSES!

ACE inhibitors- prevent production of angiotensin II, dilating efferent arterioles and preventing adequate glomeruli pressure. Use caution for patients with heart failure and hypovolemia!

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# PRERENAL FAILURE MANAGEMENT

- Restore effective arteriole blood volume
- Maintain MAP>70 mmHg to improve renal perfusion
- Avoid nephrotoxic agents, contrast, and utilize pharmacy consult for renal dosing
- Strict I/Os with daily weight correlation
- Wean pressors as able
- Be mindful of NSAID and ACE inhibitor use.

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# INTRARENAL FAILURE

*Causes tubular membrane destruction*

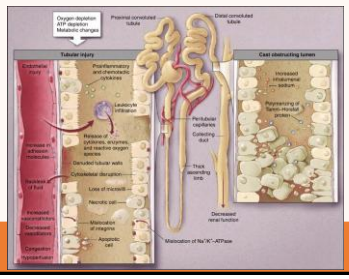
## Etiologies

**Cortical:**

Post-infection including strep, hepatitis, and varicella

Systemic lupus erythematous (SLE)

Vasculitis



**Medullary (ATN):**

Nephrotoxicity: contrast dye, drugs, rhabdomyolysis, organic solvents

**Ischemic**:

Caused by all causes of prerenal and postrenal failure, surgery (typically CV or vascular)

Cardiopulmonary bypass

Hypotension (sepsis, hypovolemia)

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# Acute Tubular Necrosis

- Most common type of hospital-acquired intrarenal failure
- Usually caused by prolonged hypoperfusion of kidneys
- Inpatient survival rate is ~ 50%, with ~ 30% of patients surviving for a year after discharge.
- Three phases- initiation, maintenance, and recovery
  - **Initiation-** acute decrease in GFR with sudden increase in BUN and Cr
  - **Maintenance-** sustained reduction in GFR, BUN and Cr continue to rise
  - **Recovery-** characterized by increase in UOP and gradual decline in BUN and Cr levels

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## Rhabdomyolysis

Crush injuries, compartment syndrome, prolonged immobility,
DTs, heat stroke, burns, and hyperthermia-

THINK RHABDO.

•Rhabdo is the release of myoglobin, CK, and potassium into the extracellular and intravascular spaces due to damaged muscles. CK and myoglobin are large particles which form obstructive casts renal tubules.

- Classical S/S: dark, tea colored urine, decreased UOP, myoglobin in urine, CK>10,000 u/L, muscle cramping, and cardiac arrhythmias.
- Treatment: FLUIDS, mannitol, loop diuretics, correction of electrolyte imbalances, and sometimes dialysis

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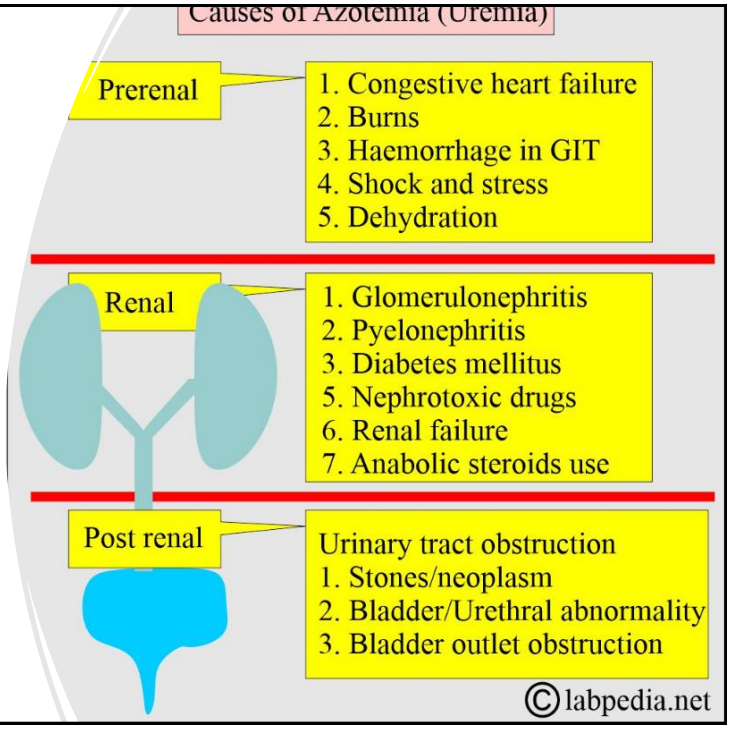
# Summary ARF

- BUN measures perfusion
- eGFR measures blood flow
- Creatinine measures function
- High BUN and low eGFR in prerenal i.e. HF
- High BUN and high CR in intrarenal failure

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# Electrolytes

**Normal Calcium level:** 8.5-10mg/dL

**Normal Potassium level:** 3.5-5.0 mEq/L

**Normal Sodium level:** 135-145 mEq/L

**Normal Magnesium level:** 1.5-2.5 mEq/L

**Normal Phosphate level:** 3-4.5 mEq/L

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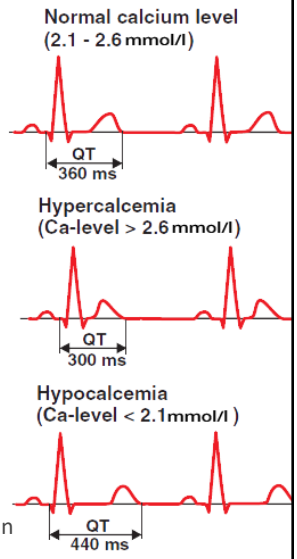
# CALCIUM

## Hypocalcemia

- **Causes**: acute pancreatitis, chronic renal failure, alkalotic states, Vit. D deficiency
- **S/S**: anxiety, irritability, twitching around mouth, laryngospasm, seizures, Chvostek and Trousseau signs, torsades VT
- **Tx**: IVF- NS, calcium gluconate or calcium chloride, vitamin D, correct respiratory alkalosis

## Hypercalcemia

- **Causes**: Renal disease, prolonged immobilization, malignancies
- **S/S**: lethargy, fatigue, AMS, DTRs decreased or absent, abdominal pain, constipation, N/V, weakness, anorexia, weight loss, kidney stones
- **Tx**: glucocorticoids, Mithracin IC, calcitonin, or etidronate, IVF to promote diuresis, promote renal excretion with furosemide (Lasix)




High calcium levels can cause kidney problems like kidney stones, while chronic kidney disease can lead to high or low blood calcium. Both conditions can result in kidney stones, kidney failure

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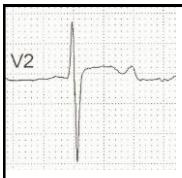


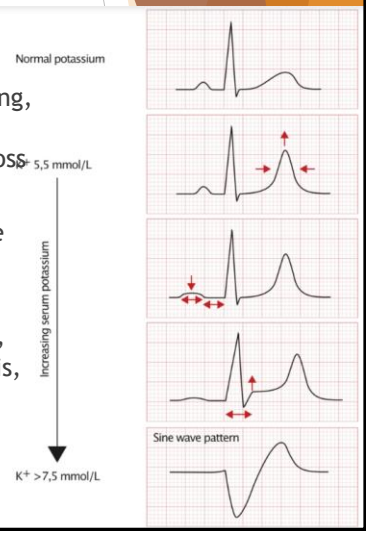

# Potassium

## Hypokalemia

- S/S: muscle weakness, nausea, vomiting, paralytic ileus or abdominal distention/gas, shallow respirations, EKG changes; fast, irritable (VT or VF)
- Causes: diuretics, metabolic alkalosis, ETOH use, uncontrolled DM
- Tx: KCl, correct alkalosis, correct hypomagnesemia

## Hyperkalemia

- S/S: muscle weakness, irritability, nausea, diarrhea, abdominal cramping, muscle cramps, pain, EKG changes: peaked T-waves, widening of QRS, loss of P-waves, bradycardia, PEA
- Causes: renal failure, burns, massive crush injuries, acidosis, adrenal cortical insufficiency
- Tx: Calcium chloride, sodium bicarb, insulin & D50 combo, correct acidosis, Kayexalate, Lokelma, dialysis

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# Sodium 135-145 mEq/L

- **Causes**: fluid overload: excessive water ingestion, SIADH
- **S/S:** edema, fatigue, muscle cramps, weakness, diarrhea, lethargy, confusion, seizures, coma, brain herniation
- **Tx**: water restriction, sodium replacement, loop diuretics, 3% NS

- **Causes**: fluid deficit: osmotic diuresis, mannitol, DKA, HHS, DI
- **S/S:** thirst, tachycardia, hypotension, orthostasis, restlessness, irritability, possibly obtunded
- **Tx**: Identify cause, correct slowly to prevent edema, vasopressin for DI, sodium restriction, D5W or 0.45NS

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# Magnesium 1.5-2.5 mEq/L

- **S/S:** hyperreflexia, ventricular arrhythmias, agitation, confusion
- **Causes**: ETOH chronic use, vomiting, diarrhea, post-CABG or AMI, DKA, HHS, drugs: dig, aminoglycosides, diuretics, cisplatin
- **Tx**: Magnesium sulfate- generally at a rate of no more than 1gm/minute

- **S/S**: decreased DTRs, respiratory, respiratory arrest, bradyarrhythmias, hypotension, lethargy, coma
- **Causes**: Renal failure, magnesium containing laxative abuse
- Tx: Give calcium and furosemide, may need dialysis

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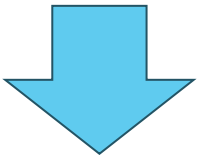
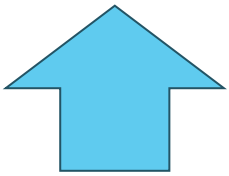
# Phosphate 3-4.5 mEq/L



- S/S: same as hypercalcemia- lethargy, fatigue, altered mental status
- Causes: alcoholism, TPN
- Tx: Phosphate replacement



- S/S: same as hypercalcemia- anxiety, irritability, laryngospasm
- Causes: decreased renal excretion, renal failure
- Tx: phosphate binders, calcium carbonate

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# Anemia

- Why are renal patients at risk for anemia?

- Administer PRBCs for extreme anemia
- Administer epogen for chronically anemic renal patients

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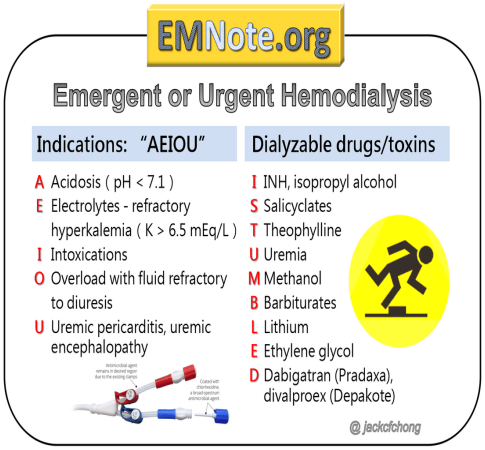
# Dialysis

- Indications:




- Modalities: hemodialysis, CRRT
- Considerations: hemodynamic stability, speed of dialysis (CRRT is slow dialysis compared to HD), ARF vs CRF

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# Kidney Infections & Urosepsis

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# Renal Trauma

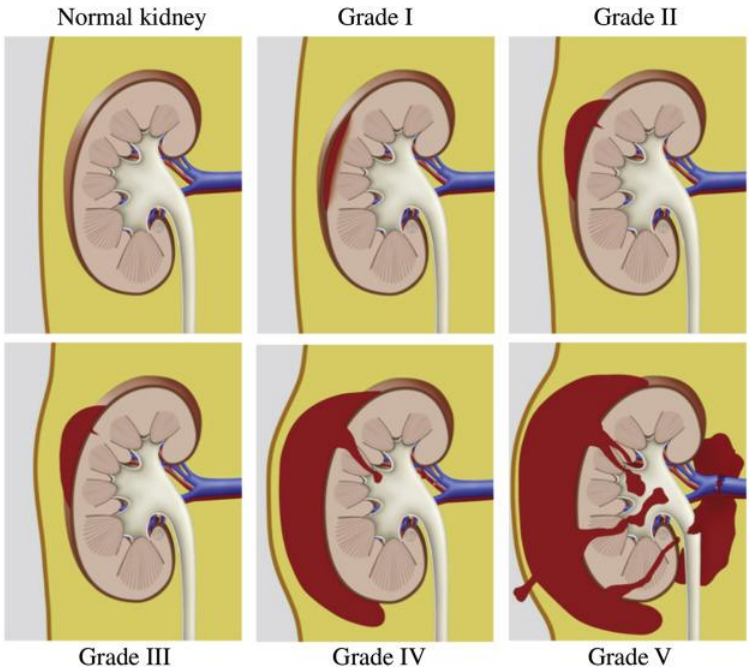
**Grade 1:** Contusion or subcapsular hematoma

**Grade 2**: Cortical laceration less than 1 cm deep

**Grade 3:** Cortical laceration more than 1cm deep without urinary extravasation

**Grade 4:** Laceration into collecting system; segmental vascular injury

**Grade 5:** Shattered kidney, renal pedicle injury or avulsion

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# Female Urogenital Trauma

- Frequent causes include pelvic fracture, straddle injuries, or sexual assault
- These injuries can result in vaginal and perineal tears that sometimes extend to the rectum.
- Blood at the vaginal introitus and/or urinary meatus can indicate injury to the female urogenital system
- Be aware of and assess for the possibility of sexual assault for any patient who appears with vaginal or peritoneal lacerations in the absence of other trauma

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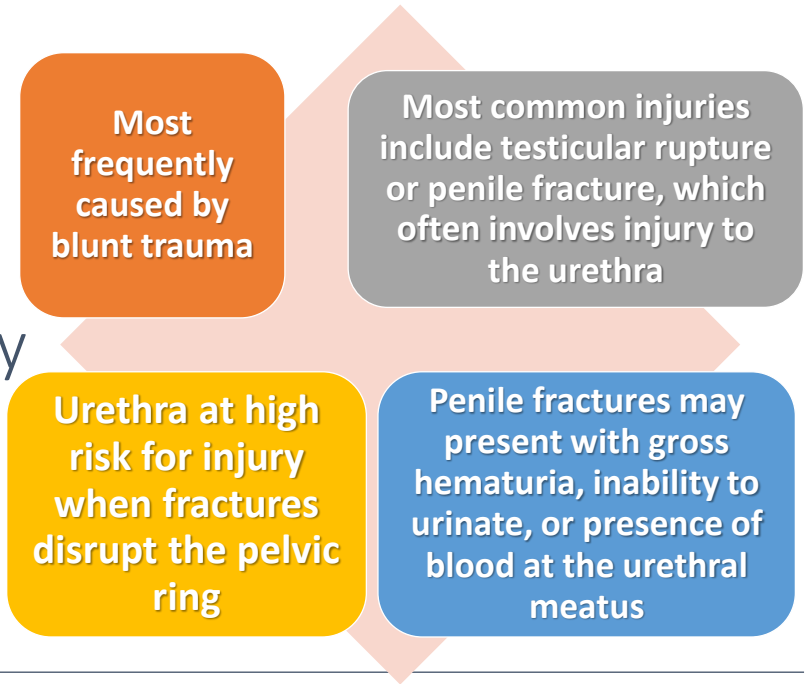
# Male Genitourinary Trauma

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# Post-Op Care

- Assess for s/s of urinary retention, inability to urinate, abdominal distention, strict I/Os, hematuria, clots
- Monitor labs and vital signs
- Monitor pain and treat accordingly
- Be aware of possible emotional duress or discomfort
- Allow for patient privacy whenever possible

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# Review Questions

**A 24 year old man has been diagnosed with acute kidney injury as a result of severe hemorrhaging after a motor vehicle collision. Which of the following would be expected laboratory values for this patient?**

A) Low urine osmolality, high urinary sodium concentration

B) High urine osmolality, high urinary sodium concentration

C) Low urine osmolality, low urinary sodium concentration

D) High urine osmolality, low urinary sodium concentration

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# D) High Urine Osmolality, Low urine Na+

- **Rationale**: Consider that the renal response to blood loss is to conserve sodium and water. If the kidney is holding onto sodium, little is excreted into urine, so urine sodium is low. If the kidney is holding onto water, little is excreted into the urine, so urine concentration is high and osmolality is increased.

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A 30-year-old man was electrocuted with around 450 volts of electrical current. Eight hours after admission to the critical care unit, the nurse observes that the urine is brownish. What intervention is anticipated?

A) Rapid fluid administration and dopamine at 2mcg/kg/min

B) Furosemide (Lasix) 10mg IV and dopamine at 2 mcg/kg/min

C) Rapid fluid administration and 25g of 20% mannitol

D) Insertion of a double-lumen vascular catheter and hemodialysis

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C) Rapid fluid administration and 25gm of 20% mannitol

- **Rationale**: The single most important intervention when any renal toxin (remember abx, dyes, and myoglobin!) is present is to flush the toxins through the renal tubules with large amounts of fluids.
- Remember that when large burns are present, we need to think about rhabdomyolysis.
- Myoglobin can cause extensive damage to the renal tubules- thereby causing acute tubular necrosis.

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**Which of the following is indicated in acute tubular necrosis when the blood urea nitrogen (BUN) is greater than 100mg/dl?**

A) Aggressive rehydration
B) Diuretics
C) Dialysis
D) Nephrectomy

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D) Dialysis

**Rationale**: Dialysis is usually indicated when the BUN is greater than 100mg/dl. Aggressive rehydration is indicated long before the BUN reaches 100mg/dl. Diuretics may be used early but aren't used if the patient is dehydrated or anuric. Nephrectomy is not an indication for ATN.

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Margaret, an elderly patient brought in after having fallen on the kitchen floor and unable to move for approximately 48 hours, has dark, tea colored urine, urine positive for myoglobin, BUN 52mEq per liter, and serum potassium 5.6 mEq per liter.


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**Which of the following is a priority treatment for the patient?**

(A) Administer a loop diuretic

(B) Administer an amp of sodium bicarbonate

(C) Administer normal saline at a rate to maintain a urine output of 300mL/hour

(D) Dialyze the patient as soon as possible

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(C) Administer normal saline at a rate to maintain a urine output of 300mL/hour, because the clinical scenario describes rhabdomyolysis.

Administration of large volumes of fluid to maintain “flushing” of the kidneys is needed to prevent permanent renal tubular damage.

Diuretics and hemodialysis have not been shown to prevent permanent damage.

Alkalization of urine is beneficial however it is done by placing sodium bicarbonate into large volume IV bags and infusing over several hours.

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Which of the lab values below would we expect from Margaret?

(A) CK 30,000

(B) Amylase 500

(C) Troponin 12

(D) Bilirubin 4.2

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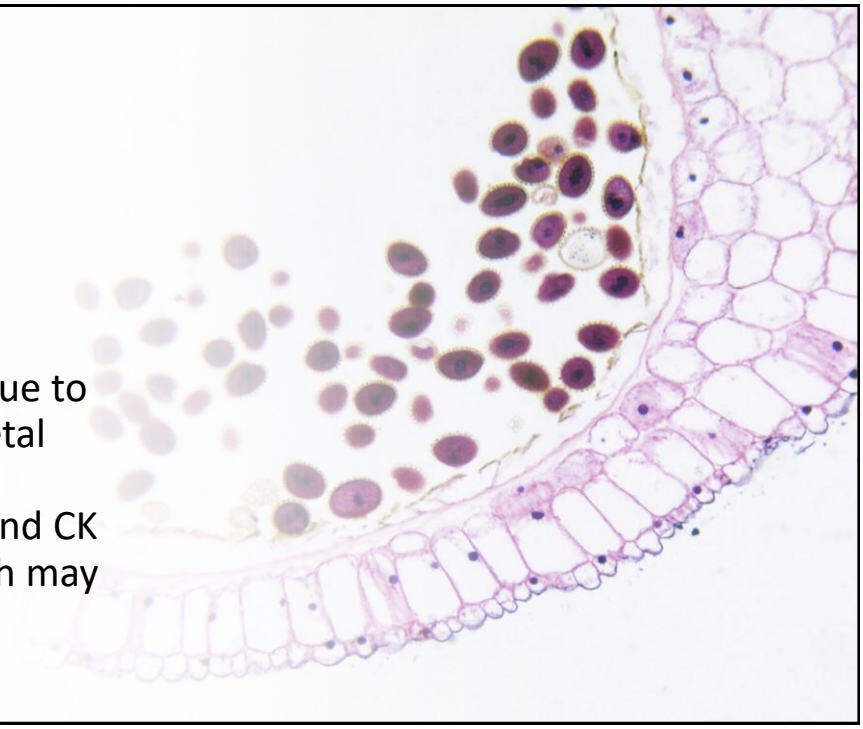

(A) CK 30,000 because rhabdomyolysis is due to crush injury of skeletal muscle cells which releases myglobin and CK into the blood which may clog renal tubules.

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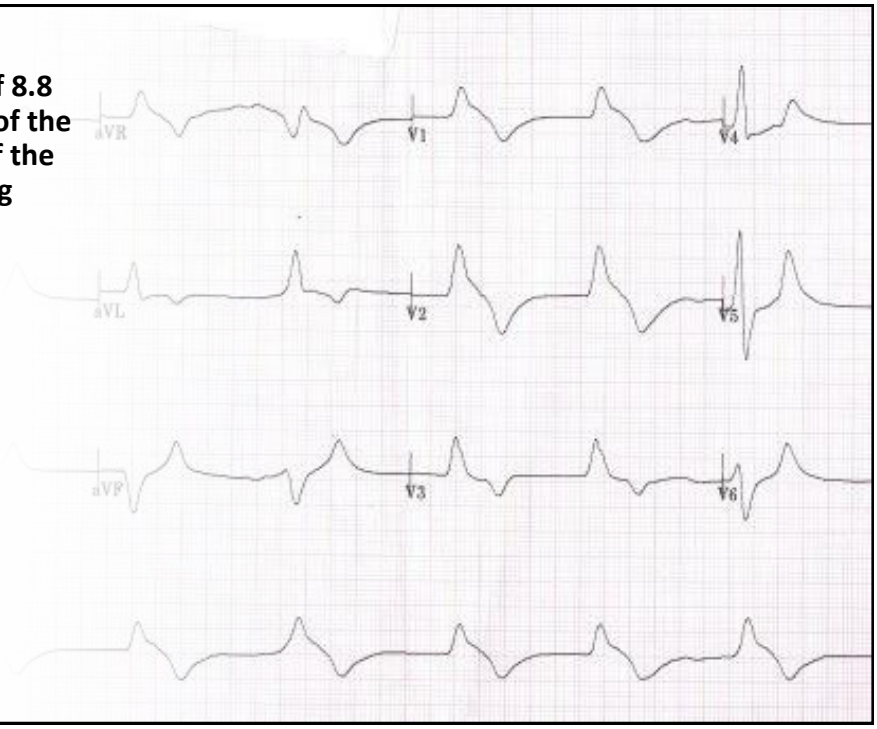
**A patient has a serum K+ of 8.8 mEq/liter and has slowing of the heart rate with widening of the QRS. Which of the following would be an appropriate treatment?**

(A) Kayexalate enema

(B) Calcium gluconate, glucose, and insulin intravenously

(C) Sorbitol by mouth

(D) Hemodialysis

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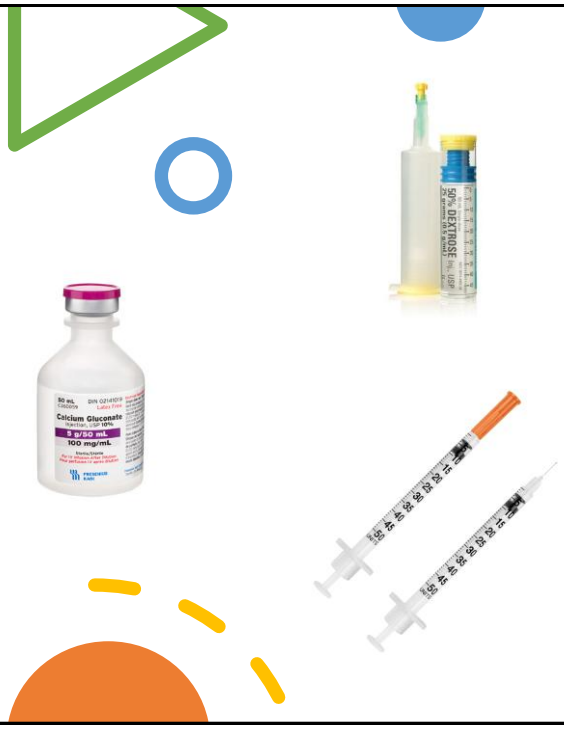
(B) Calcium gluconate, glucose, and insulin intravenously because the calcium will stabilize cell membranes, insulin will drive potassium into the intracellular space, thereby decreasing serum potassium. Kayexalate and hemodialysis will decrease total body potassium but will take hours. Sorbitol does not decrease potassium levels.

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**A patient with a large amount of protein in the urine suggest damage to which portion of the nephron?**

(A) Glomerulus
(B) Bowman capsule
(C) Proximal convoluted tubule
(D) Collecting duct

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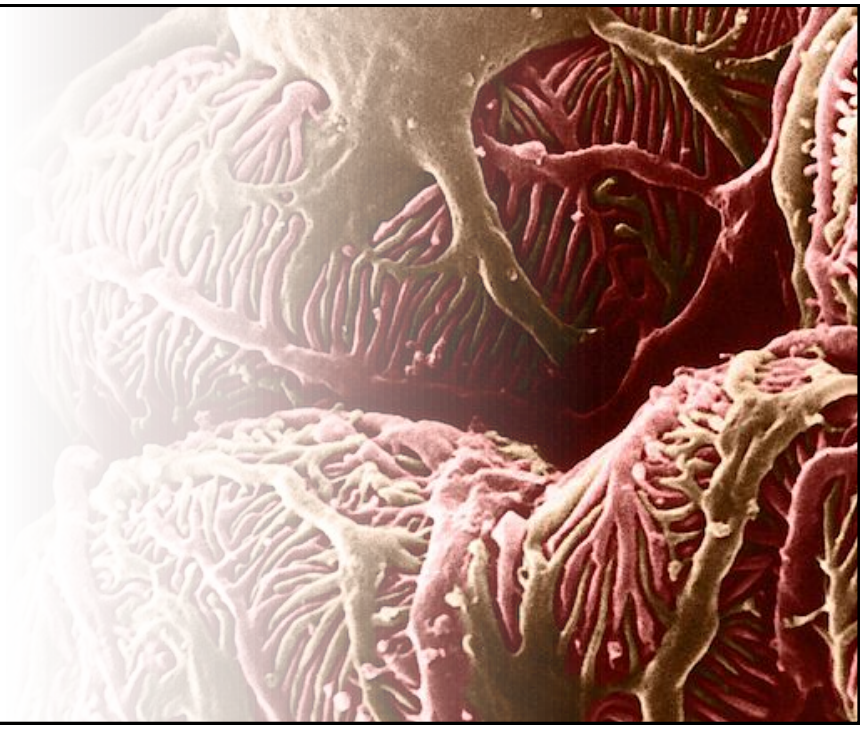
(A) Glomerulus because damage to the glomerulus causes loss of protein and proteinuria



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The psychiatric unit nurse calls the critical care nurse with a report of a 27-year-old man with a diagnosis of "coma-undetermined cause".

It is reported that he has consumed approximately 10 liters of water over the past 24 hours.

On admission he is difficult to arouse, moaning occasionally, but moving all extremities purposefully and equally. Pictured are his lab values.

| | |
|---|---|
| Na | 110 mEq/L |
| Cl | 80 mEq/L |
| K | 3.5 mEq/L |
| $HCO_3$ | 20 mEq/L |
| Blood urea nitrogen (BUN) | 20 mg/dl |
| Creatinine | 2 mg/dl |
| Hematocrit | 22% |

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## What would be the most appropriate treatment for this patient?

(A) Administer hypertonic saline
(B) Restrict fluids
(C) Administer diuretics
(D) Institute hemodialysis

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(A) Administer hypertonic saline because the neurologic symptoms and the sodium level are indications that hypertonic saline should be used

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- https://ecgwaves.com/topic/ecg-electrolyte-imbalance-electrolyte-disorder-calcium-potassium-magnesium/

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# GI Emergencies

LYNNETTE FLYNN

CCRN CMC/CSC

REFERENCED SHEEHY'S MANUAL OF EMERGENCY CARE, 8TH EDITION

PAGES 235-245

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## CCRN blueprint for GI

- Abdominal compartment syndrome
- Acute abdominal trauma
- GI hemorrhage
- Bowel infarction obstruction, perforation, mesenteric ischemia, adhesions
- GI surgeries (Whipple, esophagectomy, resections)
- Hepatic failure/coma (Portal HTN, varices, hepatitis, biliary atresia)
- Liver disease
- Malnutrition and mal absorption
- Pancreatitis
- Peritonitis

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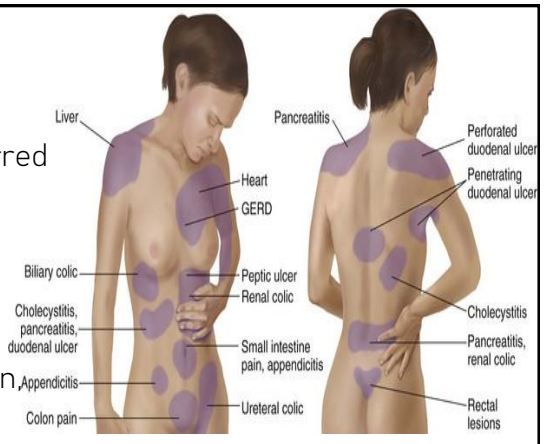
# Introduction




**Pain** – Categorized as visceral, parietal or referred

- Visceral receptors located throughout abd
- Parietal located in peritoneum
  - Somatic *(muscles, bones, joints, skin)*
  - Localized, sharper pain
  - Signals surgical intervention

Assess location and radiation, change in position, D/T of last BM, surgical Hx

Pain preceding vomiting, severe pain > 6 hours → surgical condition

Anorexia N/V are directly proportional to extent of peritoneal irritation

Colic increases peaks and subsided → hollow viscera

r/o hypovolemia if tachycardic

Fetal position → peritonitis

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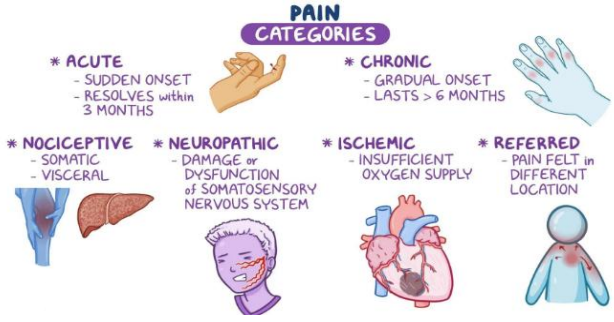


# Pain patterns

- **Diffuse pain**
  - Gastroenteritis
  - Sickle cell crisis
  - DKA
  - Peritonitis
  - IBS
  - Intestinal obstruction
  - Constipation
- **Epigastric pain**
  - Acute gastroenteritis
  - PUC
  - GERD
  - AAA
  - Early perforated viscus
  - Acute pancreatitis
  - AMI

**Upper Quadrants**

- Lower lobe pneumonias
- Pylonephritis
- Herpes zoster
- Assess with ultrasound

Right sided

- Liver
  - Hepatitis
  - Hepatomegaly
  - Herpes zoster

Left sided

- Spleen
  - Infarct or rupture
  - Splenomegaly of leukemia or mono

- **Lower Quadrants**
  - Ovarian torsion or cyst rupture or mettleschmerz
  - Ruptured ectopic
  - PID or salpingitis
  - Inguinal hernia
  - Assess with CT

Left

- Diverticulitis

Right

- Acute appendix

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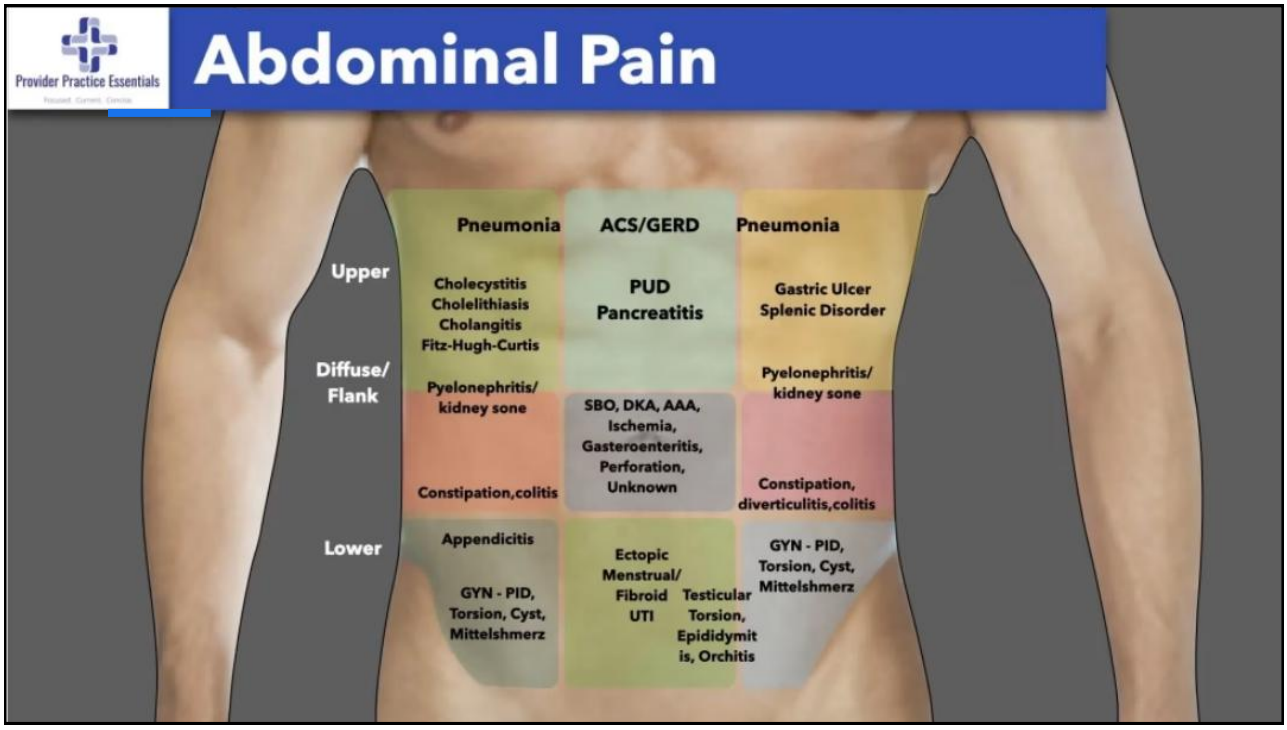


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# Abdominal compartment syndrome

- Abdominal pressure 12 mmHg or greater with diminished gut perfusion, increased arterial and capillary pressure and intestinal wall edema.
- **Primary**
  - Associated with abdominal trauma
  - Shock, reperfusion injury and massive fluid resuscitation and ongoing hemorrhage
- **Secondary**:
  - Sepsis, major burns, massive trauma and fluid resus.

**Presentation**

- Decreased preload, increase afterload, decreased UOP, increased PIPs, decreased TV and compliance, increased ICP, decreased cerebral perfusion pressure
- Elevated H&H with dehydration, elevated WBC, ↓K, ↓CL, metabolic alkalosis with severe emesis.
- ↑ *BUN, ↑lactate, metabolic acidosis may signal bowel ischemia*

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# Abdominal compartment syndrome

- Ultrasound and abd xrays are unreliable
- Measure bladder, or NG intraabdominal pressure. Nml < 12 in adults, > 20 organ damage

**Management:**

- 1st goal – optimize tissue oxygenation and perfusion
- 2nd goal – Optimize perfusion and fluid administration
- 3rd goal - Evacuation and decompress bowel
- 4th goal – Correct electrolytes
- 5th goal – evacuate air, blood, ascites, abscesses and tumors

**Intervention**:

- Insert OG/NG/ rectal tubes
- Administer enemas as needed
- Administer gastro- and coloprokinetic agents (metoclopramide)
- Monitor intraabd pressures and notify of increases or deterioration of other system functions

**Potential complications**

- Hypovolemic shock
- Septicemia
- Gangrene
- AKI

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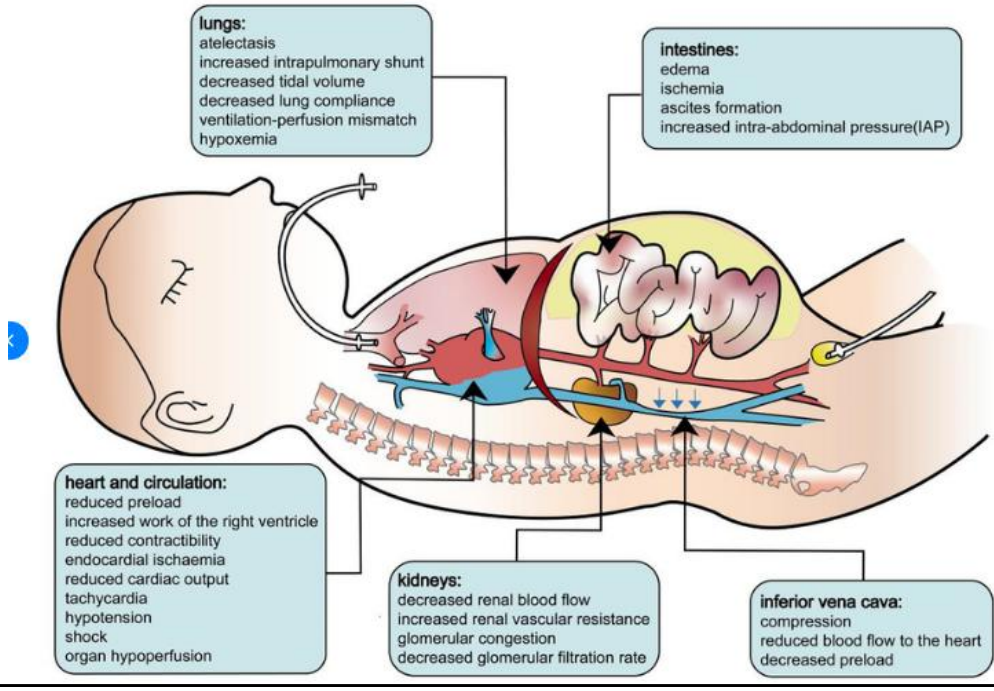


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# Bowel infarction, obstruction, perforation, mesenteric ischemia, adhesions

- **Causes**: -Mesenteric blood flow disrupted
  - Arterial embolism – 50%:  CAD, HF, VHD, AF
  - Arterial thrombosis 25%: generalized atherosclerosis
  - Venous thrombosis 5%: hypercoagulable states, inflammatory conditions i.e. p[ancreatitis, diverticulitis, trauma, HF, RF, PHTN
  - Nonocclusive ischemia 20%: low flow states. i.e. HF, shock, Cardiopulmonary bypass, splanchnic vasoconstriction
- **Presentation**
  - Early signs; Severe pain, vomiting diarrhea
  - Later signs, increasing abd tenderness, guarding, rigidity, absent bowel sounds, guaiac +,  shock and death
  - Labs:  ↑ WBC, CK, lactate, K, amylase, LDH, with acidosis
  - Normal or free air in abd
  - Ultrasound with doppler shows arterial occlusion
  - Abd CT non contrast

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# Bowel infarction, obstruction, perforation, mesenteric ischemia, adhesions

**Management**:

- 1st goal: early identification – immediate consult to OR for exp lap
- 2nd goal: anticoagulation – administer anticoag and monitor coag profile
- 3rd goal: restore fluid & electrolyte balance – IV fluids, monitor RF and lactate
- 4th goal: pain management

**Complications:**

- Cardiac arrest due to acidosis
  - Tissue necrosis, hyperkalemia, elevated lactate
- Peritonitis and sepsis
  - Perforation
- Intestinal infarction
  - Occlusion of blood supply, prepare for OR
- Intestinal scaring

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# Bowel Obstruction

*Impairment or complete arrest of passage of contents through intestine.*

## Causative factors

- Mechanical obstruction i.e. tumor, volvulus, intussusception, paralytic ileus, hernia, inflammatory disease i.e. Crohn's, prior surgery, cancer or irradiation, severe constipation, foreign objects

## Symptoms

- Bloating, distention, cramps, decreased appetite, hypotension, fever, N/V, constipation or small volume diarrhea, decreased UOP, dehydration
- Labs – elevated WBC, Crit, sodium, BUN and creatinine, hypokalemia, metabolic acidosis
- Abd CT – ID specific site and severity of obstruction, distention of bowel, gas bubbles and typical 'bird-beak deformity of a volvulus
- Colonoscopy/Endoscopy

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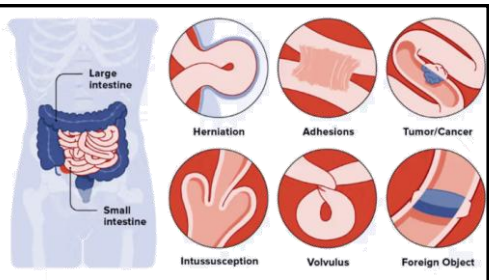
# Bowel Obstruction




## Management

- 1st goal–ID level and source of obstruction

  Exam, monitor, order, implement and review

  02 as needed, prep for OR at 72 hrs. if partial obstruction not relieved

  Low-fiber diet if tolerated

  Complete small bowel obst, risk of strangulation is high so prep for OR
- 2nd goal Pain management
- 3rd goal: decompression: NG, antiemetics
- 4th goal: Restore fluid and electrolyte,
  Telemetry, IV fluids,
  Resp, CV, Renal and organ dysfunction assessments

**Complications**

Hypovolemic shock
Gangrene
Septicemia
Renal insufficiency

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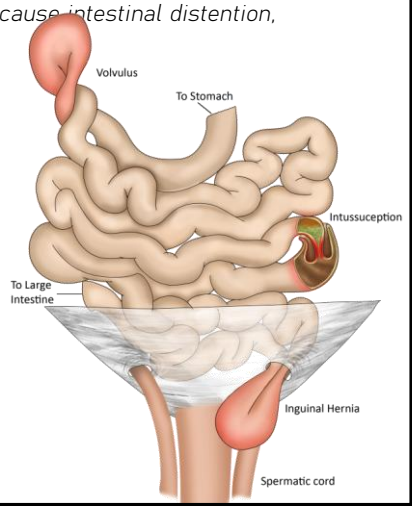
# Intestinal Obstruction

***Physical obstructions:*** *fecal impaction, hernia, tumor, intussusceptions, volvulus , postop adhesions.*
***Nervous system disorders:*** *paralytic ileus*
***Inflammatory conditions:*** *abscess, pancreatitis causing an ileus, inflammatory bowel disease*
*Following intestinal obstruction, GI secretion accumulation and swallowed air cause intestinal distention, increased intraluminal pressure and massive third spacing of fluid.*




**Symptoms**
- Hx of previous abdominal surgery esp. appendectomy
- N/V of stomach contents, then bile then feces.
- Colic pain that may be wavelike, Pain improved after vomiting
- Abd distension and tenderness
- Tachycardia and hypotension
- No flatus or stool passage
- Bowel sounds *high-pitched, hyperactive proximal, hypoactive/absent distal*

**Procedures:** Chem, BUN, CBC, abd x-ray, CT abd

**Intervention**
- Treat hypovolemia from third spacing
- NGT for bowel decompression
- Analgesics, antiemetics, IV abx as indicated.
- Surgical consultation

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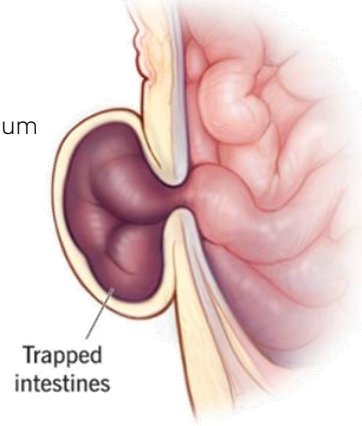
# Incarcerated Hernia

*When a protrusion of a bowel loop through the abdominal musculature but not through the skin. Commonly inguinal, femoral, umbilical regions. When blood supply compromised, it is incarcerated and emergent.*




**Symptoms**
- Pain/swelling
- Inguinal hernias are firm, tender masses in the inguinal canal and scrotum
- Nausea and vomiting
- May develop signs of obstruction

**Procedures** – diagnosis based on physical exam
- Abd x-rays to r/o obstruction
- Ultrasound to detect strangulation

**Interventions**
- Anticipate manual reduction of hernia
- Provide sedation
- Ice packs to hernia and Trendelenburg positioning 20-30 min prior to reduction
- Surgical consult may be needed

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# Acute abdominal trauma

Bowel Infarction/Ischemia

- Blood flow disrupted either venous or arterial due to embolism, thrombosis or low-flow state
  - Arterial embolism 50%
    - CAD, HF, valvular HD, AF, arterial emboli
  - Arterial thrombosis 25%
    - Generalized atherosclerosis
  - Venous thrombosis 5%
    - Hypercoagulable states, inflammatory conditions, trauma, HF, RF, PHTN, decompression sickness
  - Nonocclusive ischemia 20%
    - Low-flow states: HF, shock, bypass, splanchnic vasoconstriction (pressors, cocaine, meth)

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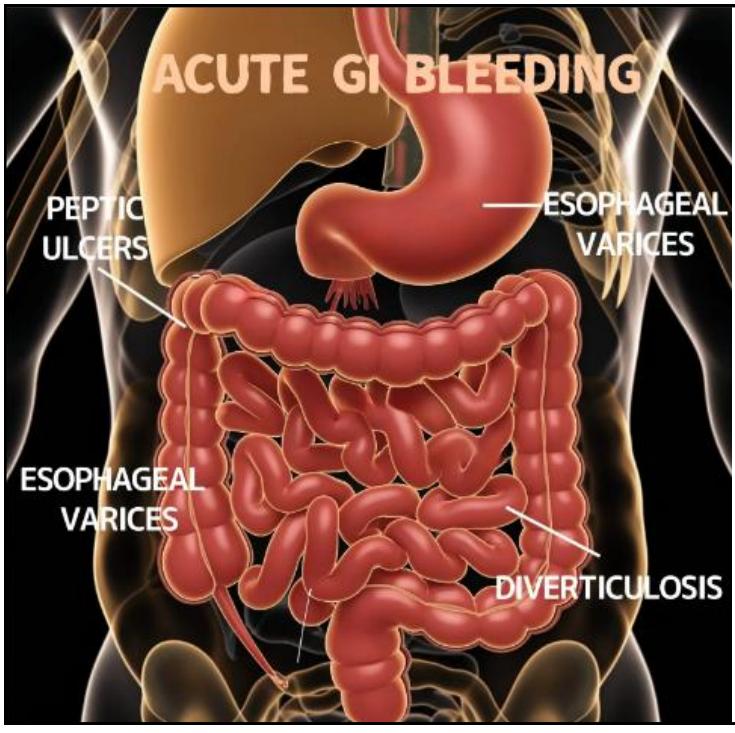


# GI hemorrhage

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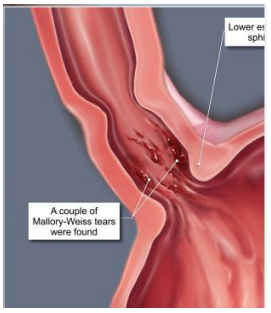
# Upper GI Bleeding

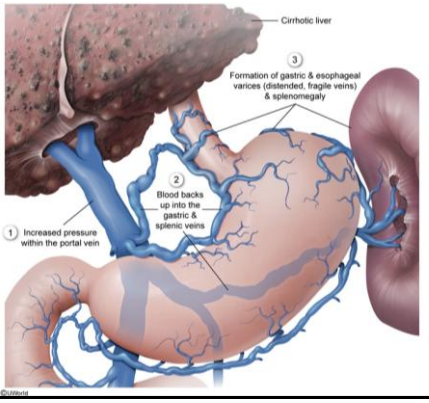
**Causes**
- Esophageal varices, gastric ulcers and erosions, Mallory Weiss syndrome and esophagitis

**Symptoms**
- Weakness, dizziness, syncope, & postural hypotension of hypovolemic shock
- Hematemesis or melena
- Coffee ground emesis specific for UGI bleed

**Procedures**
- Basic labs + coags, type & cross
- CT or GI bleeding scan
- Endoscopy to ID site

**Interventions**
- Intubation if actively bleeding
- IV fluids and PRBC transfusion
- NGT
- Anticipate endoscopy

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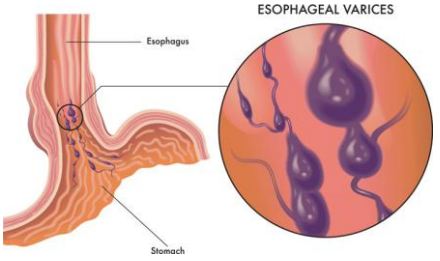
# Bleeding Esophageal Varices

*Portal HTN from liver disease causes collateral vessels to form in the lower esophagus which can rupture.*

**Symptoms**
- UGI bleeding with Hypovolemic shock & hx. Of chronic ETOH

**Procedures**
- Labs – coags, hepatic function studies
- UGI endoscopy
- Abdominal US or CT




**Interventions**
- NGT high risk on insertion
- Rx. Somatostatin or octreotide to decrease portal HTN or IV vasopressin and SL/Transdermal TNG
- Endoscopic injection sclerotherapy
- Balloon tamponade (Blakemore, Minnesota, Linton-Nachlas tubes)
- TIPS (transjugular intrahepatic portosystemic shunt) with esophageal US for coil embolization and glue injection (99% success)

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# Lower GI bleeding

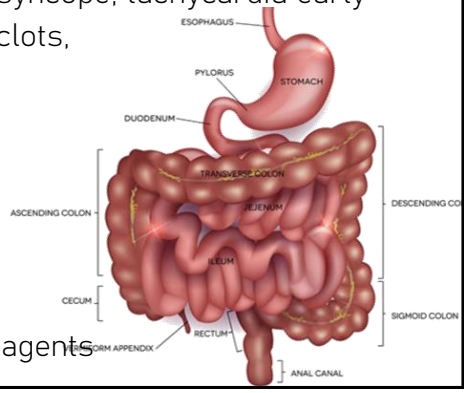
Bleeding distal to the ligament of Treitz

## Causes

- Inflammatory bowel disease, bleeding polyps or ulcers, cancer, hemorrhoids, perirectal abscess or diverticulosis

## Symptoms

- Hypovolemia signs of pallor fatigue, postural changes, syncope, tachycardia early
- Modest, painless, bright red bleeding that may contain clots,
- Hypotension is a late sign




## Procedures

- Labs, stool guaiac, colonoscopy

## Intervention

- IV fluids and transfusion
- Reverse any coagulopathy
- Thermal coagulation or vasoconstrictors or sclerosing agents

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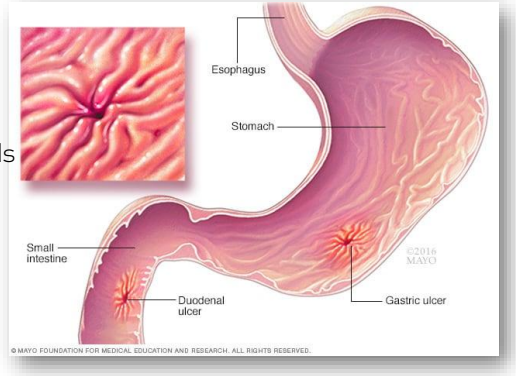
# Peptic Ulcer Disease

*Disruption if the protective mucosal barriers and increased acid secretion*
*Contributing factors: NSAIDS or infection with helicobacter pylori*

Three types:

- **Duodenal**
  - Increased acid and gastrin
  - Rapid emptying time
  - Pain when stomach is empty, relieved with food or antiacids
  - Heal spontaneously and recur often
- **Gastric**
  - In the antrum and tend to become chronic
  - c/o pain after eating, may have weight loss
  - Higher risk for gastric cancer




- **Stress**
  - Develop after long period of physical stress such as illness, trauma or neural injury
  - Stress shunts splanchnic circulation causing ischemia and mucosal damage
  - Often seen in ICU

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# Peptic Ulcer Disease

**Symptoms**

- Episodic gnawing or burning pain, relieved or exacerbated by food
- Pain accompanied by fullness or bloating
- Pain may waken during the night
- Hx of frequent NSAID or ASA use
- May present initially with UGIB

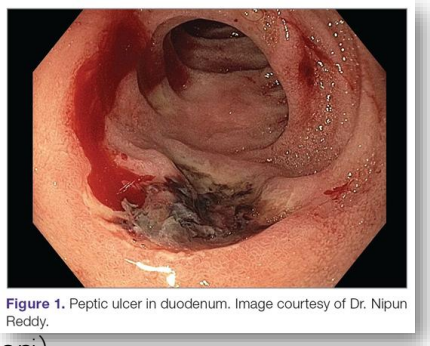

**Figure 1.** Peptic ulcer in duodenum. Image courtesy of Dr. Nipun Reddy.

**Procedures**

- Fecal antigen

**Interventions**

- Acid inhibiting meds (H2 blockers or PPIs)
- Antibiotics (clarithromycin and amoxicillin for H. pylori)
- Discontinue NSAIDS

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# GI surgeries *(Whipple, esophagectomy, resections)*

Liver transplant

- **1st goal of care**
  - Monitor for: new liver fx, Mentation , coagulation, rejection, levels of immunosuppression, infection
- **2nd goal of care**
  - Optimize liver function and functional status
    - Minimize hepatoxic meds
    - Monitor for progression of encephalopathy, coagulopathy or elevated liver tests
- **Complications**
  - Fever > 101F or chills = infection
  - Dramatic or persistent increase in LFTs – Rejection
  - Ischemic insult to the liver and biliary complications from surgery
  - Med toxicities or sensitivities

**Interventions**

Skin care
Pain management
Nutrition
DC planning
Pharmacology
Psych issues

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# GI surgeries *(Whipple, esophagectomy, resections)*

**Esophagogastrectomy**

(a) Indication: Esophageal cancer

(b) Potential complications: Anastomotic leak, paralyzed vocal cord, chylothorax, gastroparesis

**Gastrectomy**: Subtotal or total with either duodenostomy (Billroth I) or Roux-en-Y (Billroth II)

(a) Indication: Gastric cancer

**Complications**

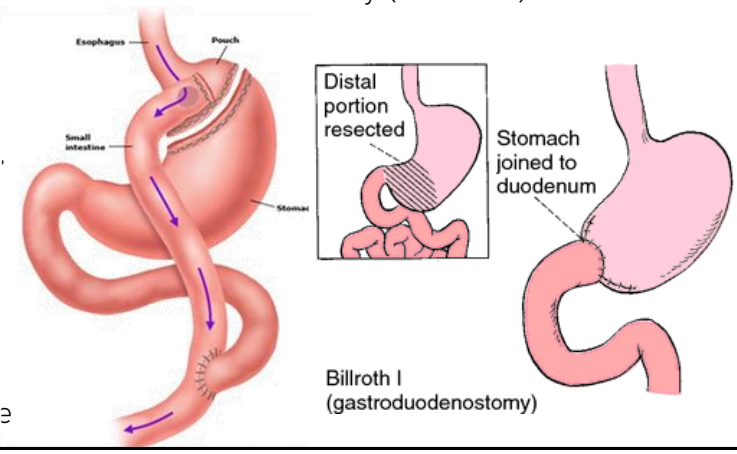
(a) Anastomotic leak, evisceration, hemorrhage, cardiac failure, dysrhythmias, Infection (wound or respiratory), malnutrition;

(b) ileus

(b) Hypovolemia

(c) Malnutrition

(d) Acute liver or renal failure

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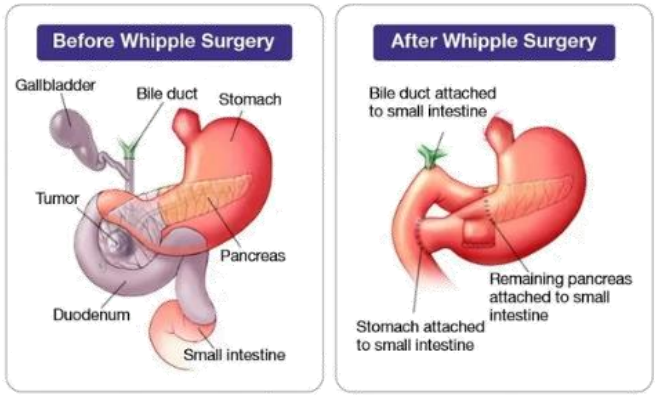
# Whipple Procedure

- Performed for pancreatic cancer, chronic pancreatitis, and bile duct cancer
- Removes all or part of the pancreas head, Gallbladder, bile duct and duodenum
- May also remove part of the stomach & lymph nodes as well

**Recovery –** months to recovery

Post op experience:

- Pain
- Nausea
- Diarrhea
- Fatigue
- Diabetes

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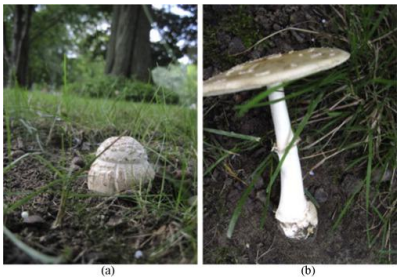
Beef wellington, Australia

*Amanita phalloides*
*(Death cap)*

*Gyromitra esculenta*
(False Morel)

## Hepatic failure/coma
## *(portal HTN, varices, hepatitis, biliary atresia)*

### Causative factors



(a) (b)

- Viral hepatitis: A & B
- Autoimmune hepatitis
- Acetaminophen toxicity
- Hepatotoxic meds/substances
- Mushroom poisoning
  - Amanita phallolides, verna and venosa;
  - Galerina autumnalis, marginata and venenata;
  - Gyromitra species
- Viral infections: herpes
- Acute Wilson's disease, Budd-Chiari syndrome
- Veno-occlusive disease and GVHD after bone marrow transplantation
- Reye's syndrome

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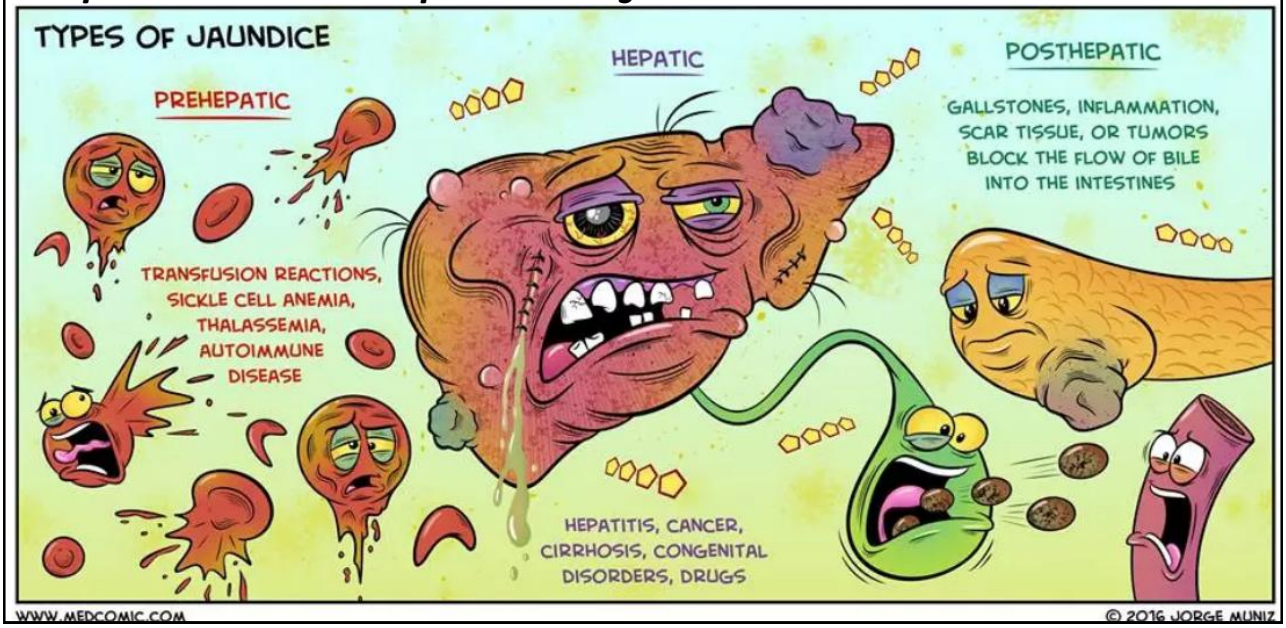
## Hepatic failure/coma
## *(portal HTN, varices, hepatitis, biliary atresia)*

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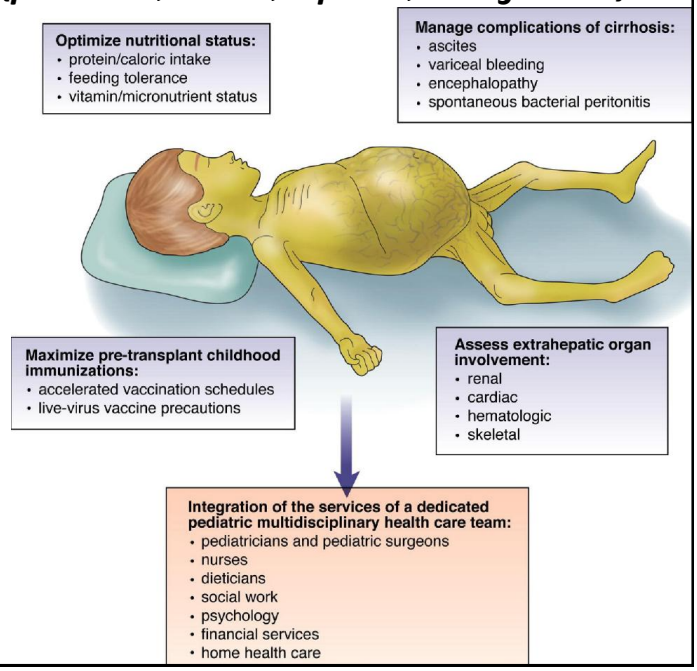
# Hepatic failure/coma *(portal HTN, varices, hepatitis, biliary atresia)*

**Presentation**:

Flulike symptoms, fever
Jaundice
Resp alkalosis of hyperventilation
Hepatic encephalopathy
Profound coagulopathy
Hypoglycemia
Hepatorenal syndrome
Sepsis, metabolic acidosis
Intracranial hypertension
Hyperdynamic circulation
Systolic ejection murmur
CV collapse

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# Hepatic failure/coma *(portal HTN, varices, hepatitis, biliary atresia)*

**Labs**:

- ↑ AST, ALT, Alkaline phosphatase and gamma-glutamyltransferase (GGT).

  *(when resolution of severe elevations accompanied with increasing PT, INR and bilirubin levels, it indicates near-complete hepatocellular necrosis)*
- ↑ serum bilirubin, CR, BUN, lactate, ammonia and WBC
- Prolonged PT and INR, factors V & VII < 20% of nml is poor prognostic sign
- Hypoglycemia, decreased H&H, + stool guaiac
- CXR – bilateral effusions and infiltrates
- CT of head, normal until very late
- Cerebral perfusion scan – decreased or absent flow late,
  - performed prior to liver transplantation to r/o brain death

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## Hepatic failure/coma *(portal HTN, varices, hepatitis, biliary atresia)*

- **Key concept:** reduced liver fx will result in prolonged ½ life of meds and metabolites
- 1st goal – optimize liver function, Establish cause
- 2nd goal – Stabilize for transplantation
  - Get labs, monitor VX/Neuro status/lytes, *phosphorous depletion occurs in a regenerating or recovering liver*
- 3rd goal – monitor and treat complications
  - Infection or sepsis
  - Brainstem herniation
  - Renal failure
  - Respiratory failure

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## Chronic Liver failure, decompensated cirrhosis


**Added signs**

Clay colored stools
Abd distention with ascites
Fetor hepaticus
Asterixis
Muscle wasting
Palmar erythema
Clubbing of the fingers
Gynecomastia in males
Splenomegaly
Hepatic bruit

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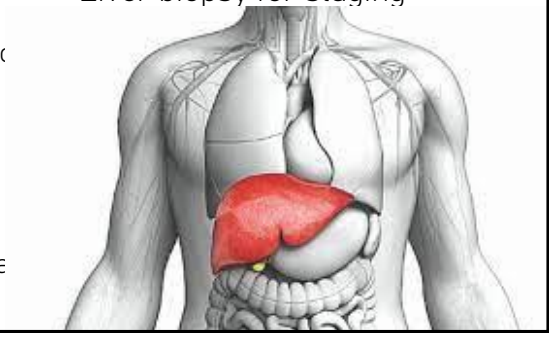
# **Chronic Liver failure,** decompensated cirrhosis

- **Labs:**
  - ALT, AST, GGT not usually extreme
  - Bili elevated
    *If bili normal & PT, INR elevated, dz of biliary stasis)*
    - Platelet count, may be low due to PHTN and splenomegaly early in the dz
    - Ammonia may be elevated
    - H&H decreased BUN, CR, until hepatorenal syndrc occurs
    - Serum sodium decreased (often critically)
    - Culture ascitic fluid, CT shows decreased liver volume with increased spleen volume, PHTN
    - MRI to evaluate organs, vessels, bile ducts
    - Abd US to determine liver/spleen sizes, hepatoma bile duct dilation, ascites

**Invasive studies**

- ERCP – shows dilated bile ducts or beading of ducts
- UGI endoscopy – varicies
- Paracentesis of ascites
- Liver biopsy for staging



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# **Chronic Liver failure,** decompensated cirrhosis

- **Management:**
  - 1st goal – Optimize remaining liver function
    - Eliminate hepatotoxic meds, remove unneeded lvs, catheters, provide nutritional supplements, monitor labs and give meds, assess volume status
  - 2nd goal – stabilize decompensation
    - ID and intervene to prevent further decompensation
    - Give BBlkrs to reduce PHTN
    - Give lactulose and abx to minimize encephalopathy
    - Fall precautions
    - Antireflux precautions
    - Monitor weight and optimize nutrition

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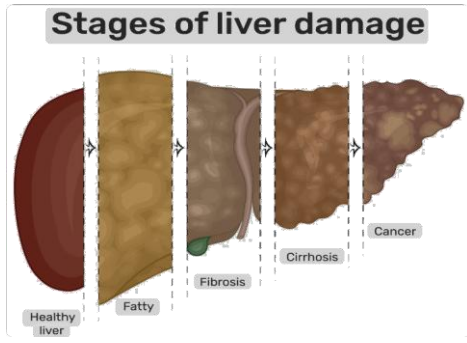
# Chronic Liver failure, Complications:

- **PHTN and splenomegaly**
  - Results in varices & pancytopenia
    *(anemia, leukopenia, thrombocytopenia)*
  - Restrict lift weight < 40 lbs
  - Monitor pancytopenia
  - Use b-blkrs
  - Surgical shunt for bleeding
  - Portosystemic stents for refractory bleeding
    *(TIPS) transjugular intrahepatic portosystemic stents)*
- **Ascites**
  - Low NA diet, diuretics
  - Accurate I&O
  - TIPS




- **Bacterial peritonitis**
  Paracentesis to verify primary vs secondary peritonitis
  Admin ABX and diuretics
- **Malnutrition**
  Reduced albumin synthesis by the liver
  Supplements, nutrition

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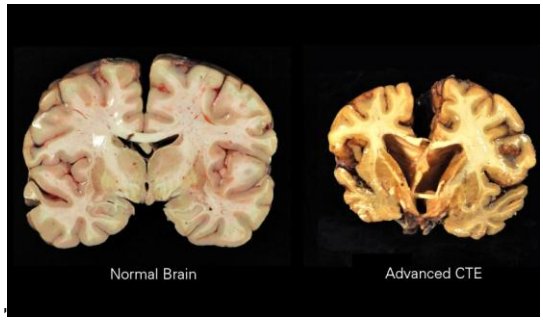
# Complications

- **Hepatic encephalopathy**
  - Toxins from gut flora accumulate due to impaired transformation and elimination
  - Tx – lactulose to enhance GI motility
- **Pulmonary complications**
  - Hypoxemia, hepatohydrothorax,
  - intrapulmonary vascular shunting,
  - hepatopulmonary syndrome
- **Hepatorenal syndrome**
  - From decreased circulating plasma volume, vasoconstriction mediators diverting renal blood flow
  - Tx with nephrology consult and dialysis
- **Infection or sepsis**
  - Depressed immune system, breaks in skin barrier, aspiration
  - ABX

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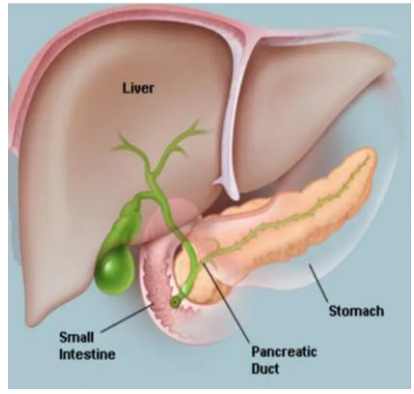
# Pancreatitis

*Results of release of digestive enzymes into the tissue of the pancreas – auto digestion, inflammation, tissue destruction, injury to adjacent organs*

**Causes**

- ETOH, gallstone, recent surgery or ERCP, viral illness, trauma, hypertriglyceridemia
- Can resolve spontaneously or progress to life-threatening condition
- Chronic from long term ETOH, results in inability to digest fats, proteins & carbs properly, reduced insulin = hyperglycemia
- Hemorrhagic pancreatitis is emergent condition where enzymes erode through a major abdominal vessel




**Symptoms**

- Sudden dull and steady pain in the LUQ or epigastrium
- Onset that increases in severity.
- Abdominal tenderness and guarding with NV anorexia
- Fever, tachycardia and hypovolemia may ensue

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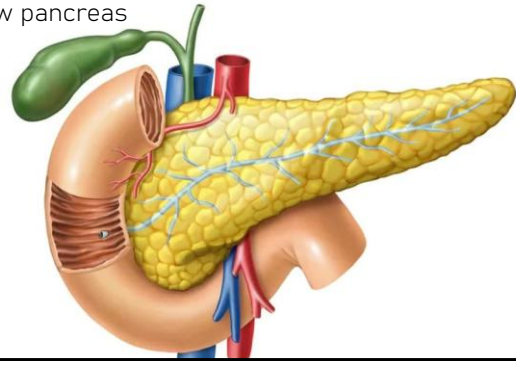
# Pancreatitis

**Procedures**

- Serum amylase rises quickly but returns to normal 24-72 hrs.
- Urine amylase is elevated up to 2 weeks
- Serum lipase rises slowly for up to 2 weeks (specific to pancreatitis)

Diagnosis: 2 of 3 criteria: abdominal pain, elevated serum lipase or amylase, abdominal imaging findings consistent with acute pancreatitis

- Lytes, CBC, hepatic profile, glucose
- Ultrasound can view biliary tract but is often unable to view pancreas
- Contrast CT abd
- Abd x-ray to check for free air of perforation



**Interventions**

- IV fluids and meds
- MSO4 can cause spasms in sphincter of Oddi so don't use
- Antiemetics
- Replace serum calcium with IV infusion
- Frequent reassessment
- IV antibiotics if septic

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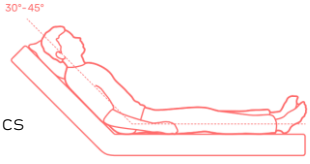
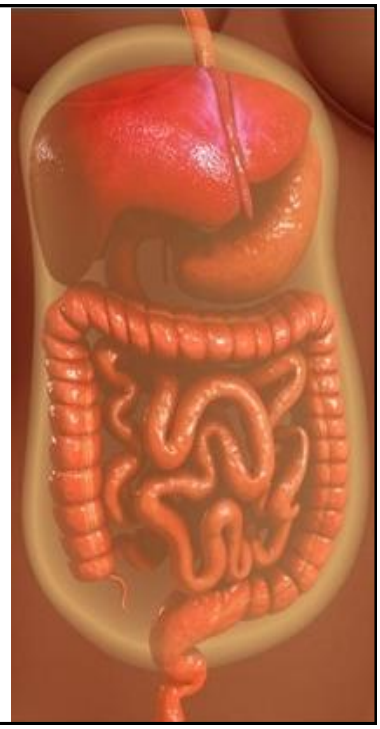
# Peritonitis

- **Primary**
  - Spontaneous peritonitis occurs when blood borne organisms enter the peritoneal cavity as a complication of liver or kidney disease
- **Secondary**
  - More common, occurs when abd. organs perforate as in appendicitis, pancreatitis, diverticulitis, PUD and perforated small bowel or penetrating injury
- **Symptoms**
  - Pain diffuse, severe and worsens with movement
  - Hypovolemic shock, abd tenderness, guarding and rigid abdomen, rebound tenderness, N/V, Diarrhea or constipation, bloating
- **Interventions**
  - NPO, NGT monitor I&O
  - Semi-fowler's position
  - IV fluids and electrolytes
  - Analgesics, antiemetics, antibiotics
  - Anticipate surgical intervention



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# Acute Gastroenteritis

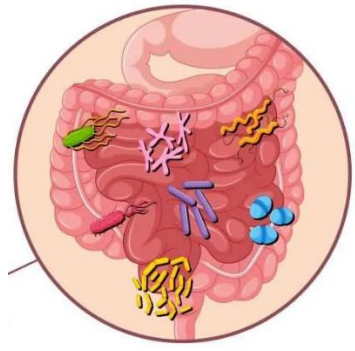
*Bacterial, viral or chemical origin*

**Symptoms**

- Diarrhea with nausea and vomiting
- Pain is diffuse, crampy and lower abdominal
- Fever
- Dehydration with tachycardia and warm dry skin
- When splenomegaly present, bacterial origin
- Assess similar symptoms in others – food poisoning or recent travel – intestinal parasite

**Procedures**

- Ova and parasite stool testing
- r/o appendicitis
- r/o gastritis *(LUQ or epigastric pain of gastric mucosa irritation from smoking, ETOH, meds)*



**Interventions**

IV fluids and electrolytes

Antiemetics

Pain control

Keep NPO till vomiting passes then po fluids with glucose and lytes (Pedialyte)

41

# Appendicitis

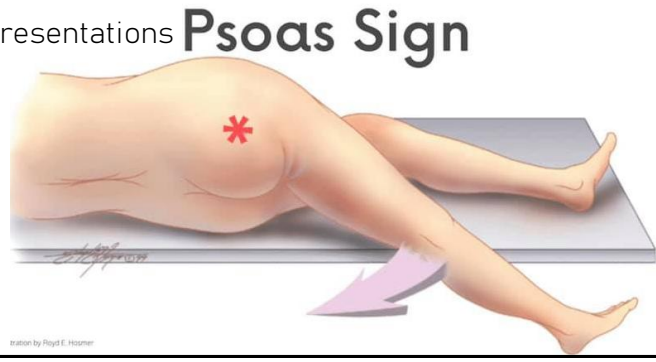
*Obstruction of appendiceal lumen →↓ blood supply → necrosis, perforation & peritonitis*

**Presentation**

- mild fever, dull steady periumbilical pain, anorexia nausea
- vomiting that does not precede abd pain
- Over 12-48 hrs, pain moves to RLQ ' McBurney's point' with positive psoas sign
- Rebound tenderness with abd rigidity
- CT over US, with contrast for atypical presentations

**Interventions**

- NPO
- IV fluid
- Analgesics, antiemetics and antibiotics
- Prepare for surgical intervention

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# GERD and Esophagitis

- *acid pH<3, coagulative necrosis, eschar keeps more superficial*
- *alkali > 11, liquefactive & more extensive damage*
- *TAR is titratable acid or alkali reserve and predicts amt of acid or alkali required to bring substance pH to 8*

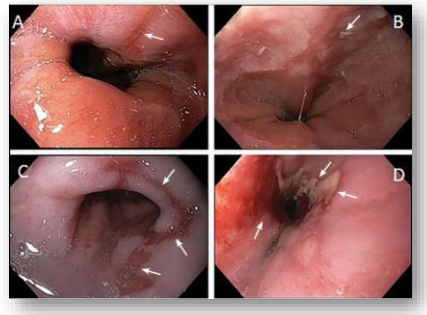
*Gastroesophageal Reflux Disease – stomach acid erodes esophagus*
*Esophagitis – results from GERD, infections, radiation, caustic ingestions*

**Symptoms**

- Substernal pain, positional, worsens when supine, increases with swallowing
- Occasional vomiting
- Weight loss
- Sore throat with raspy voice
- GI bleeding episodes reported

**Intervention**

- Weight loss recommendation
- Avoid foods that relax lower esophageal sphincter,
  *coffee, alcohol, chocolate fatty foods and smoking*
- Elevate HOB, avoid food/drink before HS
- GI cocktail, PPI, H2 blockers

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# Mallory – Weiss Syndrome

- *Results from violent vomiting asynchronous with gastric regurgitation causing a longitudinal mucosal tear at the gastroesophageal junction*
- *Similar to Boerhaave syndrome which differs in that the treatment is surgical due to multiple transmural lacerations to the distal esophagus*

**Symptoms**

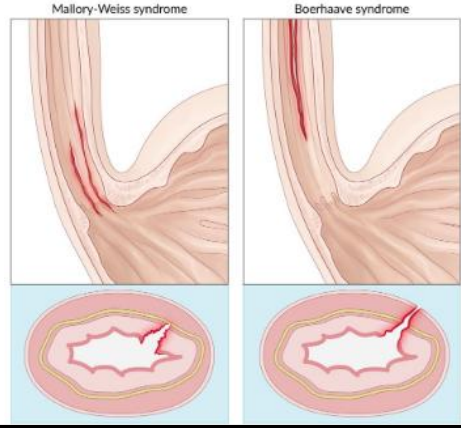
- Hx of vomiting followed by hematemesis
- Hx of ETOH, ASA, heavy lifting, coughing, bulimia or pregnancy
- Red or coffee ground emesis
- Hematochezia (maroon colored stool)
- With or w/o melena (black tarry stool with strong odor)

**Procedures**

- NGT to assess for occult blood
- UGI
- Labs

**Interventions**

- IV
- Antiemetics
- Prepare for endoscopy
- Avoid balloon tamponade if possible

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# Cholecystitis

*Acute or chronic inflammation of the gallbladder, usually from a stone*

**Symptoms**

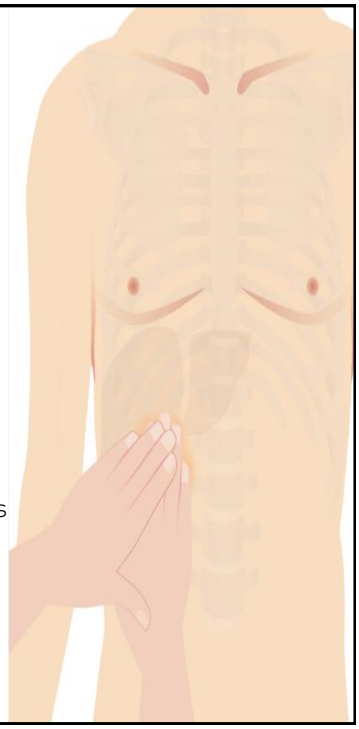
- RUQ pain radiates to back, Rt shoulder or scapula after a high fat meal
- Pain – may be colicky initially but becomes constant
- + Murphy sign – gasp with palpation below Rt costal arch
- Low grade fever and tachycardia from infection
- Jaundice if significant obstruction
- GI upset N/V, anorexia, flatulence or fat intolerance

**Procedures**

- Labs show elevated WBC, Bili and ALT/AST
- US, HIDA scan (hepatobiliary iminodiacetic acid)
- Abd CT scan, cholangiogram, cholecystogram, ERCP, flat & upright x-rays

**Interventions**

- NGT for vomiting
- IV fluids and electrolyte replacement
- Antiemetics and analgesics
- Broad spectrum antibiotics
- Anticipate endoscopy



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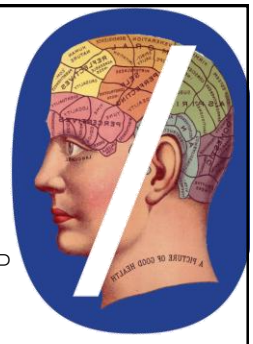
# Irritable Bowel Syndrome



*IBS is characterized by abdominal pain and altered bowel function without structural or biochemical abnormalities. Diagnosis is one of exclusion.*

IBS has three components:
- Altered GI motility
- Visceral hyperalgesia
- Psychopathology

**Symptoms**
- Abd pain with constipation, diarrhea or both
  - Pain usually in lower abdomen
  - Described as crampy or generalized ache with periods of cramping
  - May be relieved with a bowel movement
- Anxiety and stress may be a factor
- May have recent weight loss with diarrhea

**Procedures**
- CBC for anemia, ESR and CMP
- Stool for blood O&P, C.Diff
- Abd CT to r/o obstruction
- Colonoscopy

**Intervention**
- Analgesics, antidiarrheals, anticholinergics, prokinetics and antidepressants
- Psych referral
- Dietary modifications
  - More fiber
  - Avoid fluids with meals
  - Limit lactose, fructose, gluten
  - Increase fluid intake for constipation

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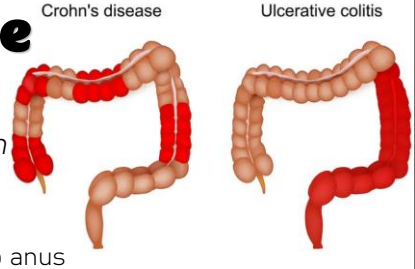
# Inflammatory Bowel Disease




*Intestines inflamed, usually due to auto-immune reaction*

**Two types**
- Ulcerative colitis – involves large colon
- Chron's disease – can affect any part of the GI tract from mouth to anus

**Procedures**
- Routine labs
- Albumin to assess nutrition
- Diagnosis by endoscopy
- Abd x-rays can see colonic dilation, evidence of perforation or obstruction

**Intervention**
- Bowel rest with IV rehydration

| Symptom | Ulcerative colitis | Crohn's disease |
|---|---|---|
| Pain | Cramps | Crampy or steady |
| Abdominal | LUQ tenderness<br>Abd distention | Periumbilical<br>RLQ<br>Abd pain |
| Stool | Bloody<br>Severe diarrhea | Signs of obstruction |
| Weight | Loss | Loss |
| Other | Fever and tachycardia | Intermittent fever<br>Associated with anal fissures, perianal fistulae or abscesses |

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# Diverticulitis

*Small outpouchings anywhere in the GI tract, most common in the sigmoid colon*

Diverticulosis – uninflamed diverticula, associated with a low-fiber diet, constipation and obesity

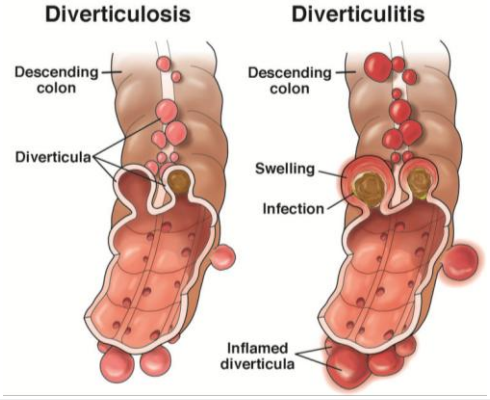
Diverticulitis is the inflammation of one or more diverticula resulting in focal necrosis and perforation due to obstruction of diverticula by fecal material or food.

**Symptoms**

- LLQ pain and tenderness (left appendicitis)
- Anorexia, N/V, Constipation, Diarrhea
- Fever and peritonitis if perforated

**Procedures**

- Usual labs, CBC for WBC evidence of infection, BMP for electrolyte imbalances
- CT scan or abdominal x-rays

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# Esophageal Obstruction

**Causes**: Children: ingested foreign body
Adults: food bolus or bone

**Symptoms**

- Hx of foreign body ingestion may not be present
- Difficulty swallowing
- Drooling
- SQ emphysema of the neck when esophagus perforated

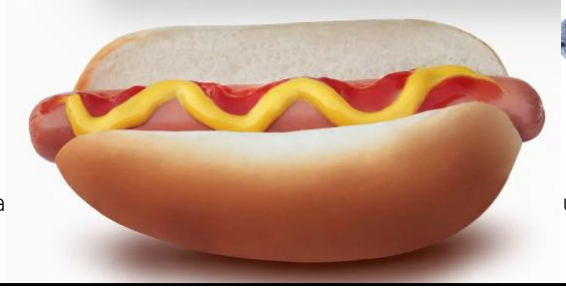
**Procedures**

- Chest / neck x-rays

**Interventions**

- IV admin of glucagon to relax
- Upright position
- Esophagoscopy to remove

**NOTE**: if no sharp edges and ca ut difficulty



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- **John has been diagnosed with GERD. It's crucial to educate him about his condition. What would be an essential piece of advice to include in his discharge instructions?**

A. Encourage John to increase his intake of spicy and greasy foods
B. Advise John to start a heavy weightlifting regimen immediately
C. Suggest John increase his consumption of alcoholic beverages
D. Avoid reclining or lying down for three hours post-meal

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- **John has been diagnosed with inflammatory bowel disease. What distinguishes the two types of this condition in terms of areas affected in his system?**

A. "Chron's disease can impact any segment of the GI system while ulcerative colitis is limited to the large colon.
B. Both Chron's and UC affect the entire GI system equally
C. Chron's affects only the large intestine, and UC affects the small intestine
D. Chron's primarily affects the stomach and small intestine, while UC affects the large intestine and rectum.

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- **What type of discomfort would Mr. Smith likely experience if he was suffering from pancreatitis?**

A. Epigastric pain that radiates to the back
B. Severe chest pain that mimics a heart attack
C. Continuous pain in the lower left abdomen
D. Sudden sharp pain in the lower right abdomen

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- **John is rushed to the ED due to esophageal varices. Can you identify the most severe complication that could arise from his condition?**

A. Pulmonary embolism
B. Hypovolemic shock
C. Arrhythmia
D. Stroke

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- **John has developed small pouches known as diverticula in his GI tract. When they become inflamed it is referred to as diverticulitis. What is the most typical area of the intestines where these tend to form?**
  - A. Sigmoid colon
  - B. Jejunum
  - C. Ileum
  - D. Duodenum

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- **What is a late sign of intussusception?**
  - A. Colicky pain
  - B. Ribbon-like stools
  - C. Left lower quadrant tenderness
  - D. Currant jelly-like stools

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# Reference


- Referenced Sheehy's Manual of Emergency Care, 8th edition, Pages 235-245
- Septic Peritonitis, Brown et all, NIH StatPearls, September 2022 https://www.ncbi.nlm.nih.gov/books/NBK526129/#:~:text=Concerning%20signs%20present%20in%20a%20high%20percentage,spontaneous%20bacterial%20peritonitis%20are%20asymptomatic%20on%20presentation.
- Caustic Ingestions, Bielecki et al, StatPearls, Jan 2024 https://www.ncbi.nlm.nih.gov/books/NBK557442/
- CEN exam study guide, Judy Stevenson, 2023


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# Behavior & Toxins

CCRN question review

1

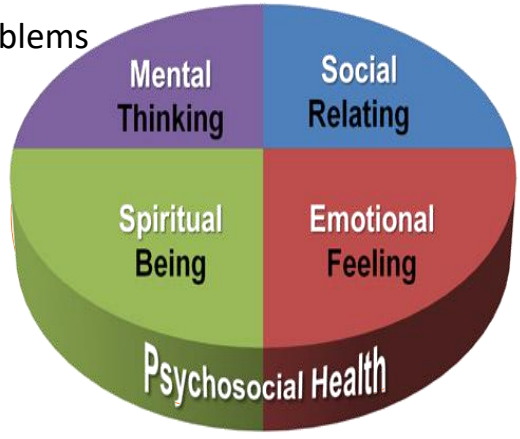
## Behavioral Content

- Abuse/Neglect
- Antisocial behaviors, aggression, violence
- Delirium and dementia
- Developmental delays
- Failure to thrive
- Mood disorders
- Depression
- Substance dependence
- Suicidal behavior

2

# Psychosocial Assessment

- Acute care hospitalization is a potential crisis
- Preexisting mental health diagnosis
- Undiagnosed mental health problems
- Prehospitalization coping skills
- Anxiety level
- Scope of control/powerlessness
- Sources of support
- Family Stress
- Cognitive level

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# Psychosocial Assessment (cont)

- Sleep deprivation
- Pain level
- Grief and loss
- Fear level
- Attention level
- Ability to retain information
- Physical sx of mental stress


4


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## Question 1

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

The charge nurse is having trouble finding nurses who will accept responsibility for a "difficult" patient and family who have been on the unit for 2 months. Once the assignment is determined for the next shift, the next action of the nurse might be to:

A. Hold a family meeting and demand that their behavior change at once
B. Call the nursing supervisor and have the patient transferred to another unit
C. Arrange to have a nursing care conference and discuss possible solutions
D. Put a note by the charge nurse station to always assign this patient to the float or PRN nurse

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## Question 1—Rationale

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

The charge nurse is having trouble finding nurses who will accept responsibility for a "difficult" patient and family who have been on the unit for 2 months. Once the assignment is determined for the next shift, the next action of the nurse might be to:

C. Arrange to have a nursing care conference and discuss possible solutions—Communication, collaboration, and a consistent plan are what is needed. If this had been done earlier, the situation this shift might have been avoided

- Hold a family meeting and demand that their behavior change at once—A family meeting is always a good idea. Communication is always good, but we cannot demand an adult do anything
- Call the nursing supervisor and have the patient transferred to another unit—This is not a solution to the actual issue/problem
- Put a note by the charge nurse station to always assign this patient to the float or PRN nurse—Continuity of care works best with behavioral or customer service issues

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## Delirium

› ***"Characterized by rapid onset and fluctuating course, the symptoms of delirium include disturbances in consciousness and attention and changes in cognition, such as memory deficits or perceptual disturbances"***

› Hallucinations, illusions, and delusions are not required

› Not psychosis

› Old names?

› Potentially avoidable

› Must be assessed on a regular basis

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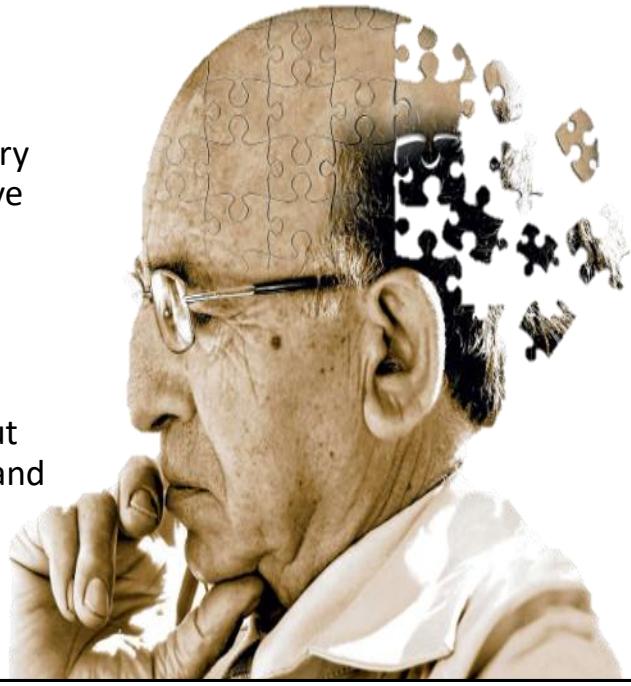
# Dementia

- ***Gradual*** onset of memory impairment and cognitive disturbances
- ***Slow, steady*** decline in cognitive function
- Can be organic or metabolic in etiology, but typically ***not reversible*** and often not treatable



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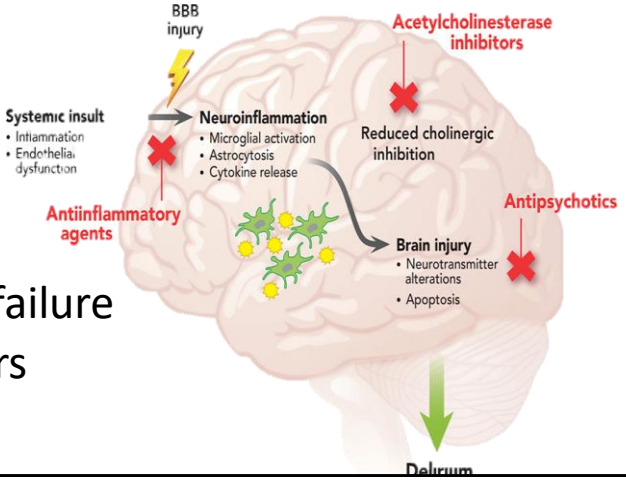
# Delirium: Etiologies and Risk Factors

## *All things in acute care*

- History of …
- Medical history of
  - CHF
  - HIV
  - Renal and or liver failure
  - Endocrine disorders
  - ***CoVID-19***

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# Delirium: Clinical Presentation

- Disorientation/confusion
- Decreased attention span and ability to focus
- **Hyperactive type**
  - Restless and agitated
  - Does not follow commands
  - Wide mood swings
  - Attempts to get out of bed
- **Hypoactive type**
- More common, worse outcome
  - Lethargy
  - Withdrawal
  - Decreased responsiveness

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# Delirium

- **Prevention!**
- **Early ID of risk factors**
- **THINK**
  - **T** oxic Situations *(CHF, meds, organ failure)*
  - **H** ypoxemia
  - **I** nfection/Immobilization
  - **N** onpharmacological interventions
  - **K**$^{+}$ or Electrolyte problems
- **Accurate Assessment**
  - Delirium Rating Scale
  - Confusion Assessment Method – ICU
  - Richmond Agitation and Sedation Scale

*Assess Sedation First!*

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TABLE 5.

**Delirium and Dementia Screening Measures**

| Measure | Purpose |
|---|---|
| *Delirium* | |
| Confusional Assessment Method[32] | Quickly identify delirium in clinical and research settings |
| Confusional Assessment Method in the ICU[33] | Monitor delirium in ICU settings |
| Richmond Agitation and Sedation Scale[34] | Measure agitation or sedation level |
| Nursing Delirium Screening Scale[35] | Measure continuous delirium in hospital settings |
| *Dementia* | |
| Montreal Cognitive Assessment[36] | Assess orientation, attention, memory, language, visual construction |
| MoCA-Blind[37] | Assess orientation, attention, memory, and language in examinees who are blind |
| Dementia Rating Scale-2[38] | Measure cognitive functioning in examinees with known or suspected dementia |
| Repeatable Battery for the Assessment of Neuropsychological Status[39] | Measure cognitive functioning in adults with neurological disturbance |
| Mini-Mental State Examination[40] | Screen for mental impairment |

ESC)

um

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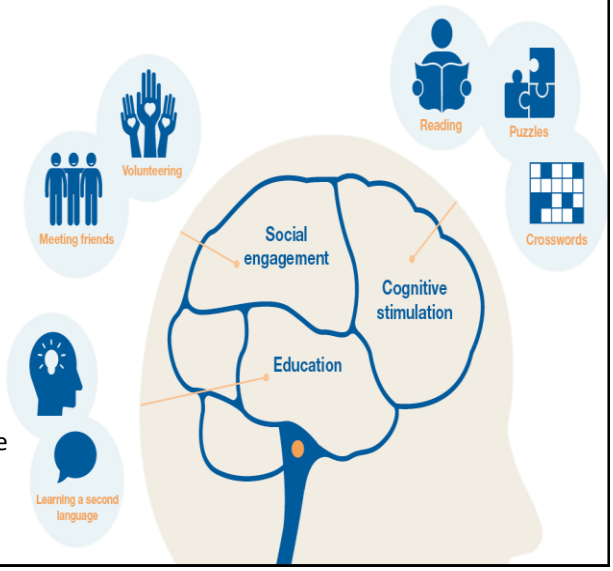
13

# Delirium

- Treatment – Modification of risks
- Review all medications
- Treat electrolyte and metabolic derangement
- Nonpharmacological
- Pharmacological
  - Analgesia, no benzos, resume psych meds, tx withdrawal syndromes, use antipsychotics
  - Avoid Haldol
  - Tx neuropathic pain with gabapentin/carbamazepine as 1st line
  - Neuraxial analgesia with rib fractures/abd AO OR

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## Treatment
# Delirium (cont.)

### The ABCDEF Bundle

- A — Assess, prevent, and manage pain
- B — Both spontaneous awakening trials and spontaneous breathing trials
- C — Choice of analgesia and sedation
- D — Delirium: assess, prevent, and manage
- E — Early mobility and exercise
- F — Family engagement and empowerment

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# Question 2

***A 78 y/o hearing-impaired patient was admitted to the telemetry unit for syncope 5 days ago. The nurse notices that the patient is confused off and on, appears more withdrawn, and is not interacting with visitors as much today. The most appropriate nursing action would be to:***

A. Move the patient to a private room and limit visitors

B. Place the patient on the unit sleep protocol and review medication list

C. Keep the lights on in the room so he can see where he is at all times

D. Discuss with the physician the need for an antidepressant

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## Question 2—Rationale

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

A 78-year-old, hearing-impaired patient was admitted to the telemetry unit for syncope 5 days ago. The nurse notices that the patient is confused off and on, appears more withdrawn, and is not interacting with visitors as much today. The most appropriate nursing action would be to:

B. Place the patient on the unit sleep protocol and review medication list—The hospital environment and change in routine are the first things to consider as causes of delirium
   - Move the patient to a private room and limit visitors—The lack of stimulation might make the delirium worse
   - Keep the lights on in the room so he can see where he is at all times—Lighting can help with safety concerns, but might disrupt sleep even more
   - Discuss with the physician the need for an antidepressant—Before prescribing medications, a diagnosis should be made

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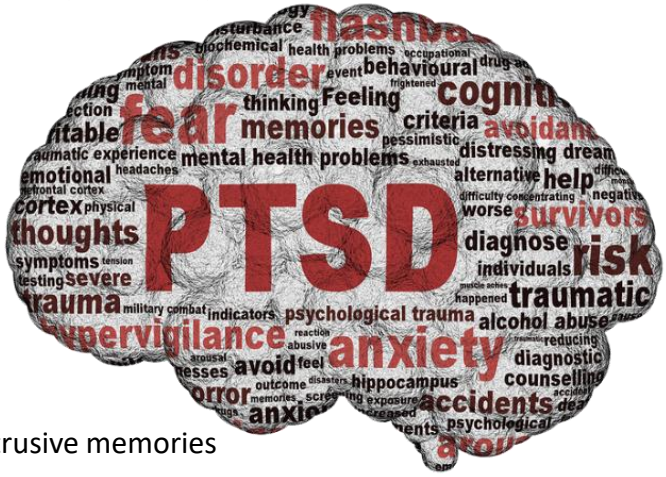
- ASD first month, PTSD is longer lasting
  - ASD from MVA = 13-24%
- **Risk factors**
  - Trauma
  - Military
  - Assault
  - Depression/anxiety
  - Illicit med use
  - Comorbid conditions
- **Diagnostic criteria**
  - Recurrent involuntary intrusive memories
  - Traumatic nightmares
  - Dissociative reactions (flashbacks)
  - Marked physiologic reaction (HR, SOB)
  - Significant distress or impairment in functioning




**PTSD**

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# PTSD

**Treatment**

- **ASD**
  - Good social support
  - Eliminate exposure to stressors
  - Psychiatric or cognitive behavioral therapy
  - Eye movement desensitization and reprocessing
- **PTSD**
  - Communication of emotions
  - Medications
    - Antidepressants
      - (paroxetine, sertraline, venlafaxine)
    - Alpha blockers (prazosin)
    - Avoid benzos


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# Mood Disorders

- **Depression**
  - An abnormal emotional state characterized by exaggerated feelings of sadness, melancholy, dejection, worthlessness, emptiness, and hopelessness that are inappropriate and out of proportion to reality
    - **Etiology and Risks**
      - Fear and anxiety related to illness
      - Response to loss and/or grief and/or deprivation
      - Diminished self-esteem
      - Guilt – real or perceived
      - Metabolic causes
      - Sleep deprivation

*All things critical care!*

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## Behavioral Health Issues: Nursing Priorities

- Identify and request mental health consultation
- Safe environment
- Identify and treat the cause
- Risk of injury?
- Orientation


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- Assist with
  - Crisis management
  - Stress management
  - Coping skills
  - Social Support

- Pharmacological management
- Education of patient/family/support system
- Discharge planning

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## Question 3

A patient with a documented history of schizophrenia is admitted with diabetic ketoacidosis. A priority of the admission nurse would be to do all of the following, except:

A. Review all preadmission medications
B. Contact the patient's counselor with the patient's permission
C. Hold all psychiatric medications pending regulation of the blood glucose level
D. Ask the patient if he knows why he was admitted

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## Question 3—Rationale

A patient with a documented history of schizophrenia is admitted with diabetic ketoacidosis. A priority of the admission nurse would be to do all of the following, except:

C. Hold all psychiatric medications pending regulation of the blood glucose level—Medications should only be held when there is a clear benefit to doing so. Many of the psych meds have a long half-life, and holding them can affect the steady state

- Review all preadmission medications—Should be done with all patients
- Contact the patient's counselor with the patient's permission—Continuity of care is important with every admission, and always important with behavioral health issues
- Ask the patient if he knows why he was admitted—Should be done with all admissions

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## Question 4

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

Three days after undergoing elective hip replacement, a patient has HR 125, RR 36, BP 164/84; is diaphoretic; and has dilated pupils. He is anxious, denies pain, and appears to be having auditory hallucinations. Despite frequent reorientation from the nurse, the patient continues to try to climb out of bed. Which of the following orders might be appropriate?

A. Lorazepam (Ativan)
B. Soft wrist restraints
C. Methadone
D. Leaving the TV or radio on in the room for background noise

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## Question 4—Rationale

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

Three days after undergoing elective hip replacement, a patient has HR 125, RR 36, BP 164/84; is diaphoretic; and has dilated pupils. He is anxious, denies pain, and appears to be having auditory hallucinations. Despite frequent reorientation from the nurse, the patient continues to try to climb out of bed. Which of the following orders might be appropriate?

A. Lorazepam (Ativan)—The timing and assessment indicate the patient might be in DTs. Of the four choices, prescribing a benzo would be the most appropriate
   - Soft wrist restraints—Restraining this patient would be unsafe, and might even escalate the hallucinations
   - Methadone—No indication for this medication at this point
   - Leaving the TV or radio on in the room for background noise—Decreasing the stimulation would be preferred

AACN CertificationReview

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# Substance Abuse: Nursing Concerns

- Physical / mental dependence
- Withdrawal symptoms
- Assessment of cause
- Current health
- Nutritional state
- Tolerance/cross tolerance
- Mental health issues
- Self-care post discharge
- Patient education and adherence
- Additional referrals
- Community and social support

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## Question 5

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

A nurse walks into the family waiting room and discovers a physical altercation between two visitors has just begun. The nurse should:

A. Get between the two individuals and tell them their behavior is inappropriate
B. Ask the largest man in the waiting room to break it up
C. Pull the fire alarm by the door
D. Call security

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## Question 5—Rationale

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

A nurse walks into the family waiting room and discovers a physical altercation between two visitors has just begun. The nurse should:

D. Call security—Think safety first, for yourself and everyone else. Our security colleagues are trained to handle these situations
- Get between the two individuals and tell them their behavior is inappropriate—This would be unsafe
- Ask the largest man in the waiting room to break it up—This would be unsafe
- Pull the fire alarm by the door—Although this would bring many people to the location, it is not as appropriate as calling security

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## Antisocial Behavior – Aggression and violence

- PTSD
- Post-Intensive Care Syndrome (P*CS*)
  - *Physical*
  - *Cognitive*
  - *Mental Health*
- Risk Factors
- Clinical presentation
  - Strong correlation between Delirium and PICS
  - Long Term Impact
  - Treatment/Prevention


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## Suicidal Behavior

- ICU for their physical needs
- Counseling, psychotherapy when appropriate
- Not always obvious
- Elderly, chronically and terminally ill
- Family and support system – essential
- ETOH and drugs
- Hard for critical-care team

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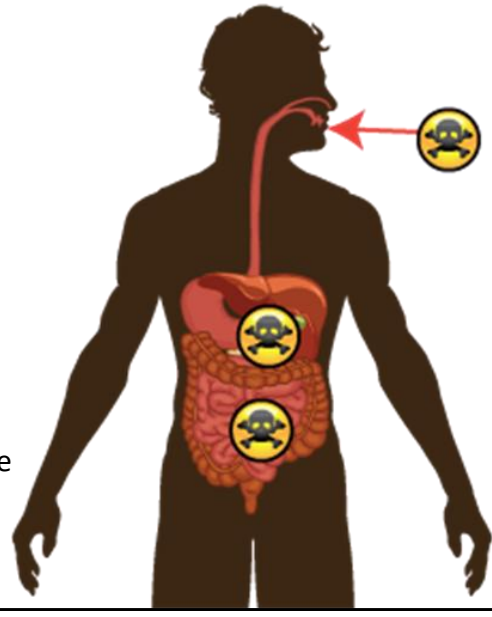
## Toxic Ingestion/Inhalations/Drug Exposure

- Absorption
- Distribution
- Metabolism
- Elimination
- Primary survey
  - ABCs
  - DE and poison control
- Secondary survey
  - Level of consciousness (LOC)
  - Heart rate, resp rate, blood pressure
  - Temperature
    - Elev with salicylates and cocaine
    - Low with barbs and opiates



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## Assessment (cont)

- Full system assessment
- History
- Environment/bystanders
- **AMPLE**
  - **A**llergies
  - **M**edications
  - **P**ast Illnesses
  - **L**ast meal
  - **E**vents

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## Assessment (cont)

- **Diagnostic tests**
  - **Toxicology screens**: blood, urine, gastric aspirate
  - CBC, chemistry, liver function tests, coagulation profile, arterial blood gases
  - Chest x-ray, ECG
  - Abdominal x-ray
  - Pregnancy test


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# Rapid response

- Unknown substance, unconscious victim
  - **Dextrose 50% IV**
    - Hypoglycemia
  - **Thiamine 100 mg IV**
    - Wernicke-Korsakoff syndrome
  - **Naloxone 2 mg IV, IM or ET**
    - Narcotic antagonist

**4 Universal Antidotes**

**"TONG"**

- ☐ Thiamine
- ☐ Oxygen
- ☐ Naloxone
- ☐ Glucose

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# Treatment Options (cont)

- Antidote
- Prevent absorption
- Enhance elimination
- Orogastric lavage
- Emetics (not recommended)
- Activated charcoal
- Diuresis
- Whole bowel irrigation
- Hemodialysis

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New Slide

# Charcoal

- *Charcoal stops toxins from being absorbed in the stomach by binding to them. The body is unable to absorb charcoal, and so the toxins that bind to the charcoal leave the body in the feces.*
  - *calcium channel blockers*
  - *carbamazepine (Tegretol)*
  - *NSAIDs and other OTC anti-inflammatories*
  - *sedatives*
  - *dapsone*
  - *malaria medications*
  - *methylxanthines (mild stimulants) B2 agonists examples: aminophylline*
- *Ones that activated charcoal cannot help clear:*
  - *alcohols*
  - *lye*
  - *iron*
  - *lithium*
  - *petroleum products*
    - **any type of corrosive*

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## Toxic Exposure: Common Toxins

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

Acetaminophen

Liver failure

N-acetylcysteine
(NAC, Mucomyst)

**Assessment**
- Nausea/vomiting
- Right upper quadrant pain
- Bleeding
- Elevated liver function tests

**Treatment**
- NAC
- Gastric lavage
- Charcoal

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## Toxic Exposure: Common Toxins (cont)

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

**Alcohol**

Respiratory depression

Seizures

**Liver failure**

No direct drug antidote
IV fluids

**Assessment**
- Altered LOC
- Alcohol breath
- History
- Arterial blood gases

**Treatment**
- Protect airway
- Nasogastric tube, lavage
- IV fluids
- Seizure precautions
- Manage/treat electrolytes

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## Toxic Exposure: Common Toxins (cont)

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

**Carbon monoxide**

Hypoxia

Replaces oxygen on hemoglobin

**Remove from exposure**
**Administer oxygen**

**Assessment**
- Altered LOC
- Headache, seizure
- Flu-like complaints

**Treatment**
- 100% oxygen
- Hyperbaric oxygen

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## Toxic Exposure: Common Toxins (cont)

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

**Cyclic antidepressants**

**Central nervous system**
**Cardiovascular**
**Anticholinergic**

**Sodium bicarbonate**
**Physostigmine**

**Assessment**
- Electrocardiographic changes
- Hypotension
- Altered LOC

**Treatment**
- Sodium bicarbonate
- Nasogastric lavage
- Charcoal
- Treat heart rhythm, pacemaker

Antilirium
Also Counter to atropine OD

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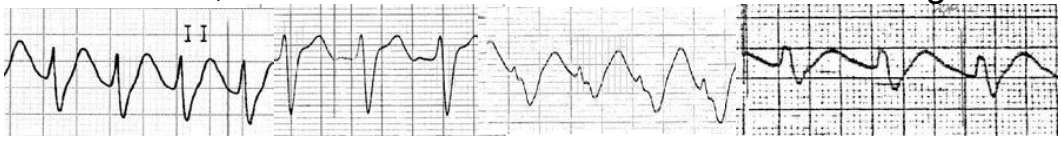
Prolongation of the QRS is a reflection of TCA tissue concentrations and is predictive of both seizures and cardiac arrhythmias.
TCAs block voltage gated Na+ channels in a use dependent manner (i.e. block increases with heart rate). As the degree of Na+ channel block increases with use, the QRS width will increase with increasing heart rates.




However, the Na+ channel blockade also slows the heart rate. The presence of a very wide QRS complex without tachycardia is a sign of severe cardiotoxicity.
Other cardiac channel effects include reversible inhibition of the outward potassium channels responsible for repolarisation giving a mechanism for QT prolongation and arrhythmia generation (Teschemacher et al, 1999)
TCAs demonstrate a dose dependent direct depressant effect on

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## Toxic Exposure: Common Toxins (cont)

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

**Cocaine**

**Sympathetic response**

**None**

**Assessment**
- Hypoxia
- Stroke
- Head injury
- High temperature
- Myocardial infarction

**Treatment**
- Treatment presentation
- Benzodiazepines—sedation
- Vasodilators—hypertension
- Acute confusional state treatment
- Provide cooling
- Seizure treatment

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## Toxic Exposure: Common Toxins (cont)

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

**Opiates**

**Cardiovascular and respiratory depression**

**Naloxone**

**Assessment**
- Decreased heart rate
- Decreased blood pressure
- Decreased respiratory rate

**Treatment**
- Administer naloxone

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## Toxic Exposure: Common Toxins (cont)

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

| | |
|---|---|
| Salicylate | **Assessment**<br>Hyperventilation<br>Respiratory alkalosis<br>Metabolic acidosis<br>Nausea/vomiting<br>Hyperpyrexia<br>Bleeding<br>**Treatment**<br>Arterial blood gases<br>Blood levels<br>Chemistry, coagulation profile<br>Nasogastric lavage, charcoal<br>IV fluids<br>Treat metabolic derangement<br>Lower temperature<br>Treat seizures<br>Hemodialysis |
| Respiratory stimulation | |
| Metabolic acidosis | |
| Hyperthermia | |
| Hypoglycemia | |
| Platelets—bleeding | |
| No direct drug antidote<br>Sodium bicarbonate | |

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## Overdose summary

| | Medication overdose physical signs: |
|---|---|
| – Amphetamines | tachycardia |
| – Digitalis | bradycardia |
| – Salicylates | tachypnea |
| – BBLkrs | heart block |
| – Tricyclic antidepressants | heart block |
| – SSRIs | Abn rhythm |
| – barbs, opiates | Bradypnea, Respiratory acidosis |
| – amphetamines | Dilated pupils, elevated temp/BP |
| – opiates | Constricted pupils, Bradypnea |
| – SSRIs | Serotonin syndrome |
| – salicylate, methanol OD | Metab acidosis |
| – lower dose salicylates | Respiratory alkalosis |
| – dig OD | Hyperkalemia |

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# Death and Dying

- **Five stages –** *KÜbler-Ross*
  - Denial/isolation
  - Anger, rage, envy, resentment
  - Bargaining
  - Depression
- ***Confirmation studies may include EEG, cerebral blood flow studies***
- ***Use palliative care strategies***
  - Does not experience discomfort, pain, SOB or anxiety during the dying process
  - Discuss goals, fears, concerns
  - Allow alone time if desired
  - Determine cultural preferences
  - Assist in validation of their feelings & Acknowledge grief
  - Prepare by describing symptoms and how they can be treated
  - Explain that pain medication is given for pain, not to hasten death
  - Role model how to touch the patient, hold hands, wipe brow
  - Create memories – lock of hair, handprint, ECG strip
  - Clean patient and room to prevent last memory of blood and soiled linens

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## Question 1

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

All of the following are anticipated treatments for acetaminophen overdose *except*:

A. Charcoal
B. NAC
C. Acute hemodialysis
D. Gastric lavage

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## Question 1—Rationale

All of the following are anticipated treatments for acetaminophen overdose *except*:

C. Acute hemodialysis—Acetaminophen is not dialyzable, unfortunately

- Charcoal—Might help to decrease absorption
- NAC—Only agent used as an antidote
- Gastric lavage—Might help to enhance elimination and decrease absorption

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## Question 2

When assessing a patient with suspected cocaine intoxication, a nurse would expect to see:

A. Chest pain, hypothermia, hypoxia
B. Tachycardia, chest pain, hyperthermia
C. Hyperthermia, hypotension, drowsiness
D. Anxiety, hypertension, hematuria

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## Question 2—Rationale

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

When assessing a patient with suspected cocaine intoxication, a nurse would expect to see:

B. Tachycardia, chest pain, hyperthermia

- Cocaine intoxication presents as a hypermetabolic state
- Hematuria is not a symptom of hypermetabolic state

AACN

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Overdose on antifreeze and what the priority is in treatment, which I believe is dialysis.

*Traditional tx of ethylene glycol poisoning consists of sodium bicarbonate, ethanol, and hemodialysis.*

Antifreeze with methanol level of 50?

Kayexalate, steroids, hemodialysis – *I chose hemodialysis but unsure*

### TOXIC ALCOHOLS AND THEIR METABOLITES


**Table 1. Commercial Sources of Toxic Alcohols**

| SUBSTANCE | FORMULA | COMMERCIAL SOURCES |
|---|---|---|
| Methanol | $CH_3OH$ | Windshield washer fluid, model airplane fuel, canned heat (Sterno), photocopying fluid, perfumes, paint, shellac, gas line antifreeze, varnish |
| Ethylene gylcol | $CH_2OHCH_2OH$ | Antifreeze, adhesives, brake and hydraulic fluids, cosmetics, de-icers, detergents, fire extinguishers, inks, lacquers, paints, pesticides, polishes, and some windshield-washer fluids |
| Isopropanol | $CH_3CHOHCH_3$ | Rubbing alcohol, solvents, lacquer |

ETOH with red smooth tongue and hyporeflexia is a

*deficit of iron (I said B-12)*

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› OD – first action dialysis or sodium bicarb – I *chose bicarb but unsure*

› ASA OD

› Patients with salicylate toxicity are volume depleted due to hyperventilation, fever, and increased metabolic activity. Fluid resuscitation should utilize D5 with 3 amps of sodium bicarbonate. The dextrose will treat the central nervous system (CNS) hypoglycemia. The sodium bicarb will help correct the metabolic acidosis. Potassium may be supplemented if hypokalemia is present. Goal urine output is 2 to 3 mL/kg per hour.[8][9]

› Patients with severe toxicity will eventually fatigue and be unable to maintain respiratory compensation for the metabolic acidosis. Mechanical ventilation, while not ideal, may be required. Consider a bolus of 1 to 2 mEq/kg of sodium bicarbonate at the time of intubation to temporize the patient's pH until hyperventilation can be resumed on the ventilator. Mechanical ventilation will not be able to compensate for the metabolic acidosis as well. Arrangements for emergent hemodialysis should be arranged following intubation. Patients may also experience respiratory distress secondary to pulmonary edema following fluid resuscitation.

› Following initial stabilization, attempts should be made to decrease the serum salicylate levels. Activated charcoal has been shown to decrease salicylate levels. However, no morbidity or mortality benefit has been shown. Gastric lavage may be considered if the patient presents after acute ingestion of enteric-coated aspirin. If there is any concern for aspiration, these options should be avoided. Whole bowel irrigation has shown no benefit and may increase absorption.

› Fluid resuscitation and serum alkalization will increase salicylate elimination. Hemodialysis can also accomplish this. Indications for hemodialysis include severe acidosis or hypotension despite fluid resuscitation; salicylate levels are greater than 100 mg/dL, mechanical ventilation, or end-organ damage. Common signs of end-organ damage in salicylate toxicity include seizures, rhabdomyolysis, pulmonary edema, cerebral edema, and renal failure. Hemodialysis removes salicylates and lactate, which should improve the patient's metabolic acidosis.

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# CCRN Review LRCCP Cardiovascular

- November 2025
- Lynnette Flynn
  - CCRN-CMC/CSC, RCIS, CHFN, CRAT, SCRN, CEI

1

## CCRN

**I. CLINICAL JUDGMENT (80%)**

**A. Cardiovascular (13%)**

1. Acute coronary syndrome
2. Aortic aneurysm, dissection, rupture (i.e. thoracic, abdominal)
3. Cardiac infection and inflammatory diseases
4. Cardiac surgery
5. Cardiac tamponade
6. Cardiac trauma
7. Cardiac/vascular catheterization
8. Cardiogenic shock
9. Cardiomyopathy
10. Dysrhythmias
11. Heart failure
12. Hypertensive crisis
13. Myocardial conduction system defects (e.g., prolonged QT interval, Wolff-Parkinson-White)
14. Structural heart defects (acquired and congenital, including valvular disease)
15. Vascular disorders (e.g., arterial/venous stenosis)
16. Vascular interventions (e.g., stents, fem-pop bypass, carotid endarterectomy)

## PCCN

**1A. Cardiovascular (20%)**

1. Acute coronary syndromes
   a. Non-ST segment elevation myocardial infarction
   b. ST segment elevation myocardial infarction
   c. Unstable angina
2. Acute inflammatory disease (e.g., myocarditis, endocarditis, pericarditis)
3. Aneurysms (dissecting or ruptured)
4. Cardiac surgery (e.g., post ICU care)
5. Cardiac tamponade
6. Cardiac/vascular catheterization
   a. Diagnostic
   b. Interventional
7. Cardiogenic shock
8. Cardiomyopathies
   a. Dilated (e.g., ischemic/non-ischemic)
   b. Hypertrophic
   c. Restrictive
   d. Takotsubo cardiomyopathy
9. Dysrhythmias
10. Heart failure
    a. Acute exacerbations (e.g., pulmonary edema)
    b. Chronic
11. Hypertension (uncontrolled)
12. Hypertensive crisis
13. Structural heart procedures (e.g., TAVR, mitral clip)
14. Valvular heart disease
15. Vascular disease

**Test Plan**

2

## Testable nursing actions

**Cardiovascular**

- Identify, interpret and respond to cardiac rhythms
- Monitor hemodynamic status and recognize signs and symptoms of hemodynamic instability
- Recognize early signs of decreased cardiac output
- Recognize indications for and manage patients with/ requiring:
  - cardiac catheterization
  - endovascular procedures
  - mechanical circulatory support devices
  - non-invasive and invasive hemodynamic monitoring
  - pericardiocentesis
  - temporary pacing

3

## Acute Coronary Syndrome

- STEMI – ST elevated myocardial infarction
  - Full thickness (transmural) necrosis due to interrupted coronary perfusion.
  - Enzymes positive after 2-4 hours
    - With peak and trough pattern in serial measurements
  - ECG
    - ST elevation
    - reciprocal T-wave inversion
    - Q waves develop as necrosis occurs
  - C/O crushing or heavy chest discomfort
    - Pain radiates to arm, neck, jaw
    - Crescendo pattern
  - Treatment: MONA BATH
    - Aspirin, Nitro, Morphine, Beta blockers ACEi, thrombolytic, heparin
    - Cathlab intervention

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## Acute Coronary Syndrome

- NSTEMI (non-transmural)
  - Enzymes positive after 2-4 hours
  - ECG
    - Dynamic ST depression
    - Q waves do not develop
  - Pain crushing or heavy discomfort
    - Lasts greater than 10-20 minutes
    - Radiates, Crescendo pattern
  - Treatment
    - ASA, TNG, Morphine, Beta blockers, Thrombolytics
    - Early intervention

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## Acute Coronary Syndrome

- Unstable Angina
  - Negative enzymes
  - Dynamic ST and T-wave ECG changes
  - Considered unstable when:
    - provoked by less demand,
    - occurs at rest or
    - After meals
    - Lasts longer than 20 min

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## ACS Pearls

**Angina**

- Lasts < 20 min
- Enzymes negative
- ST & T wave changes with symptoms
- **Treat** with aspirin, nitro, heparin and oxygen if needed
- ECG changes return to normal when ischemia is relieved.

**STEMI / NSTEMI**

- Lasts > 20 min
- Positive enzymes
- ST & T wave changes
- Q wave development in STEMI
- **Treat** with cath-lab balloon dilatation and stent, or thrombolytics if door to balloon time > 90 min

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## ACS Pearls

| Artery | Wall | Leads | considerations |
|---|---|---|---|
| LAD<br>Left anterior descending | Anterior wall LV | V1-V6 | V1-V2 antero-septal<br>V3-V4 anterior<br>V4-V5 anterior lateral<br>High risk for cardiogenic shock<br>Watch for 2nd degree type 2 AVB |
| LCX<br>Left circumflex | Lateral wall of LV | I<br>avL | |
| RCA<br>Right coronary | Inferior wall LV<br>RV<br>Conduction system | II<br>III<br>avF | Bradycardia<br>Hypotension<br>Esp with PDE4s and nitroglycerine<br>Consider RT sided leads |
| PDA<br>*Off RCA or LCX* | Posterior wall of LV | V7<br>V8<br>V9 | Consider when ST depression in V1 and V2 reciprocal change occurs during an RCA event |
| RCA | Right Ventricle | RV1-RV6 | Consider when STE in III is > STE in II<br>Or when hypotension occurs with vasodilators |

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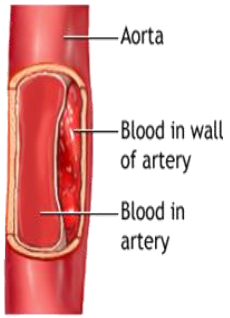
## Aortic Issues

- Aneurysm
  - Dissection
  - Rupture
    - Thoracic
    - Abdominal

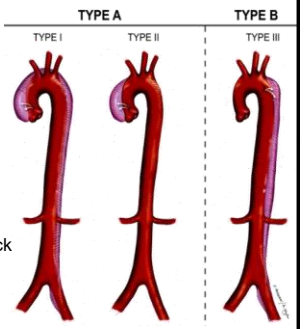



ADAM.

9

## Aortic Issues

- Aneurysm
- Dissection
  - HTN cause of 80%
  - Ascending dissection may extend to valve and pericardium
  - Ripping or tearing pain radiates to back
  - 15% have neuro symptoms
- Rupture
  - Syncope, hypovolemic shock
  - Thoracic
    - Pain to shoulders, neck and back
    - Cough hoarseness
    - dysphagia
  - Abdominal
    - Severe instant chest pain radiates to back
    - Pulsation
    - n/v means pressure against duodenum

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## Aortic Issues

- Treatment
  - Distal dissections managed medically
  - Ascending require surgery
  - Acute dissection surgical emergency
    - Stabilize BP to 100-120 mmHg
    - Assess periph pulses and BP comparing both sides
      - Differences > 20 mmHg indicate dissection
      - Proximal dissections 80% mortality
      - Postop – monitor hemodynamics, UOP, mentation
      - Distal – OR only if rupture, Marfan's or very unstable

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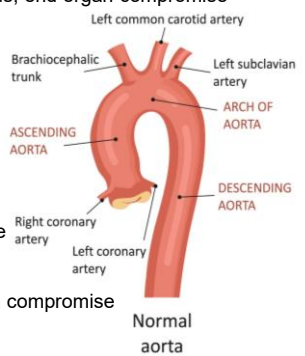
## Aortic Issues

**Complications**

- Aneurysm
  - Dissection, embolization of thrombus, end organ compromise
- ABD aneurysm
  - DIC
- Ascending
  - MI, Hemorrhagic CVA,
  - tamponade, AR, death
- Postop ascending
  - Death, CVA, end organ compromise
- Postop descending
  - cord ischemia, paralysis, end organ compromise
- Post procedure endovascular
  - small bowel infarct, gangrene

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# Cardiac Infection & Inflammation

## Endocarditis

### Risk factors

- IV drug use
- Prosthetic valve
- Poor dentition/gum disease
- UTI
- OR
- **Treatment** 6 week course abx after 3 cultures

### Symptoms

- Fever, Muscle, joint/back pain
- Murmur (regurg)
- Splenomegaly
- Chest pain
- Weight loss
- Night sweats
- Skin changes, petechiae, red or purple bumps, flat red spots on palms or soles of feet
- Hematuria

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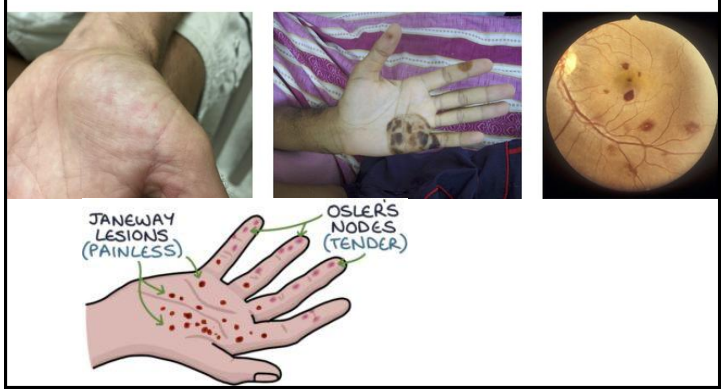
Janeway lesions and Osler's nodes are not exclusive to endocarditis
Seen in bacteremia without endocarditis, infected intravascular graft and in systemic lupus erythematosus Marrie 2008.

Janeway lesions | Osler nodes | Roth spots

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# Cardiac Infection & Inflammation

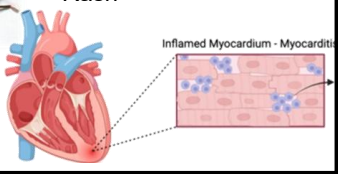
## Myocarditis

### Risk factors

- Virus
  - Covid-19
  - Coxsackie (HF&M), herpes, flu, parvo (fifth dz)
- Bacteria
  - Most common
  - Staph, strep
  - IV drugs/dental proc
- Parasites (Chagas)
- Fungi (Weak immune systems)

### Symptoms

- Fever
- Chest pain
- Fatigue/ exercise intolerance
- SOB
- Arrhythmias
- Rash

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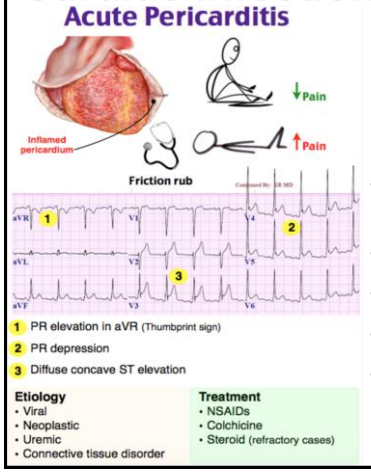
# Cardiac Infection & Inflammation




## Symptoms

- Chest pain - sharp worse with breathing, positional
- Friction rub
- SOB
- Pain in neck or shoulders
- Fever

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# Treatments

**Positioning**: Position the patient for comfort

**Pain** management

- Frequently assess pain and its characteristics.
- Pain is diminished significantly in 24 to 48 hours, may last weeks.
- Reassure the patient of the nonischemic cause of the pain.

**Pharmacology**

- **Antimicrobial** agents: If culture or serologic evidence
- **NSAIDs**: For pericarditis, pleural effusions
- **Corticosteroids**: If unresponsive to NSAIDs after 48 hours.
  Used short term and tapered quickly.
  They can contribute to recurrences due to viral proliferation.
- **Colchicine**: Pain management and to prevent recurrences
- **Anticoagulants**: Withheld due to tamponade risk
  Heparin can be used, if necessary, due to its shorter half-life and reversibility.
- **Volume** support (IV fluids) and/or inotropic agents

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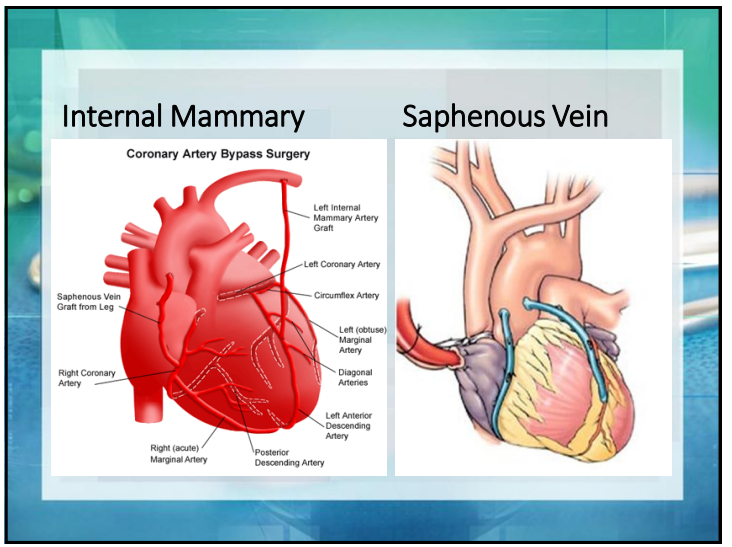


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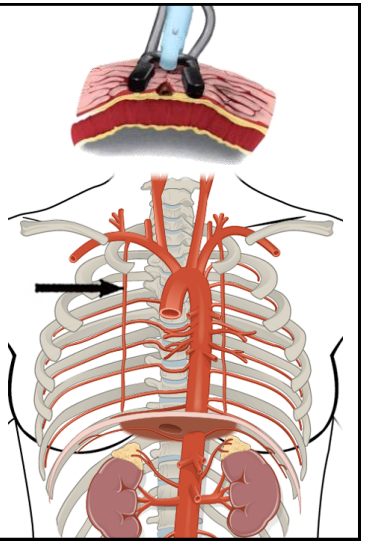
# MidCAB

- Off pump, beating heart
- Difficult to dissect LIMA long enough
- Difficult to access posterior vessels
- Difficult anastomosis



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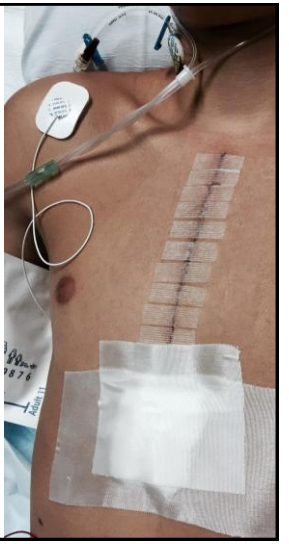
# Postoperative Management

- **Cardiac Arrhythmias**
  - Afib, flutter, VF, VT
- **Ventilatory status**
  - ABG
  - Early extubation protocol
  - Pain control
    - Local anesthetics
    - Epidurals and PCA
  - Incisional care



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# Hemodynamics

- **Pulses – assess ALL pulses**
  - Rapid Radial Pulse may indicate dysrhythmia, shock, fear, fever, hypoxia, CHF, or hemorrhage.
  - Decreased pulses in extremities may indicate peripheral embolus
- **Body Temperature – slight elevation normal**
  - Temperature rise 1-1.5° C on 1st & 2nd day post-op is normal
  - The temperature may remain elevated for 3-4 days.
- **Respirations – even, unlabored, equal breath sounds**
  - Arterial blood gases & chest x-rays as ordered.
- **Heart Sounds**
  - Pericardial Rubs - irritation and inflammation
  - A S3 gallop probably indicates hypervolemia, S4 – decreased compliance, HTN
  - Absent or diminished heart sounds are signs of Cardiac Tamponade.
- **Blood Pressure – Systolic >90 and <140**
  - Beware of Hypertension & Hypotension.
  - If the MAP is <60 tissue perfusion to organs is compromised.
  - If the MAP is >110 then it can exacerbate bleeding from the mediastinal tubes. It can also increase the left ventricular workload.
- **Pulse Oximetry - > 90%**

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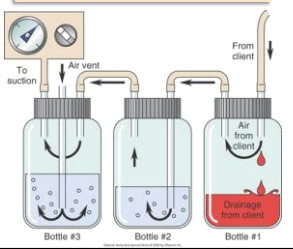
# Management of Chest Tubes & Drains

- **Chest Tubes**: drains air and fluid from pleural cavity.
- **Mediastinal Tubes**: drains fluid from mediastinal space.

- **JP drains (bulb drains):** pleural or pericardial
- Observe for air leak.
  - Clamp tube, disappearance indicates leak at insertion or in the chest
- Measure and observe the chest drainage.
- Observe for S&S of infection.

*FOCA mnemonic:*
***F**luctuation in the water seal chamber,*
***O**utput,*
***C**olor of drainage, and*
***A**ir leak.*

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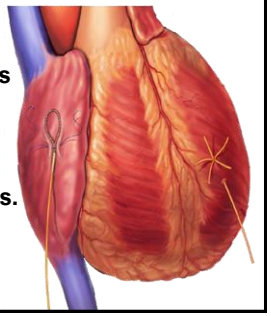
## Care of Pacing Wires

- **Wires are Atrial, Ventricular, or Ground**
  - Typically the atrial wires are located on the right and the ventricular wires are located on the left. The ground wires can be located on the right or the left. There could possibly be no ground wire.
- **Keep the wires insulated.**
- **Wear gloves to prevent microshocks**
  - Microshocks can cause fibrillation
- **Care of the pacing wire site.**
- **Risks involved in removing the wires.**



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## Epicardial Pacing

Usually Placed in OR

- May be atrial, ventricular or both
- May have a ground wire
- May have to create ground 18Ga needle
- Neg is distal and where e- flow from
  - Attach black to wire exiting the chest
  - Ventricle is on left
  - Atrial is on right
- Pos is red and where e-flow to
  - Attach red to ground

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## Fluid Balance

- **Obtain daily weights to determine if the patient is retaining fluid in the tissues (3rd spacing) or losing excessive fluid rapidly.**

## Electrolytes

- **Daily studies are performed as ordered.**
- **Replacements should be ordered when low.**
- **Common abnormalities include:**
  - Hypomagnesemia (norm 1.5-2.5 mEq/L)
  - Hypokalemia (norm 3.5-5.0 mEq/L)
  - Hypocalcemia (norm 8.5-10.5 mEq/L)


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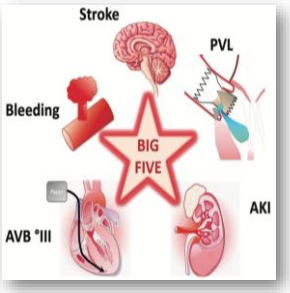
## Postoperative Management

- **Early complications**
  - Coagulopathies
    - Excessive bleeding
    - Cardiac tamponade
  - Electrolytes ($K^+$, $MG^{++}$)
  - Renal insufficiency/ATN
  - Cardiogenic shock
  - Stroke
  - Respiratory failure/atelectasis

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## Cardiac Tamponade

- Common causes
  - Aortic dissection
  - MI with rupture
  - Trauma
  - Pericardiocentesis
- Symptoms:
  - CVP ↑
  - pulsus paradoxicus
  - CO ↓↓↓
  - Compensatory tachycardia,
  - hypotension and
  - death in minutes
  - Global ECG changes
  - Beck's triad
    - Muffled heart sounds, hypotension, JVD

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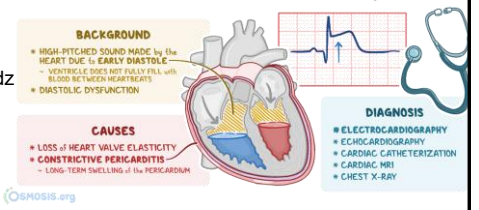
## Constrictive pericarditis

- Chronic scarring of pericardium after pericarditis of any cause
  - Infection
  - Neoplasms
  - connective tissue dz
  - radiation therapy
  - Dressler's
  - Trauma
  - dissecting aorta
  - systemic disease
    - uremia, sarcoidosis
  - drug reactions
    - Hydralazine
    - Procainamide
    - PCN
    - Phenytoin
    - Isoniazid




- Interferes with filling in mid to late diastole
- CO↓ and ↑CVP
- Right sided HF with decreased output & no pulmonary edema
- Friction rub, pericardial knock
- Death us usual outcome
- Pericardiectomy is performed

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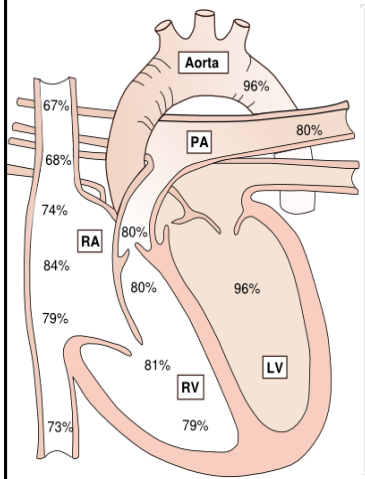


## Perforated IV Septum

**Abrupt drop in BP, CO/CI**

**Loud holosystolic murmur**

**Insertion of PA catheter**

- Look for O2 step-up from RA to RV
- Presence of large "V" wave in PaOP tracing

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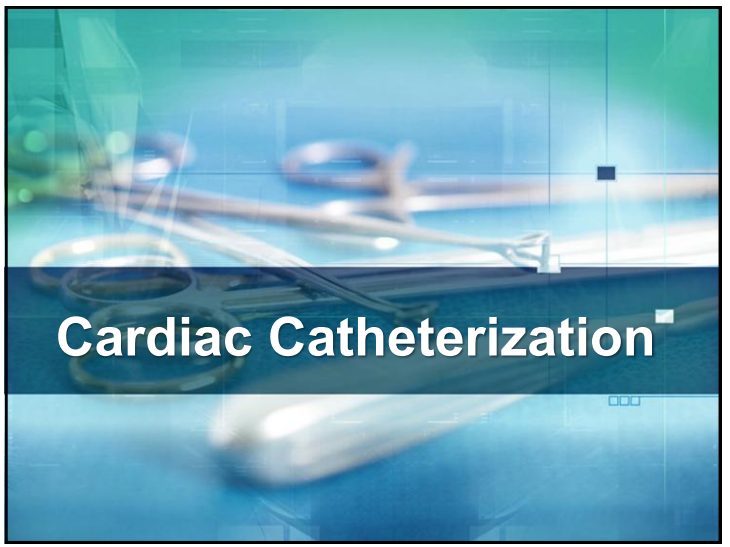


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# Cardiac Cath and Angio

- LV gram
- Coronary angiogram
- Angioplasty
- Stent deployment
- Embolectomy
- Atherectomy
- IV ultrasound
- OCT

- Definitive techniques for establishing cause & severity of cardiac disease
- Combined hemodynamic & angiographic invasive procedure which may:
  - Confirm clinically suspected heart condition
  - Define anatomy & physiology
  - Provide mechanism for treatment

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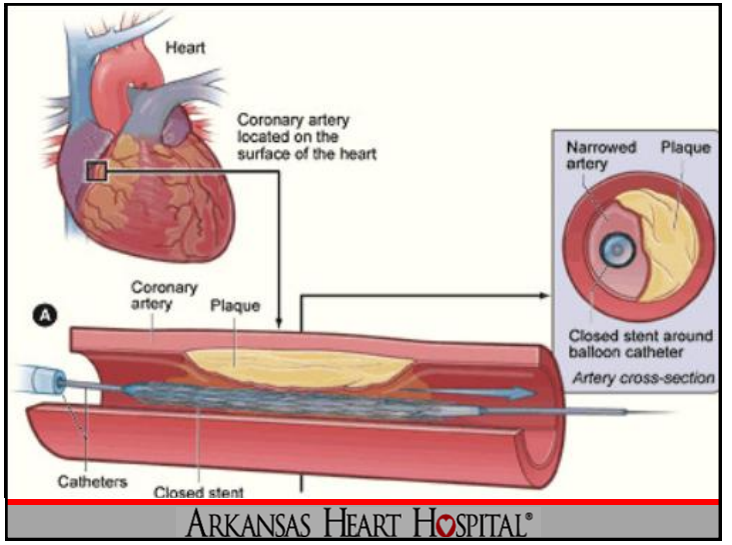


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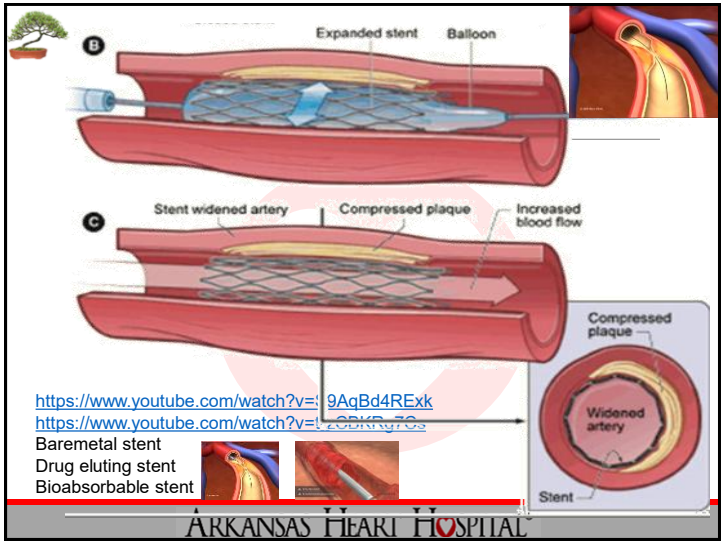


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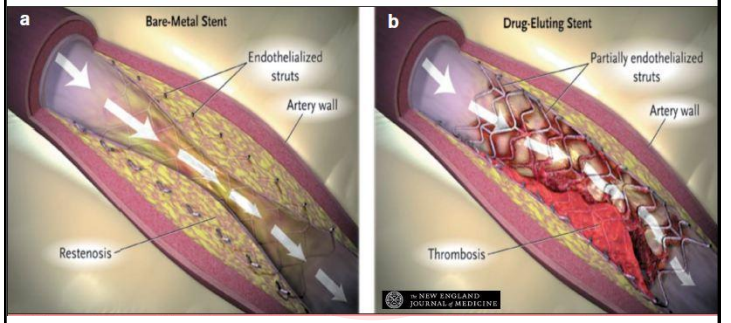
# In stent restenosis

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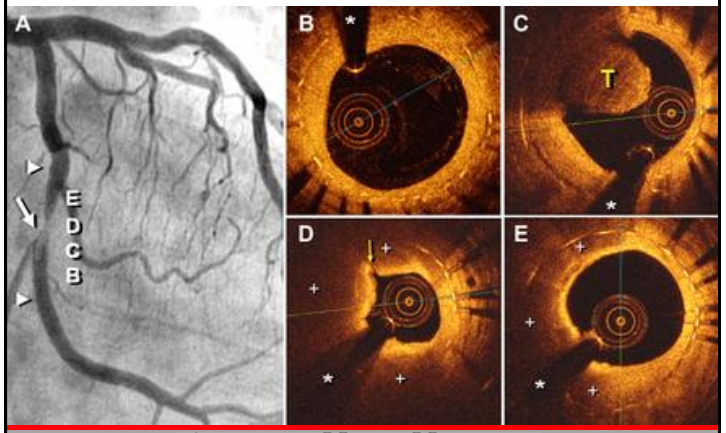
## IVUS

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## Debulking techniques

Cutting and scoring balloons

Atherectomy
- Laser
- Directional
- Rotational

brachytherapy

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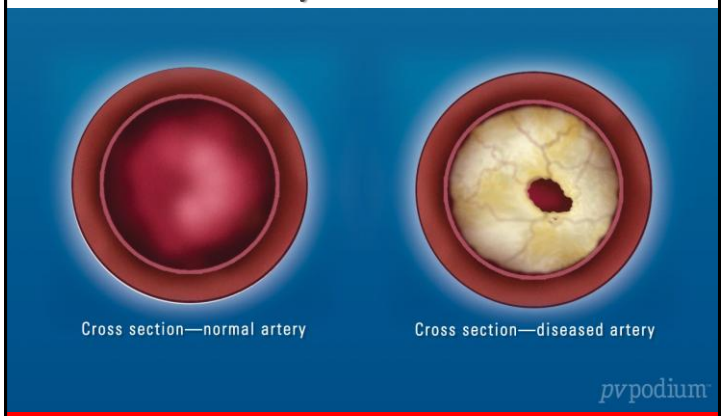
## Atherectomy

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## Embolectomy


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## Watchman

https://www.youtube.com/watch?v=jffGNtcpLQU

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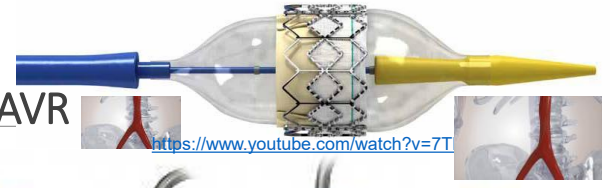
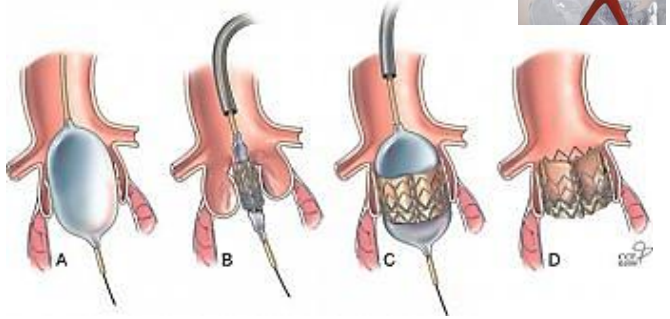
## TAVR



https://www.youtube.com/watch?v=7T

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## Complications

- Heart Perforation
- Embolism
- Arrhythmias
- Allergic reaction
- MI
- Hematoma
- Hemorrhage
- Retroperitoneal bleed
- Infection
- Artery dissection
- DEATH

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## Post Procedure care

- Anticoagulation
- Care of femoral insertion site: distal circulation, use of femstop, bed rest.
- Continued Cardiac Monitoring
- Blood check: Coags
- Cardiac Rehab

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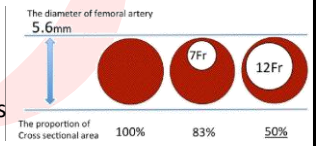
# Hold times


Abide by your hospital's policies.

My own hold times are simple.
Any artery with ≤7 French hold for 20 minutes
Add 5 minutes per additional sheath size

Impella, mitraclip 13-14fr
AVR, 10-12 fr

- First 5 minutes, full pressure
- release slightly every 5 minutes
- last 5 minutes is light pressure.

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# Venous sheath

1. Hold 10 minutes regardless of site
2. Do not hold as much pressure as with an artery
3. Primary hold below site
4. Control hold above

*while holding pressure, whether arterial or venous, constantly feel around the site, look for bleeding.*

*Have atropine available if needed for vagal reactions.*

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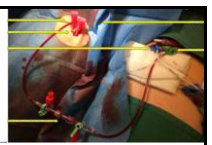
# A & V sheaths



When both arterial and venous sheaths are present, pull the arterial sheath first.

- It takes longer to obtain hemostasis with an arterial sheath
- Large venous access is used for IV access

***Experienced*** ppl may pull both sheaths together.

- Pull the arterial sheath first,
- After 10 minutes pull the venous sheath.
- Pulling one sheath at a time will reduce the risks of complications.

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# Hematoma

- Usually evident within 12 hours of sheath removal
- Local discomfort, hypotension
- Avoid by careful puncture, compression, closure, immobility
- Risk factors
  - Women
  - SBP>160 mm Hg
  - Artery puncture >1
  - Sheath time >16 min
  - ACT≥175 sec
  - Glycoprotein (GP) IIB/IIIa inhibitors
  - Low Molecular Weight Heparin before procedure
  - Personnel change during compression
  - Anti-coagulant-treatment before procedure

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Heart Failure

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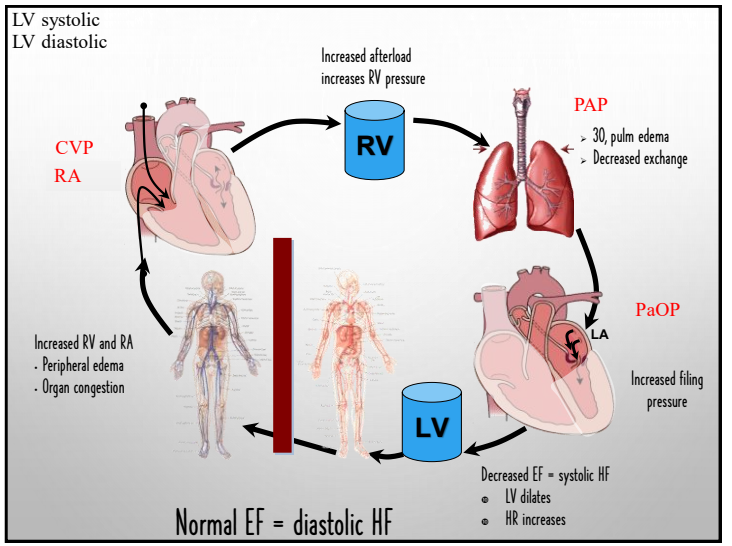
LV systolic
LV diastolic
Increased afterload
increases RV pressure
RV
PAP
30, pulm edema
Decreased exchange
CVP
RA
PaOP
LA
Increased filing
pressure
Increased RV and RA
- Peripheral edema
- Organ congestion
LV
Decreased EF = systolic HF
LV dilates
HR increases
Normal EF = diastolic HF

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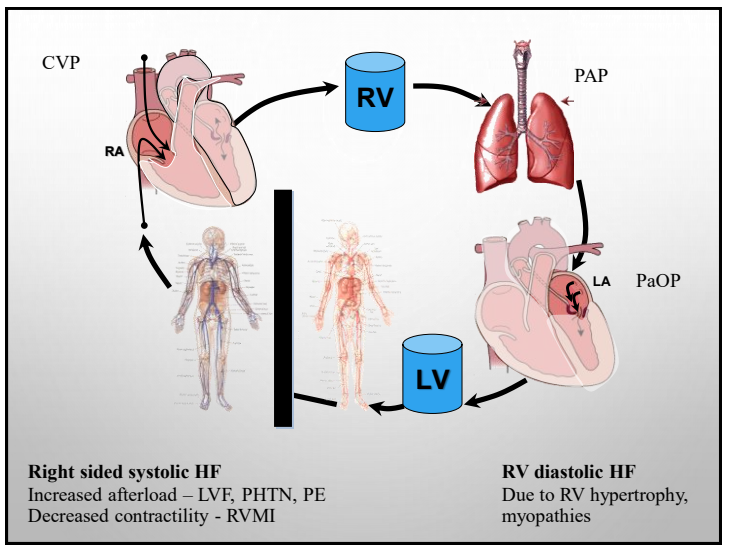
CVP
RA
RV
PAP
LA
PaOP
LV
Right sided systolic HF
Increased afterload – LVF, PHTN, PE
Decreased contractility - RVMI
RV diastolic HF
Due to RV hypertrophy,
myopathies

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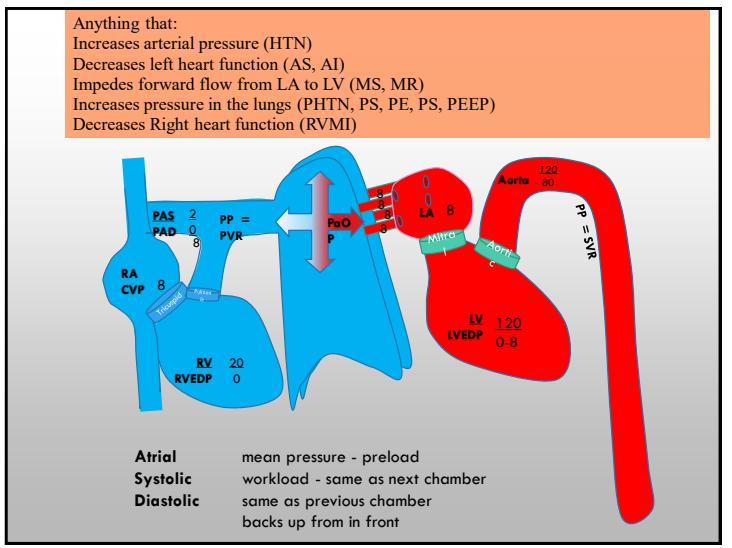
Anything that:
Increases arterial pressure (HTN)
Decreases left heart function (AS, AI)
Impedes forward flow from LA to LV (MS, MR)
Increases pressure in the lungs (PHTN, PS, PE, PS, PEEP)
Decreases Right heart function (RVMI)
PAS 2
PAD 0
8
PP = PVR
PaO
P
LA 8
Aorta 120
80
PP = SVR
RA
CVP 8
RV 20
RVEDP 0
LV 120
LVEDP 0-8
Atrial mean pressure - preload
Systolic workload - same as next chamber
Diastolic same as previous chamber
backs up from in front

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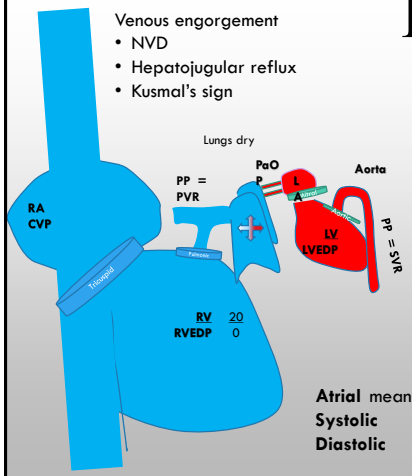
# RVF

Venous engorgement
- NVD
- Hepatojugular reflux
- Kusmal's sign




**Decreased arterial perfusion:**
Tachycardia
Low BP, Narrow PP
High dicrotic notch
Diving:
- Cool skin
- Decreased periph pulses
- Decreased gut perfusion
- Decreased renal perfusion
- Decreased hepatic perfusion
- Decreased cerebral perfusion

**Atrial** mean pressure - preload
**Systolic** workload - same as next chamber
**Diastolic** same as previous chamber backs up from in front

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## PRECIPITATING FACTORS

### DECREASED CONTRACTILITY
- ASHD
- Acute RVMI
- Contusion
- Cardiomyopathy

### INCREASED PRELOAD
- ASD/VSD
- Fluid overload
- Sleep apnea

### INCREASED AFTERLOAD:
- PE
- Pulm valve stenosis
- PHTN
- Valvular disease
- Left sided heart failure

## SYMPTOMS

### VOLUME OVERLOAD:
- Hepatomegaly, Splenomegaly
- Dependent pitting edema
- Ascites
- Abd. pain (congested liver)
- Weight gain
- Oliguria, nocturia
- Venous distention
- Hepatojugular reflux
- $S_3$, $S_4$ heart sounds (rt-sided)
- Kussmaul's sign
- Murmur of TR
- Elevated CVP
- Cachexia
- Increased fatigue, weakness
- Anorexia, nausea, emesis
- Low blood pressure

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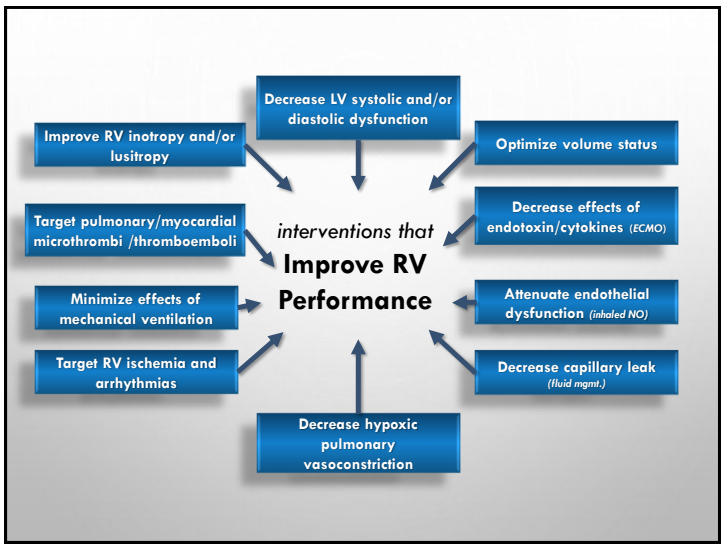


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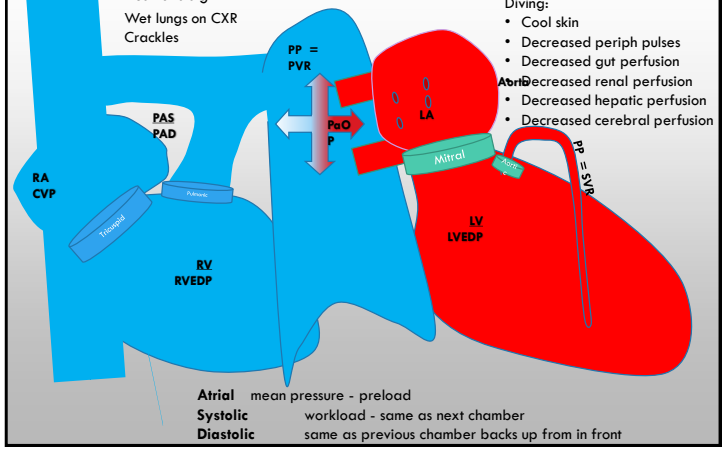
# LVF

Venous engorgement
NVD
Hepatojugular reflux
Kusmal's sign
Wet lungs on CXR
Crackles




**Decreased arterial perfusion:**
Tachycardia
Low BP, Narrow PP
High dicrotic notch
Diving:
- Cool skin
- Decreased periph pulses
- Decreased gut perfusion
- Decreased renal perfusion
- Decreased hepatic perfusion
- Decreased cerebral perfusion

**Atrial** mean pressure - preload
**Systolic** workload - same as next chamber
**Diastolic** same as previous chamber backs up from in front

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## Diagnostic findings

- **Lab**
  - BNP, CRP
  - HCT, HGB
  - Electrolytes
  - TSH
  - BUN/CR
  - LFTs
  - Enzymes
  - HIV testing
- **ECG**
  - Nonspecific
  - Arrhythmias
  - Drug effects
- **Echo**
  - Chamber size, thickness
  - Systolic, diastolic, valve fx.
  - Thrombus
  - Pericardial disease
- **Radiologic**
  - Pulmonary vasculature – edema, congestion
  - CXR for silhouette Chamber enlargement
    Pleural effusion
    Valve calcifications

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## Diagnostic findings

- **Nuc Med**
  - chamber function
  - chamber volume
  - Myocardial perfusion
- **CT / MRI**
  - Structural abnormalities
  - Tumors
  - Pericardial disease
- **Cardiac Catheterization**
  - Coronary anatomy
  - Rt and Lt Pressures
    - Diuretic and IV TNG can create false-negative by artificially normalizing the filling pressures
  - Contractility
  - Valve fx

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## Goals of Care

- Relieve symptoms
- Stabilize hemodynamics
  - Diuretics
  - Vasodilators
  - +Inotropes
- Normalize volume
- Control arrhythmias
- **Treatments**
  - Positioning
  - Skin care
  - Pain management
  - I&O, fluid restrictions, daily weights

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## Discharge instructions

- **HF explanation**
- **When to call**
- **Who to call**
- **Worsening symptoms**
- **All medications** *(handout grid)*
  - Name
  - Purpose
  - Dose
  - Frequency
  - Side effects
  - benefits

**Lifestyle changes**

- Diet
  - NA restriction
  - Fluid restrictions
  - Rich $K^+$ foods
  - Daily weights
  - Routine exercise
  - Control of BP, lipids, BS
- How to check Pulse and BP


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# Pharmacology

## Inotropic agents

- **PDE inhibitors**
  - **Milrinone**
    - Relaxes veins/arteries
    - Increases contractility
    - Does not increase HR
  - **Dobutamine**
    - Increases contractility
    - Decreases SVR

## Vasopressors

- **Dopamine**
  - < 10 mcg/kg/min
    - *Increases BP, cerebral and renal perfusion*
  - > 10 mcg/kg/min
    - *Increases SVR & HR*
- **Phenylephrine**
  - Pure alpha
- **ADH**
- **Norepinephrine**

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# Pharmacology

## Afterload Reduction

**Nipride**

- Arterial dilation
- Tx. infiltration with phentolamine
- Watch for cyanide tox with methemoglobinemia

**ACEi**

- Afterload and preload reduction
- Contraindicated in shock, hyperk
- Watch renal function

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# Pharmacology

## Preload Reduction

**TNG**

**Diuretics**

**B-blockers**

**Digoxin**

**Spironolactone**

**Morphine**

**ACEi**

- Afterload and preload reduction
- Contraindicated in shock, hyperK
- Watch renal function

**Avoid**

- Negative inotropes *(except BBlkrs)*
- Antiarrhythmics (except amio)
- Calcium channel blockers (except amlodipine, felodipine)
- NSAIDS
- Chemo – daunorubicin, doxorubicin

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Pharmacologic Tx. Of HFrEF

| Drug | Mortality | HF Adm | Use for |
|---|---|---|---|
| ACEi/ARB | 17% | 31% | Stage A – control HTN<br>Stages BCD – everyone |
| Beta Blkrs | 34% | 41% | Stage AB - control HTN<br>Stages CD - everyone |
| Aldosterone Blkrs | 30% | 35% | Stage CD Class II-IV with EF < 35% and CR < 2.5/2.0<br>*Avoid ACEi, ARB and Ald blkr 2°to ↑K+* |
| Hydral/Isosorbide | 43% | 33% | Symptoms despite GDMT in African Americans |
| Digoxin | | | Symptoms despite GDMT |
| Anticoagulants | No proven | No proven | consider |
| Omega-3 850-882mg | 10-20% | Significant | consider |
| Calcium Channel Blkr | | | Except amlodipine |
| NSAIDS | | | Causes NA and H2O retention and blunt effects of diuretics |

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## Psychosocial Issues

Will need help at home

Support and closely follow adherence to treatments

- Diet
- Weight
- Fluid intake
- Medications

Assess for depression

Monetary costs can cause strain

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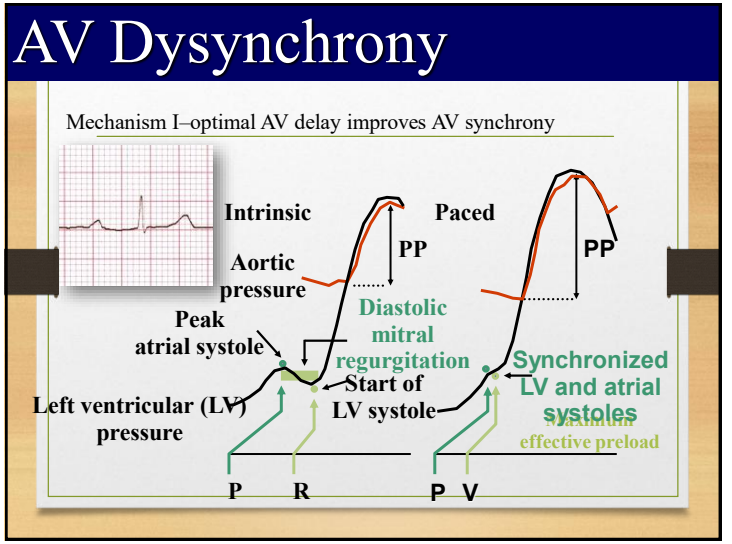
## AV Dysynchrony

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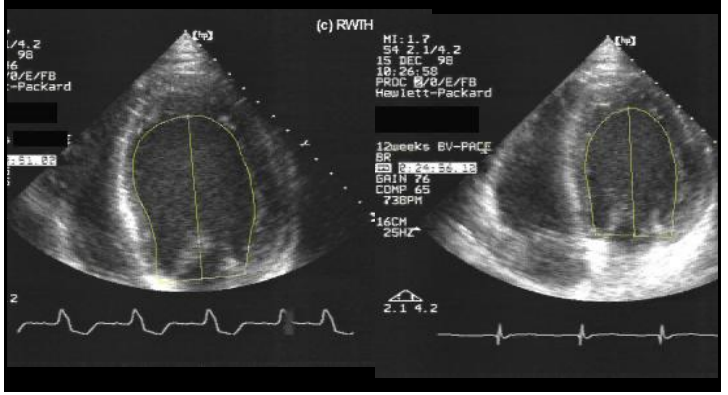
## After Cardiac Resynchronization Therapy

Cardiac resynchronization therapy (CRT)– global synchrony

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(b) *IABP placement: Increases myocardial & cerebral perfusion and decreases afterload*

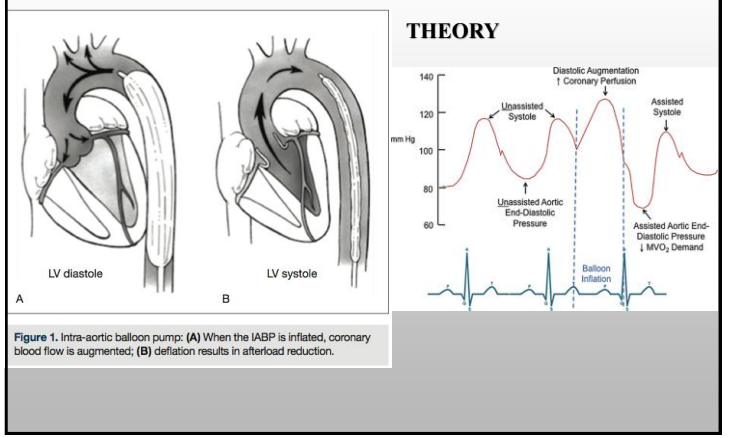


Figure 1. Intra-aortic balloon pump: **(A)** When the IABP is inflated, coronary blood flow is augmented; **(B)** deflation results in afterload reduction.

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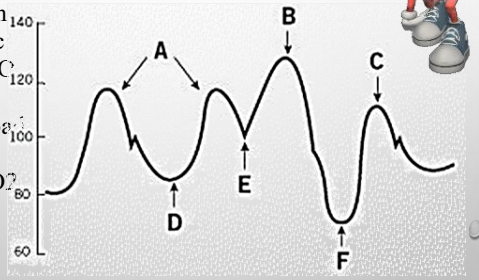
**IABP**

- Increases coronary and cerebral perfusion through increased systolic pressure in the AC arch
- Decreases afterload or workload, or demand, or MVO2

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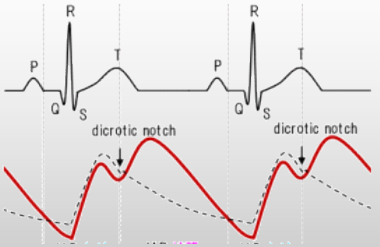
**WAVEFORM ANALYSIS**




Sharp "V" at Dicrotic Notch
Augmented diastolic pressure that is supra-systolic
Reduced assisted aortic end-diastolic pressure
Assisted systolic is lower than un-assisted systolic
Mean Arterial Pressure is increased

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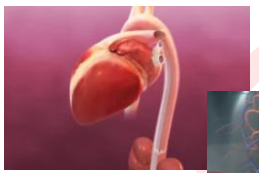
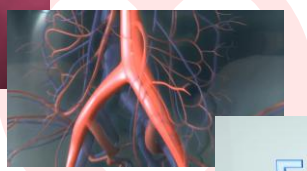
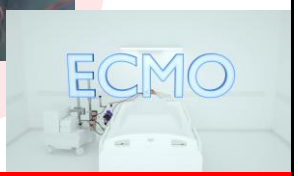
## MCS – *Mechanical Cardiac Support*





Impella application:

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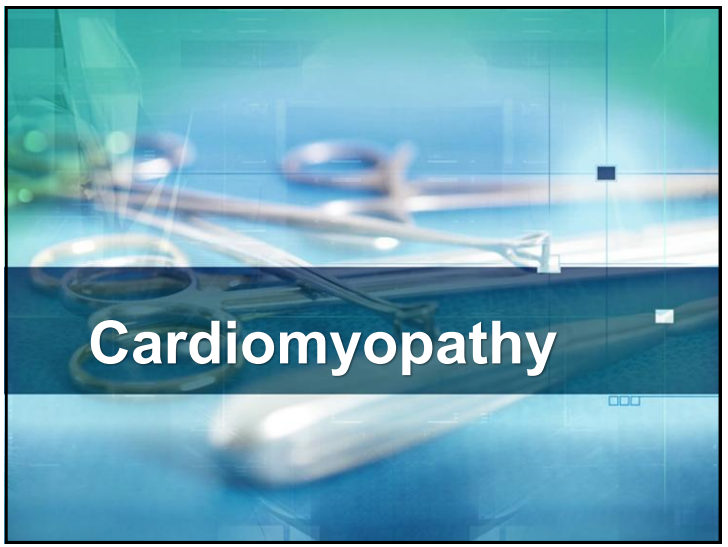


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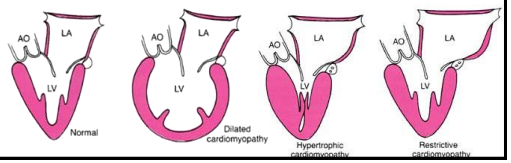
## Types

**Definition**:
*Cardiomyopathy is a chronic or acute disorder of the heart muscle. Treatment may involve pharmacotherapy to reduce afterload and/or improve the contractility. Surgery and/or pacemaker/automatic implantable cardiac defibrillator (AICD) placement may also be appropriate*

- Dilated cardiomyopathy (Idiopathic)
- Restrictive cardiomyopathy
- Hypertrophic cardiomyopathy
- Stress-induced cardiomyopathy
- Tako Tsubo cardiomyopathy

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## Dilated Cardiomyopathy Treatment Strategies

**As per description in Heart Failure systolic dysfunction:**

ACEi/ARB
Beta Blocker
If AA – add nitrate and hydralazine
Digoxin
Pacer/ICD/CRT
Revascularize
Valve repair
Mechanical support

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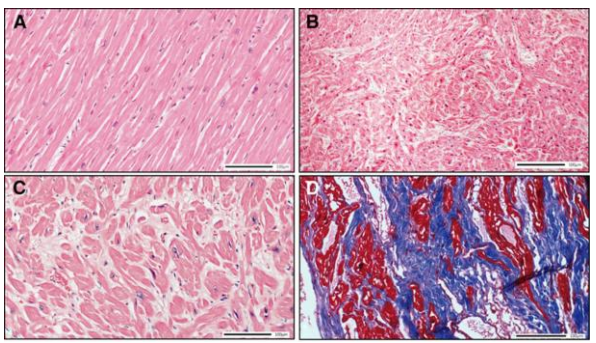
## Hypertrophic Cardiomyopathy

- Disarray of myofibrils with hypertrophy of myocytes
- Cells take on a variety of shapes
- Myocardial scarring and fibrosis occurs

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## Hypertrophic cardiomyopathy

- Increased mass and thickening of the heart muscle, which results in diastolic dysfunction
- SV decreases.
- LV chamber becomes very small *(hypertrophy occurs inwardly at the expense of the LV chamber)*
- LA becomes dilated
- Contractility may be normal or increased

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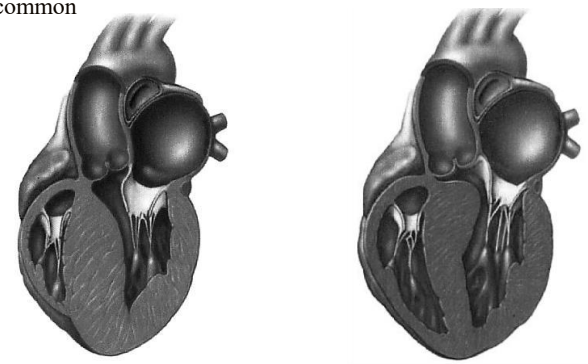
## Hypertrophic Cardiomyopathy

- Usually only effects the LV
- Changes may be symmetrical
- Asymmetrical septal hypertrophy is more common

May involve entire septum or only a portion of the septum



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## Hypertrophic Cardiomyopathy Presentation

Many asymptomatic for years

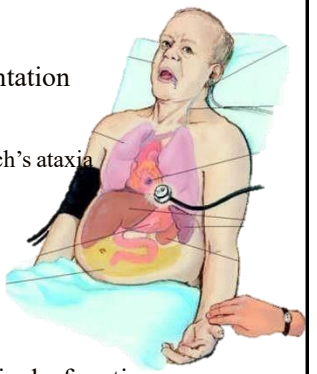
Incidence of SCD often first presentation

- 60-70% familial
- Idiopathic
- Neuromuscular disorders: Friedreich's ataxia
- Metabolic: Hypoparathyroidism
- HTN

Heart failure

- Dyspnea #1 sign
- Syncope/palpitations with activity
- Chest pain
- SVT

Symptoms r/t to severity of diastolic dysfunction



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## Treatment

**Other Medications**

- Diuretics – with caution
- ACEi and NTG – avoid with HOCM
- Positive inotropes – NEVER with HOCM

### Pregnancy

- Not restricted in non-obstructive disease

### Endocarditis Prophylaxis

- NO LONGER INDICATED

### Non-Obstructive Disease Rx.

- More difficult to treat if no symptoms
- Ultimately evolves into dilated cardiomyopathy

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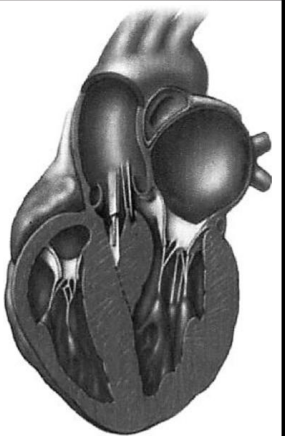
## Surgical Myectomy

- Marked outflow obstruction
- On maximum medical therapy
- NYHA Class III or IV
- MV replacement or repair at same time (increased Op mortality)
- Improvement noted immediately and lasts 20-30 yrs
- Survival rates 80% at 10 years
- May need pacemaker (2%)



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## Percutaneous Alcohol Septal Ablation

- Symptomatic with full therapy
- NYHA Class III or IV
- Not appropriate if MVR needed
- Cath lab procedure
- Catheter in septal perforator
- Ethyl alcohol injected
- Myocardial infarction occurs
- Enlarged septum eventually shrinks
- May need pacemaker (20%)

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## Restrictive Cardiomyopathy

- **Rigidity of myocardial wall**
  - NOT secondary to:
    - untreated hypertension
    - aortic stenosis or
    - hypertrophy seen with HCM
- Restricted filling of ventricles
- Loss of diastolic distention and systolic contraction
- Usually an infiltrative process i.e. amyloidosis in adults
- LVEDP increases; contractility decreases, which results in low CO, HF, and death
- **Least common form of cardiomyopathy**
  - 5% of all primary heart muscle diseases

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## Restrictive Cardiomyopathy

**Primary Causes**

**Endomyocardial Dzs**

- Idiopathic
- Eosinophilic Endomyocardial Fibrosis (Peds)
- Endocardial Fibrosis
- Cardiac Transplant (Peds)
- Anthracycline Toxicity
- Loffler's Endocarditis

**Secondary Causes**

**Infiltrative disorders**

- Amyloidosis
  - 90% of RCM in North America
- Sarcoidosis
- Radiation carditis

**Storage Diseases**

- Glycogen storage disease
- Fabry's Disease
- Hemochromatosis

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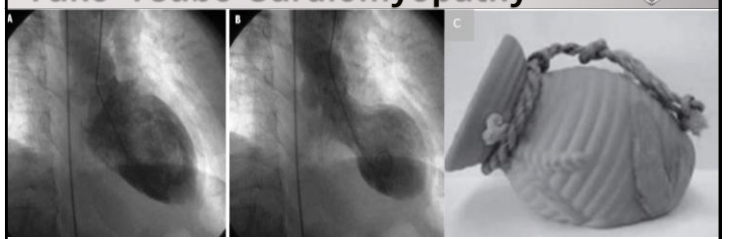
## Tako-Tsubo Cardiomyopathy



- Transient LV apical ballooning
- Abrupt onset of ballooning or dilatation of LV
- Post menopausal women
- Occurs after psychosocial or physical stressors
- Also referred to as stress cardiomyopathy
- Cause unknown
  - Related to excessive catecholamines

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## Diagnosis Tako Tsubo

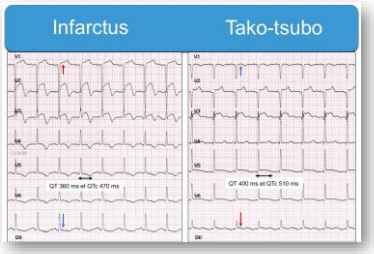
**ECG**
- STE mimicking AAMI
- Prolonged QT interval

**Cardiac Biomarkers**
- Do not follow same rise and fall as AMI
- Mildly elevated

**Cardiac Cath**
- No significant CAD
- Visualize ballooning of LV

**Echo**
- LV dysfunction with ↓ EF
- Visualize ballooning of LV

| Investigation | Takotsubo | STEMI |
|---|---|---|
| Initial TnI | 1.1 | 1.9 |
| Peak TnI | 4.9 | 7.3 |
| Ejection fraction | 33 | 25 |

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## Treatment

**Goals**: Similar to patients with acute MI

Treat LV failure
- Cardiogenic shock
- IABP
- Arrhythmias
- Hypotension
- Avoid inotropes

Cardiac Rehab

Stress reduction

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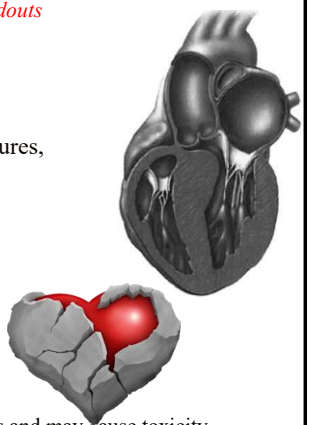
- *Read through the summary, diagnostic tests, management, goals, treatments, pharmacology etc. in your handouts*
- **Dilated**
  - Standard heart failure
    - Left sided-Restrict fluids, improve contractility & control afterload
    - Right sided-Control pulmonary pressures, fluid & Na restriction
- **HOCM**
  - Don't stimulate SNS
  - Never give inotrope
  - never reduce preload (no ACEi or TNG)
  - Relieve Obstruction with OR or Ethanol
  - Use BiV pacing or AICD
- **Restrictive**
  - Maintain preload (no ACEi, TNG)
  - Avoid Dig – concentrates in amyloid fibrils and may cause toxicity



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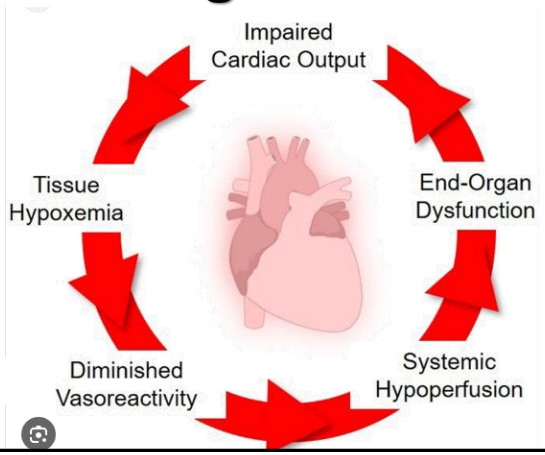
# Cardiogenic shock

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# Rapid Assessment of Hemodynamic Status

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# Acute DHF Management

**Wet – NVD, crackles and low sat**
**manage volume, monitor by Sat**

Reduce preload, reduce afterload
*Nitrates, vasodilators*

Increase oxygen exchange
*Positioning, BiPAP, O2*

**Cold – thready pulses, hypotension, narrow PP**
**Hypoperfusion – monitor end organ fx.**

- Increase contractility with inotropes
- Mechanical support

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# Dysrhythmias

Acute LAD occlusion
AAMI or anterior
2nd degree type II

Inferior MI
RCA occlusion
Bradycardias and heart blocks

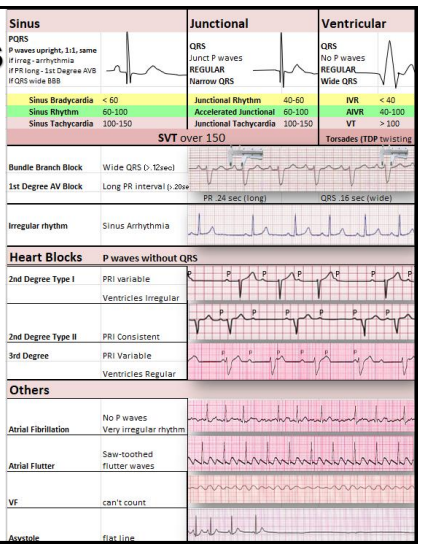
Never shock asystole
Described as undulating flat line

Irregular rhythms almost always AF
Slow vent rate if onset time unkn

"scalloped" is used for flutter

Rapid wide QRS tachycardia
SVT with BBB or VT

Tachycardia > 150 with narrow
QRS is SVT, use adenosine

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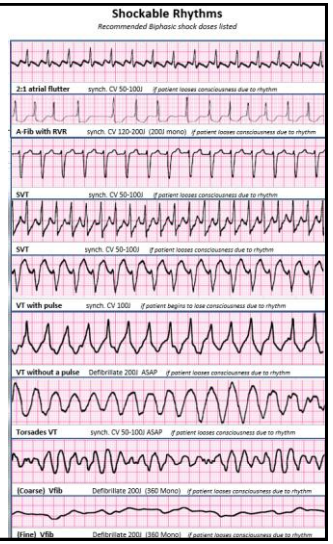
# Dysrhythmias

***Know all ACLS algorithms***

- **Bradycardia**
  - Atropine 1 mg (max dose 3 mg)
  - Epinephrine drip (1-10 mcg/min)
  - Pacing
- **Narrow QRS tachycardia**
  - Adenosine 6mg, may repeat at 12 mg
  - If unstable, synchronize cardiovert
- **Wide QRS tachy**
  - Lidocaine 100 mg or amiodarone 150mg f/w drip
  - If unstable synchronize cardiovert
  - If no pulse, defibrillate, amiodarone dose to 300
- **Asystole/ PEA**
  - CPR, Epi, ID cause
  - If slow PEA, consider atropine

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# Hypertensive Crisis

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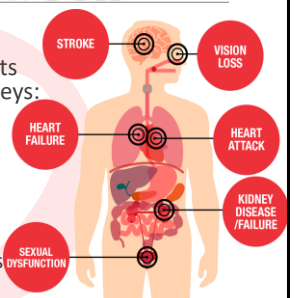
# Physical Effects

Hypertensive pathophysiology and its effects on the heart, brain, and kidneys:

- Enhanced sympathetic stimulation
- Effects of renin-angiotensin system
  - *increased fluid retention*
  - *increased systemic vasoconstriction)*
- Necrosis of arterioles
- Decreased blood flow to end organs

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# Management

**Anticipated patient trajectory:**
Immediate BP reduction is essential for the prevention or minimization of end organ damage

**Goals of care**

- Rapid treatment of elevated BP
- MAP is lowered in small decrements
- Cause of the hypertension is identified and treated

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# Pharmacology

**Nipride**: gold standard for malignant HTN therapy.

Med of choice for HTN encephalopathy, cerebral infarction or bleeding, dissecting aortic aneurysm. Ø in pregnancy

- 0.25 to 0.5 mcg/kg/min IV Titrate every 5 min
  - max 10 mcg/kg/min.
  - titrate to lowest dose.
  - Run at Max no more than 10 min
- Acts in seconds, reversed by stopping (1-5 min)
- Protect bag and lines from light
- Watch for cyanide toxicity after 48 hours or with RI.
  - Blurred vision, tinnitus, confusion
  - Thiocynate blood level at 48 hours. should not exceed 1.7 mmol/L.
- Closely monitor the patient's response to therapy


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# Rx Management

**Nicardipine** (CaCh blocker): Safer & similar effect
- Dose: 5mg/hr; titrated to a max dose of 15 mg/hr
- Half-life 3-6 hours
- Longer onset of action (9.5-10 min), longer half-life
- **Clevidipine** 1mg/hr ½ life 5-15 min. Best for post op HTN

**Fenoldopam** (selective dopamine receptor agonist); potent vasodilator; as effective as nipride in lowering BP
- Dose: 0.1 mcg/kg/min; titrated every 15 min to response
- Half-life is 10 min
- SEs hypokalemia, headache, flushing, dizziness, reflex tachy
- Increases intraocular pressure

**Labetalol** med of choice for ICH
- Dosage: 20 mg IV bolus, then 20-80 mg q 10 min or IV infusion
- An α & ß blocking agent, esp. for adrenergic crisis.
- Does not increase heart rate (good in CAD)

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# Rx Management


**ACE inhibitors** - **Enalapril**: 1.25 - 5 mg IV every 6 hours
- Medication of choice for LV failure and pulmonary edema
- Onset of action: 10-15 minutes

**Beta blockers**: reduce mortality and morbidity
- **Metoprolol**: 5 mg IV every 5 min up to 15 mg total
- **Esmolol**: 500 mcg/kg/min for 4 min, then 50-300 mcg/kg/min IV
- *(comes in 2500 /250mL, or 10 mg/mL)*

IV **NTG** for hypotension due to cardiac (AMI, failure)
**Loop diuretics** (torsemide, furosemide, ethacrynic acid) for LV failure, pulmonary edema.
- Watch for volume depletion.

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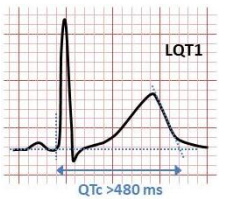
# Conduction system defects (long QT, WPW)

## Long QT

- **A family history of LQTS**
- **Heart conditions,** cardiomyopathy and congenital heart defects
- **Medical conditions** that cause low blood levels of potassium, magnesium, or calcium
- **Medicines** some antibiotics, antidepressants, and antihistamines
- **Sex:** LQTS is more common in women than men.




**Treatment**
- ICD
- MgSO4
- Isuprel
- Avoid loud noises
- Beta blockers

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# Conduction system defects (long QT, WPW)

**WPW**

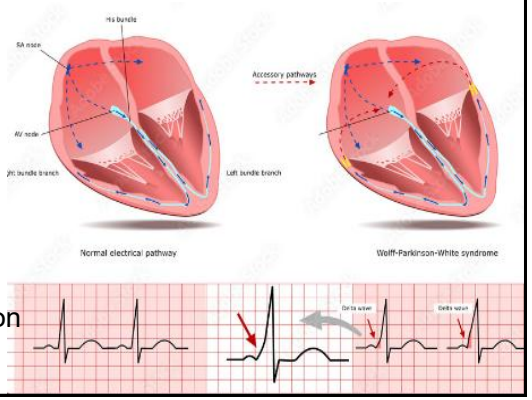
- Inherited

**Symptoms**

- Palpitations
- SOB
- Syncope

**Treatment**

- Meds
- Cardioversion
- Ablation

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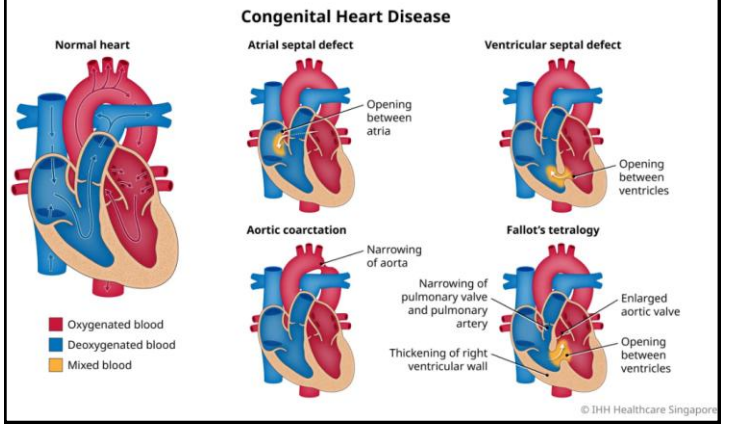
# Structural Defects -(Acquired / Congenital / Valvular disease

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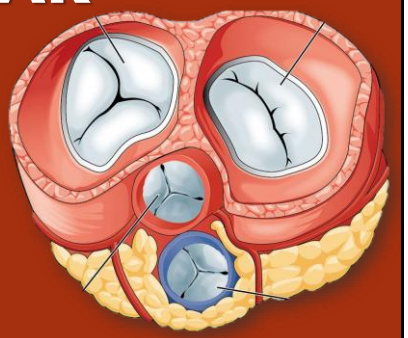
# VALVULAR HEART DISEASE



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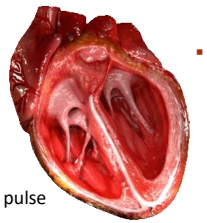
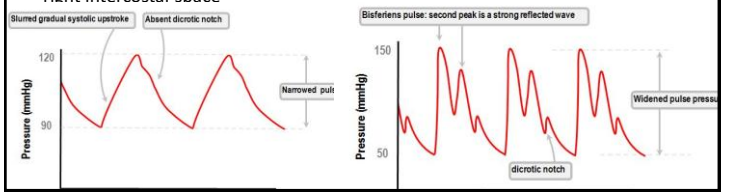
# AORTIC VALVE

- **Aortic Stenosis**
  - Angina pectoris
  - Syncopal episodes
  - Left ventricular failure
  - Slow upstroke to arterial pulse
  - Ejection systolic murmur in 2nd right intercostal space



- **Aortic Regurgitation**
  - Congestive cardiac failure
  - Increased pulse pressure
  - Water-hammer pulse
  - Early diastolic murmur at 2nd intercostal to the left of the sternum

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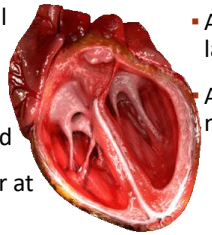
# MITRAL VALVE

- **Mitral Stenosis**
  - Pulmonary hypertension
  - Paroxysmal nocturnal dyspnea
  - Atrial fibrillation
  - Loud first heart sound
  - Mid diastolic murmur at apex



- **Mitral Regurgitation**
  - Pulmonary edema
  - Apex beat displace laterally
  - Apical pansystolic murmur

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# PROSTHETIC HEART VALVES

- **Principal types are:**




  - **Tissue**
    - **Heterografts** (e.g. pig) – stented or unstented
    - **Homografts**, homovital homografts
      - Women who want to become pregnant
      - older patients with short life span, aortic valve endocarditis
      - Those who cannot use anticoagulants
  - **Mechanical / Prosthetic**
    - Ball and cage (e.g. Starr-Edwards)
    - Tilting disc (e.g. Bjork-Shiley)

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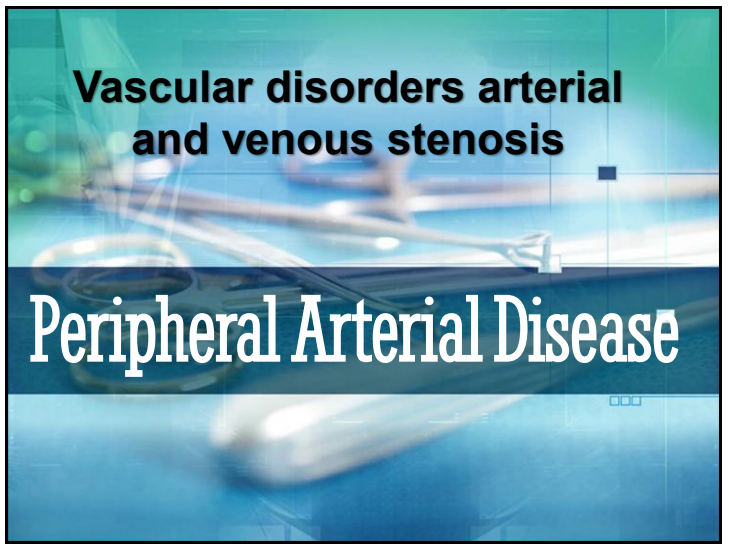


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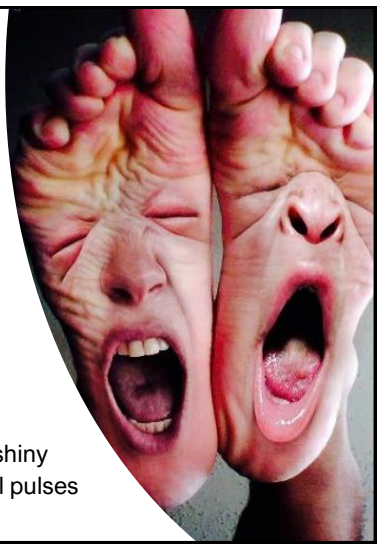
# Peripheral Arterial Disease

- **Etiology**
  - Atherosclerosis
    - poss hx. CVA, CAD, HTN
- **S&S**
  - Pain – esp with elevation
  - Pale, mottled, rubor on dependence of limb
  - Ulcers / gangrene
  - Hair loss, skin is thin and shiny
  - Weak or absent peripheral pulses
  - Sluggish cap refill



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# 6 Ps of PAD

- **Pain**
- **Pallor**
- **Paresthesias**
- **Pulselessness**
- **Paralysis**
- **Poikilothermia**

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# PAD Diagnostic Studies

- **Doppler duplex**
- **Peripheral angio**
- **ABI**
  - Used as screening tool
  - Ankle SBP / SBP in the arm
  - Normal: 0.9-1.3 (normally higher in ankle)
  - ABI < 0.9: positive for PAD
  - ABI < 0.4: severe ischemia

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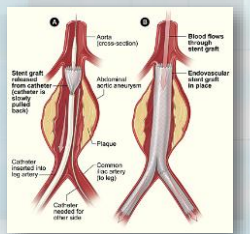
# PAD Management

- **Thrombolysis**
- **Thrombectomy**
- **PCA**
- **Endovascular stent graft**
- **Clinical implications**
  - Assess for palpable pulses
  - Limbs are warm, pink with good Cap refill
  - No signs of bleeding
  - Pain is absent

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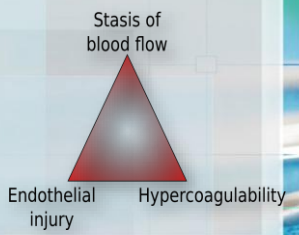
# DVT

- **Virchow's triad**
  - Stasis of flow
  - Endothelial dysfunction
  - Hypercoagulability
- **Prevention**
  - Mechanical - Pneumatic stockings
  - Pharmaceutical – Anticoagulation
  - Early ambulation

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# Carotid Disease Endarterectomy

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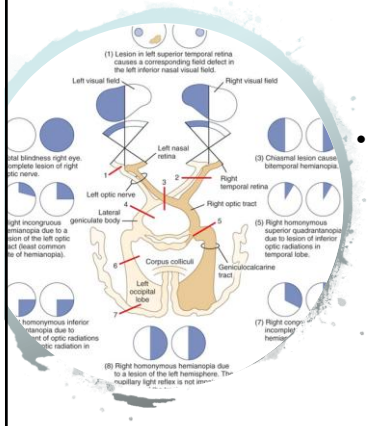
## Carotid Artery Disease




- **S&S**
  - TIAs
  - Monocular visual disturbances
  - Sensory or motor deficits
  - Expressive or receptive aphasia
  - stroke

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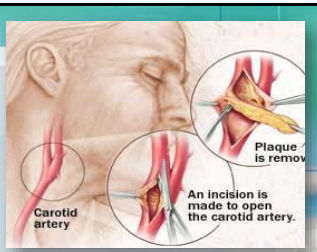
## Endarterectomy




- Removal of plaque
- 60% or greater narrowing
- Assess cranial nerves, mental orientation, pupillary reaction and LOC Q1hr x 2, q2hr x 2 then q4
  - **Hypoglossal** – able to position tongue midline
  - **Hypoglossal pharyngeal** – able to swallow
  - **Facial** – able to smile and puff cheeks
  - **Vagus** – able to speak
  - **Spinal Accessory** – able to raise bilateral arms & sustain x 3 sec

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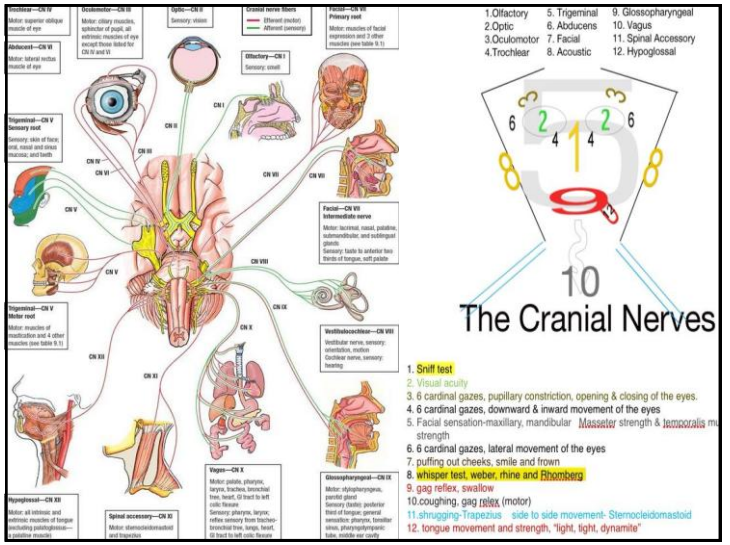


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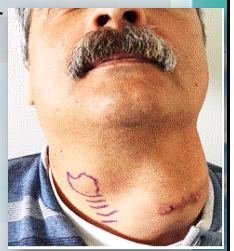
## Endarterectomy

Maintain intact airway – assess neck for edema and hematomas, note stridor, drooling, swallowing probs



Report increased incisional edema or grapefruit size hematoma

Maintain SBP <180 and >100 *(baroreceptors)*

Nerve block anes. May extend to neck, throat, to nipple line – wears off 6-8 hrs

Headache – tx with Tylenol – if unrelieved x 2 hours, report and assess for bleed

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## CCRN

**I. CLINICAL JUDGMENT (80%)**

**A. Cardiovascular (13%)**

1. Acute coronary syndrome
2. Aortic aneurysm, dissection, rupture (i.e. thoracic, abdominal)
3. Cardiac infection and inflammatory diseases
4. Cardiac surgery
5. Cardiac tamponade
6. Cardiac trauma
7. Cardiac/vascular catheterization
8. Cardiogenic shock
9. Cardiomyopathy
10. Dysrhythmias
11. Heart failure
12. Hypertensive crisis
13. Myocardial conduction system defects (e.g., prolonged QT interval, Wolff-Parkinson-White)
14. Structural heart defects (acquired and congenital, including valvular disease)
15. Vascular disorders (e.g., arterial/venous stenosis)
16. Vascular interventions (e.g., stents, fem-pop bypass, carotid endarterectomy)

## PCCN

**1A. Cardiovascular (20%)**

1. Acute coronary syndromes
   a. Non-ST segment elevation myocardial infarction
   b. ST segment elevation myocardial infarction
   c. Unstable angina
2. Acute inflammatory disease (e.g., myocarditis, endocarditis, pericarditis)
3. Aneurysms (dissecting or ruptured)
4. Cardiac surgery (e.g., post ICU care)
5. Cardiac tamponade
6. Cardiac/vascular catheterization
   a. Diagnostic
   b. Interventional
7. Cardiogenic shock
8. Cardiomyopathies
   a. Dilated (e.g., ischemic/non-ischemic)
   b. Hypertrophic
   c. Restrictive
   d. Takotsubo cardiomyopathy
9. Dysrhythmias
10. Heart failure
    a. Acute exacerbations (e.g., pulmonary edema)
    b. Chronic
11. Hypertension (uncontrolled)
12. Hypertensive crisis
13. Structural heart procedures (e.g., TAVR, mitral clip)
14. Valvular heart disease
15. Vascular disease

## Test Plan

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## Testable nursing actions

**Cardiovascular**

- Identify, interpret and respond to cardiac rhythms
- Monitor hemodynamic status and recognize signs and symptoms of hemodynamic instability
- Recognize early signs of decreased cardiac output
- Recognize indications for and manage patients with/ requiring:
  - cardiac catheterization
  - endovascular procedures
  - mechanical circulatory support devices
  - non-invasive and invasive hemodynamic monitoring
  - pericardiocentesis
  - temporary pacing

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## Questions

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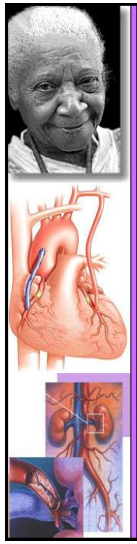

**AACN-CMC Question 3**

Your patient has been diagnosed with systolic HF. The medication that reduces morbidity and mortality by 50% is:

A. Spironolactone (Aldactone)
B. Metoprolol (Lopressor)
C. Lisinopril (Zestril, Prinvil)
D. Simvastatin (Zocor)

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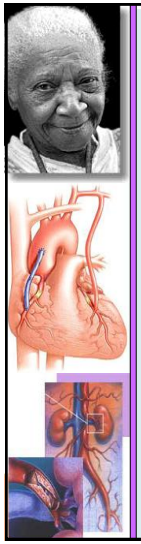

**AACN-CMC Question 3**

Your patient has been diagnosed with systolic HF. The medication that reduces morbidity and mortality by 50% is:

A. Spironolactone (Aldactone)
B. Metoprolol (Lopressor)
Metopropolol and carvedilol reduce M&M by 50%.
An ACE inhibitor reduces M&M by 10%.
Spironolactone reduces M&M by 10%.
No reduction is directly related to the use of a statin
C. Lisinopril (Zestril, Prinvil)
D. Simvastatin (Zocor)

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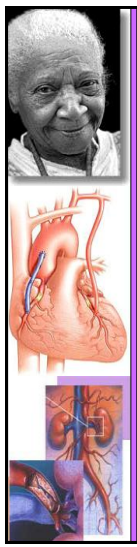

**AACN-CMC Question 4**

**The definitive diagnostic indicator for systolic HF is:**

A. BNP > 300 pg/mL
B. C-reactive protein
C. Wall motion abnormalities on echocardiogram
D. EF < 40%

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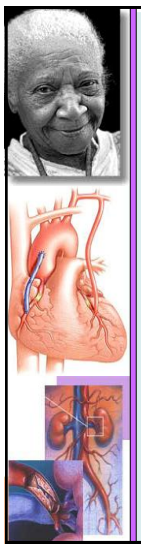

**AACN-CMC Question 4**

**The definitive diagnostic indicator for systolic HF is:**

**D. EF < 40%**

EF is the factor that differentiates between diastolic and systolic HF.

BNP is an indicator of the severity of HF.

C-reactive protein elevates in all inflammatory diseases

Wall motion changes are related to the etiology of the HF

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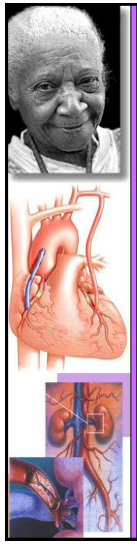

**AACN-CMC CM Q1**

**Your patient has been diagnosed with restrictive cardiomyopathy. An appropriate intervention would include administration of:**

A. Volume
B. Dobutamine
C. Lasix
D. Nitrates

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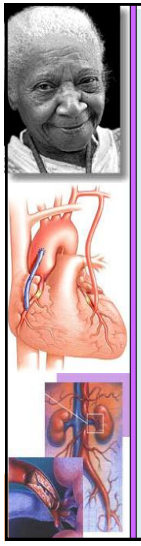

**AACN-CMC CM Q1**

**Your patient has been diagnosed with restrictive cardiomyopathy. An appropriate intervention would include administration of:**

A. **Volume**
Preload must be maintained.
Any medication that increases outflow tract obstruction with exacerbate symptoms. Avoid inotropes, dilators and diuretics

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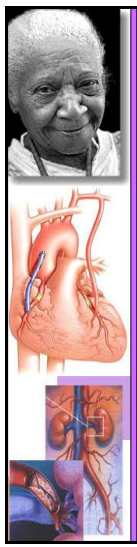

**AACN-CMC CM Q2**

**Patients with hypertrophic cardiomyopathy with high clinical or genetic risk of sudden death should receive:**

A. Cardiac transplantation ASAP
B. Surgical manipulation of the septum
C. An ICD
D. A beta-blocker to reduce workload

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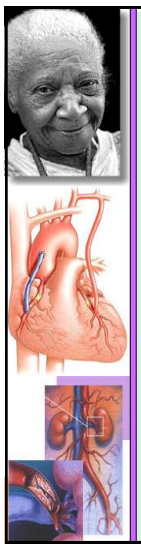

**AACN-CMC CM Q2**

**Patients with hypertrophic cardiomyopathy with high clinical or genetic risk of sudden death should receive:**
**C. An ICD**
These patients are at high risk of VF
Usually, drug therapy with amiodarone and the insertion of an ICD is the treatment of choice

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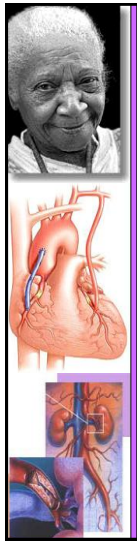

**ACCNS-AG (extra)**

**Emergency treatment for a patient with a "warm and wet" presentation of ADHF should initially consist of IV Lasix and IV:**

A. Milrinone (Primacor)
B. Dobutamine (Dobutrex)
C. Nitroglycerin
D. Enalapril (Vasotec)

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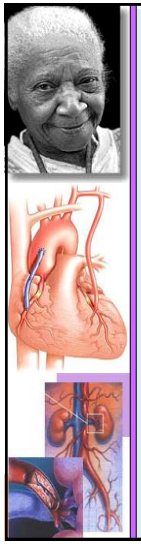
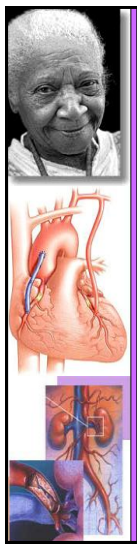


**ACCNS-AG #15 (extra)**

**Emergency treatment for a patient with a "warm and wet" presentation of ADHF should initially consist of IV Lasix and IV:**

A. Milrinone (Primacor)
B. Dobutamine (Dobutrex)
C. Nitroglycerin
D. Enalapril (Vasotec)

144



**ACCNS-AG Q16 (extra)**

**A patient has a history of heart failure and is on captopril, metoprolol and furosemide. The physician adds spironolactone to the regimen. What lab results would be particularly concerning?**

A. Glucose 140 mg/dL
B. Serum creatinine 1.8 mg/dL
C. BNP level of 100 pg/mL
D. Hemoglobin 12 mg/dL

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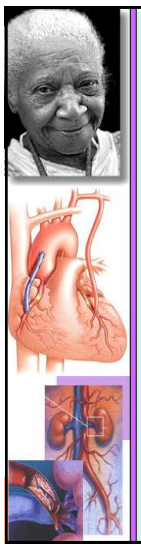

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A. Glucose 140 mg/dL
B. Serum creatinine 1.8 mg/dL
C. BNP level of 100 pg/mL
D. Hemoglobin 12 mg/dL

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A patient has heart failure secondary to ischemic cardiomyopathy and end-stage coronary artery disease. Which agents would be the MOST beneficial?

A) ○ digoxin (Lanoxin) and diltiazem (Cardizem)

B) ○ flecainide (Tambocor) and hydralazine (Apresoline)

C) ○ carvedilol (Coreg) and lisinopril (Zestril)

D) ○ captopril (Capoten) and spironolactone (Aldactone)

147

Which should the nurse anticipate administering to a patient with hypertrophic cardiomyopathy and coronary artery disease?

A) ○ furosemide (Lasix)

B) ○ nitroglycerin

C) ○ digoxin

D) ○ metoprolol (Lopressor)

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A patient diagnosed with restrictive cardiomyopathy develops acute shortness of breath. Data are:

BP 105/60
HR 95
CVP 25 mm Hg
PAP 52/25 mm Hg
PAOP 8 mm Hg
CO 4.5 L/min
CI 2.2 L/min/m2

Administration of which should the nurse anticipate?

A) ○ metoprolol (Lopressor) 5 mg IV push

B) ○ dobutamine (Dobutrex) 5 mcg/kg/min

C) ○ furosemide (Lasix) 40 mg IV push

D) ○ lisinopril (Zestril) 40 mg PO

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Which physiologic changes occurs as a direct result of cardiogenic shock?

A) increase in capacitance

B) decrease in preload

C) decrease in SVR

D) increase in afterload

150

The rationale for using dobutamine (Dobutrex) at an infusion rate of 10-12 mcg/kg/min for cardiogenic shock is to

A) ○ improve myocardial contraction.

B) ○ decrease oxygen consumption.

C) ○ decrease myocardial ischemia.

D) ○ improve urinary output.

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# References


- NIH Heart inflammation, Oct, 2023, https://www.nhlbi.nih.gov/health/heart-inflammation/endocarditis
- Mayo clinic diseases, Chagas Disease, March 2025, https://www.mayoclinic.org/diseases-conditions/chagas-disease/symptoms-causes/syc-20356212
- https://www.nhlbi.nih.gov/health/wolff-parkinson-white-syndrome
- https://www.nhlbi.nih.gov/health/long-qt-syndrome


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# PROFESSIONAL CARING AND ETHICAL PRACTICE

BY: DR. ANGELA WEEMS

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## OBJECTIVES:

1. Examine AACN Synergy Model for Nursing Practice.
2. Review AACN Nurse Competencies.
3. Review various components of research.
4. Discuss the role of evidence-based practice in nursing.
5. Identify components of collaboration
6. Define the different types of learners.
7. Assess Bloom's Taxonomy framework.
8. Classify different categories of diversity consideration.
9. Identify methods for addressing diversity in the healthcare setting.
10. Define systems thinking.
11. Recognize the impact of systems thinking in the healthcare setting.
12. Discuss ethical principles.

2

## ETHICAL PRACTICE AND PROFESSIONAL CARING BREAKDOWN

| | | | |
|---|---|---|---|
| 20% of CCRN Exam | Advocacy/Moral Agency – 3% | Caring Practices- 4% | Collaboration- 4% |
| Systems Thinking 2% | Diversity- 2% | Clinical Inquiry- 2% | Facilitation of Learning – 3% |

3

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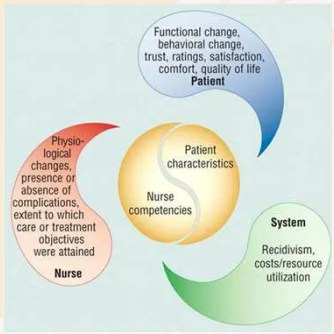
## AACN SYNERGY MODEL

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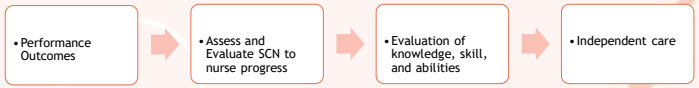
# WHAT IS AACN SYNERGY MODEL

- A way to match the patient's needs to the nurse's competencies.
- 8 Patient Characteristics
- 8 Nurse Competencies

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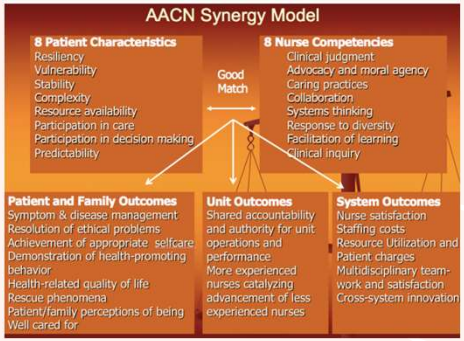
# PATIENT CHARACTERISTICS, NURSE COMPETENCIES, AND OUTCOMES

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# PATIENT CHARACTERISTICS

| | |
|---|---|
| Resiliency | Capacity to return to a restorative level of functioning using compensatory/coping mechanism; ability to bounce back quickly after an insult. |
| Vulnerability | Susceptibility to actual or potential stressors that may adversely affect patient outcomes. |
| Stability | Ability to maintain a steady -state equilibrium |
| Complexity | Intricate entanglement of 2 or + systems |
| Resource Availability | Extent of resources the pt/family/community bring to the situation |
| Participation in Care | Extent to which the pt/family engages in aspects of care |
| Participation in Decision Making | Extent to which pt/family engages in decision making |
| Predictability | Characteristic that allows one to expect a certain course of events or course of illness |

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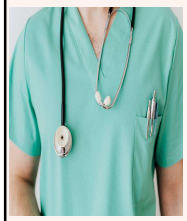
# NURSE COMPETENCY



| | |
|---|---|
| Clinical Judgement | Clinical reasoning, includes clinical decisions-making critical thinking, global grasp of situation with nursing skill acquired through education, experiential knowledge, evidence-based guideline. |
| Caring Practices | Constellation of nursing activities that create a compassionate, supportive, & therapeutic environment for pts & staff, with the aim of promoting comfort & healing & preventing unnecessary suffering. |
| Clinical Inquiry | Ongoing Process of questioning and evaluating practice and providing informed practice |
| Collaboration | Working with others in a way that promotes/encourages each person's contributions towards achieving optimal/realistic patient/family goals. Involves intra-&inter-disciplinary work with colleagues and community |
| Facilitation of Learning | Ability to facilitate learning for pt/family, nursing staff, healthcare team, and community. |
| Diversity | Sensitivity to recognize, appreciate & incorporate differences into the provision of care. |
| Systems Thinking | Body of knowledge and tools that allow the nurse to manage whatever environment & system resources exist for the pt/family/staff; within or across healthcare and non-healthcare systems. |
| Advocacy and Moral Agency | Working on another's behalf & representing the concerns of pt/family & nursing staff. Serves as a moral agent in identifying & helping to resolve ethical & clinical concerns within & outside the clinical setting. |

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# CARING PRACTICES

9

## CARING PRACTICES

- Patient and Family Support
- Patient-Centered Care
- Communication
- Empowerment
- Culturally Sensitive Care
- Therapeutic Environment

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# CLINICAL INQUIRY




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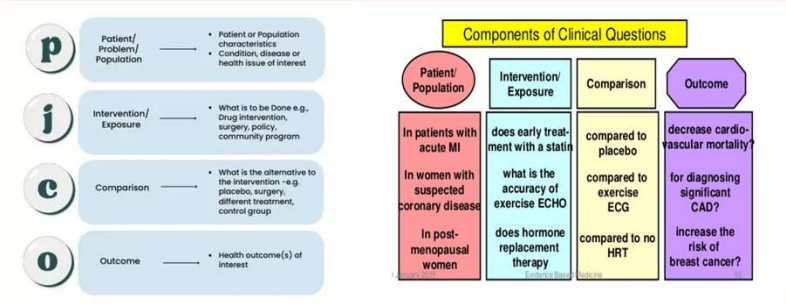
# UNDERSTAND RESEARCH ROLE IN NURSING PRACTICE

Evidence Based Practice Changes

12

12

## RESEARCH QUESTION

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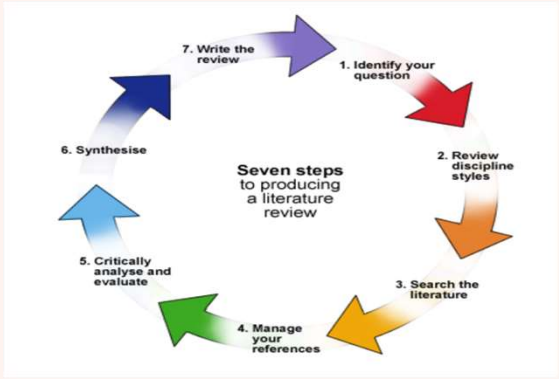
## REVIEW OF LITERATURE

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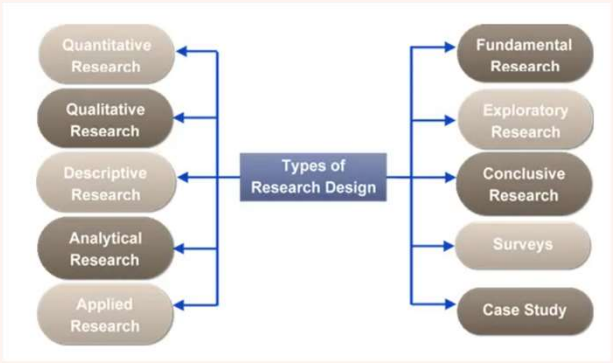
## RESEARCH DESIGN

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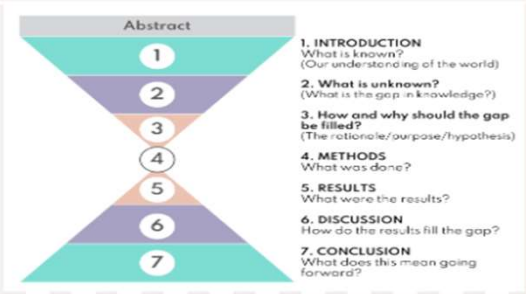
## COMPONENTS OF A RESEARCH ARTICLE

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## YOUR ROLE IN THE PROCESS

- Use peer reviewed journals.
- Look for methodologically sound studies.
- Recognize different types of evidence.
- Stay informed
- Participate in research
- Share knowledge
- Advocate for change

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## COLLABORATION

18

## INITIATING AND IMPROVING CARE

COACHING | MENTOR | MEETINGS | ROUNDS | DIVERSE RESOURCES

19

19

## PATIENT CENTERED CARE

- Health Promotion
- Lifestyle Changes
- End of Life Care
- Shared Decision Making

20

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## INTERPROFESSIONAL PARTNERSHIPS

Patient Care Plans

Role Clarity

Communication

Team Based Problem-Solving

21

21

## POPULATION HEALTH INITIATIVES

Public Health Emergencies

System- wide Initiatives

Policy Development

22

22

## FACILITATION OF LEARNING

23

## EDUCATION

| |
|---|
| Patient Education |
| Development of patient education |
| Integrates patient education |
| Evaluates patient education |
| Patient driven goals |
| Patient have choices and consequences |

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## TYPES OF LEARNERS

Visual

Kinesthetics

Auditory

Reader

25

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## LEARNING STRATEGIES

Implementing Evidence-Based Teaching Strategies

Creating a psychologically safe learning environment

Developing critical thinking and clinical judgement skills

Effective simulation and facilitation and debriefing

Integrating Informatics and Healthcare Technologies

Coaching and Student-Centered Learning

Designing Competency Based Assessments

Promoting Interprofessional Collaboration

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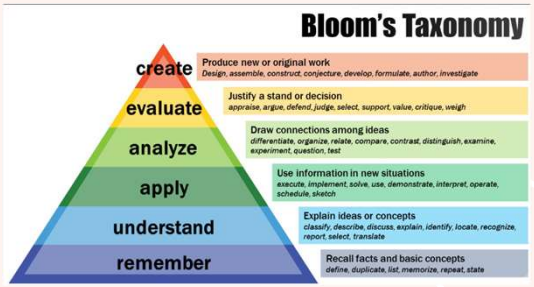
## BLOOMS TAXONOMY

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## DIVERSITY

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## SCOPE OF DIVERSITY

- Age
- Race
- Ethnicity
- Gender Identity
- Sexual Orientation
- Religious Beliefs
- Socioeconomic
- Disabilities

29

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## DIVERSITY IN PATIENT CARE

- Language Barrier
- Respecting Cultural Belief
- Addressing Health Disparities

30

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## DIVERSITY IN PATIENT CARE

- Teaching Methods to Promote Cultural Humility
- Inclusive Work Environment
- Advocating for Equity

31

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## DIVERSITY COMPETENCY DEVELOPMENT

Developing Specific Skills

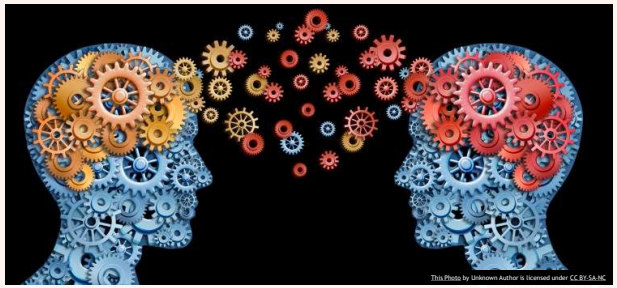
Utilization of Framework and Models on Diversity, Equity, and Inclusion

Continuous Learning

32

32

## SYSTEMS THINKING

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## WHAT IS SYSTEMS THINKING?

- A holistic approach to problem-solving that focuses on different parts of a system interconnect and influence each other within a larger context.
- Understands relationship between components rather assessing them in isolation.
- Manage resources to solve patient problems.

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## SYSTEMS THINKING IN NURSING

- Patient Flow
- Optimizing Process
- Health Work Environment

35

35

## SYSTEMS THINKING FOR THE HEALTHCARE SYSTEM

- COST EFFECTIVENESS
- PATIENT RETENTION
- CONTINUITY OF CARE

36

36

# ETHICAL PRINCIPLES

Respect for others | Beneficence | Non-maleficence | Justice | Veracity | Fidelity | Autonomy

37

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# ANA CODE OF ETHICS

- Definitive standard for ethical nursing practice.
- Guides decisions for patient care.
- Guides practice decisions
- Professional integrity


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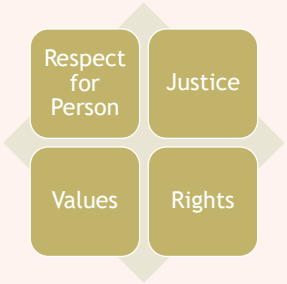
# MORAL CONCEPTS

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# LEGAL DOCUMENTS

Do Not Resuscitate

Power of Attorney

Statement of Intention

Healthcare Proxy

40

40

# FAMILY NEEDS THEORY -- NANCY MOLTER

- Accurate and Regular Information
- See the Patient
- Helpful to the patient
- Understand hospital environment
- Preserve reasonable emotional balance
- Relive the incident
- Have personal needs met
- Support
- Maintain or develop confidence in care

41

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# PHASES OF FAMILY RECOVERY

- High Anxiety
- Denial
- Anger
- Remorse
- Grief
- Reconciliation

42

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# ELIZABETH KUBLER- ROSS STAGES OF DEATH AND DYING


43

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# ADULT LEARNING PRINCIPLES


44

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OPEN
THANK YOU
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Angela.weems2@va.gov
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