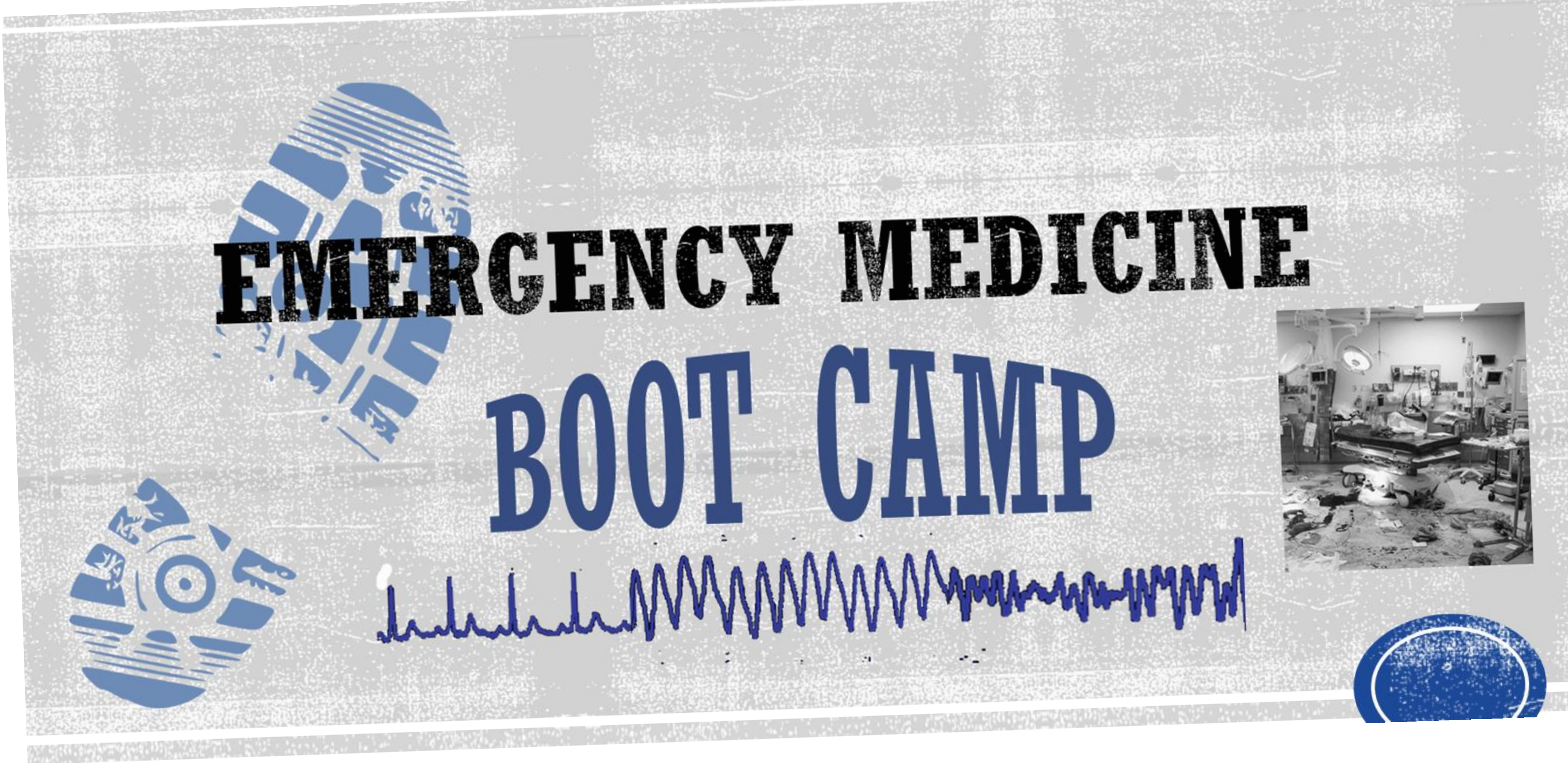
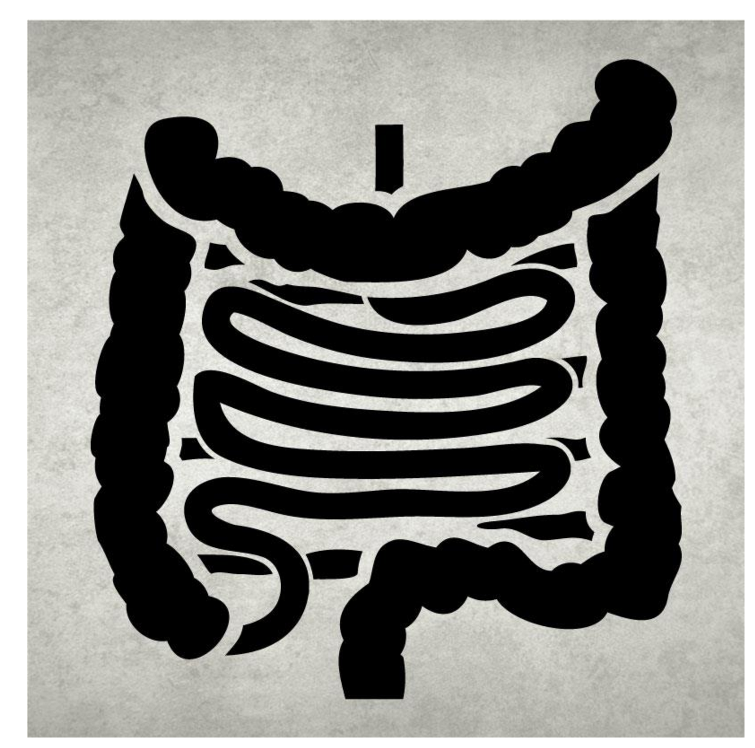


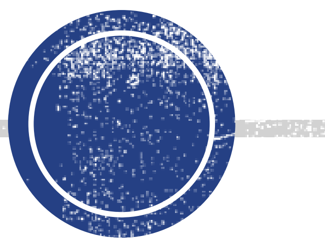
EMERGENCY MEDICINE
BOOT CAMP

INTRODUCTION TO ABDOMINAL PAIN

José A. Rubero, MD, FACEP, FAAEM

Professor in Emergency Medicine





UDAP

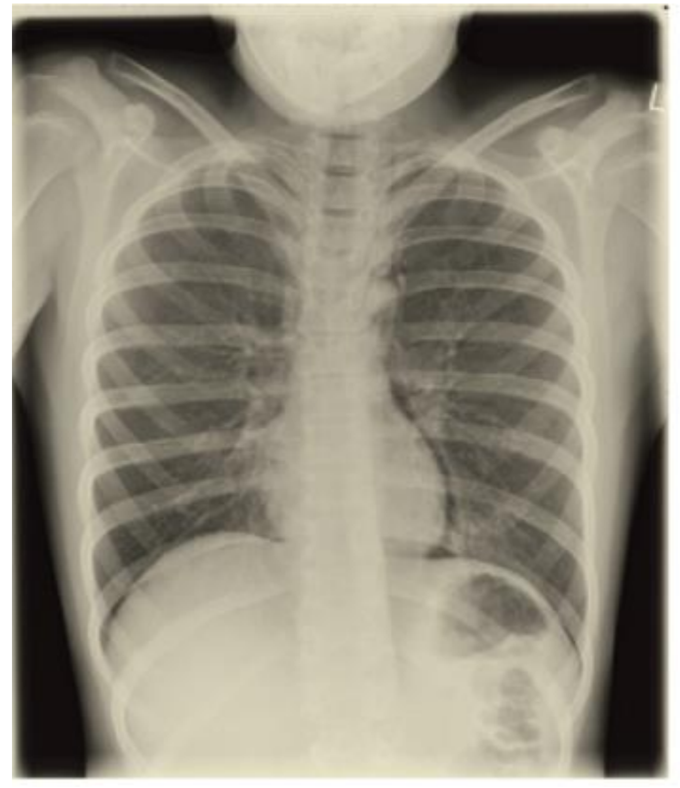
- Undifferentiated abdominal pain
- AKA
  - Non-specific abdominal pain
- Elderly
  - MC
    - Cholecystitis
    - Malignancy
    - Obstruction
    - Not UDAP
  - Appendicitis
  - Mesenteric ischemia
  - AAA
- Pediatric
  - MC
    - AGE and UDAP
- Again
- UDAP is a diagnosis of exclusion

ABDOMINAL XRAYS

- Good for….
- Suspected bowel obstruction
- Foreign body ingestion
- Perforation

FOUNDATIONS CHALLENGE

VISUAL DIAGNOSIS

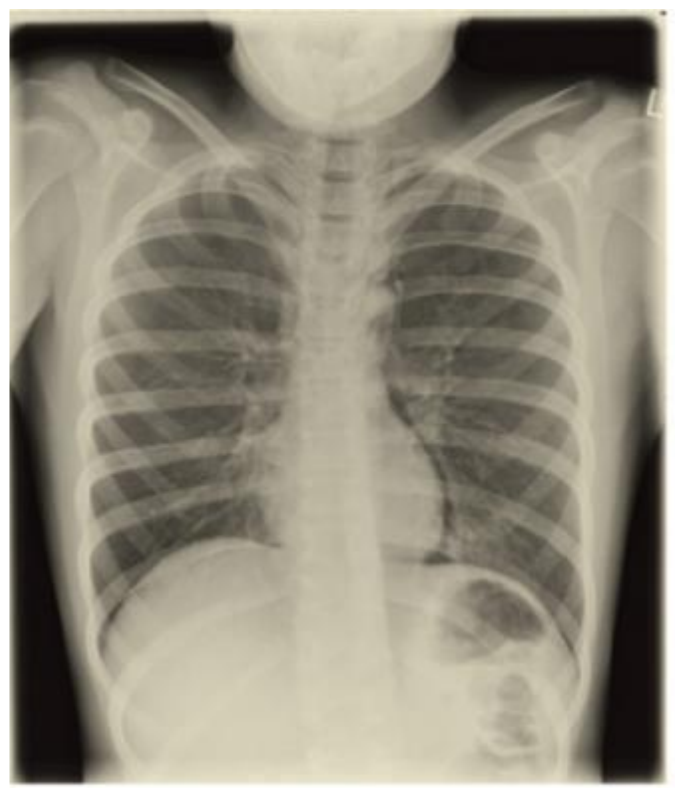


Vomiting,
Chest Pain

Diagnosis??

Foundations Challenge

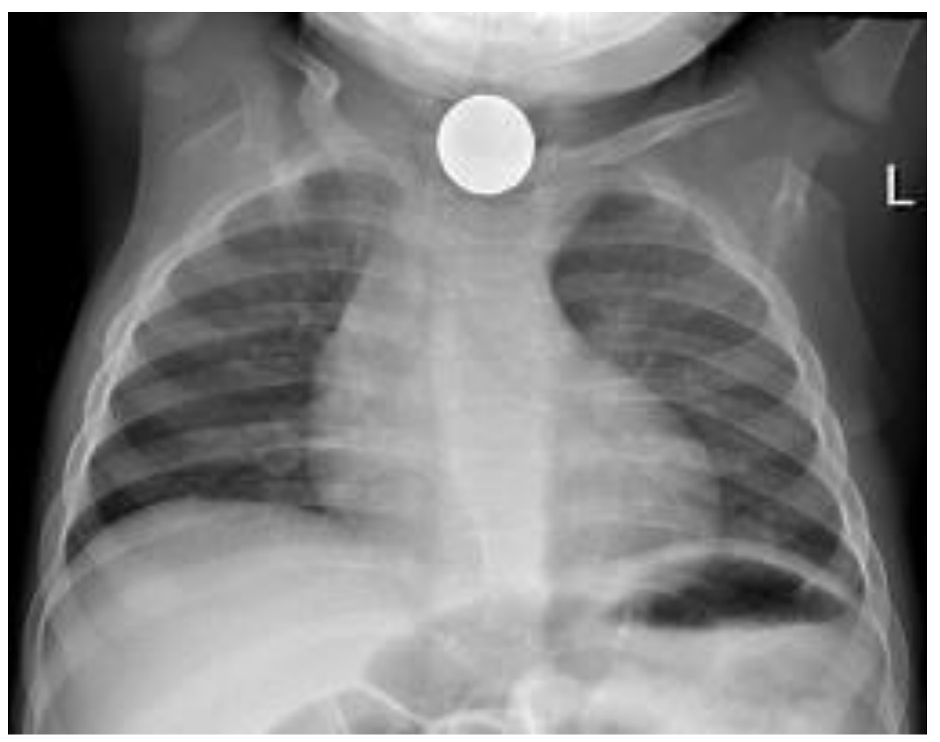
Visual Diagnosis



Vomiting,
Chest Pain

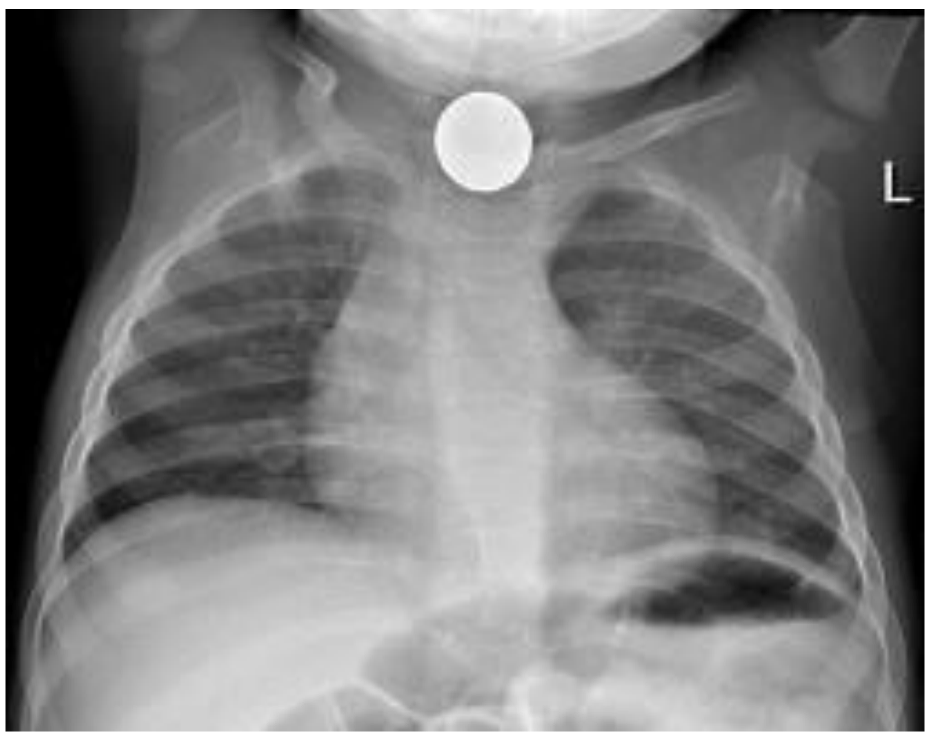
Boerhaave syndrome

Foundations Challenge
Visual Diagnosis



Consult GI or ENT?

Foundations Challenge
Visual Diagnosis



GI: coin in esophagus will align in coronal plane

FOUNDATIONS CHALLENGE
KNOWLEDGE BOMB

Esophageal Foreign Bodies

THE PROBLEM

- Kids swallow weird things; Adults get food stuck

THE CLUES

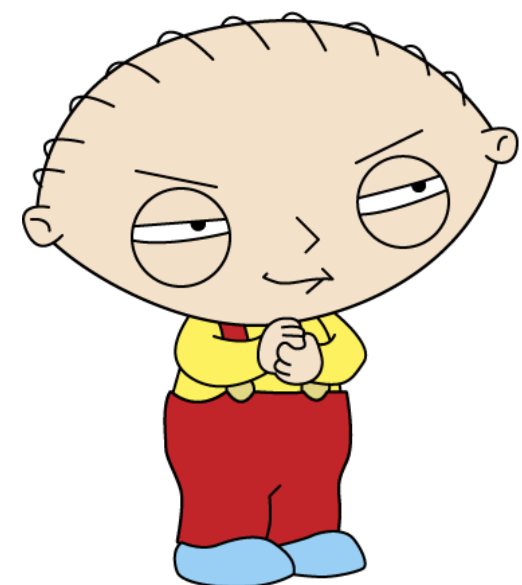
- Vomiting, gagging, choking, neck or chest pain, dysphagia, odynophagia
- XR shows radiopaque FBs; consider CT or endoscopy if high clinical suspicion but XR negative

THE SOLUTION

- High-risk FBs (button battery, sharp objects) require emergent removal; others ok for 24hr trial of passage
- Food impaction treated with Glucagon 1mg IV vs. soda vs. endoscopy
- ALL FBs require opt GI follow up to r/o structural pathology

CASE

- Mother brings in her 3yo son for possible FB ingestion. Child was left unattended for extremely short period of time. Mother was cleaning out 'junk drawer' on the floor and noticed the child place an item in his mouth and swallow right as she came into the room.



ESOPHAGEAL DISEASE: FOREIGN BODY INGESTION

- MC call to poison control…
  - Cosmetic ingestion
- Children
  - Coins #1
  - Batteries
  - Toys
- Adults
  - Steakhouse Syndrome
  - Small bones
- Button batteries
  - An emergency if lodged in the esophagus, usually safe if in the stomach
- Mules
  - Packages vs packers
  - Whole bowel irrigation

ESOPHAGEAL DISEASE: FOREIGN BODY INGESTION

- Where FB get caught?
  - Pediatrics
    - Upper esophageal sphincter (C6)
    - Cricopharyngeal muscle
  - Adults
    - Lower esophageal sphincter (T12)
  - Uncommon
    - Crossover of aortic arch (T4)

ESOPHAGEAL FB

- Esophagus: frontal plane / Trachea: sideways
- Sharp objects always need taken out
- Large objects: **2cm x 5cm**
- Button battery: EMERGENCY if still in esophagus or multiples
- Non-metallic: consider CT/contrast swallow or just scope

ESOPHAGEAL DISEASE: FOREIGN BODY INGESTION

- Risk of perforation increased with time
- High risks
  - Sharp
  - Elongated
  - >5 cm (2 x 5 cm)
  - Multiple
  - Button battery
  - Toothpicks

ESOPHAGEAL DISEASE: FOREIGN BODY INGESTION

- Treatment
  - EGD
  - Foley catheter under fluoro
  - Glucagon
  - Meat tenderizer…. Nonono!

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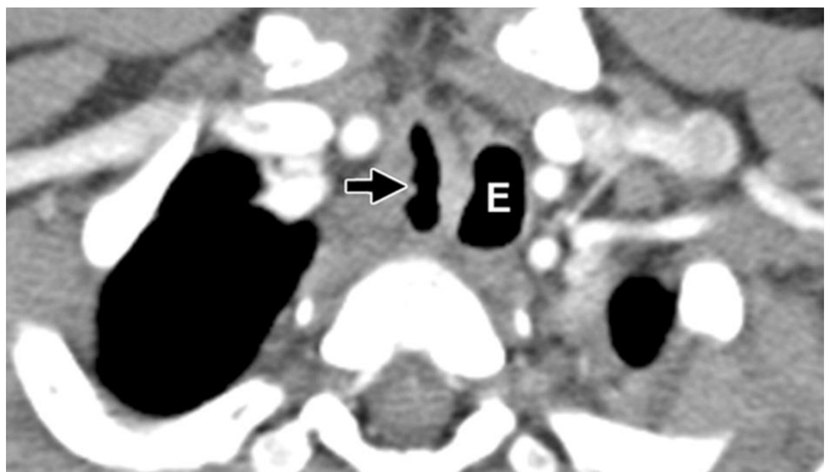
Esophagus or Trachea?



Trachea

Foreign body (coin) in trachea aligned in anteroposterior orientation

Esophagus

Foreign body (coin) in esophagus aligned in coronal plane

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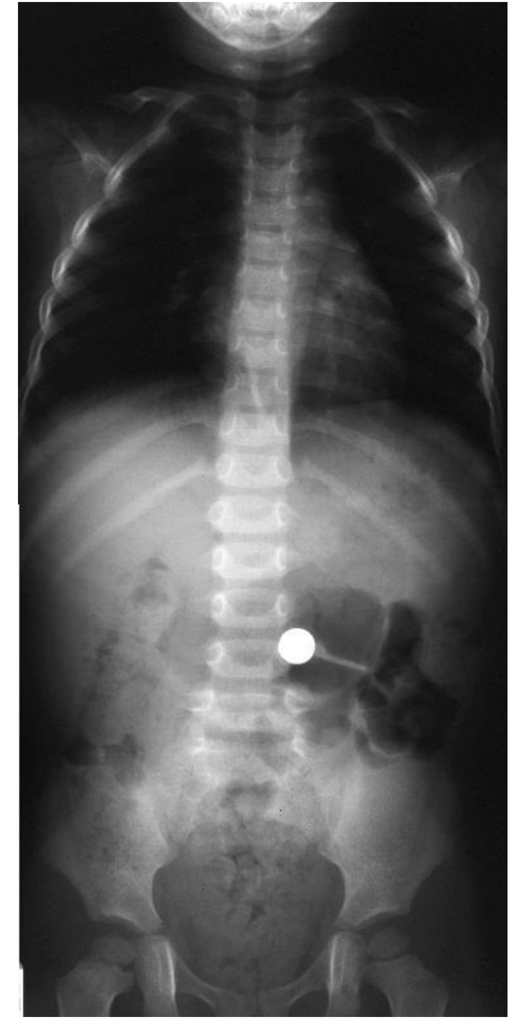

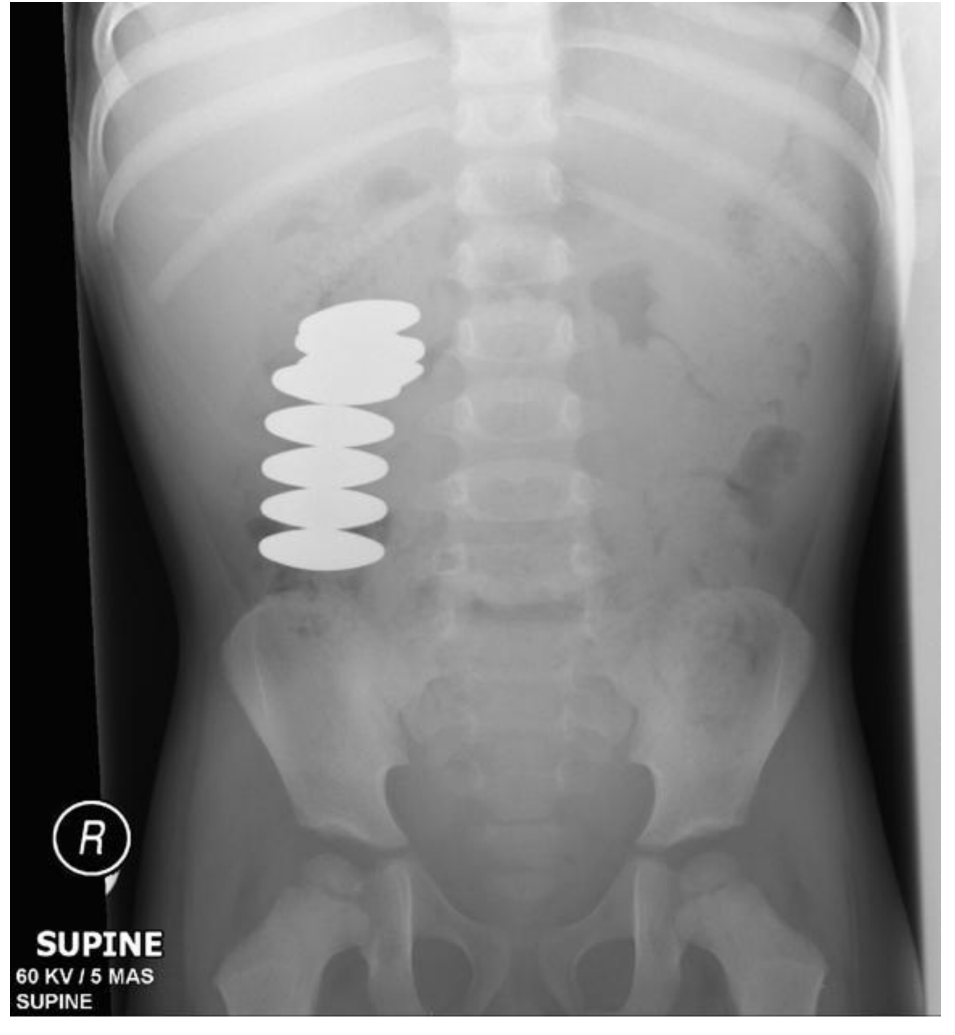
R
SUPINE
60 KV / 5 MAS
SUPINE

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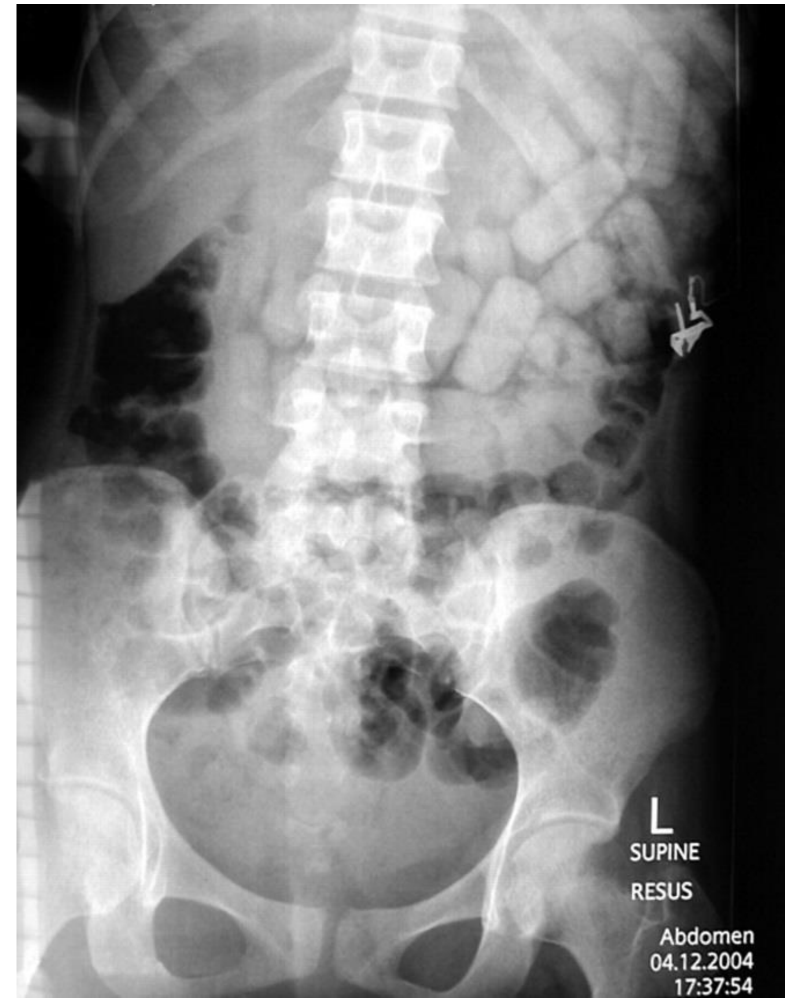
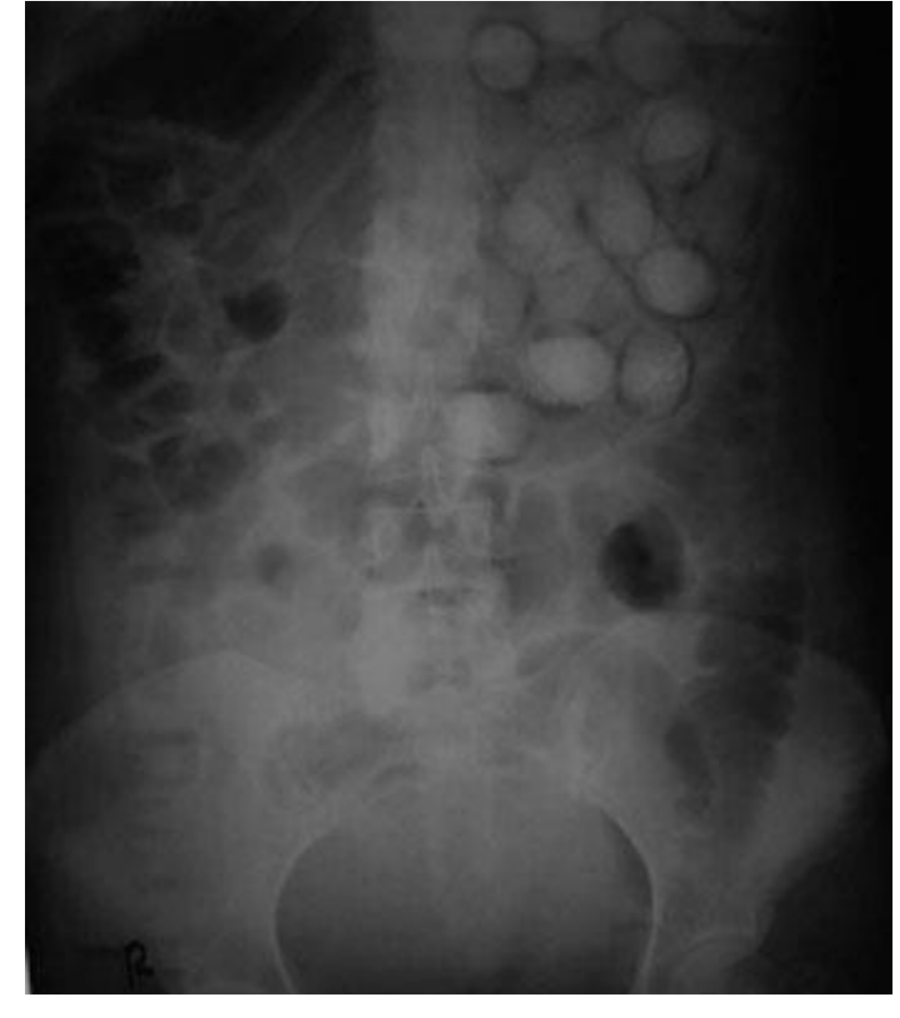
or

STEAKHOUSE SYNDROME

- Elderly, usually stuck distal esophagus
- **Glucagon: relax LES. 1-2mg. SE: VOMITING.**
- Sublingual tabs: nefidipine/nitro SE: HYPOTENSION
- **Papain (meat tenderizer) = WRONG**
- Coke products work as well
- Usually pass spontaneously, though definitive tx: SCOPE
- Always have underlying pathology


L
SUPINE
RESUS
Abdomen
04.12.2004
17:37:54



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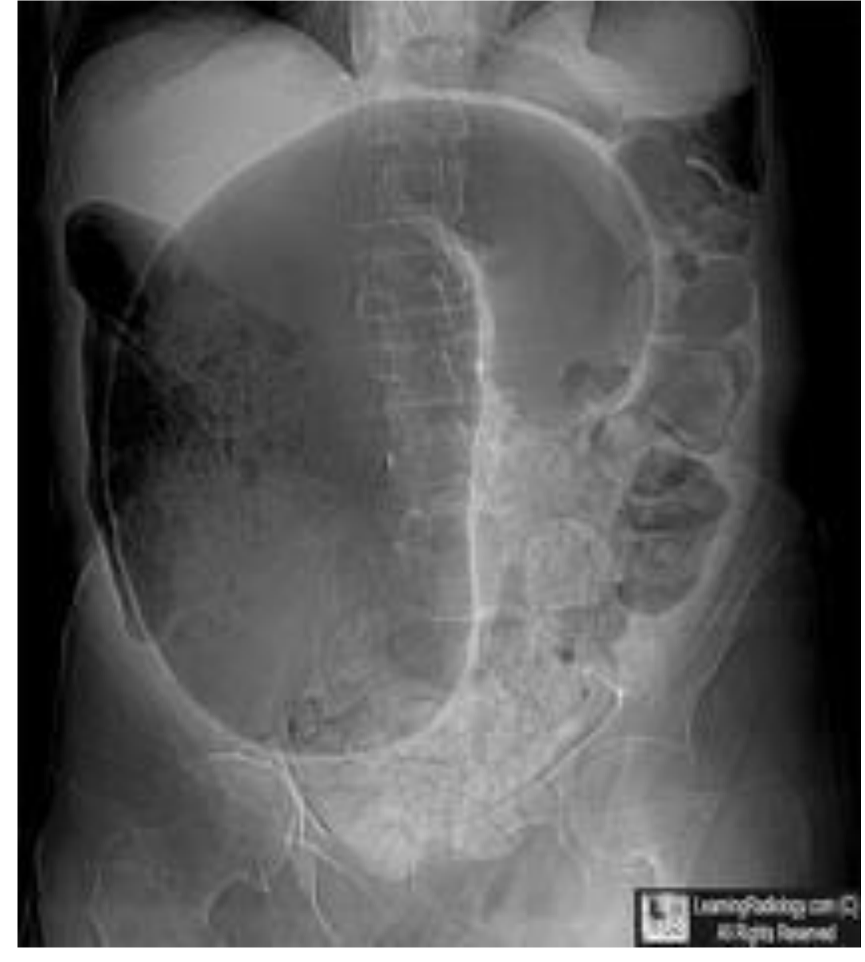
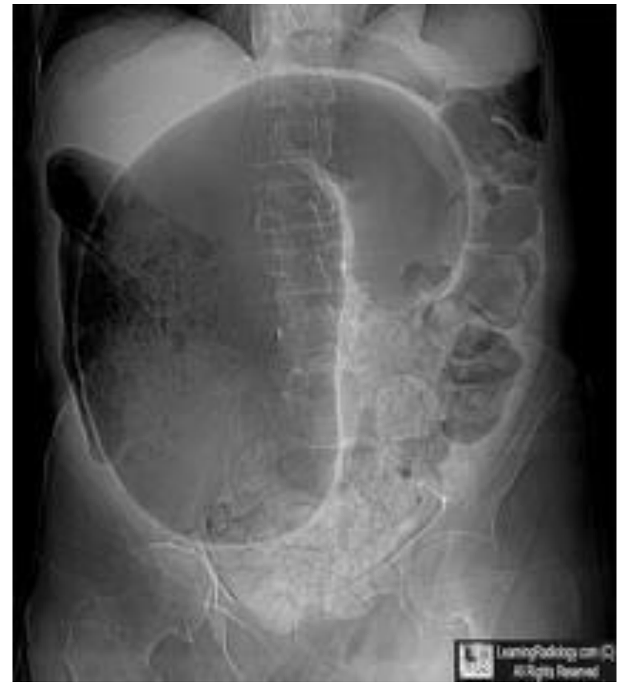
PACKERS VS STUFFERS

- Which is more of an emergency?
- **Stuffers**: quickly consume bag of goodies to hide contraband from police. Not well sealed. **High risk of toxicity**. May need emergent surgery if symptomatic.
- Packers: mules, transport service for cartel. Usually sealed very well.
- Treatment: Observation and WBI



Abdominal Pain,
Stable Vitals

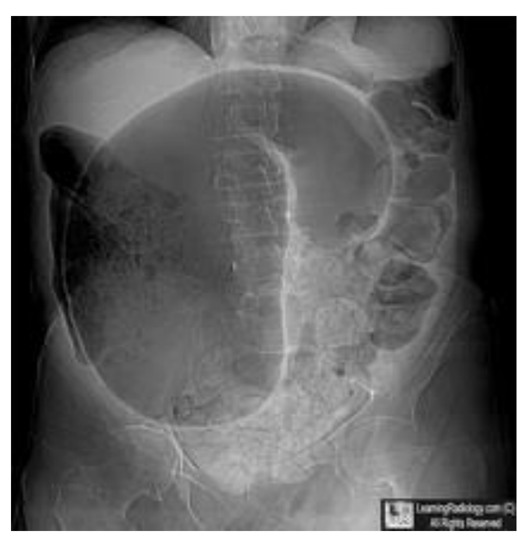
Diagnosis?? Treatment??

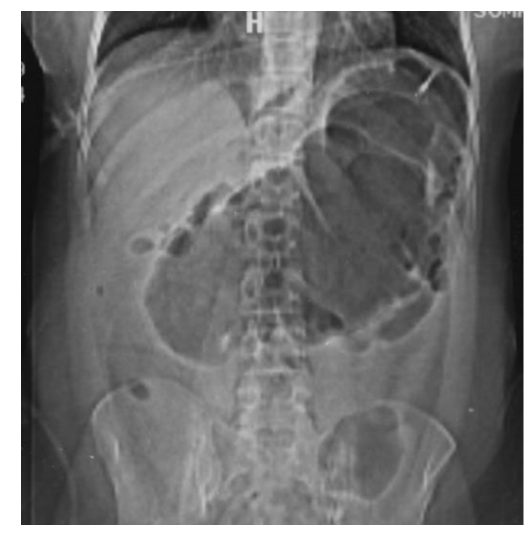


Abdominal Pain,
Stable Vitals

Sigmoid Volvulus
Decompression (sigmoidoscopy)

Volvulus



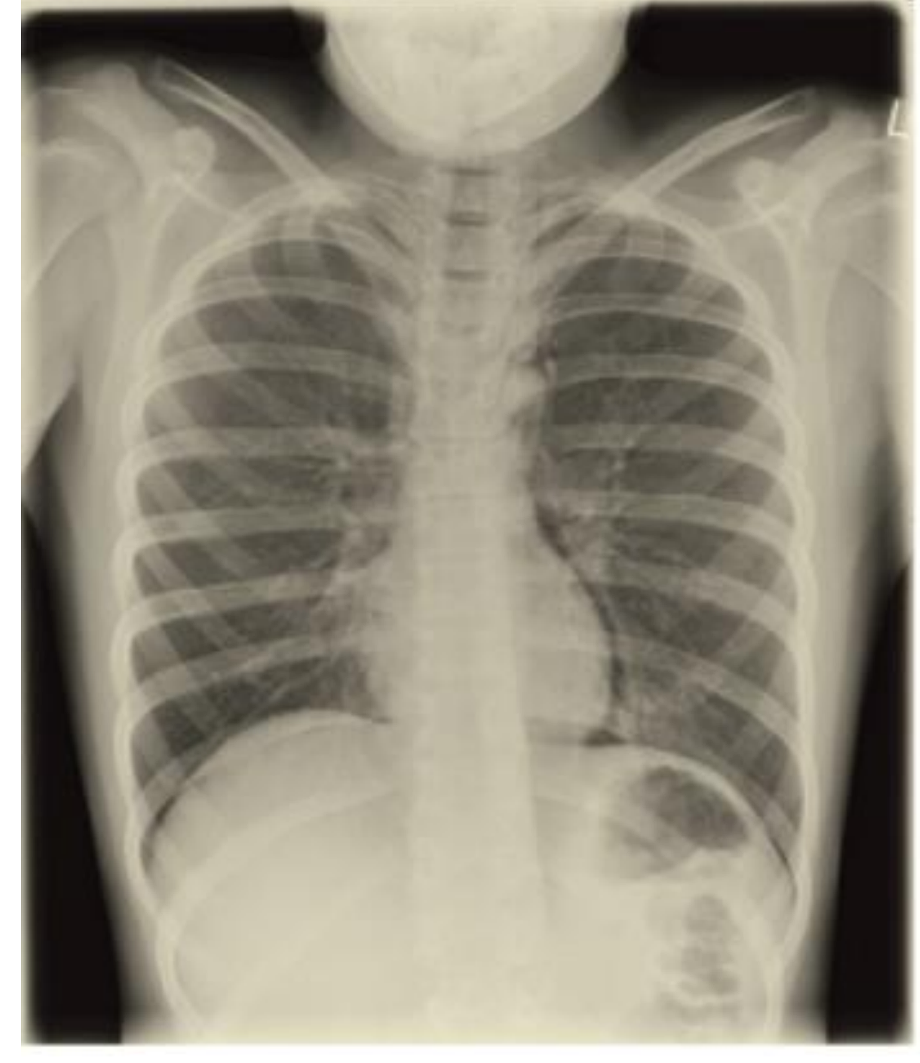


Sigmoid Volvulus

- Elderly, immobilized, constipation
- RUQ Loop → coffee bean
- Endoscopic decompression if stable, surgery if unstable

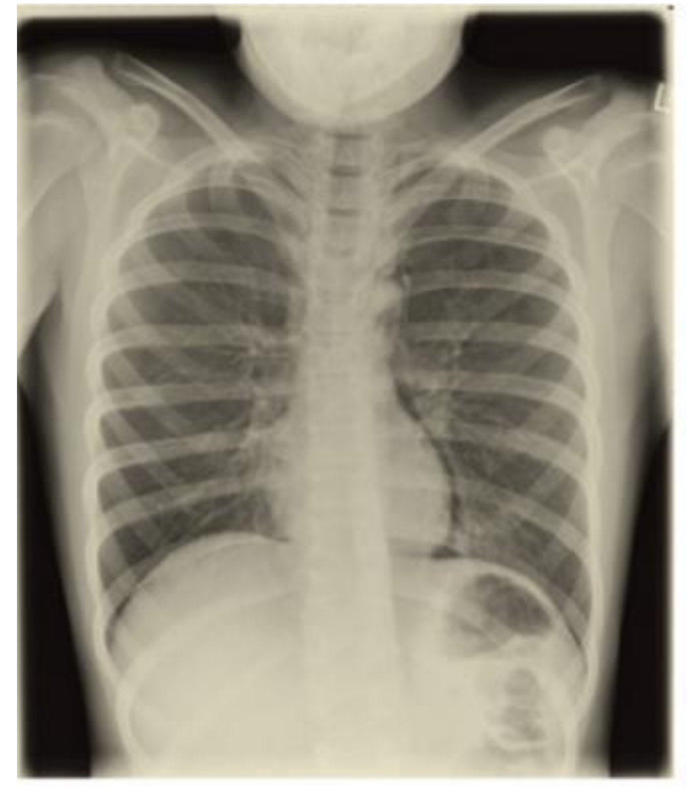
Cecal Volvulus

- Younger active patient
- LUQ Loop
- Always require surgery (high rate of necrosis)



Vomiting,
Chest Pain

Diagnosis??

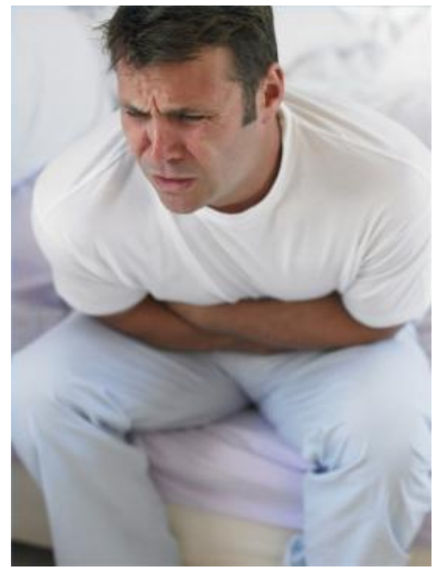


Vomiting,
Chest Pain

Boerhaave
syndrome

CASE

- 45yo male presents due to 'indigestion.' States he has noticed over the past few months more frequent episodes of burning feeling in epigastric area with intermittent episodes of burning that moves up chest to back of throat.



V1

50mm/s

V2

V3

V4

V5

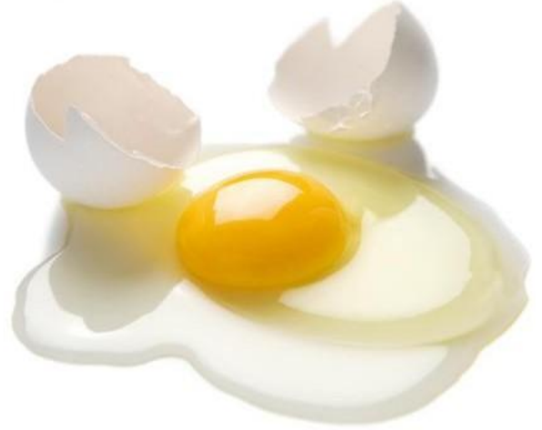
V6

VOMITING

- Toxic appearance
  - Intussusception
  - Currant jelly diarrhea with some blood
  - Distended abdomen or RUQ mass (sausage?), intermittent colicky abdominal pain; AMS; no diarrhea
  - Hydration, antibiotics
  - Barium, water soluble, or air enema is the study and treatment of choice
  - OR if unable to fix with BE

VOMITING

- Non-toxic appearance but with projectile non-bilious vomiting
  - Pyloric stenosis
  - Olive in epigastric;
  - Hypokalemic metabolic alkalosis; dehydration
  - US is the study of choice
  - Hydration, OR



Staph aureus
MCC food poisoning

Bacillus cereus

Scombroid	Ciguatera
Metallic / **Peppery taste**	Neurotoxin (dinoflagellate)
Histamine-like reaction	**Reversal hot / cold** Paresthesias Burning in hands/feet Loose teeth
Antihistamines	Supportive, mannitol?

CASE

- 28yo male presents with severe diarrhea. Just came back from undeveloped country. Abdominal cramping.

Traveler's diarrhea = Enterogenic E. Coli

DIARRHEA

Dysentery

Watery

Dysentery

Salmonella	Eggs / Chicken Typhoid Fever
Shigella	Tenesmus Low inoculation count Can cause HUS
Campylobacter	MCC bacterial diarrhea GBS
Yersinia	Looks like appendicitis or Crohns
Enterohemorrhagic E. Coli	Watery diarrhea first, then bloody HUS in kids, TTP in adults
C. Difficile	6-10d after antibiotics Oral vanco / metro
Entamoeba histolytica	Look for abscess. Usually GI symptoms beforehand.

DIARRHEA

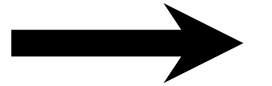
Dysentery

Watery

Watery Diarrhea

Viral Diarrhea	**MCC acute diarrhea** Norovirus - Daycare / Cruise
Enterotoxigenic E. Coli	**Traveler's diarrhea**
Vibrio cholera	Rice-water diarrhea SHELLFISH Tetracycline
C. perfringens	Food poisoning as well
Giardia lamblia	Parasite = Metro Ova / parasite testing Well or stream water Foul smelling diarrhea
Cryptosporidium	**AIDS** Acid-fast, oocysts
IBS	Functional Disorder Stress

Pinworm (Enterobiasis)	Hookworm (Nector americanus)
Kids Rectal Itching	Trachea (**cough**) to esophagus to bowels
Tape test	Penetrates skin Ova in stool Eosinophila

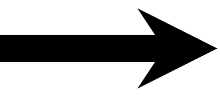


Cipro
Bactrim

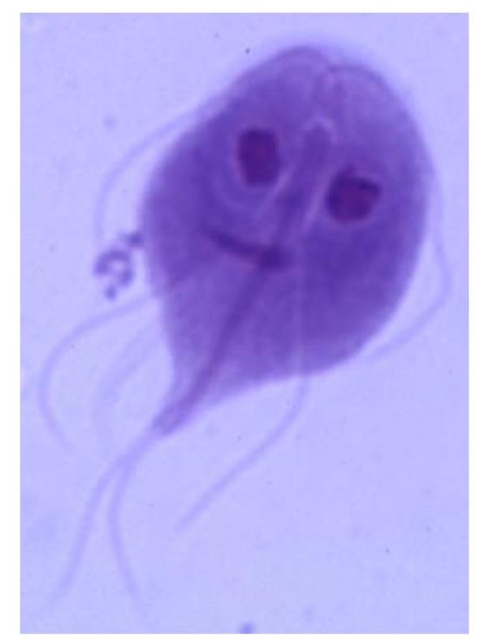
Parasite
(Amoeba, Giardia)

Metro

Worm
(Enterobiasis, Necator americanus)

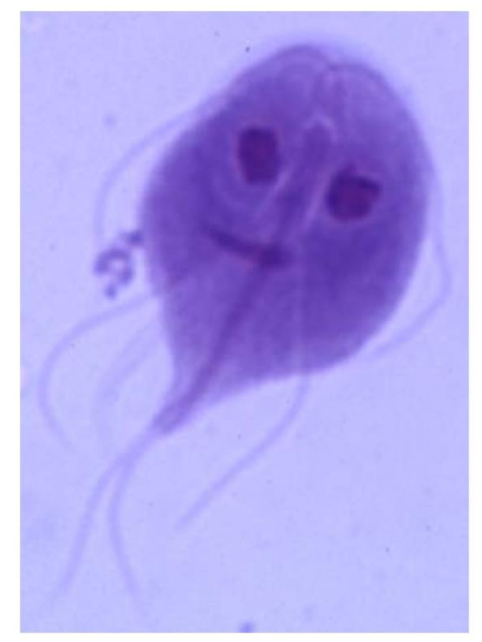


Mebendazole, Tinidazole



Diarrhea

Diagnosis?? Treatment??



Diarrhea

Dx: Giardia
Tx: Metronidazole

DIARRHEA CLINICAL SYNDROMES

Buzz Words	Bacteria
Reheated Rice	???
GI + Neuro Symptoms	???
Traveler's Diarrhea	???

DIARRHEA CLINICAL SYNDROMES

Buzz Words	Bacteria
Reheated Rice	B. cereus
GI + Neuro Symptoms	Ciguatera
Traveler's Diarrhea	ETEC

DIARRHEA CLINICAL SYNDROMES

Buzz Words	Bacteria
Recent Antibiotics	???
Sickle Cell with Sepsis or Osteo	???
Guillain-Barre	???

DIARRHEA CLINICAL SYNDROMES

Buzz Words	Bacteria
Recent Antibiotics	C.diff
Sickle Cell with Sepsis or Osteo	Salmonella
Guillain-Barre	Campylobacter

DIARRHEA CLINICAL SYNDROMES

Buzz Words	Bacteria
Picnic Foods	???
Fish + Histamine-like Reaction	???
HUS or TTP	???

DIARRHEA CLINICAL SYNDROMES

Buzz Words	Bacteria
Picnic Foods	Staph aureus
Fish + Histamine-like Reaction	Scombroid
HUS or TTP	E.coli O157:H7

DIARRHEA CLINICAL SYNDROMES

Buzz Words	Bacteria
Seizures in kids	???
Mimics Appy	???
Ate Raw Oysters	???

DIARRHEA CLINICAL SYNDROMES

Buzz Words	Bacteria
Seizures in kids	Shigella
Mimics Appy	Yersinia
Ate Raw Oysters	Vibrio*

*Usually non-cholera in the US

Bacterial Diarrhea: ENTEROTOXIN-MEDIATED

SUSPECTS	SIGNS & SYMPTOMS	SUPPORT
Staph aureus **Bacillus cereus** **ETEC** **Clostridium perfringens** **Vibrio species**	**Loose Watery Stools** **Normal Vitals** ***Minimal* Abdominal Pain** **Stool sample (if sent) without blood or mucus**	**SYMPTOMATIC:** **Oral vs. IV fluids** **Replete lytes** **Anti-emetic** (Zofran) **Bismuth subsalicylate** (Pepto-Bismol) **Loperamide** (Imodium) **+/- Cipro x 5 days**

Bacterial Diarrhea: INVASIVE

Suspects	Signs & Symptoms	Support
E. coli O157:H7*	**Bloody stools**	**SYMPTOMATIC:**
Salmonella	**Abnormal vitals** (Fever)	**IV fluids**
Shigella	**Moderate – severe abdominal pain**	**Replete lytes**
Campylobacter	**Stool sample with large blood and mucus**	**NO Loperamide**
Yersinia		**ANTIBIOTICS:**
C. difficile		**General:** IV Cipro
Vibrio parahaemolyticus		**Campylobacter:** Erythro/Azithro
		EHEC: NO ABX
		C. diff: Flagyl, PO Vanc

Crohn's	Ulcerative Colitis
FULL THICKNESS	Superficial Lesions
SKIP LESIONS	Rectal Involvement
Nephrolithiasis	Bloody diarrhea

Arthritis, erythema nodosum, uveitis
Complications: Toxic megacolon, colorectal cancer

CROHN'S DISEASE
OR
ULCERATIVE COLITIS?

Skip Lesions	**Continuous Disease**
Rectum & Colon	**Any Part of GI Tract**

Fistulas & Stricture

CROHN'S DISEASE	ULCERATIVE COLITIS
Skip Lesions	**Continuous Disease**
Any Part of GI Tract	**Rectum & Colon**
Fistulas & Stricture	

Caustic Ingestion: which is worse?

Acid or Alkali???

SBP: What makes paracentesis fluid positive?

WBC > ??? OR
Neutrophils > ???

Afib + Severe Abd Pain

Diagnosis???

Caustic Ingestion: which is worse?

Alkali

SBP: What makes paracentesis fluid positive?

WBC > 500 OR
Neutrophils > 250

Afib + Severe Abd Pain

Mesenteric ischemia

Cholangitis: (Charcot's Triad)
Fever + RUQ pain + Jaundice

What 2 additional symptoms are included in Reynold's Pentad???

Most common cause of SBO?

???

AAA repair + Massive GI Bleed

Diagnosis???

Cholangitis: (Charcot’s Triad)
Fever + RUQ pain + Jaundice

AMS
Hypotension

Most common cause of SBO?

Adhesions

AAA repair + Massive GI Bleed

Aortoenteric fistula

Common location of anal fissure?

???

Elderly, critically ill, inflamed GB, no stones

Diagnosis?

Most common cause of acute pancreatitis

???

Common location of anal fissure?

Posterior midline (90%)

Elderly, critically ill, inflammed GB, no stones

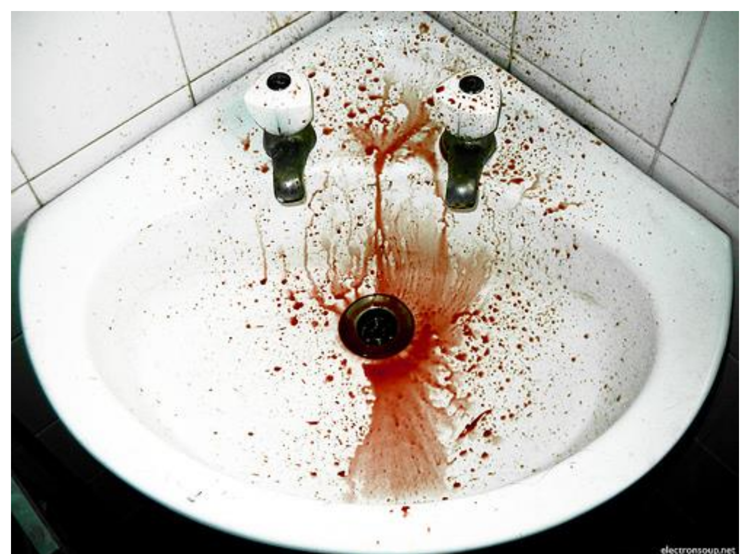
Acalculous Cholecystitis

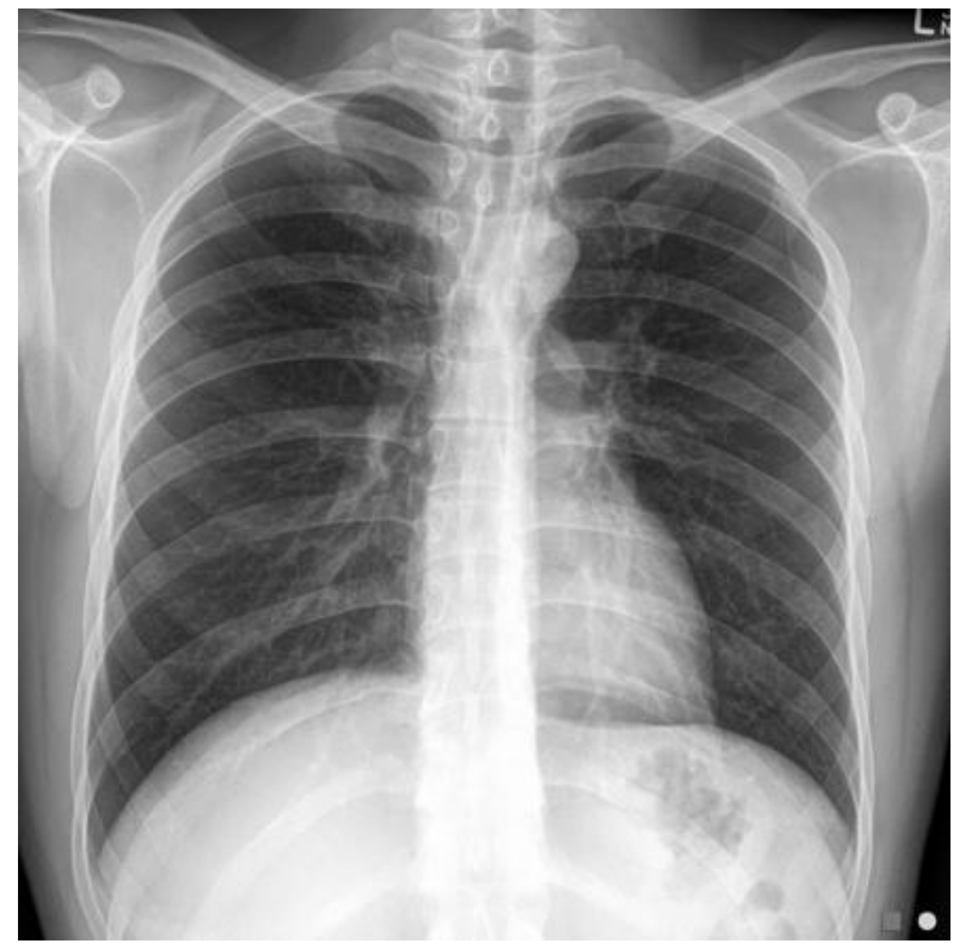
Most common cause of acute pancreatitis

Gallstones

CASE

- 21yo college student presents with vomiting. 21st birthday last night, 'went crazy' out at the bars. Has had multiple episodes of vomiting throughout the night and morning. Came to the emergency department after noticing this last night we put to puke.





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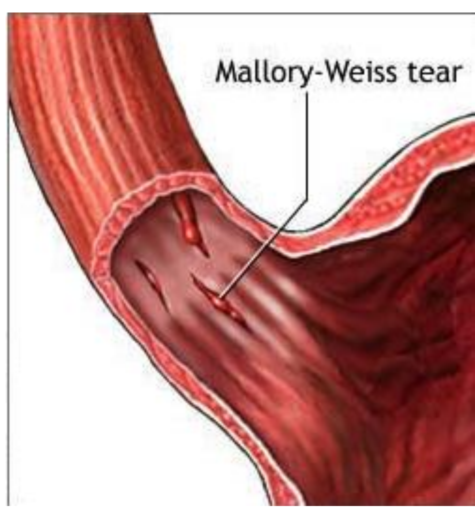
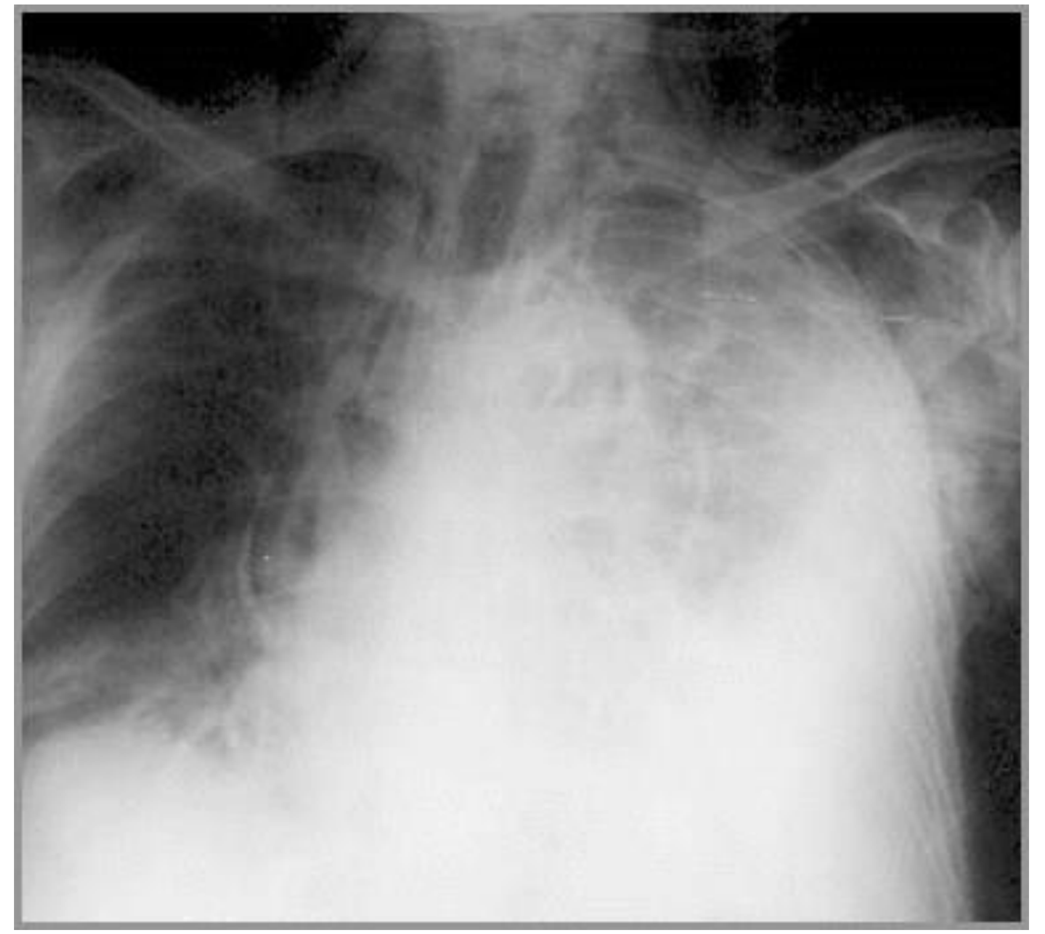
MALLORY-WEISS SYNDROME

- **Partial thickness.**
- Arteriolar bleeding.
- Generally look pretty good though…
- Can have PROFUSE bleeding requiring intervention in severe cases.
- Usually right sided.
- RARE compared to PUD





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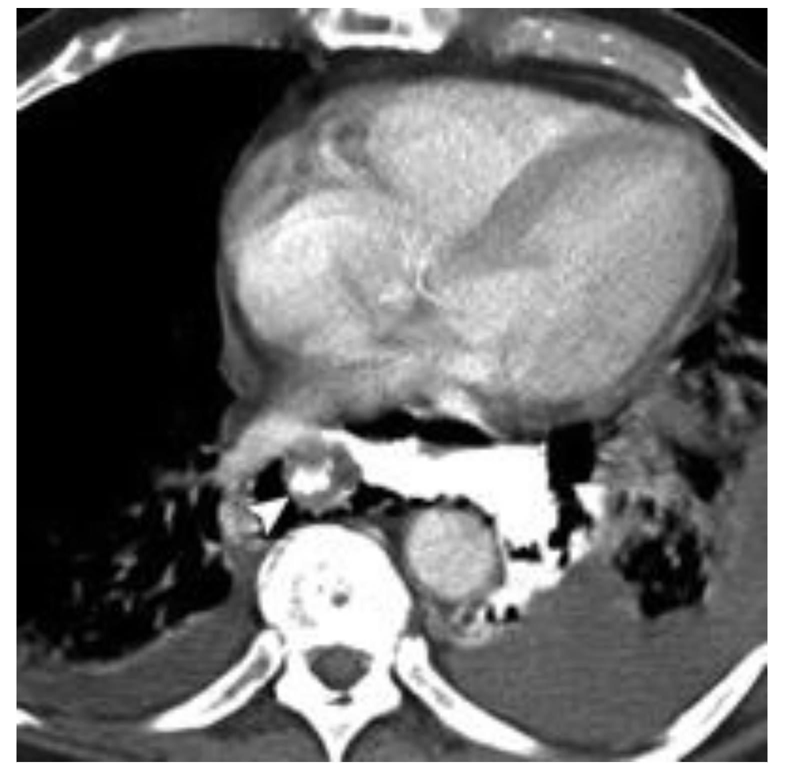

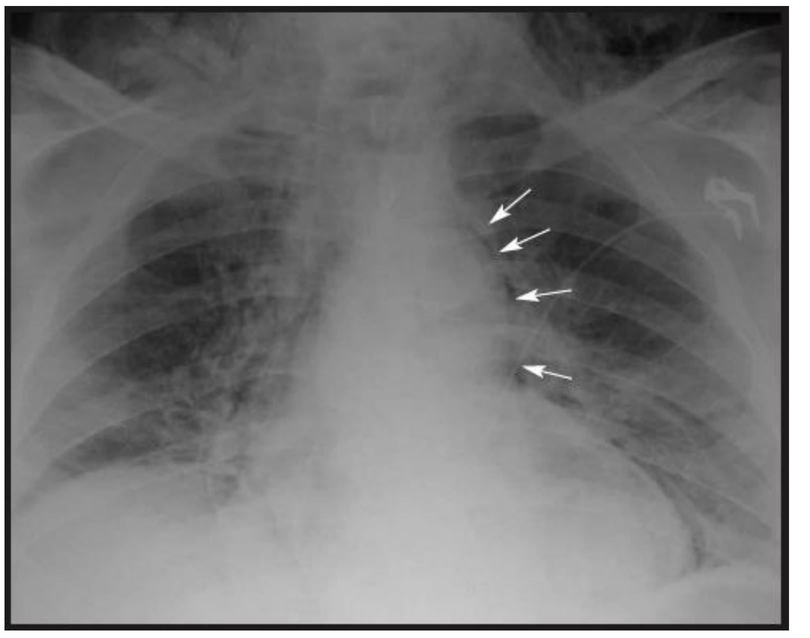

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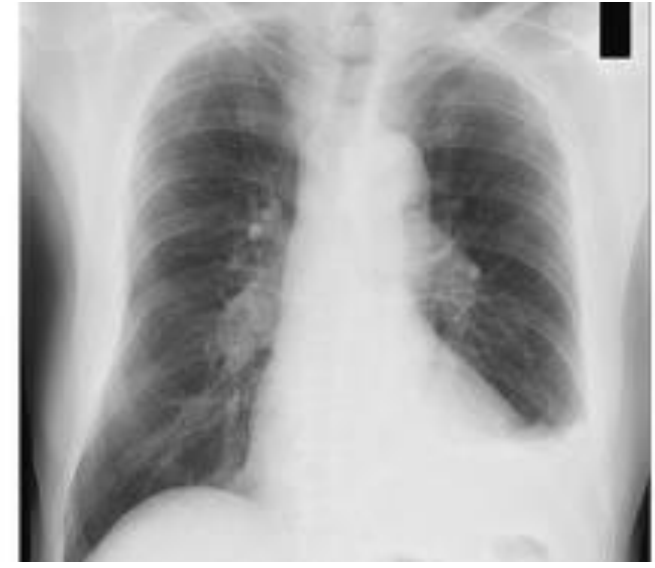
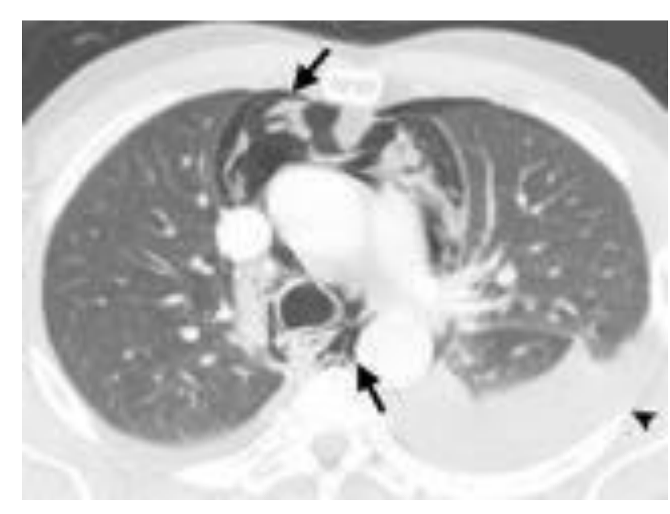
ESOPHAGEAL RUPTURE

- Full thickness
- Symptoms worse with swallowing. No bleeding.
- Hamman crunch?
- Boerhaave's: vigorous retching/vomiting
- **MCC: Iatrogenic**
- Mackler's triad: chest pain, vomiting, subq emphysema
- Diagnose: Gastrograffin vs Barium?
- Large **LEFT** pleural effusion
- Tx: ABX + SURGERY

REPEATED, VIOLENT BOUTS OF VOMITING

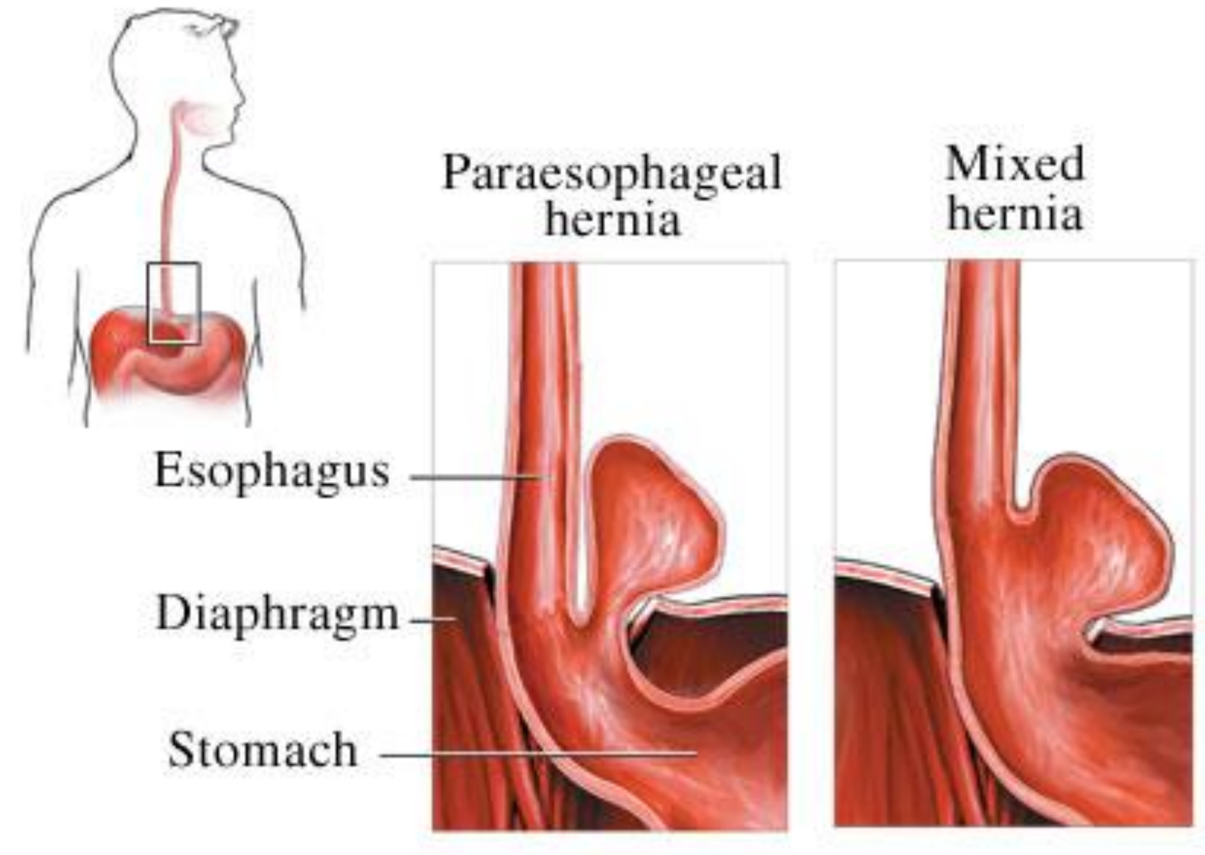
- Mallory-Weiss
  - Involve the submucosa and mucosa
- Boerhaave's syndrome
  - Full thickness tear





HIATAL HERNIA

- Herniation of a portion of the stomach through diaphragm
- Sliding
  - GE junction and stomach fundus herniate
- Paraesophageal
  - GE junction stays fixed; portion of stomach herniates through a defect in diaphragm adjacent to GE junction
  - Can incarcerate


Paraesophageal
hernia
Mixed
hernia
Esophagus
Diaphragm
Stomach

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- Elderly patient with abdominal pain and hypotension
  - AAA
  - Sepsis/colitis
  - Ruptured appendix
- Elderly patient with out of proportion abdominal pain but not tenderness
  - Mesenteric ischemia
- Childbearing woman with abdominal pain
  - Ectopic

UPPER GASTROINTESTINAL BLEEDING

- Causes
  - Peptic Ulcer Disease / Gastric Ulcer (most common)
  - Gastritis
  - Varices Rupture
  - Mallory-Weiss Tear
  - Esophagitis
  - Duodenitis
  - Boaharve Syndrome

UPPER GASTROINTESTINAL BLEEDING

- Signs & Symptoms
  - General abdominal discomfort
  - Hematemesis and melena, rectal exam
  - Classic signs and symptoms of shock
  - Changes in orthostatic vital signs
- Treatment
  - Begin volume replacement using 2 large-bore IVs.
  - Differentiate life-threatening from chronic problem.
  - H2 Blockers, PPI’s
  - NGT lavage, GI consult

ACUTE GASTRITIS

- Cause
  - Damage to Mucosal GI Surfaces
    - Pathologic inflammation causes hemorrhage and erosion of the mucosal and submucosal layers of the GI tract.
  - Risk Factors
    - Alcohol and tobacco use
    - Chemical ingestion (NSAIDs, chemotherapeutics)
    - Systemic infections

Advil
Ibuprofen Tablets, 200 mg
Pain Reliever / Fever Reducer (NSAID)
Coated Tablets
Tablets

ALL DAY STRONG
ALEVE
24 CAPLETS

Motrin
IB Ibuprofen
Pain Reliever / Fever Reducer
300

equate
Ibuprofen
Tablets, 200mg
Pain Reliever/
Fever Reducer
(NSAID)
VALUE SIZE
500 Coated Caplets

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Oesophagus

Lower oesophageal sphincter

80%

Duodenal ulcer

20%

Stomach

MCC

Duodenum

Gastric (or stomach) ulcer

Advil
Ibuprofen Tablets, 200 mg
Pain Reliever / Fever Reducer (NSAID)
Coated Tablets
Tablets

ASPIRIN

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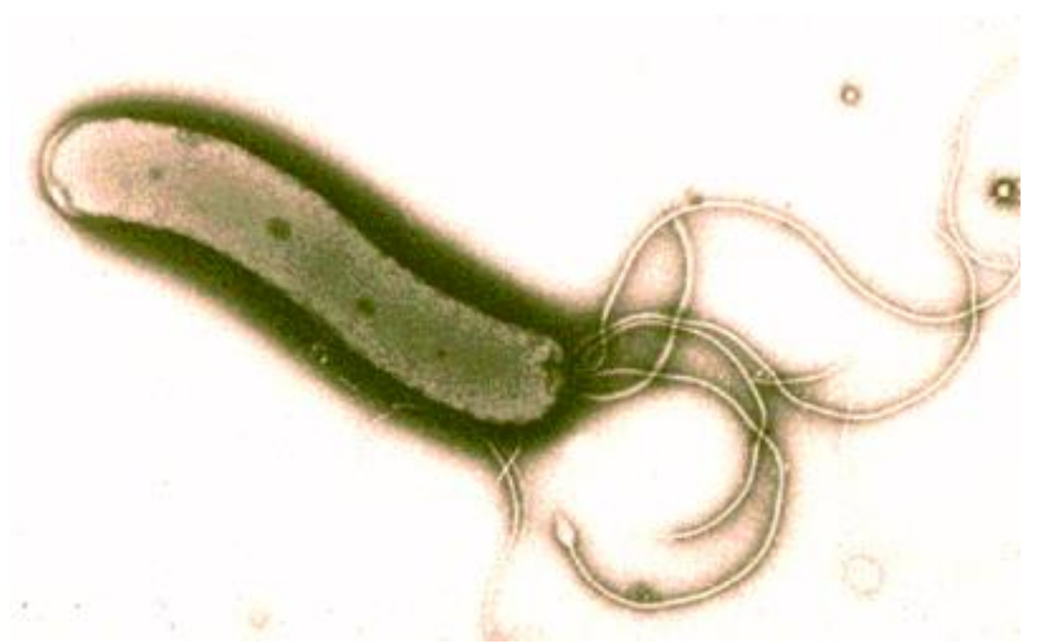

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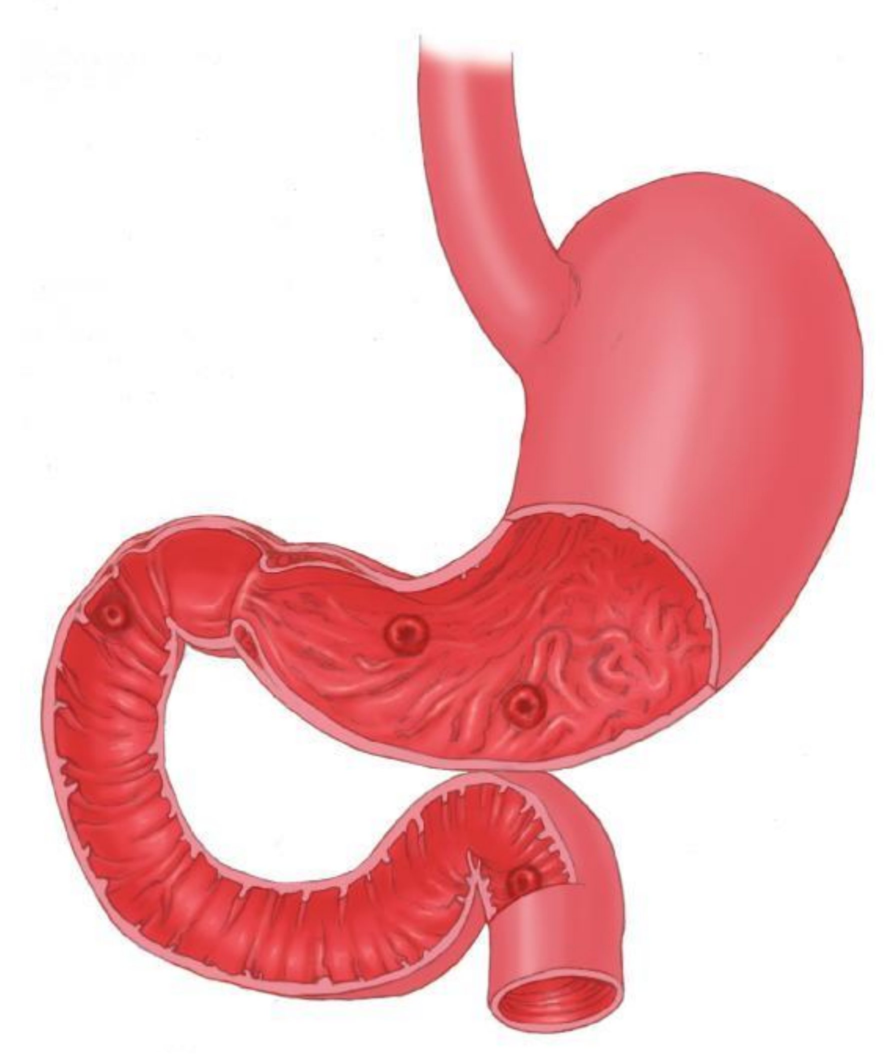
PEPTIC ULCER DISEASE

- **MCC of UGIB**. Duodenal MCC.
- Stomach = pain w/ eating. Duodenal = pain after eating
- Complications: perforation, scarring.
- **Zollinger-Ellison Syndrome: gastrin tumor**

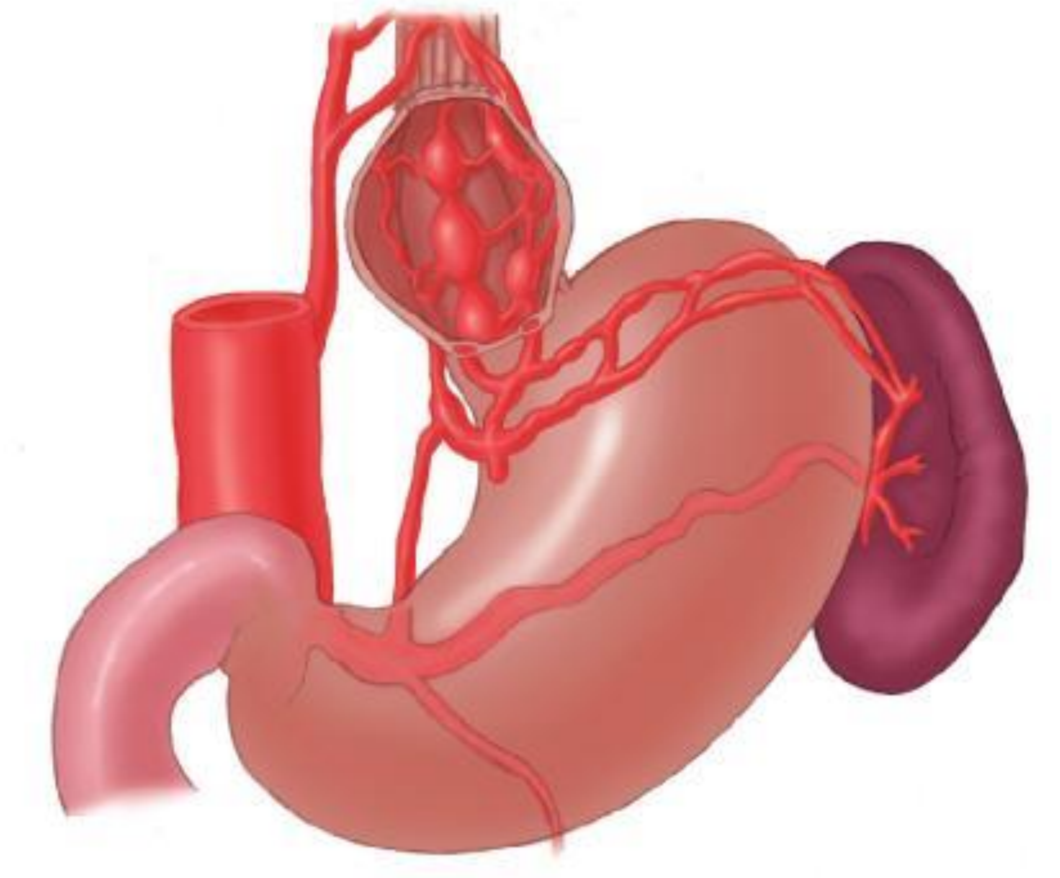
PEPTIC ULCERS

- Pathophysiology
  - Erosions caused by gastric acid.
  - Terminology based on the portion of tract affected.
  - Causes:
    - NSAID Use
    - Alcohol/Tobacco Use
    - Endocrine problems
      - Zollinger-Ellison
      - hyperparathyroidism
    - *H. pylori*



ESOPHAGEAL VARICES

- Cause
  - Portal Hypertension
    - Chronic alcohol abuse and liver cirrhosis
    - Ingestion of caustic substances

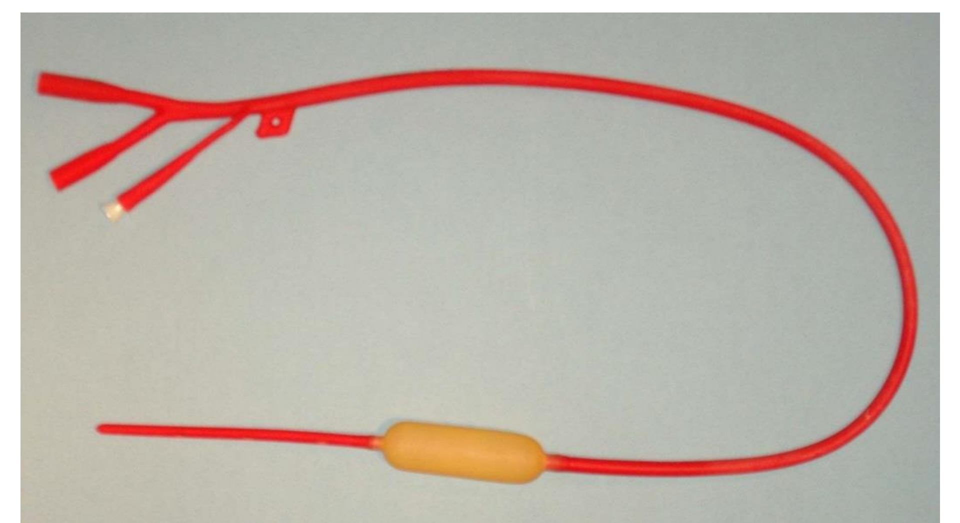


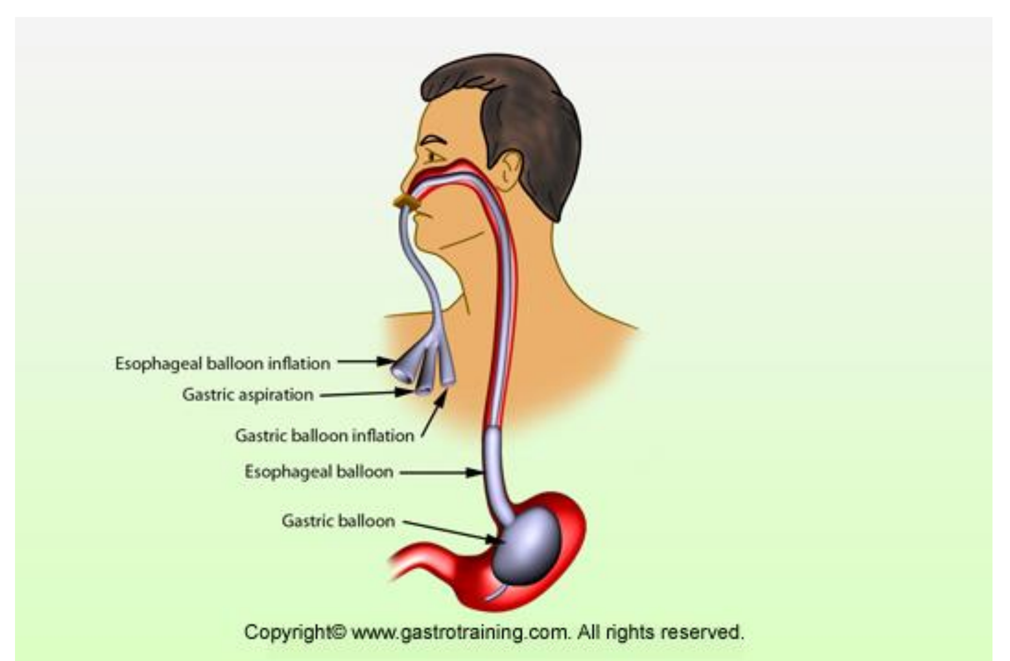
ESOPHAGEAL VARICES

- Signs & Symptoms
  - Hematemesis, Dysphagia
  - Painless Bleeding
  - Hemodynamic Instability
  - Classic Signs of Shock
- Treatment
  - Follow General Treatment Guidelines.
    - Aggressive Airway Management
    - No NGT
    - Aggressive Fluid Resuscitation
    - Octeotride, Vasopressin, NTG
    - GI consult STAT for EGD, ligation

VARICEAL BLEEDING

- Due to portal HTN - ALCOHOL
- **Meds: Octreotide (50/50), PPI infusion (80/8)**
- **ABX: ROCEPHIN or CIPRO**
- Tx: SCOPE
- Sengstaken-Blakemore tube - BIG FOLEY
- Beta blockers are prophylactic, not tx
- TIPS: liver bypass. Assess with ultrasound.
- MCC UGIB in cirrhotic patients is still PUD!




Esophageal balloon inflation
Gastric aspiration
Gastric balloon inflation
Esophageal balloon
Gastric balloon
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WHAT 2 DIAGNOSTIC TESTS ARE CONSISTENT WITH ACUTE HEP B INFECTION?

WHAT DIAGNOSTIC TESTS ARE CONSISTENT WITH ACUTE HEP B INFECTION?

HBsAg AND IgM anti-core Ab

FOUNDATIONS CHALLENGE

KNOWLEDGE BOMB

Viral Hepatitis

- **Hepatitis A**
  - Gastro + jaundice, fecal-oral transmission
  - Anti-HAV IgM (acute), IgG (prior)
- **Hepatitis B**
  - Blood/body fluid transmission, 10% have chronic disease
  - HBsAg (active infection), HBcAb IgM (early/active infection), anti-HBs (immunity)
      - HBeAg +
        - Eeekkk!!!
      - HBsAg -, antiHBs +
        - Never had it, +vaccination
      - IgMHBcAg +, antiHBs –
        - May be
      - IgGHBcAg +, antiHBs –
        - Gone
- **Hepatitis C**
  - Body/blood transmission, ~90% develop chronic infection, 10-20% develop chronic liver disease
  - Anti-HCV = acute or past infection
- **Hepatitis D**
  - Co- or superinfection with HBV
- **Hepatitis E**
  - Fecal-oral transmission, fulminant liver failure during pregnancy with high mortality

TROJAN ENZ

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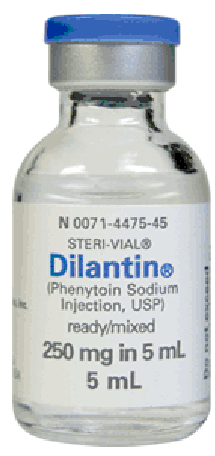
Chemical Hepatitis



CHEMICAL HEPATITIS

- **Alcohol MCC**
- Acute hepatic failure or cirrhosis
- 2:1 AST/ALT in alcohol in particular
- INR > 8 BAD
- **Massive hepatic necrosis (AST/ALT > 1000)= think tylenol, mushrooms, carbon tetrachloride.**

HEPATITIS A AND E

- **Fecal Oral Route**
- Incubation period 15-50 days
- Mild, no chronic carrier state.
- 1/3 population seropositive.
- **MCC conjugated increased bilirubin in kids**
- Consider prophylaxis immune globulin
- Hospital if INR > 1.3, bili > 20

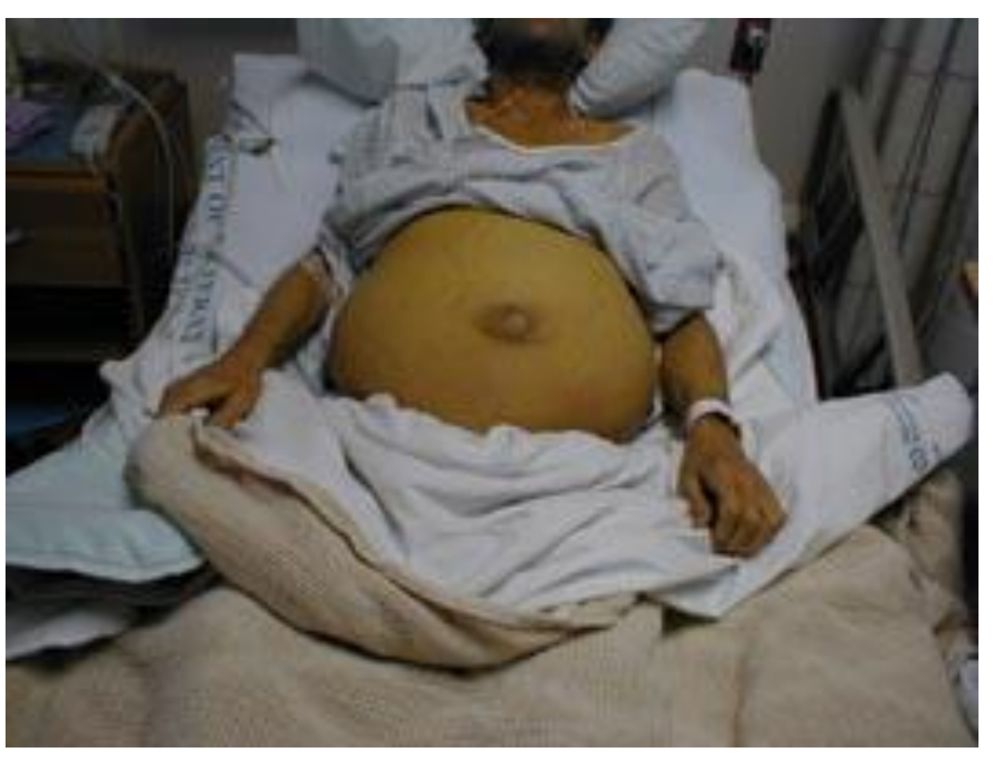
HEPATITIS B

	Immunity	Previous Infection	Active Infection
HBsAB	+	+	+
HBcAB	-	+	+
HBsAg HBeAg	-	-	+

Hepatitis B	Hepatitis C
DNA	RNA
Sex & Drugs	Mainly Drugs
5-10% chronic	50-85% chronic
Vaccine	No Vaccine
Hepatitis D can co-infect	**MCC viral hepatitis**

CASE

- 58yo male presents with altered mental status. Family states he has been more lethargic lately, not acting his normal self. No focal deficits. Does have fluid taken off his abdomen intermittently, though none recently.

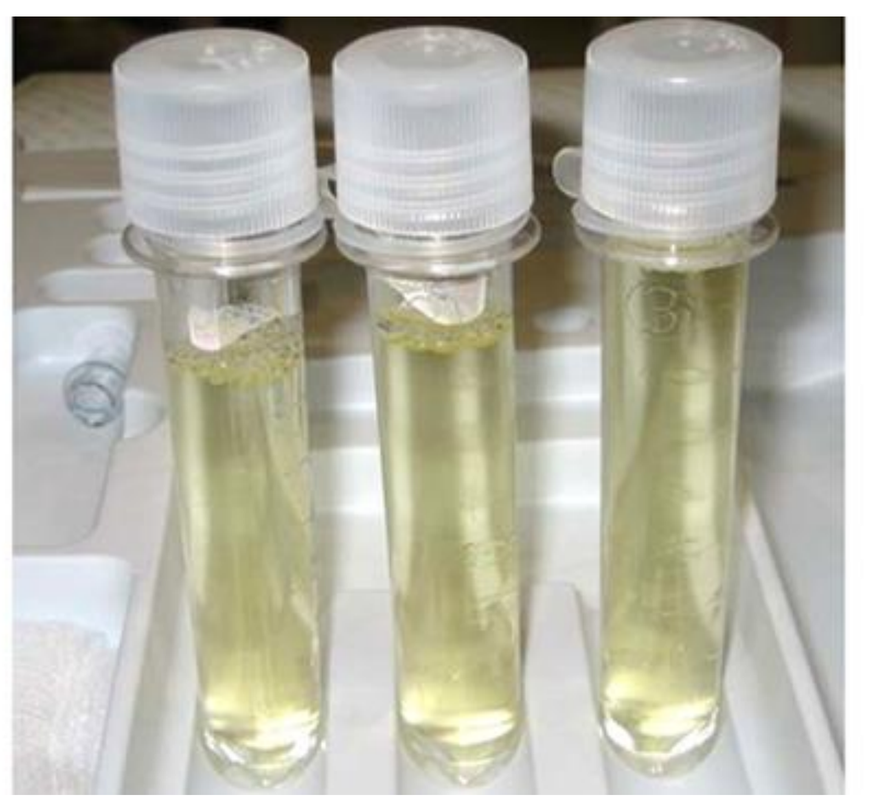


Effects of portal hypertension

- Esophageal varices
  - Hematemesis
- Gastropathy
- Melena
- Splenomegaly
- Dilated abdominal veins (caput medusae)
- Ascites
- Rectal varices (hemorrhoids)

Effects of liver cell failure

- Coma
- Fetor hepaticus (breath smells like a freshly opened corpse)
- Spider nevi
- Gynecomastia
- Jaundice
- Ascites
- Loss of sexual hair
- Testicular atrophy
- Liver “flap’ (coarse hand tremor)
- Bleeding tendency (decreased prothrombin)
- Anemia
  - Macrocytic
  - Iron deficiency (blood loss)
- Ankle edema



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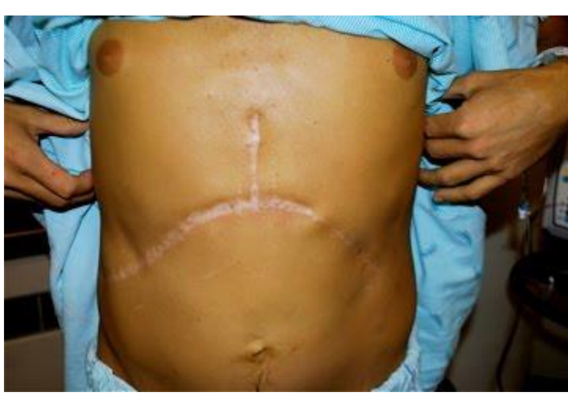
SBP

- 30% asymptomatic
- WBC > 500/mm3
- **> 250 PMNs/mm3**
- E Coli and Streptococcus MCC
  - enterococcus
- **ROCEPHIN** (Cefotaxime as well)

HEPATIC ENCEPHALOPATHY

- AMS, asterixis, elevated **AMMONIA**.
- Ammonia usually HIGH, though not always.
- Precipants: Infx, sedative meds, nitrogen load (protein, **GI bleed**), hypoglycemia, constipation.
- Still need to get CT brain
- Hepatorenal syndrome tx: TRANSPLANT
- Tx: Supportive, lactulose / neomycin

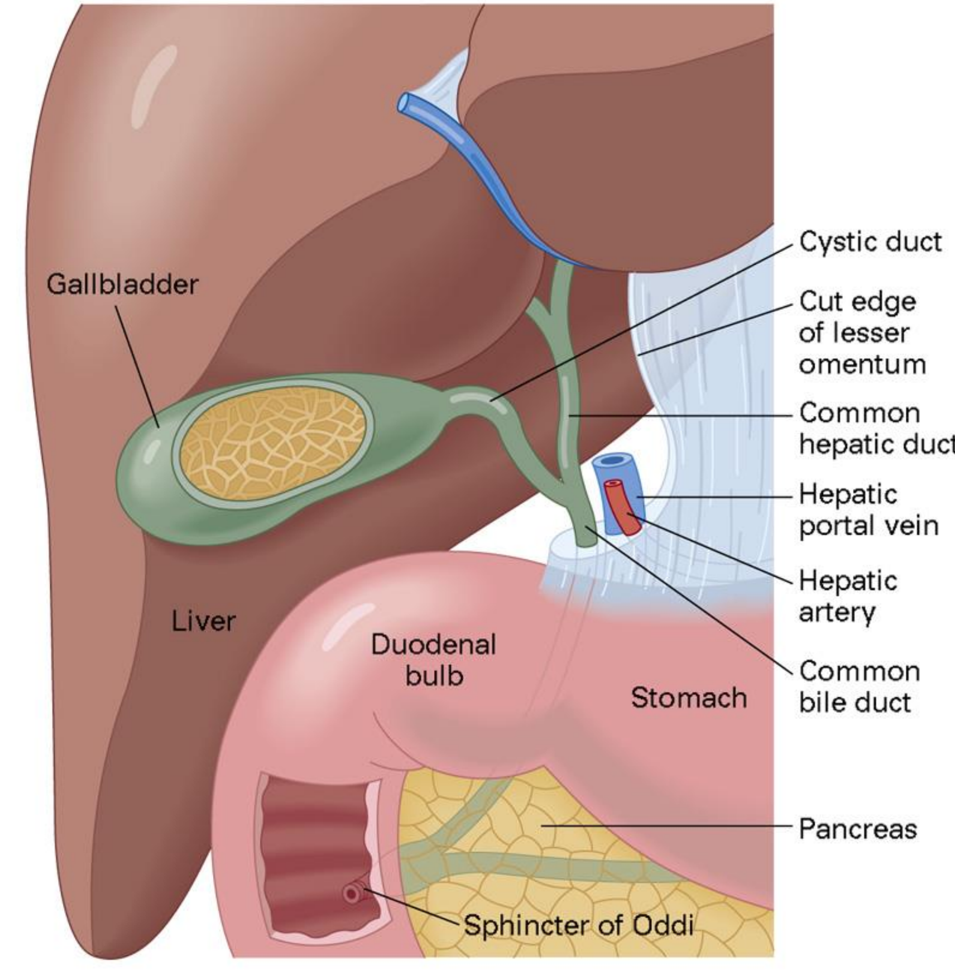
LIVER TRANSPLANT



- Complications (5 Bs)
- Bleeding (varices)
- Biliary (leak)
- Blood vessels (**hepatic artery thrombosis**)
- Bugs (**CMV** @ 1-6 months, infx)
- Burn liver (rejection - usually @ 7-14 d)

CHOLECYSTITIS

- Pathophysiology
  - Inflammation of the Gallbladder
  - Cholelithiasis
  - Ascending Cholangitis
    - Charcot's triad
  - Chronic Cholecystitis
    - Bacterial infection
  - Acalculus Cholecystitis
    - Burns, sepsis, diabetes
    - Multiple organ failure



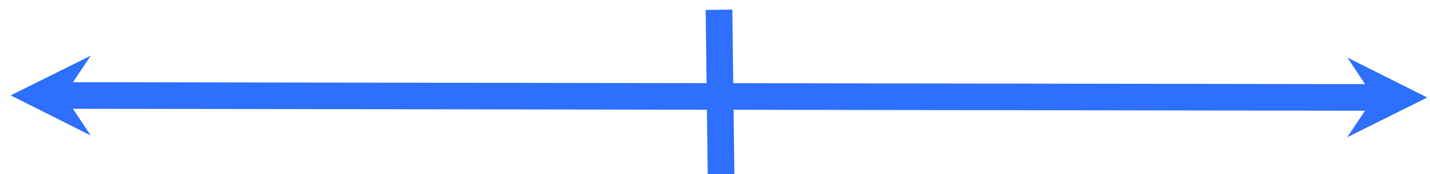
CHOLECYSTITIS

- Signs & Symptoms
  - URQ Abdominal Pain
    - Murphy's sign
  - Nausea, Vomiting after "greasy food"
  - History of Cholecystitis
- 4 F's
- Treatment
  - HIDA?
  - Surgery
    - When?
    - STAT
      - Emphysematous
      - perforation
  - IVF
  - antibiotic

- +US in cholecystitis
  - GB wall
  - > 5mm
  - CBD
  - > 6 mm
  - Gallstone? Or not?
  - Sludge?
  - Pericholecystic fluid

STONES w/ inflammation
Pain > 6 hrs, persistent
Acalculous cholecystitis
Ultrasound, though HIDA more accurate

Cholecystitis



Cholelithiasis

STONES only
-docho- STONES in CBD (>6mm)
intermittent episodes
5 Fs

Ascending Cholangitis

Charcot's triad (RUQ pain, fever, jaundice)
Reynold's pentad (+AMS, shock)
80% due to choledocholithiasis

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ACUTE CHOLANGITIS

BACTERIAL INFECTION OF THE BILIARY TRACT AS A RESULT OF OBSTRUCTION

HEPATIC DUCTS
CYSTIC DUCT
COMMON HEPATIC DUCT
COMMON BILE DUCT
PANCREATIC DUCT (OF WIRSUNG)
INVASION OF BACTERIA FROM DUODENUM

CHARCOT'S TRIAD
YOU'RE SO HOT.
102.5
1. JAUNDICE
2. RUQ PAIN
3. FEVER

ACUTE SUPPURATIVE CHOLANGITIS

THE PRESENCE OF PUS IN THE BILIARY DUCTS MAY RESULT IN REYNOLD'S PENTAD: CHARCOT'S TRIAD PLUS HYPOTENSION AND CONFUSION

www.medcomic.com

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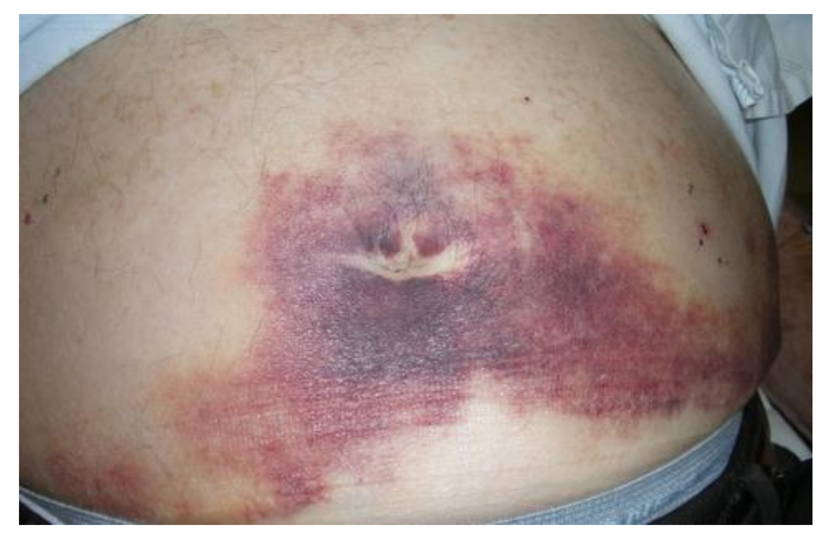
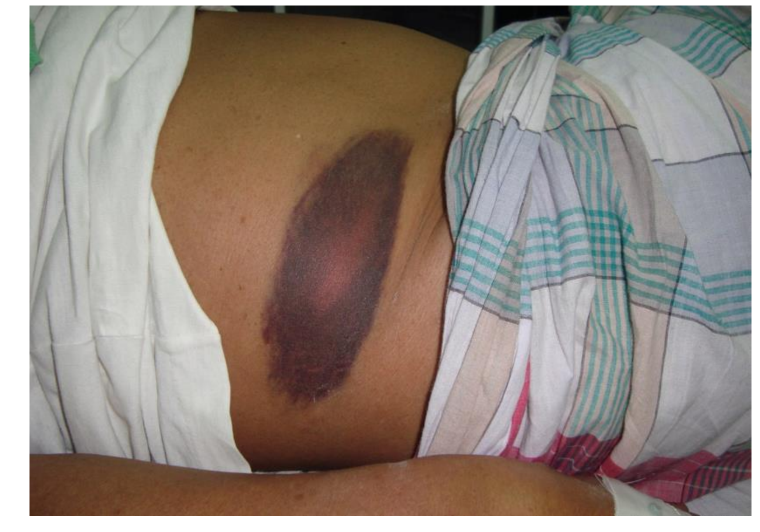
Reynold's Pentad:
- Charcot Triad
- Shock
- AMS

CASE

- 43yo male presents with severe epigastric pain / upper abdominal pain. Was out drinking all night and started having severe stabbing pain with nausea/vomiting. No prior episodes.



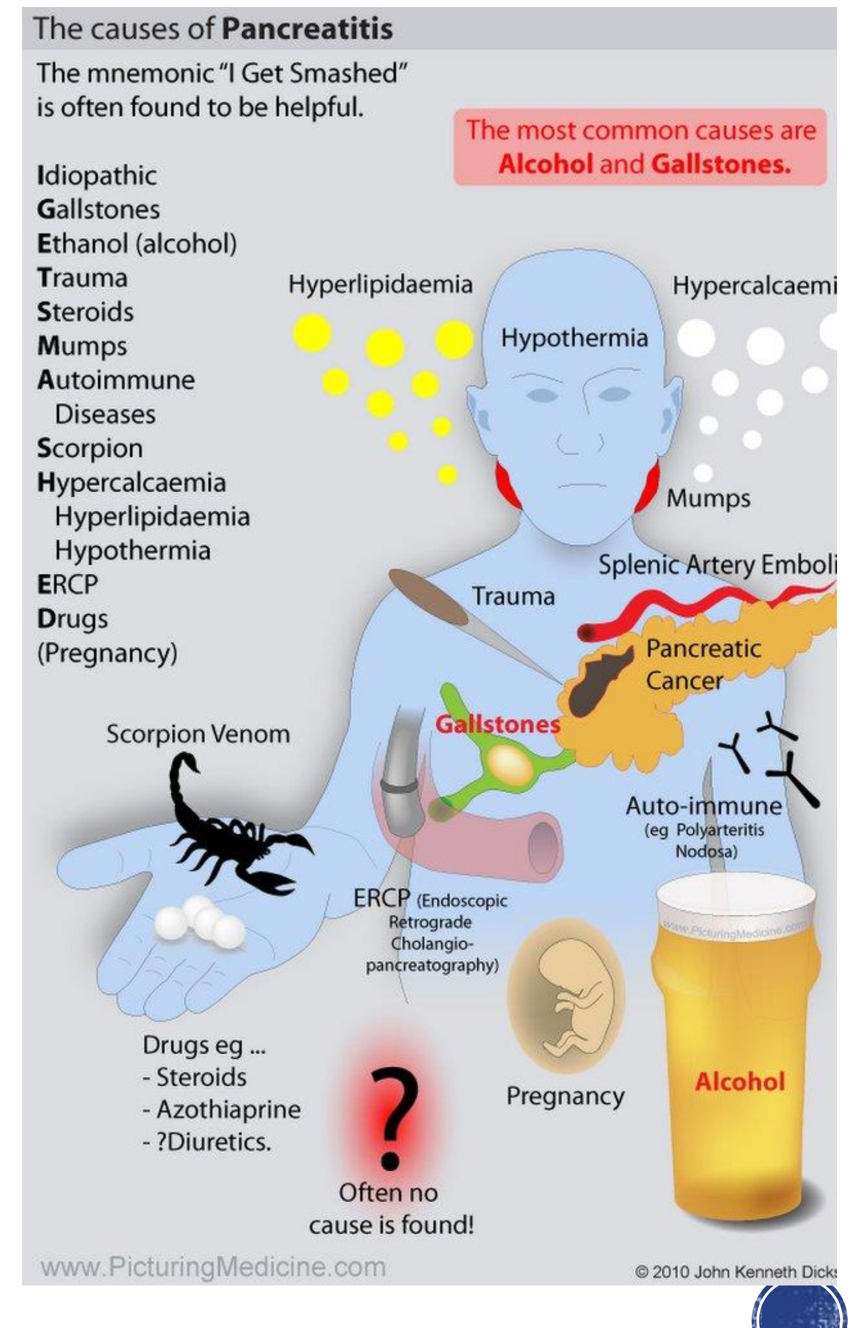


Cullen

Grey Turner

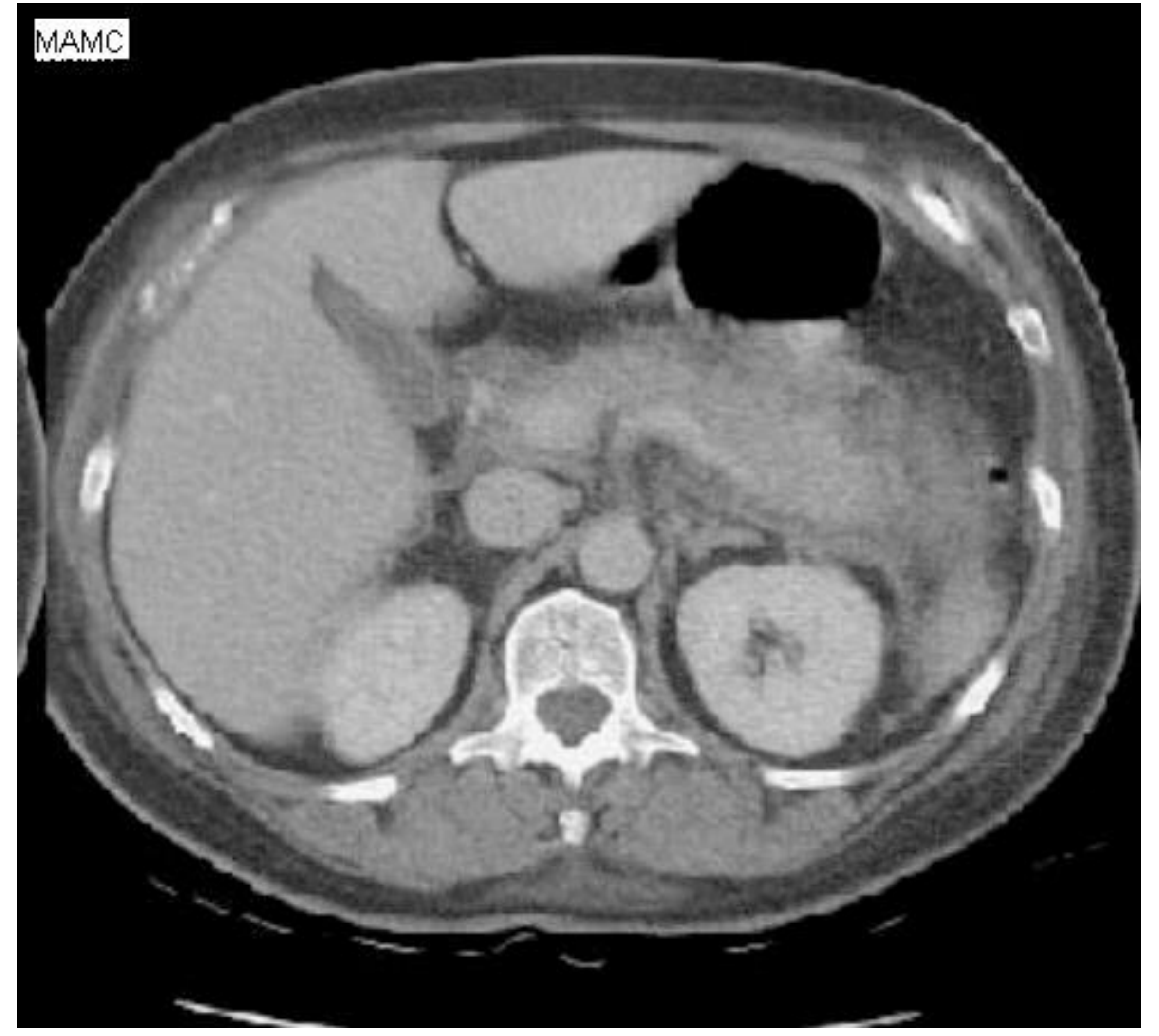
PANCREATITIS

- MCC alcohol inner-city. GB elsewhere.
- Also think about **I GET SMASHED**. Drugs (thiazide) 3rd MCC.
- **Grey Turner sign / Cullen's sign**
- Lipase > Amylase
- Ranson's criteria
- Tx: Fluids, NPO, analgesics



RANSON CRITERIA UPON ADMISSION

- First 48 hours
  - Age >55
  - Glucose >200
  - WBC>16000
  - AST>250
  - LDH>350
- After 48 hours
  - Hct drop >10%
  - Rise BUN>5
  - Ca<8
  - PaO2<60
  - 6 liters third spacing
  - Base deficit>4


MAMC

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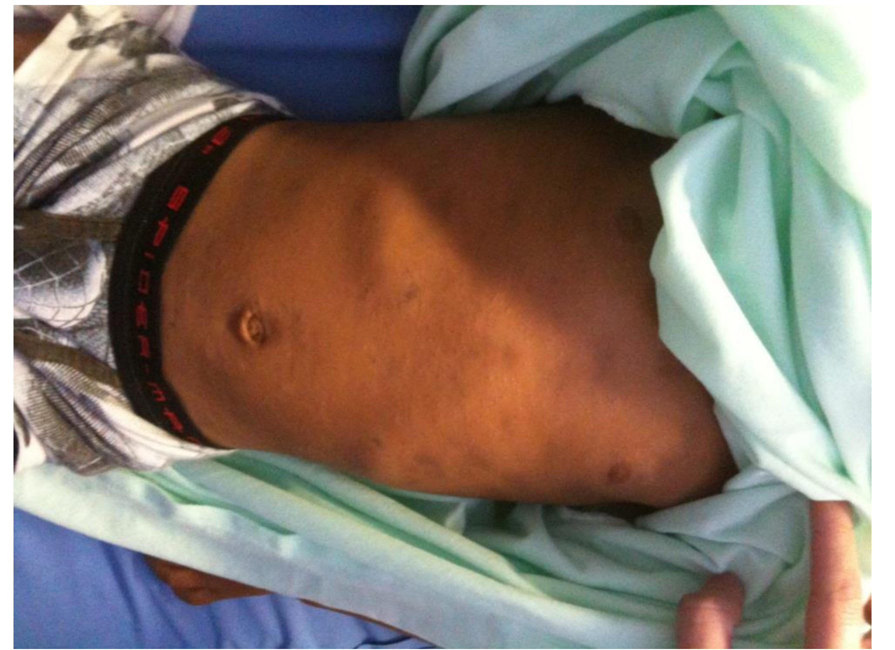
INTUSSUSCEPTION

- Usually is a pediatric patient
- Periods of lethargy and waking up in extreme pain and screaming then, going back to lethargy (Pulling legs to the chest area, and intermittent moderate to severe cramping abdominal pain. Pain is intermittent not because the intussusception temporarily resolves, but because the intussuscepted bowel segment transiently stops contracting)
- In children or those too young to communicate their symptoms verbally, they may cry, draw their knees up to their chest or experience dyspnea (difficult or painful breathing) with paroxysms of pain

INTUSSUSCEPTION

- Physical examination may reveal a "sausage-shaped" mass felt upon palpation of the abdomen
- Early symptoms can include nausea, vomiting (sometimes bile stained (green color))
- Later signs include rectal bleeding, often with "red currant jelly" stool (stool mixed with blood and mucus), and lethargy
- Fever is not a symptom of intussusception. However, intussusception can cause a loop of bowel to become necrotic, secondary to ischemia due to compression to arterial blood supply. This leads to perforation and sepsis, which causes fever



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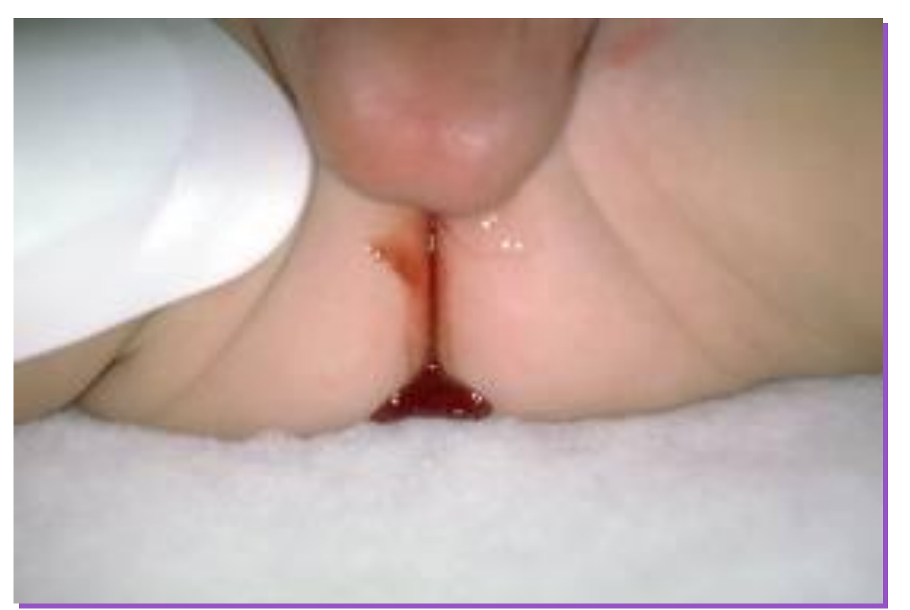

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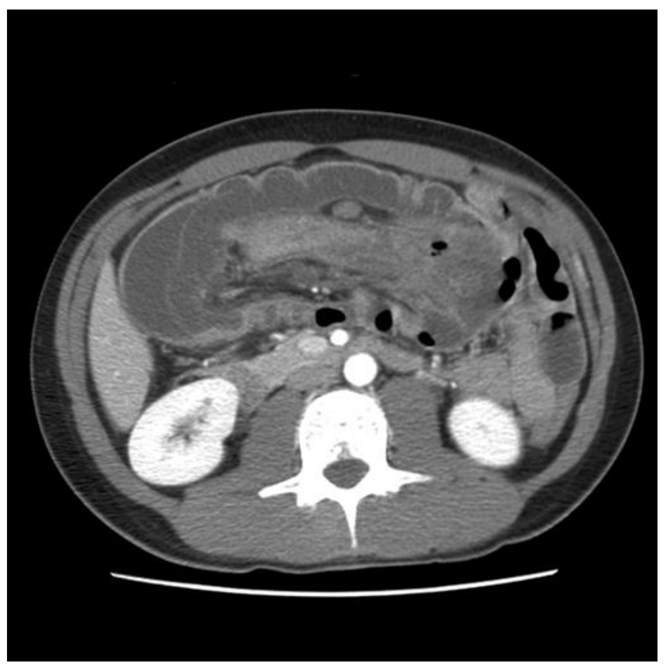
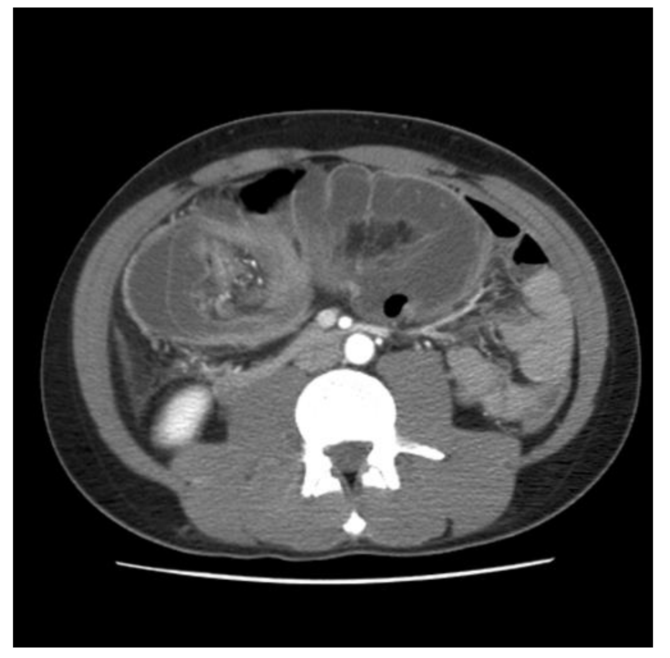
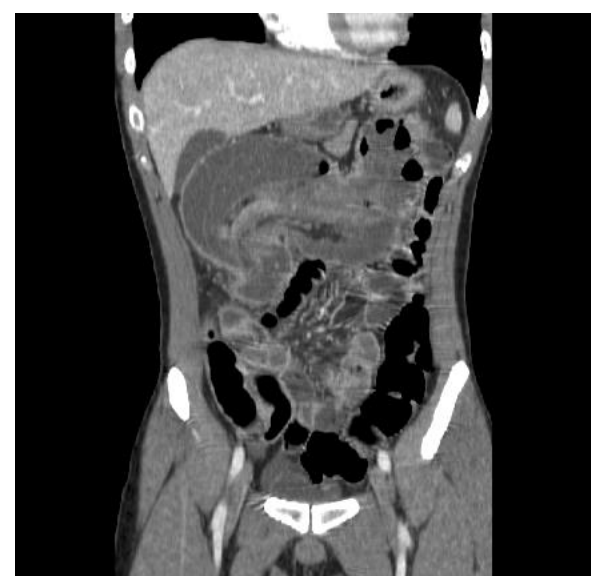

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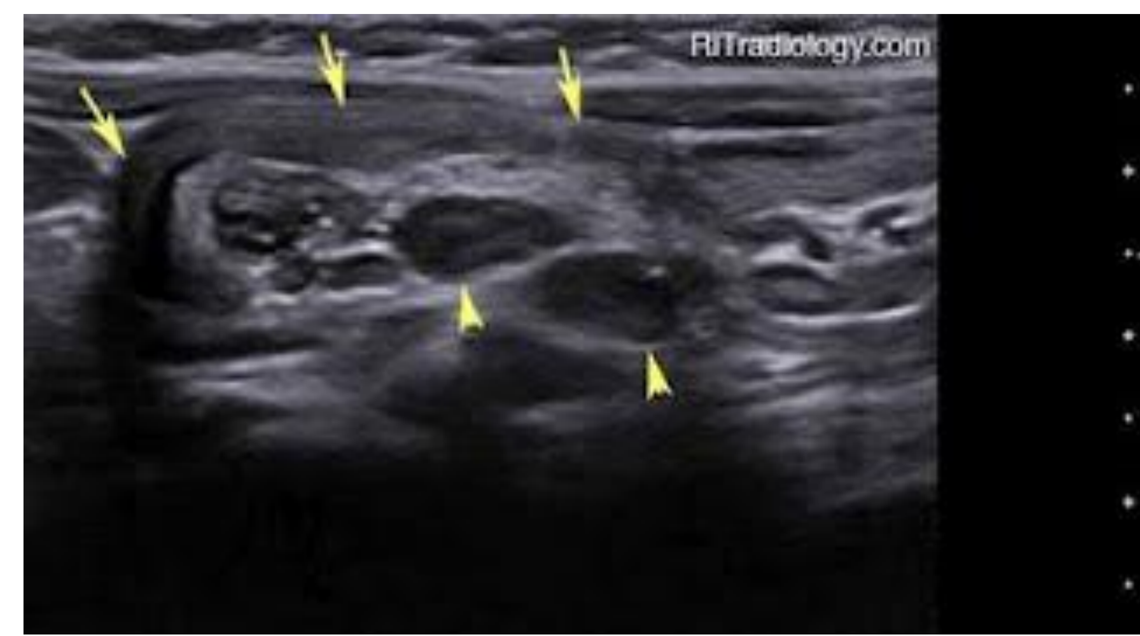
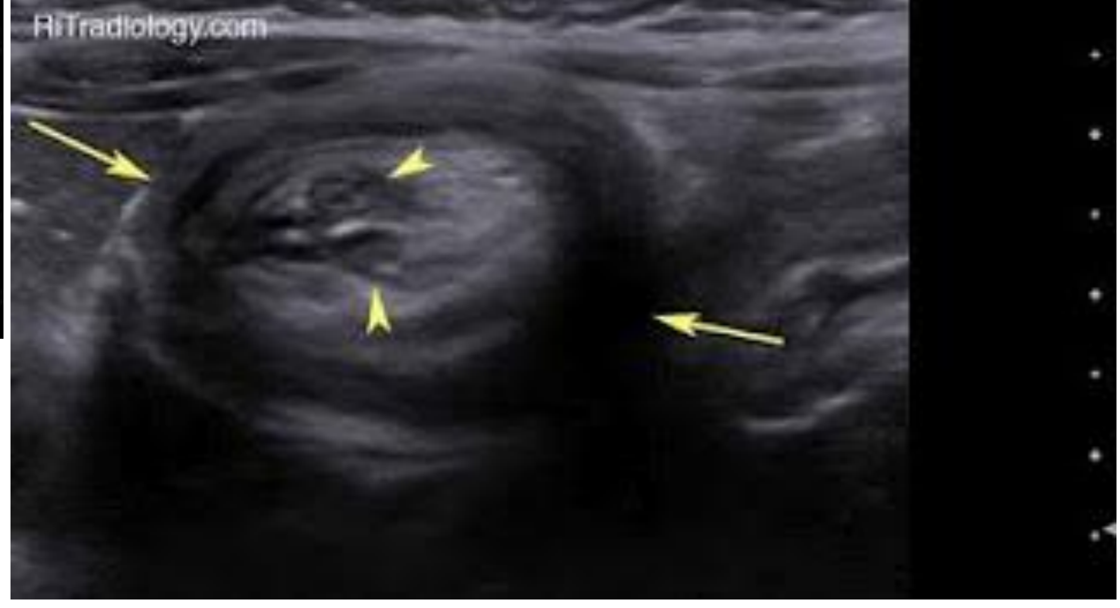

RiTradiology.com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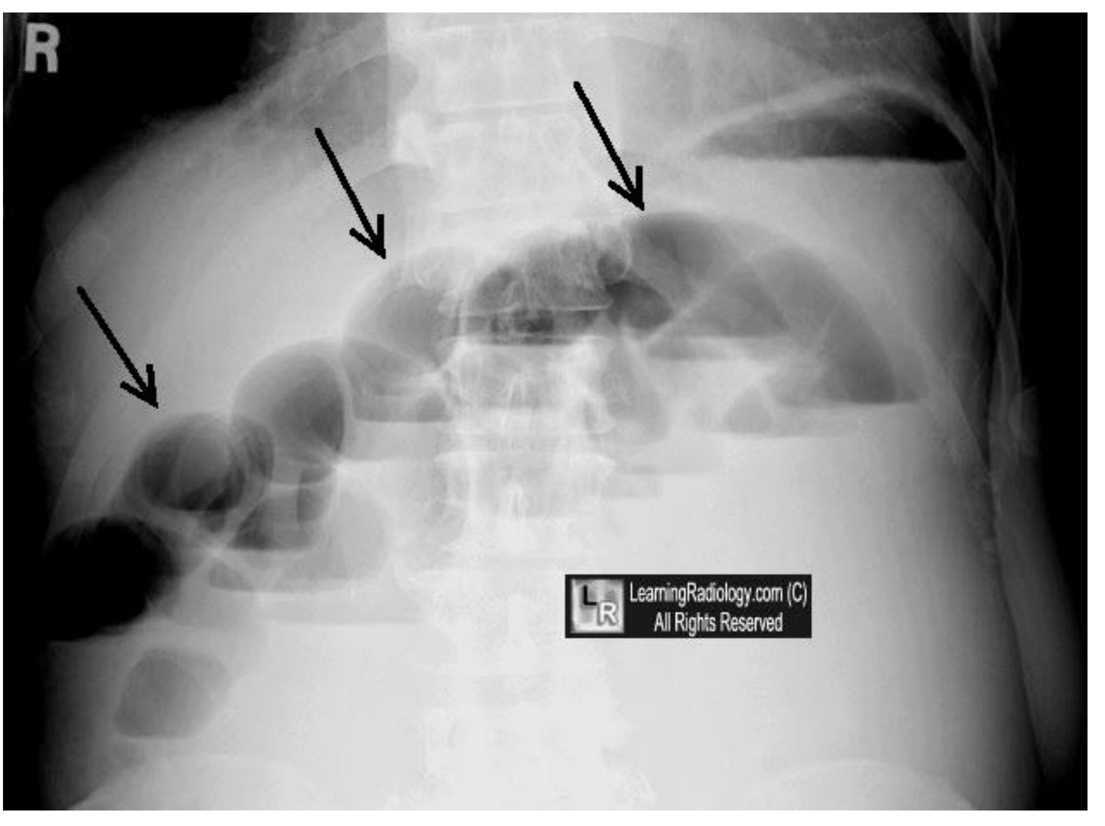
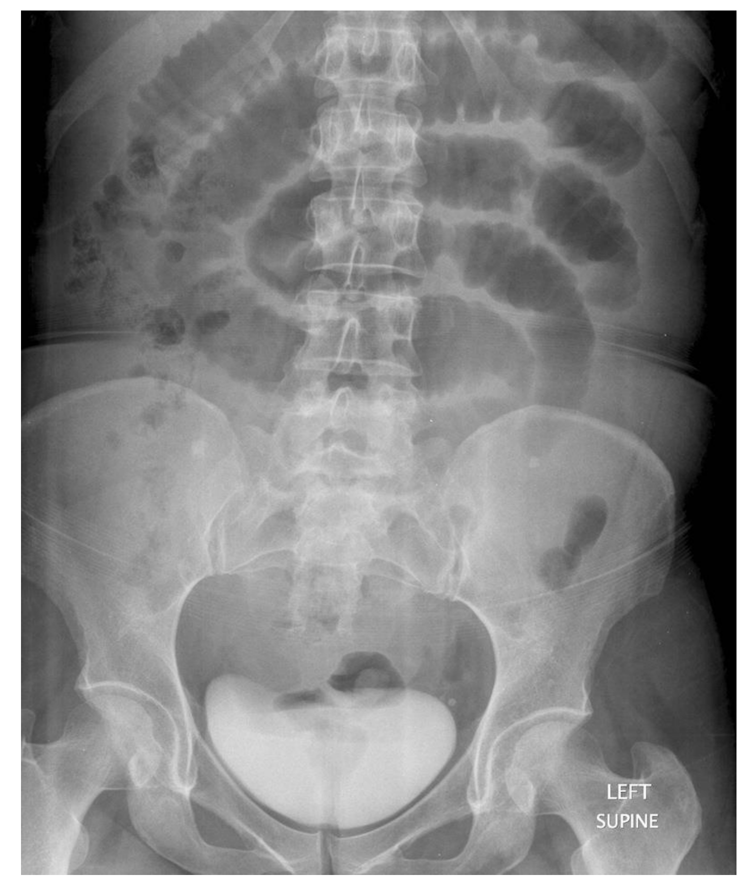
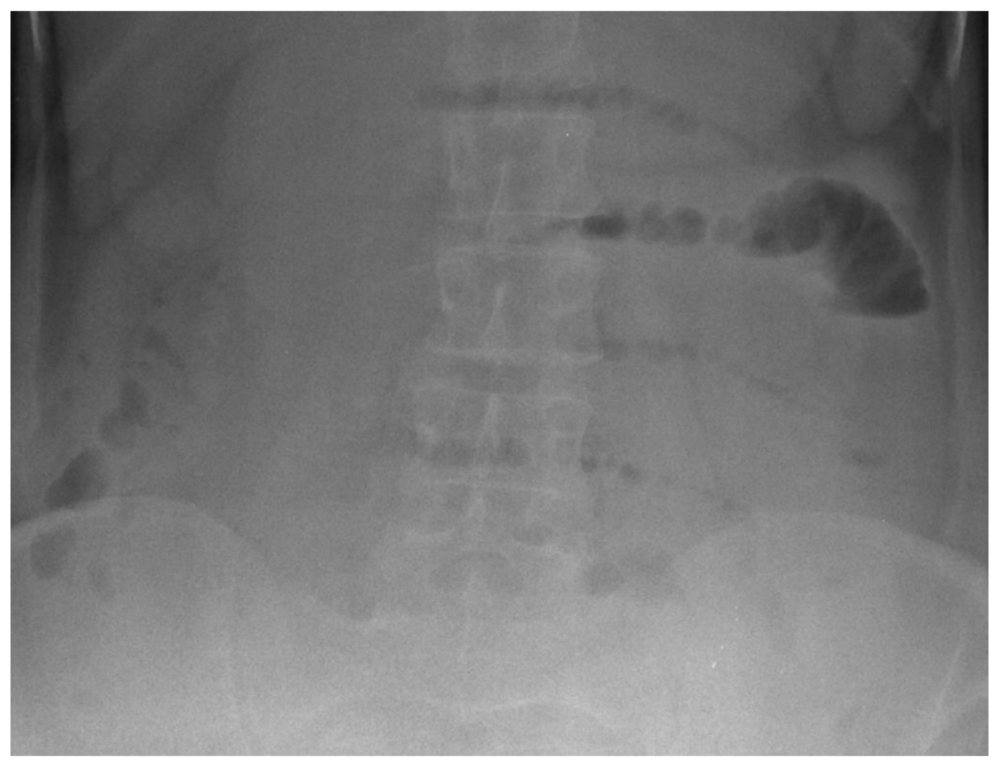
CASE

- 52yo male presents due to diffuse abdominal pain. Started last night and has continued through the day. Constant, diffuse. Initially was having nausea, now having vomiting, unable to keep anything down.



“Step ladder”





"Stack of Coins"

Bowel Obstruction

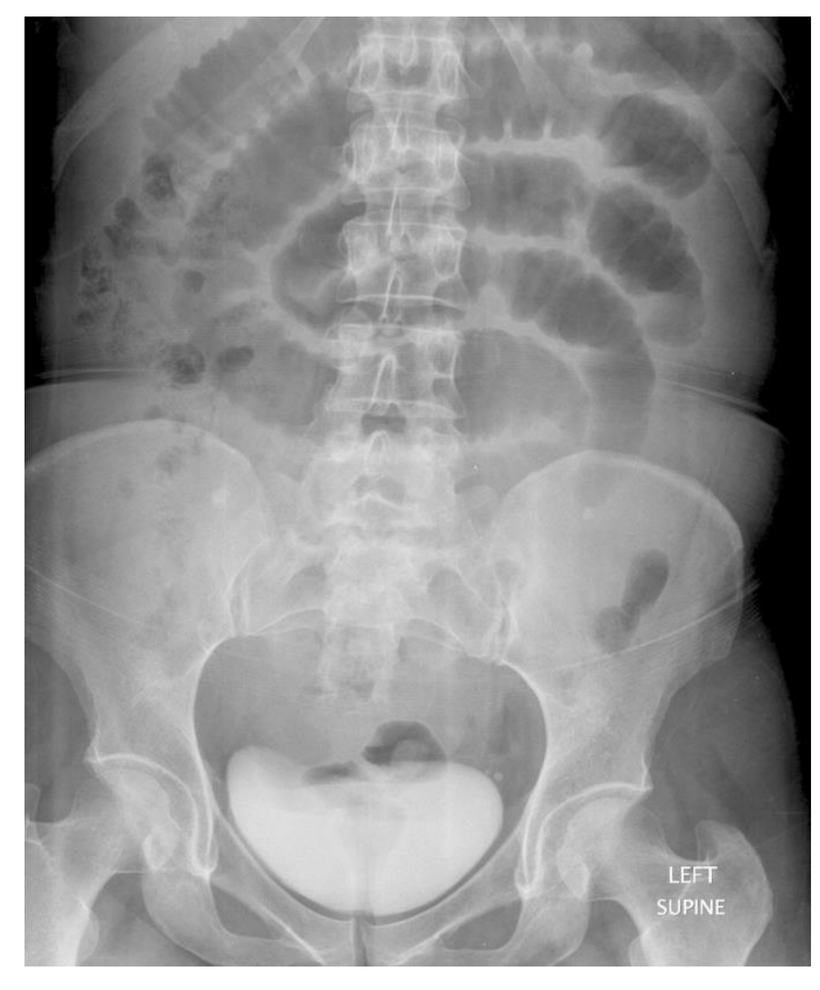
- Most common SBO
- Adhesions
- Then,
  - Hernias (2nd)
  - Intussusception
  - Volvulus
  - Foreign bodies
  - Gallstones
  - Tumors
  - Bowel infarction
  - Bezoars

BOWEL OBSTRUCTION

- Most common in LBO
- Neoplasm (benign or malignant)
- Then,
  - Stricture (diverticular or ischemic)
  - Volvulus (eg, colonic, sigmoid, cecal)
  - Incarcerated hernia
  - Intussusception, usually with an identifiable anatomic abnormality in adults but not in children
  - Impaction or obstipation
  - Gallstone ileus
  - Acute colonic pseudo-obstruction (ACPO), or Ogilvie syndrome

SBO

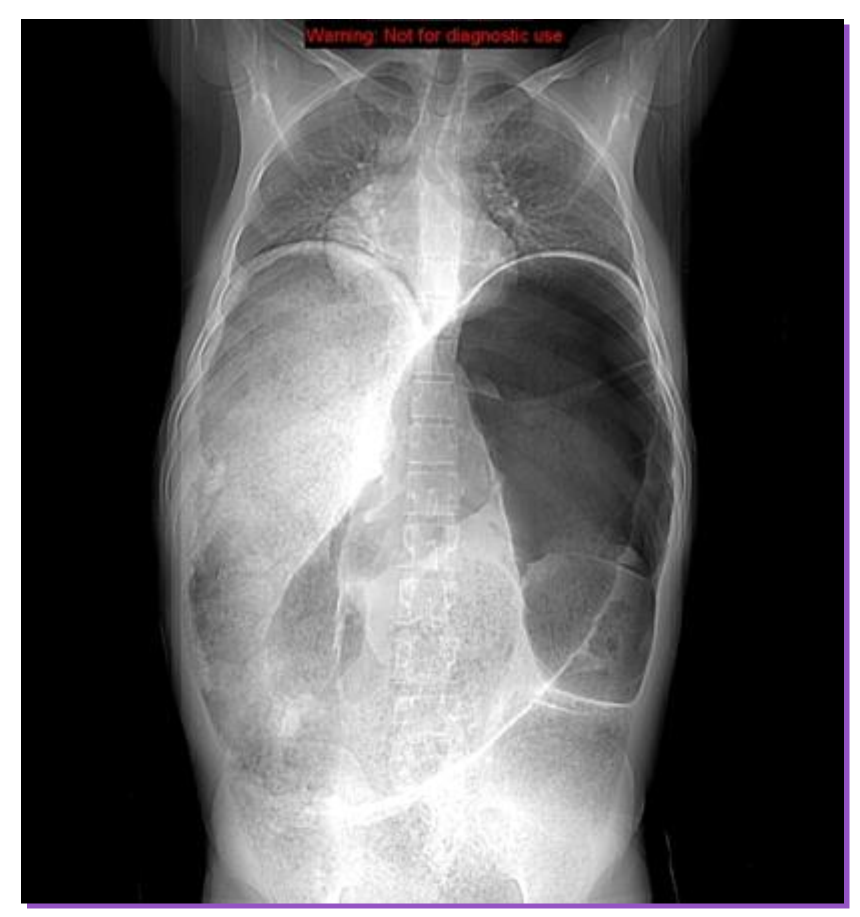
- **Adhesions MCC**
- Hernias outside of previous surgeries
- HYPERACTIVE BS
- Tx: surgery
- Ileus causes: meds, infx, lytes, stressors
- HYPOACTIVE BS
- Tx: NPO, supportive

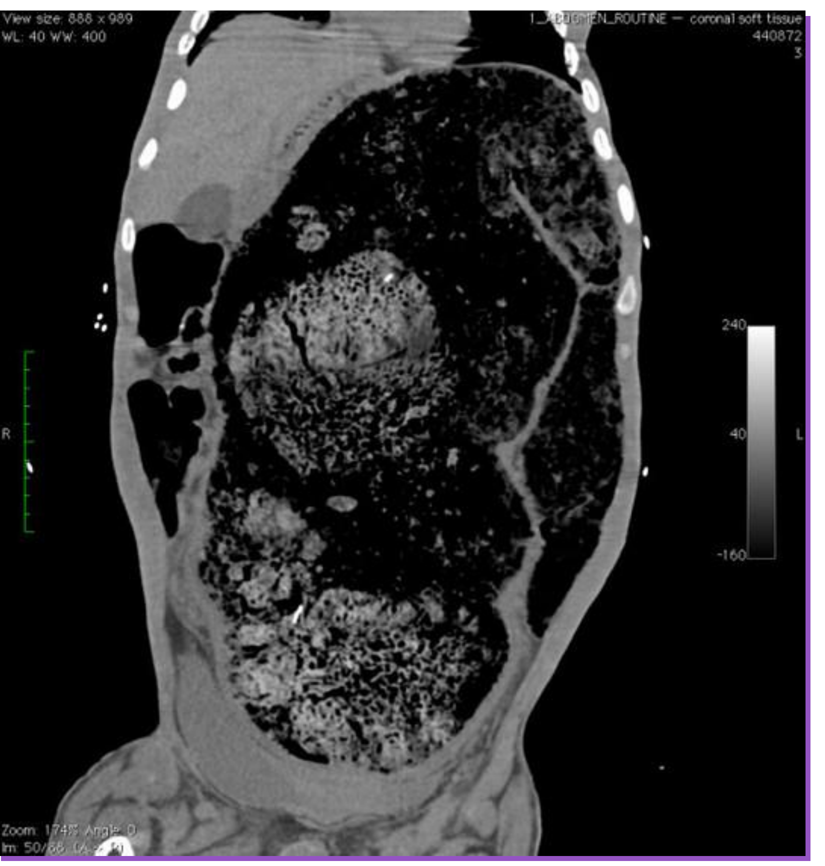


PSEUDO-OBSTRUCTION

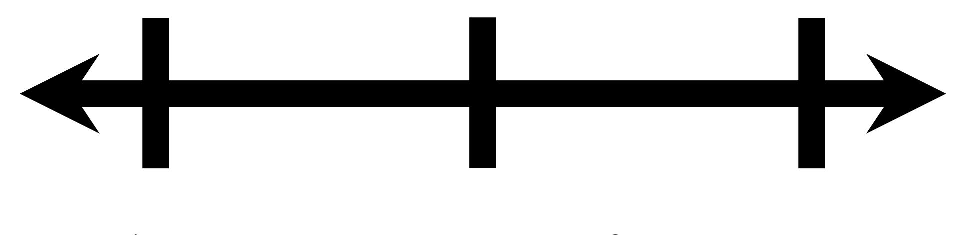
- Anticholinergics
- Antiparkisonian
- TCA

ACUTE COLONIC PSEUDO-OBSTRUCTION (ACPO), OR OGILVIE SYNDROME

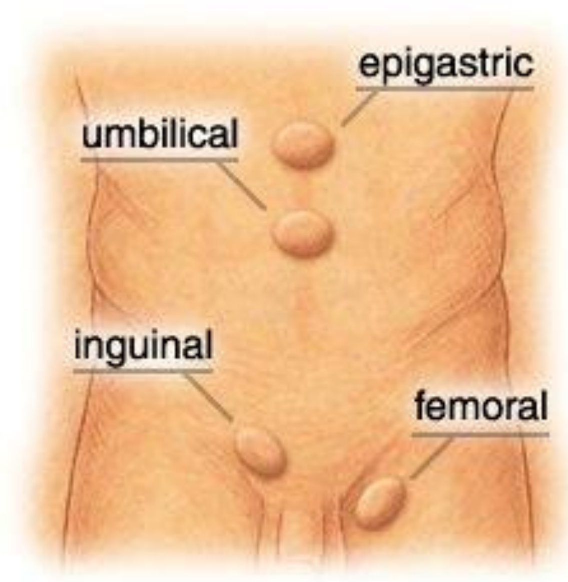




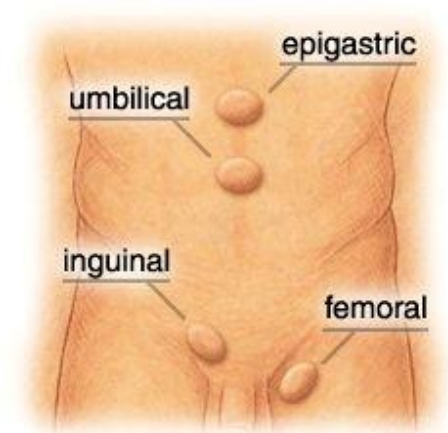
HERNIAS



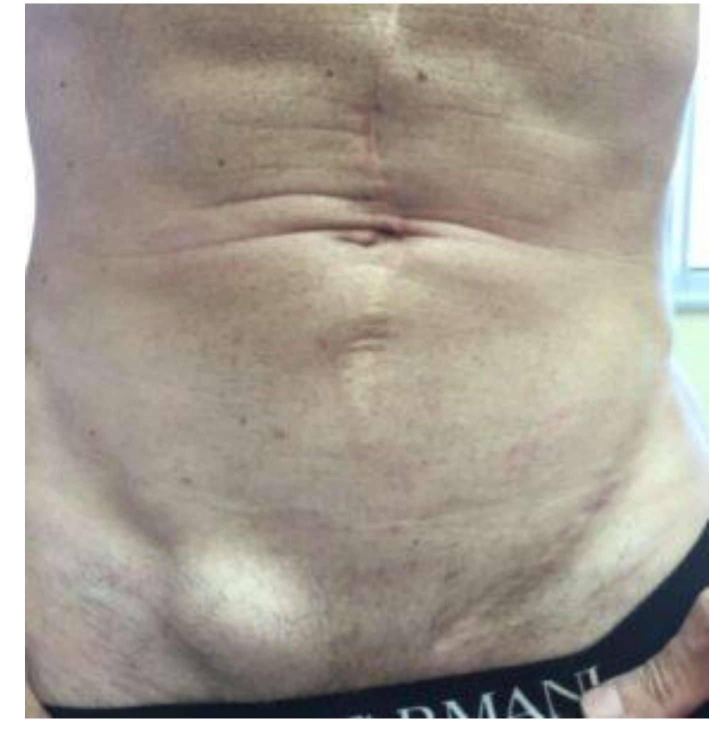
Reducible Strangulated

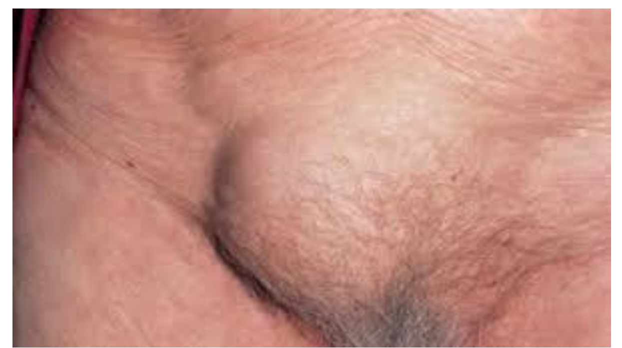


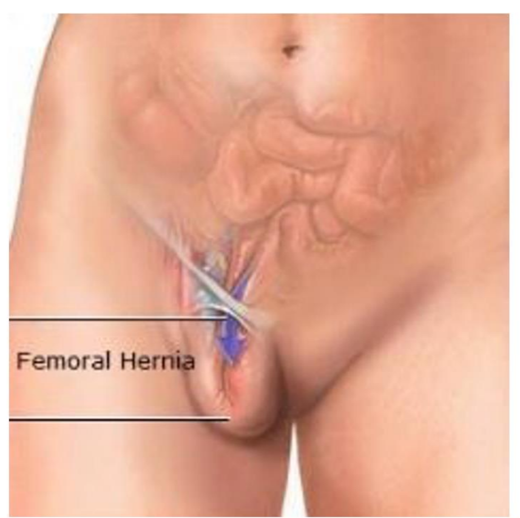
HERNIAS

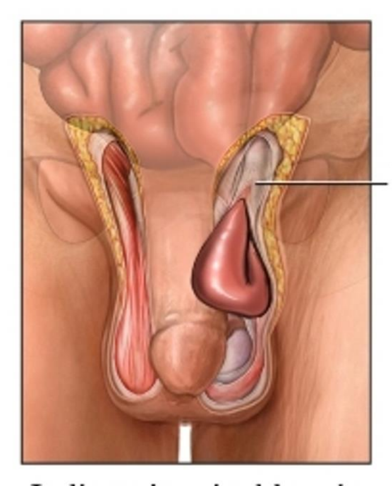


- Incarcerated = irreducible
- **Strangulated = ISCHEMIA**. Don't attempt reduction.
- Indirect inguinal hernia: MCC hernia M/F
- Femoral F > M
- Umbilical hernia in neonates usually closes on its own. High rate of incarceration in adults.

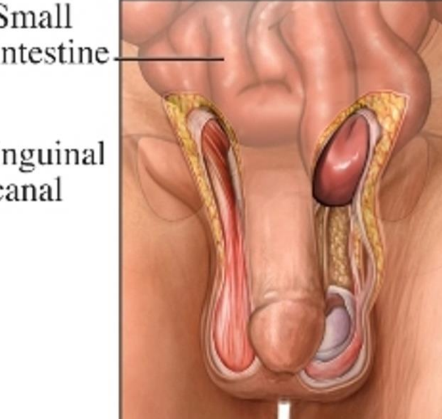








Indirect inguinal hernia



Direct inguinal hernia

https://www.laparoscopyhospital.com/femoral-hernia.html

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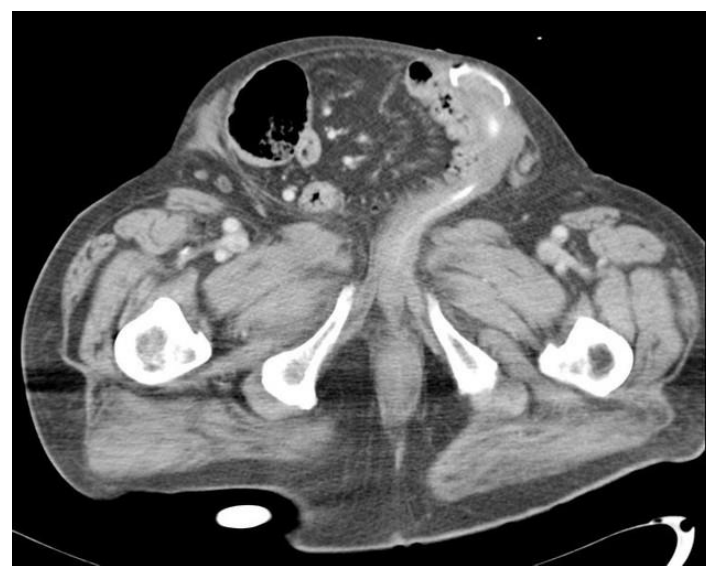

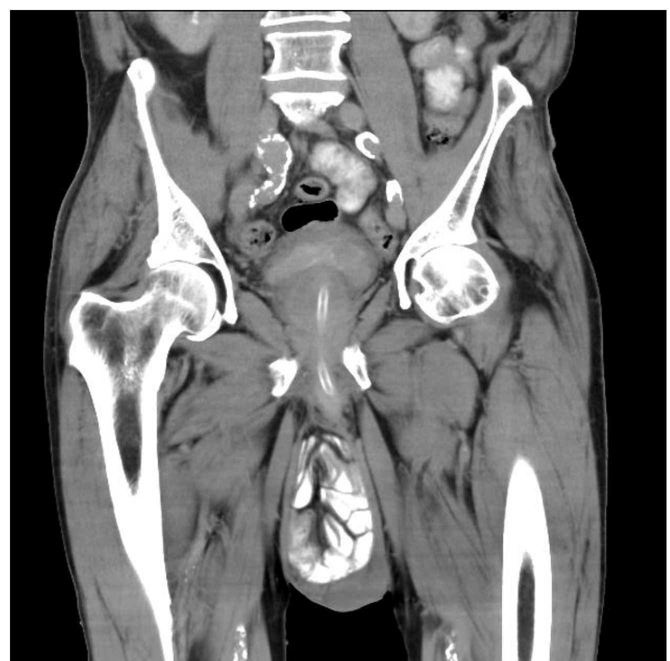

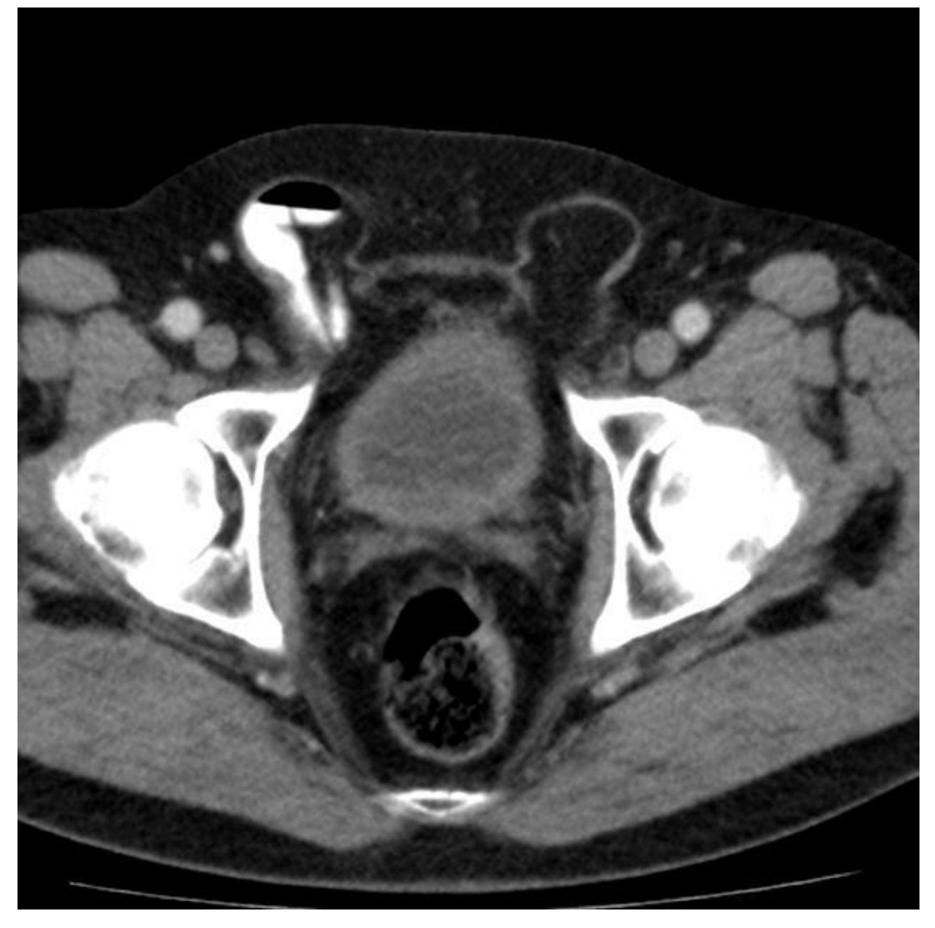

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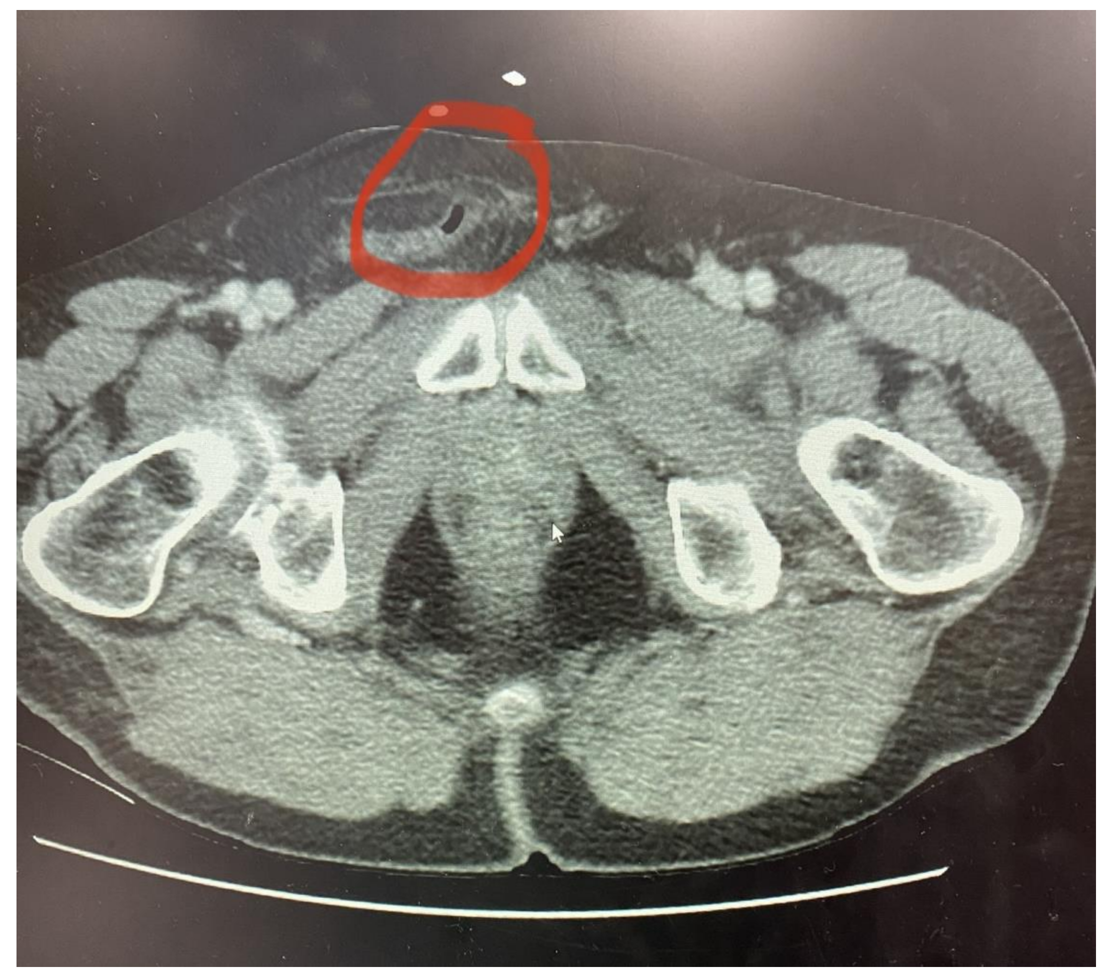

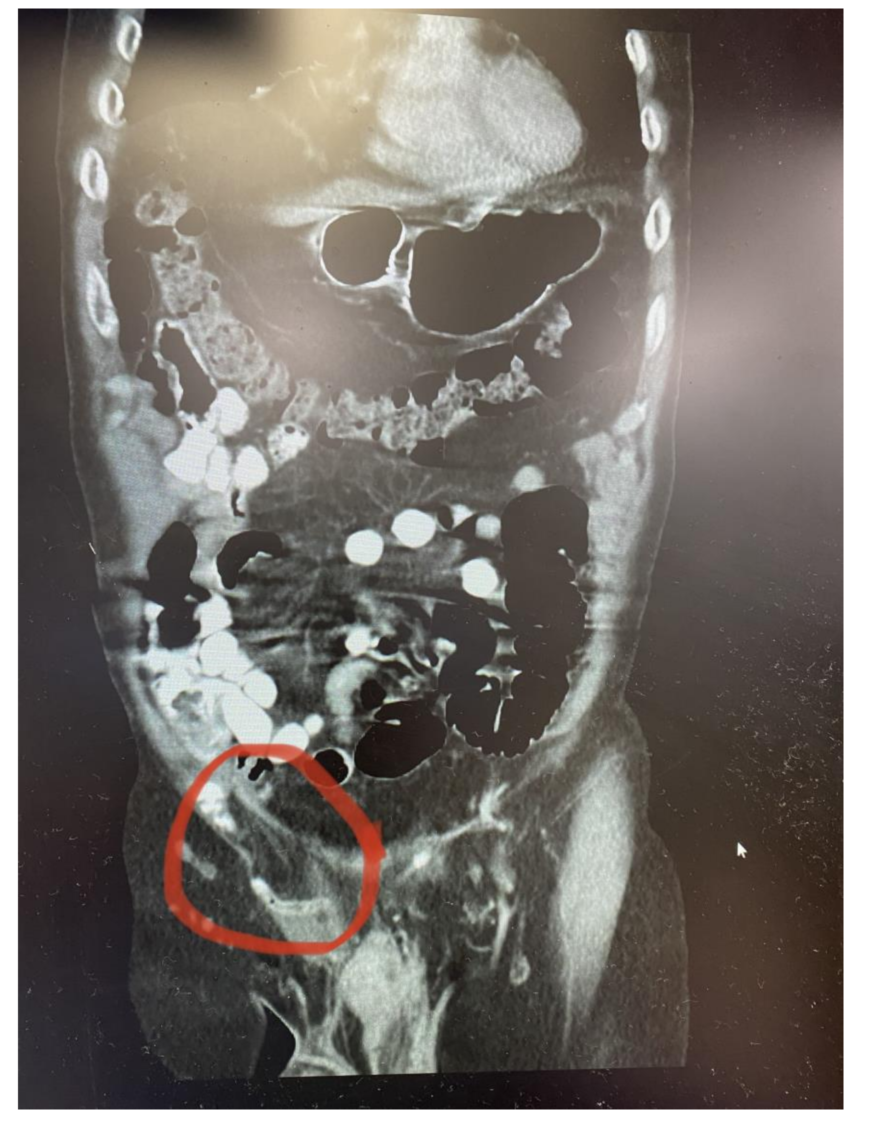

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- Hernias
  - Which incarcerates more frequently
    - internal
- In female, which are most common…femoral or inguinal?
- Inguinal
- Femoral is most common in female than male but still, the inguinal is the most common

PERFORATION

- Etiology
  - Perforated ulcers, perforated bowel (diverticulitis), mesenteric ischemia
- Diagnosis
  - PE, Acute abdomen, X-Rays
- Treatment
  - Surgical consult
  - IVF's
  - Antibiotics

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NON TRAUMATIC BOWEL PERFORATION

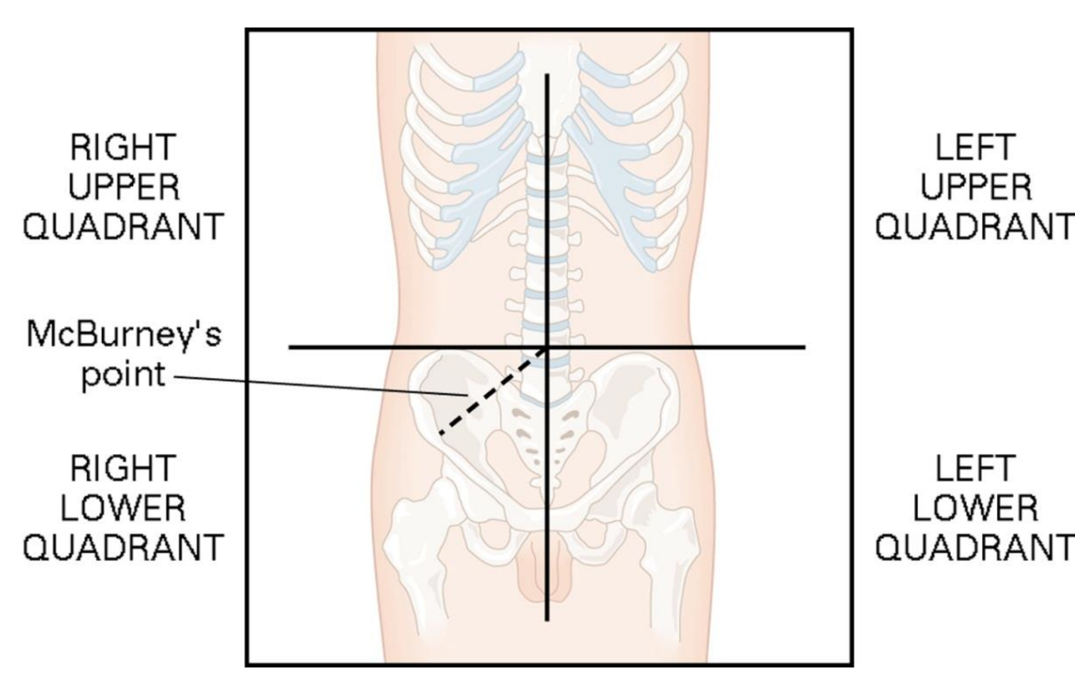
- Potassium tablets
- Typhoid
- TB
- Tumors
- Strangulated hernias
- Most common cause of lower GI perforation
  - Diverticulitis
  - CA
  - Colitis
  - FB
  - Oops!

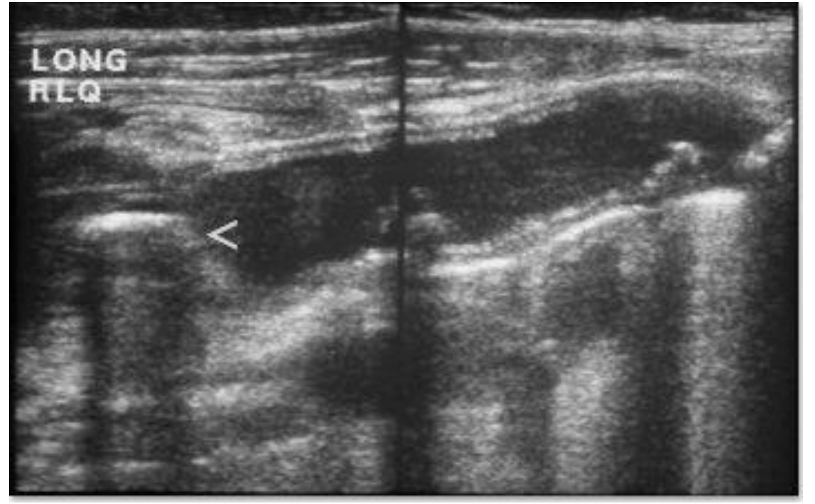
APPENDICITIS

- Pathophysiology
  - Inflammation of the vermiform appendix.
  - Frequently affects older children and young adults.
  - Lack of treatment can cause rupture and subsequent peritonitis.
  - Need to r/o when RUQ pain in pregnancy

APPENDICITIS

- Signs & Symptoms
  - Nausea, vomiting, and low-grade fever.
  - Pain localizes to RLQ (McBurney's point).
  - Rozving, Psoas, Obturator signs
- Diagnosis
  - X-rays, CT, US, PE
- Treatment
  - Surgical consult
  - IVF's
  - Antibiotics




LONG
RLQ

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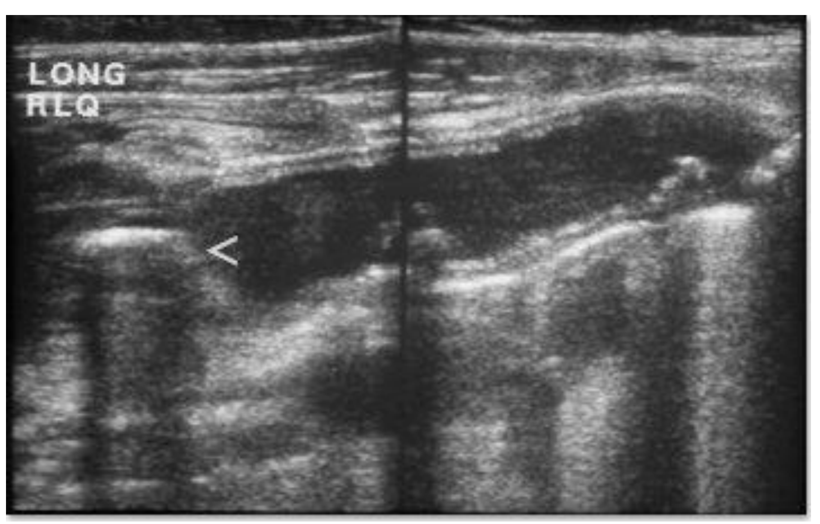
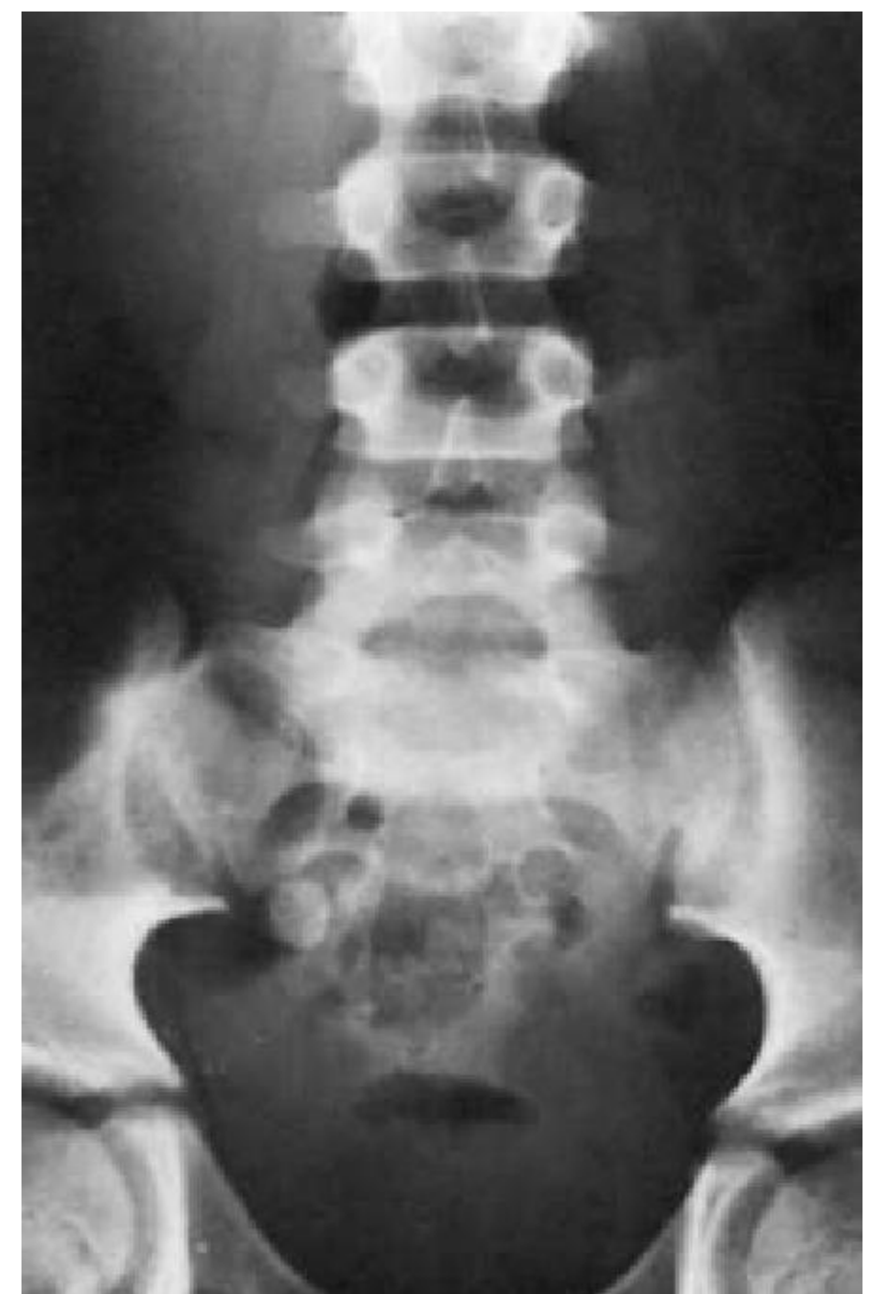
APPENDICITIS

- Best + LR: RLQ pain
- Abdominal pain and anorexia
- **Psoas / Rovsing / Obturator signs**
- US: noncompressive, > 6mm
- CT if US nonspecific. Tx: SURGERY



Appendicitis = RLQ



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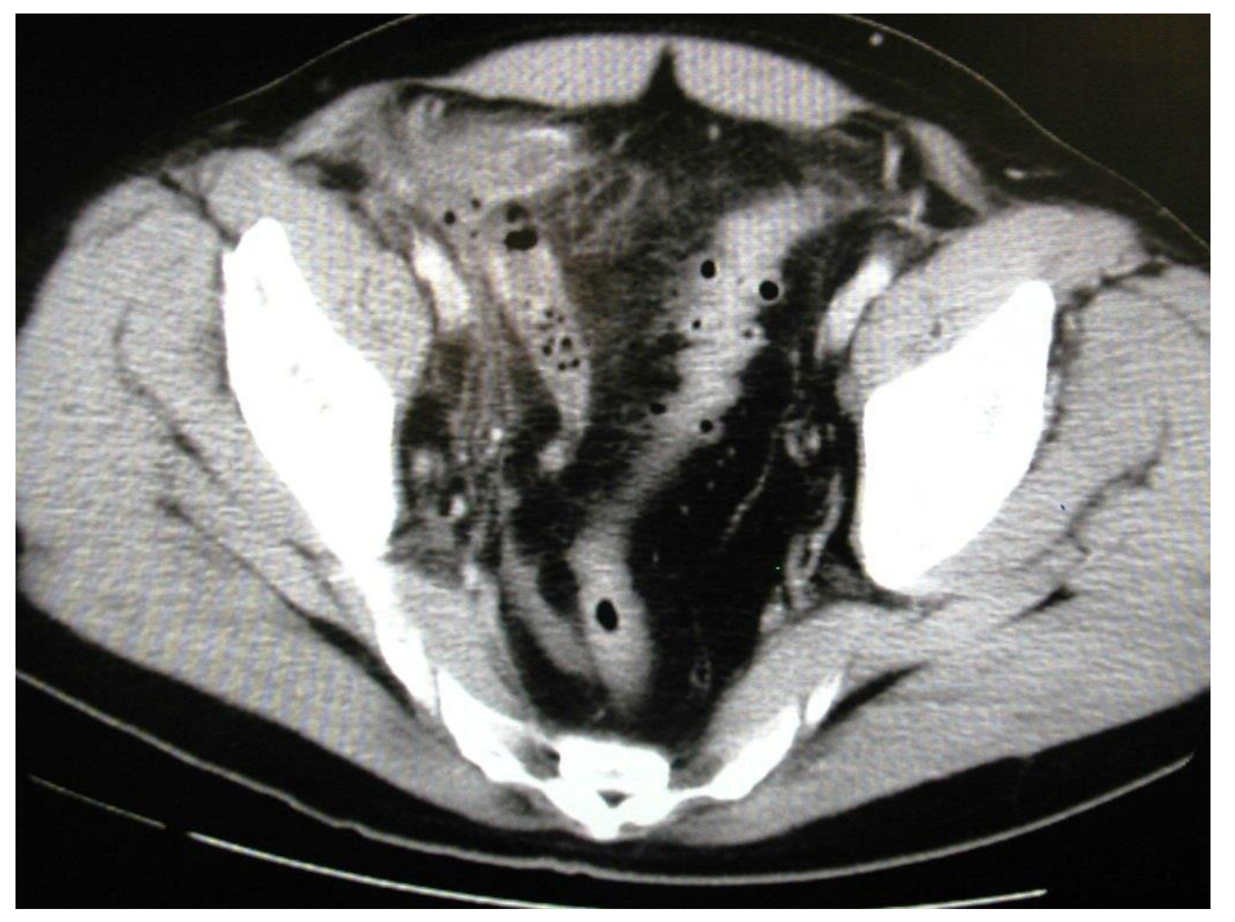

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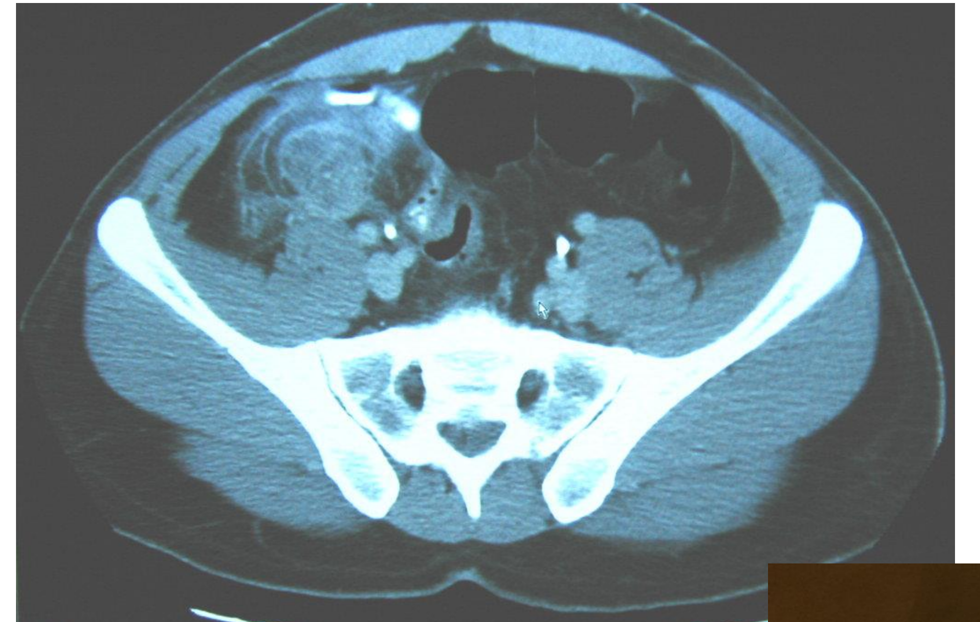
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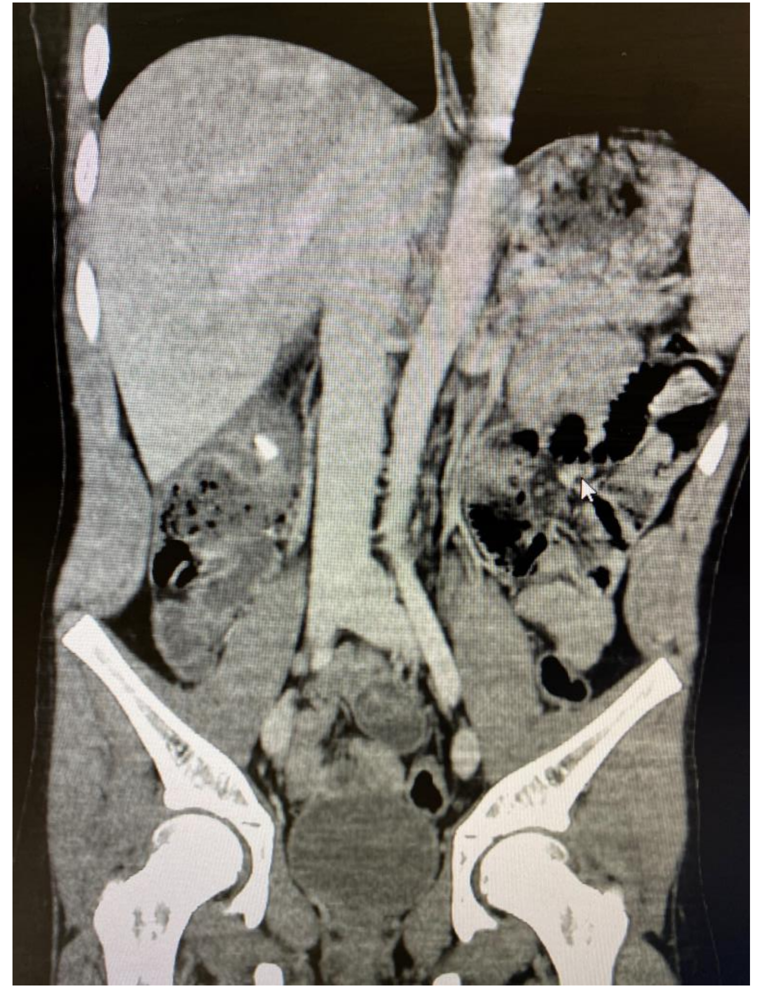
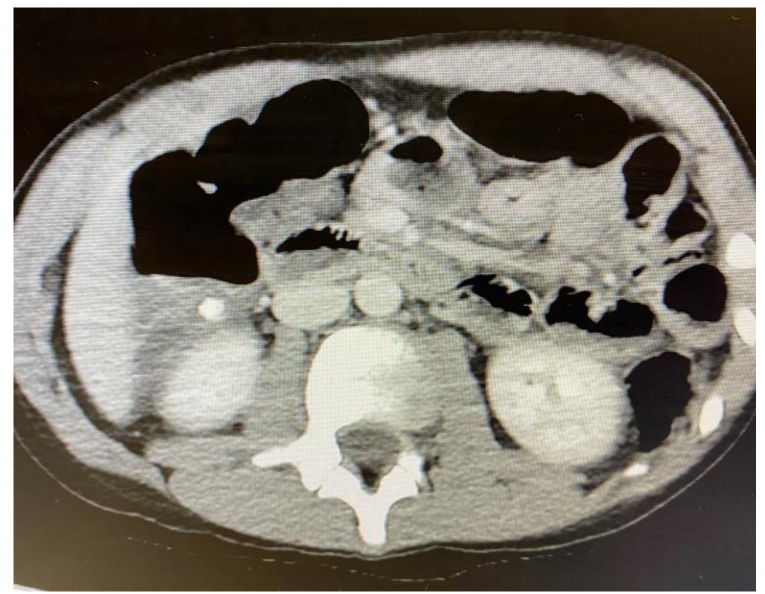
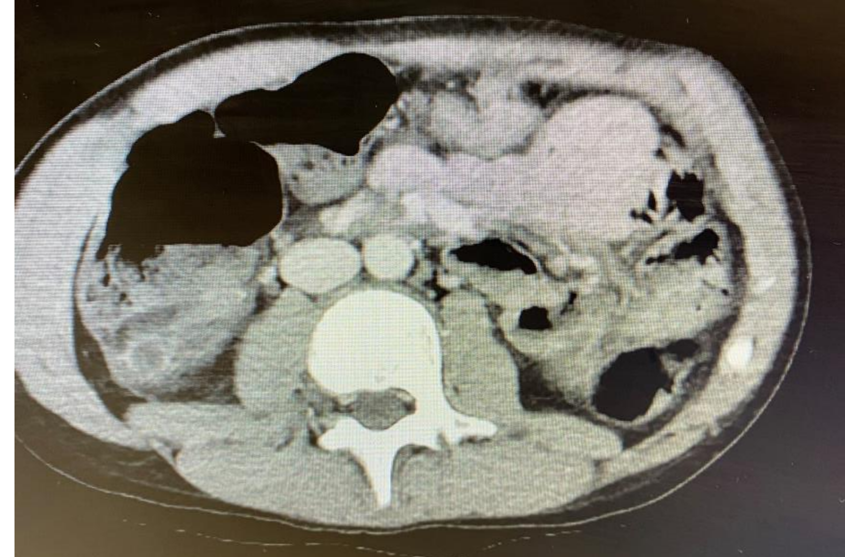
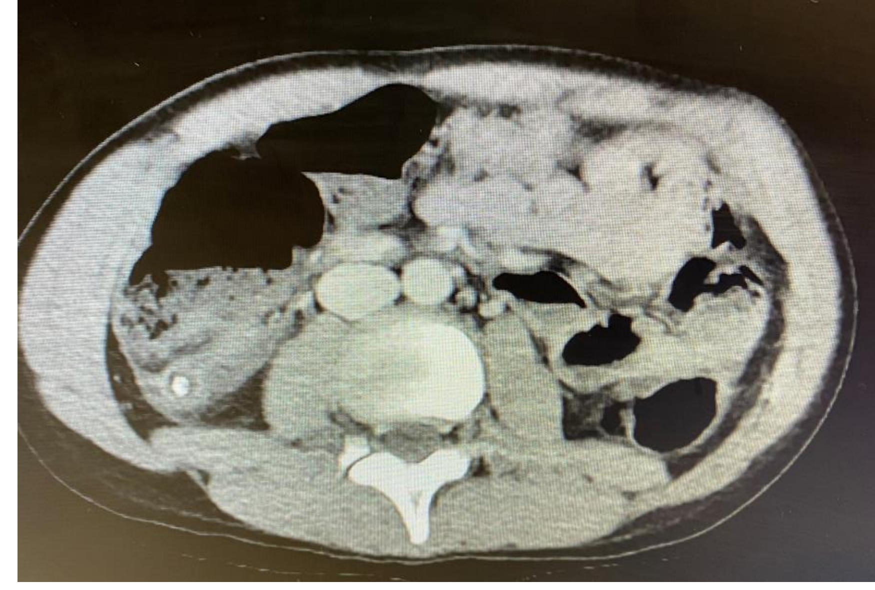

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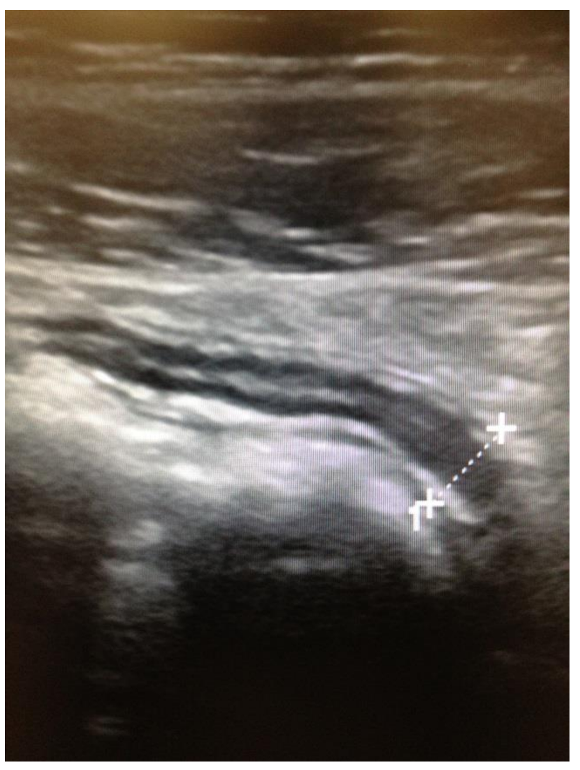

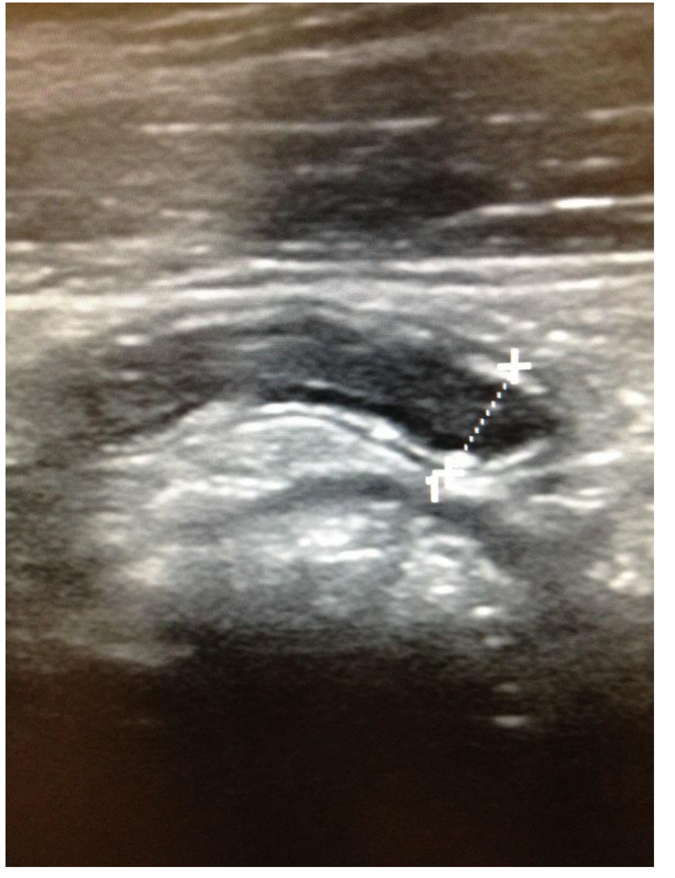

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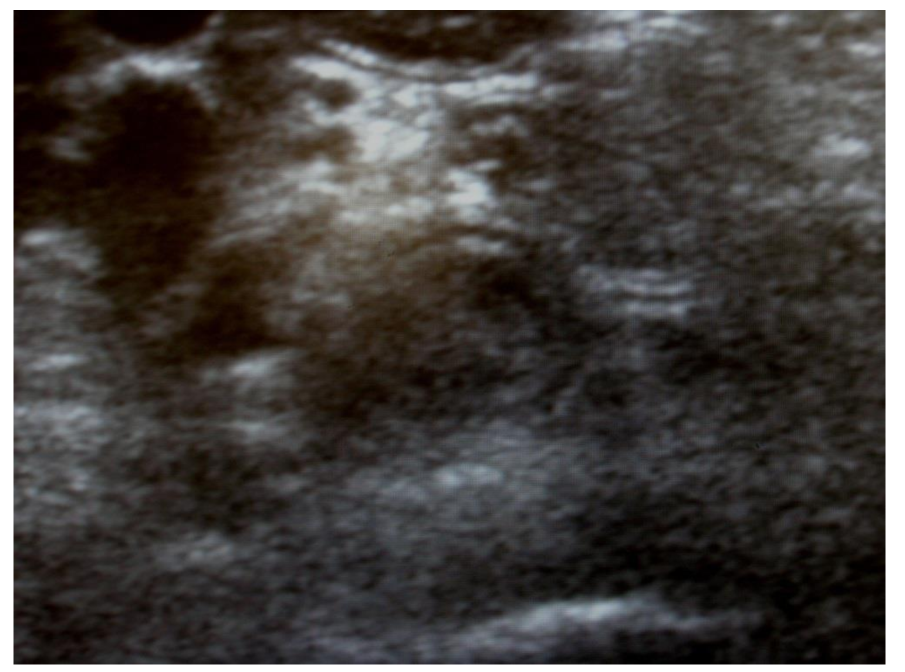

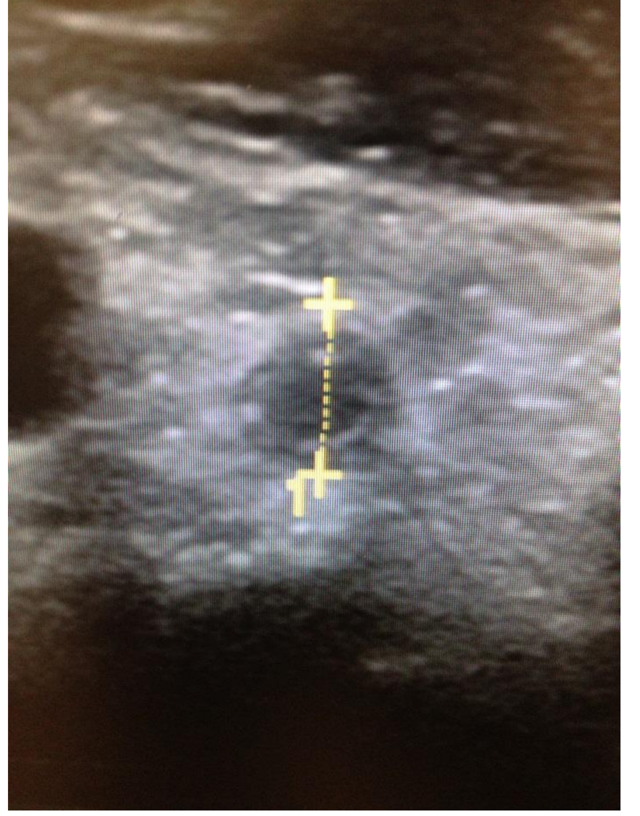

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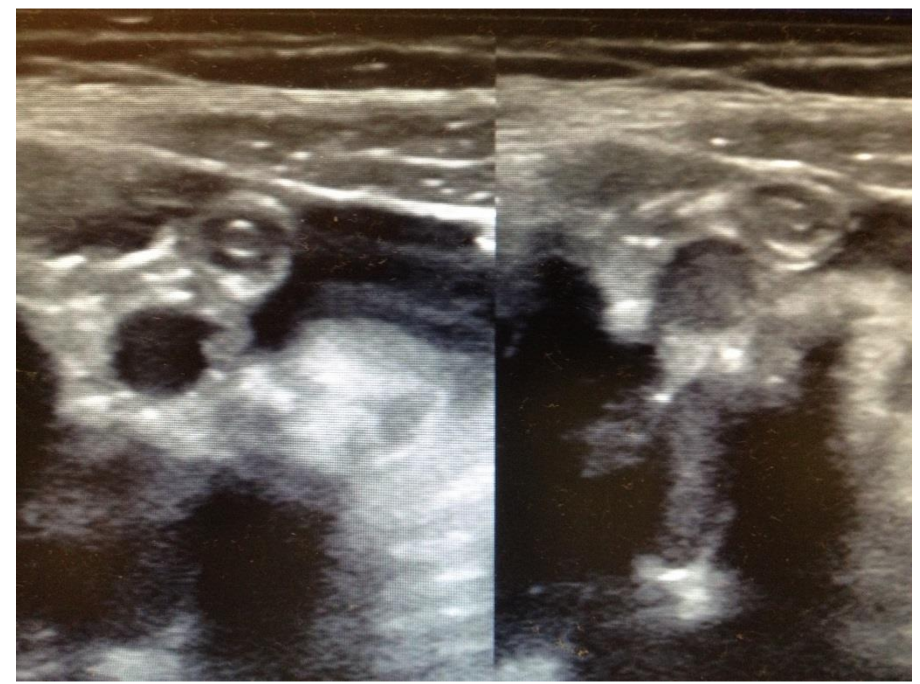

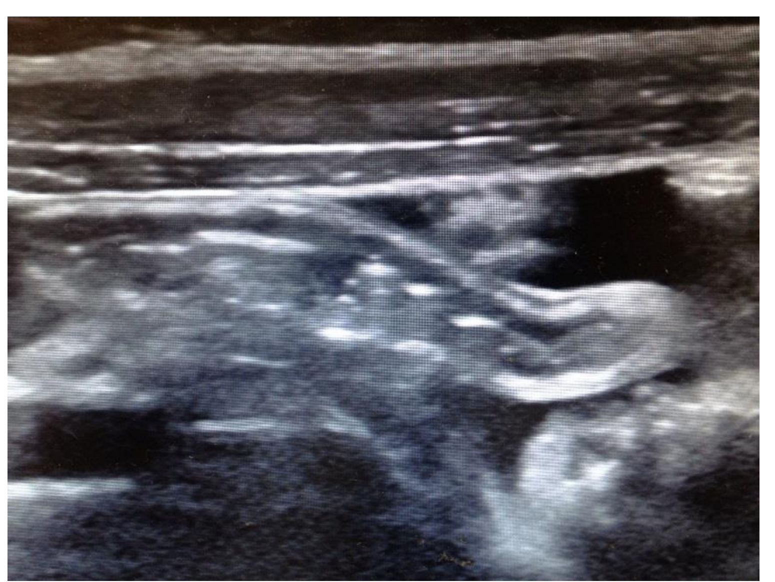

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SMALL BOWEL TUMORS

- Rare
- MCC
  - Adenocarcinoma
- Carcinoid tumors
- Adult intussusception
  - Caused by tumor until proven otherwise

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MESENTERIC ISCHEMIA

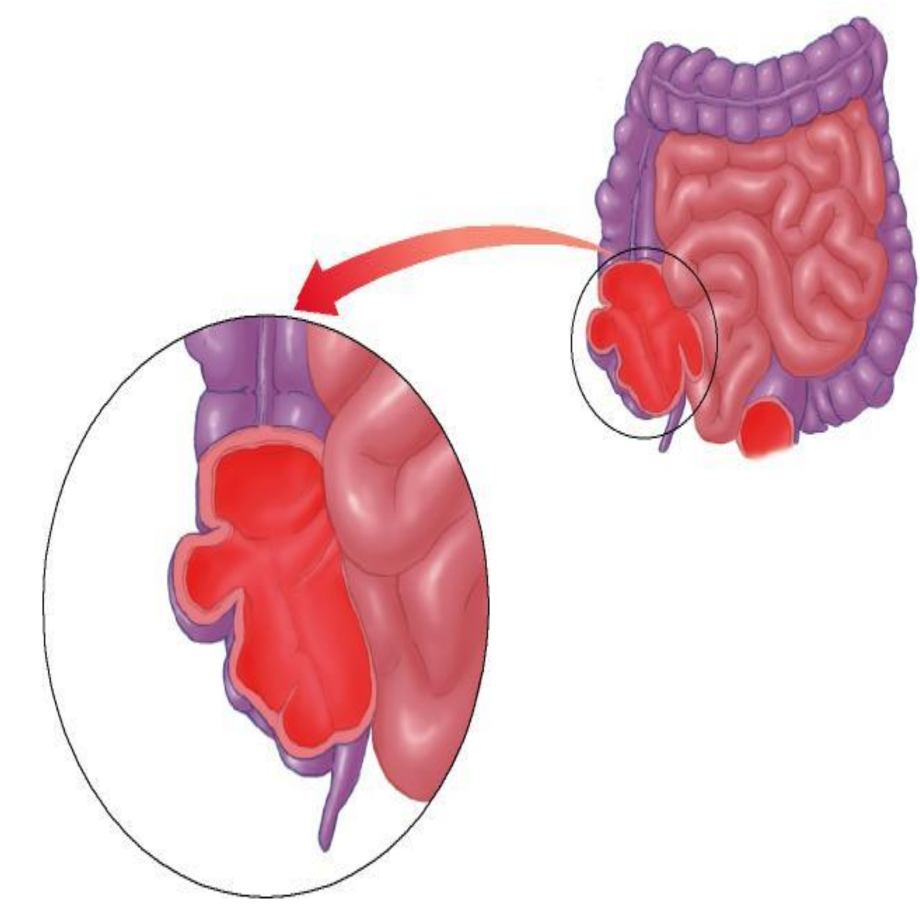
- RF:
  - Afib, hypotensive event, CHF, hypercoagulable, valvular disease, ventricular aneurysm or thrombus
  - 1/3 have had previous embolic event
- 50% due to SMA emboli
- SMA thrombosis
  - 15%
  - Atherosclerotic
- Mesenteric venous thrombosis
  - 15%
  - Hypercoagulable
- Nonocclusive mesenteric ischemia
  - 20%
  - "low flow", hypotension; CHF, sepsis, dialysis

MESENTERIC ISCHEMIA

- Usually abrupt onset; may be gradual
- Nausea / vomiting
- Classic triad
  - Abdominal pain, "gut emptying", underlying cardiac disease
- **Pain out of proportion to exam**
- **Elevated WBC, lactate**, phosphate.
- Xray may show pneumatosis intestinalis.
- CT angiography
  - Gold standard
- Tx: SURGERY, possible heparin / papaverine

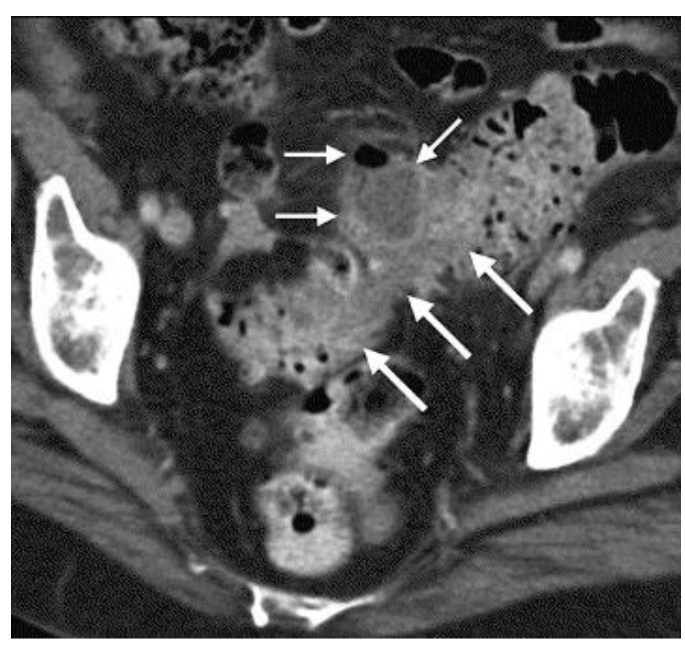
DIVERTICULITIS

- Pathophysiology
  - Inflammation of small outpockets in the mucosal lining of the intestinal tract.
  - Sigmoid in elderly; Cecum in young person
  - Diverticulosis.
- Signs & Symptoms
  - Abdominal pain/tenderness.
  - Fever, nausea, vomiting.
  - Signs of lower GI bleeding.
- Treatment
  - IVF
  - Bowel rest
  - Antibiotics
  - Surgery

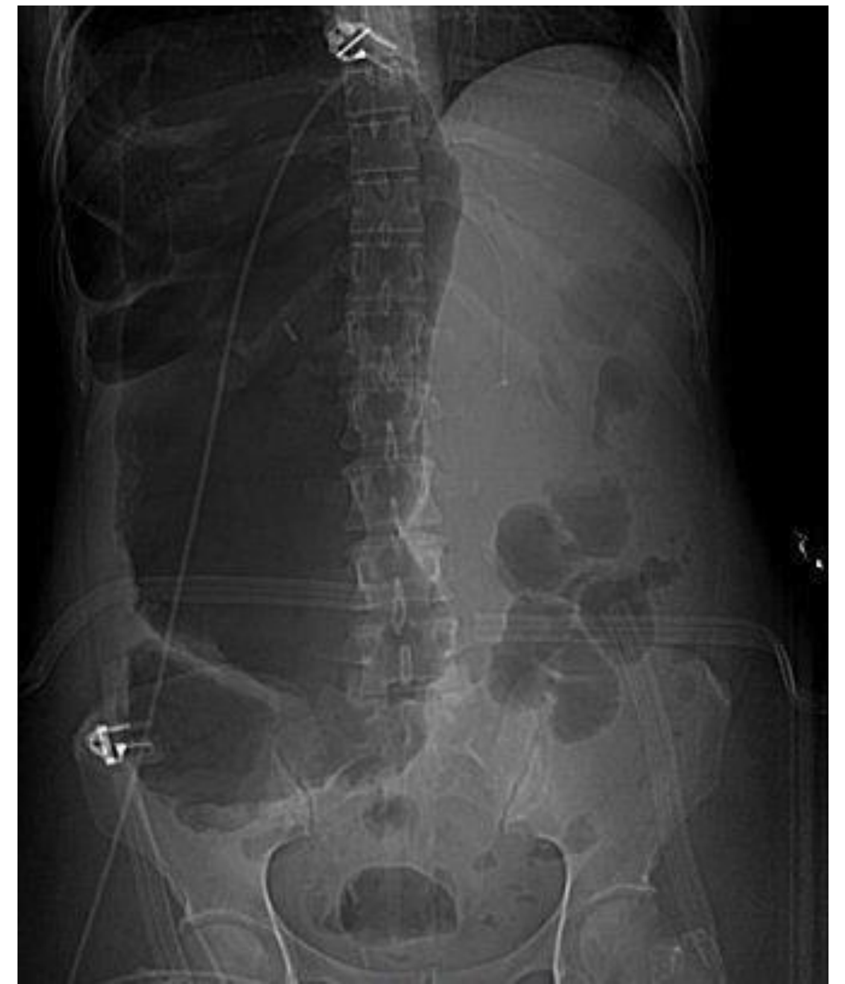


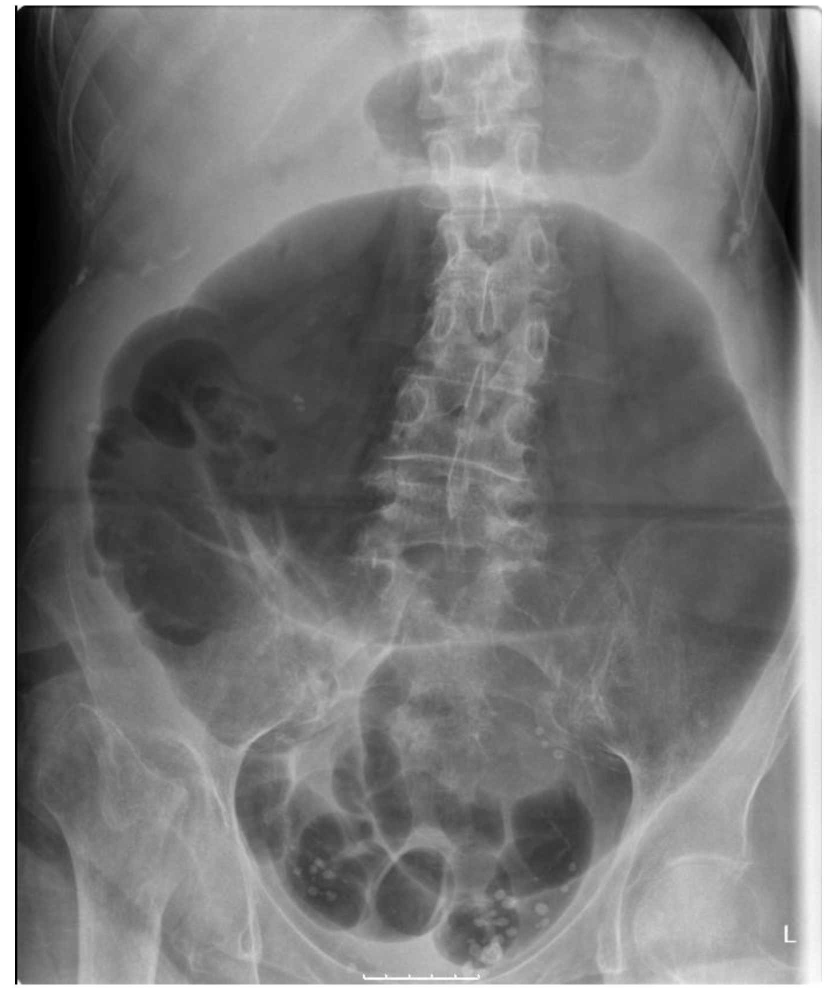
DIVERTICULITIS

- 50% have occult blood in stool
- Alternating constipation / diarrhea
- Diagnosis with CT scan
- Tx: Metro + Cipro
- Complications: Perforation / Abscess



Diverticulitis = LLQ

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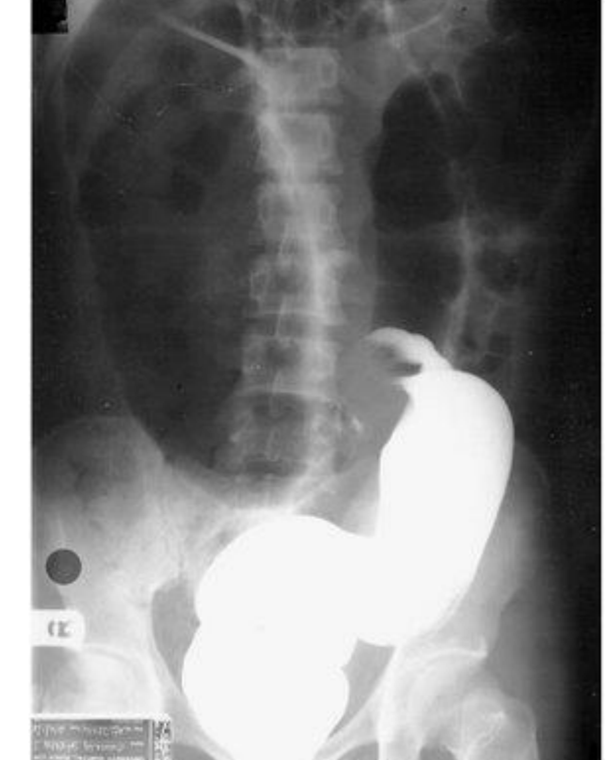
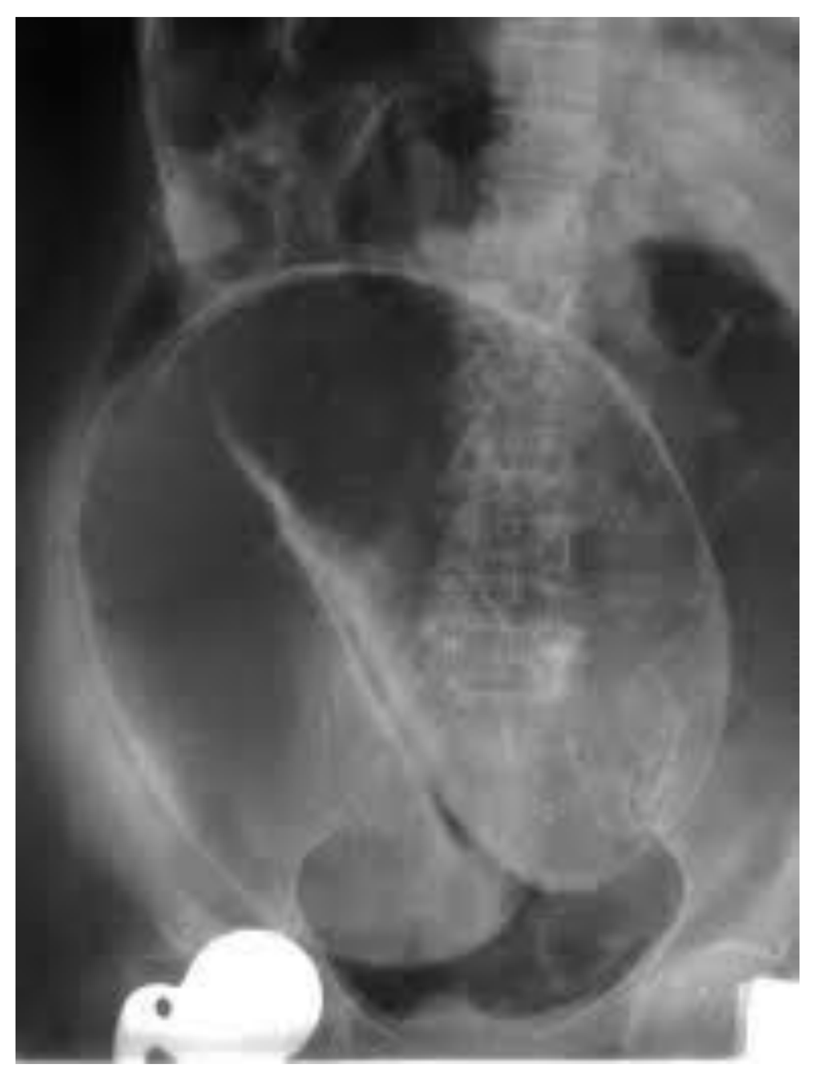
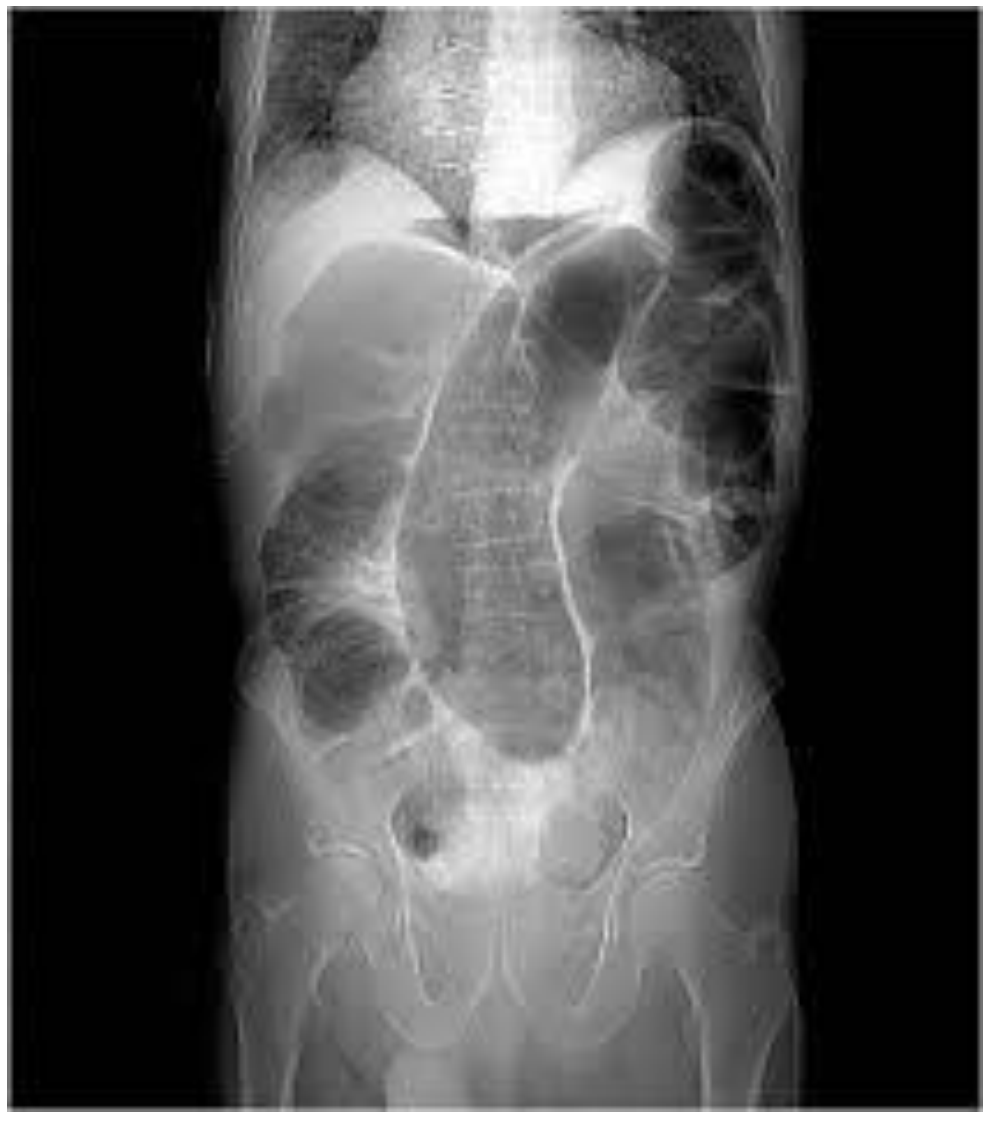
VOLVULUS

- LBO MCC: **TUMOR**
- **Ogilvie's syndrome**: pseudo-obstruction in large bowel. Caused by anticholingerics. Tx with neostigmine or colonoscopy
- Volvulus: closed loop of large bowel
- **Cecal: healthy, marathon runners**
- **Sigmoid: 2/3, nursing home/constipation**
- Bird beak with contrast. Tx: Rectal tube



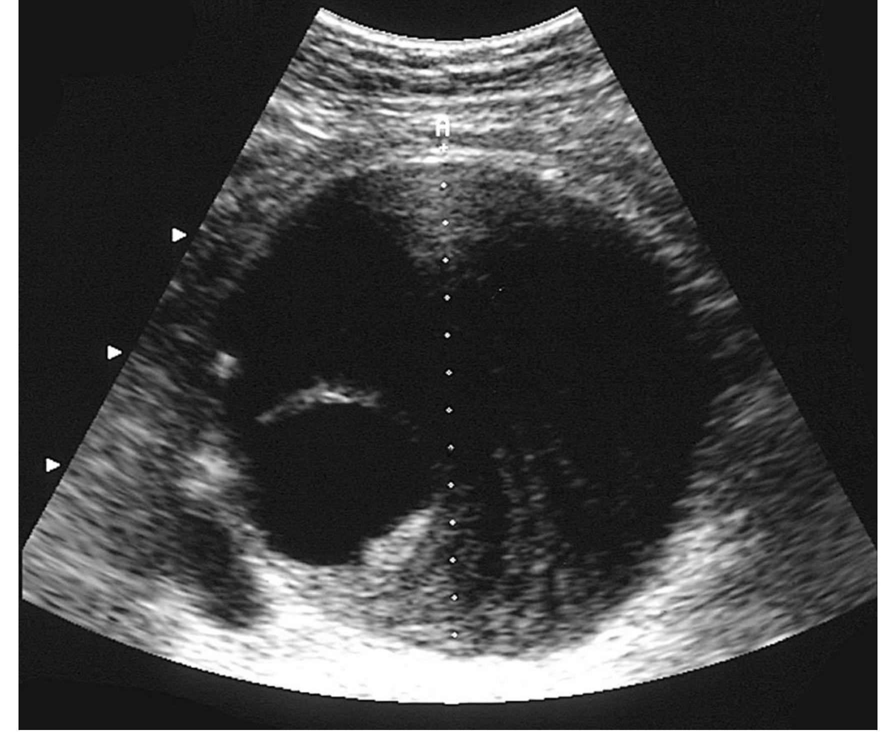
“Coffee bean sign”
Cecal volvulus





“Bent inner tube”
Sigmoid volvulus

- 80yo male presents with sudden onset of diffuse abdominal pain radiating into the back. Patient looks sick, hypotensive. Of course, you can feel pulsatile mass on exam.



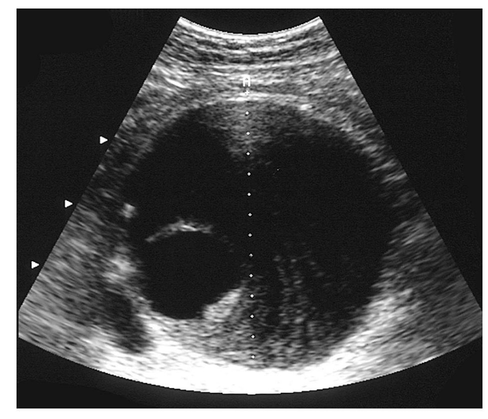
AAA

- Physical exam
  - Pulsatile mass
  - Mottling of lower extremities
  - Absence or asymmetry of femoral pulses
  - Flank pain (elderly with renal colic!)
  - Abdominal pain with syncope in the elderly
- Classic triad of a ruptured AAA
  - Pain
  - Hypotension
  - Pulsatile mass

FACTS

- Patient presents with CP and neurologic symptoms…
  - r/o dissection until proven otherwise
- What is the most important risk factor for developing aortic dissection?
  - HTN
- How about AAA?
  - Cholesterol plaques
- What age AAA is common?
- Sixth and seventh decades
- Where AAA ruptures?
- Retroperitoneum
- GI bleed and h/o AAA repair
  - Aortoenteric fistula

AAA



- Aorta > 3 cm, usually infrarenal
- RF: smoking, hypertension
- **TRIAD: pain, hypotension, pulsatile mass**
- Rupture **retroperitoneum**
- MCC misdiagnosis: renal colic
- Dx: US for AAA, rupture with clinical suspicion or CT w/ contrast
- Tx: SURGERY. Repair in asymptomatic if > 5cm or rapidly expanding

5.0 MHz

5.03 cm

5.03 cm

5.0 MHz

5.57 cm

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12.07 cm
A: 21.21 cm
A
L 208

RENAL STONES / URETEROLITHIASIS

- Etiology
  - Ca oxalate, Uric acid, Strighorn, Mg
- Symptoms
  - Pain, hematuria
- Diagnosis
  - US, IVP, CT
- Treatment

Abd
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15
cm
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TESTICULAR TORSION

- Any male patient from pre-adolescent to adult presenting with abdominal pain
- Testicles need to be examined
- Symptoms:
  - Pain, swelling, redness, syncope
- Signs:
  - Tenderness, swelling, cremasteric signs

TESTICULAR

- Diagnosis:
  - Testicular US/Doppler, nuclear scan
- Treatment:
  - Call GU STAT when suspected
  - Open book procedure
  - 6-8 hrs from onset to save testicle
  - Orchyectomy

TESTICULAR TORSION

SURGICAL EMERGENCY THAT REQUIRES INTERVENTION WITHIN 6 HOURS

TWISTING OF THE TESTIS AND SPERMATIC CORD RESULTS IN ISCHEMIA

ACUTE PAIN AND SWELLING

DOPPLER ULTRASOUND DEMONSTRATES DECREASED BLOOD FLOW

www.medcomic.com

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Normal testicle
Testicular torsion
Spermatic cord
Twisted spermatic cord
Urethra
Testicle
Epididymis
Urethra
Testicle
Epididymis

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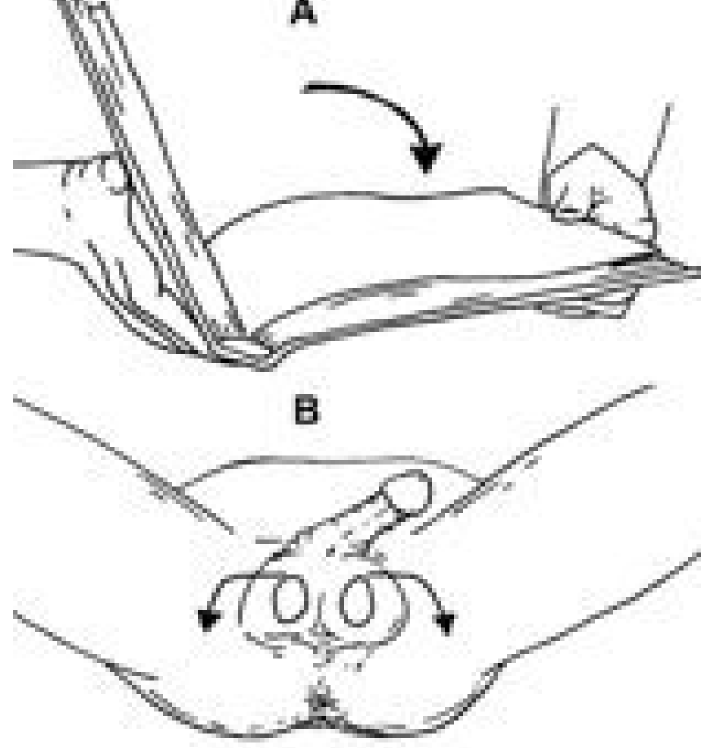
A
B

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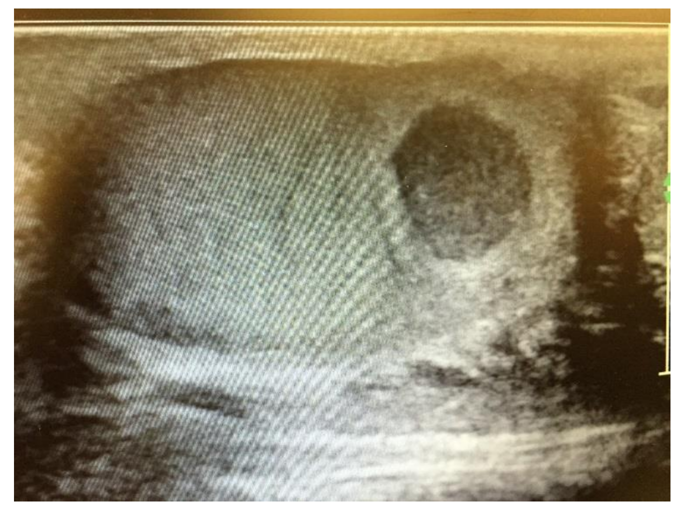

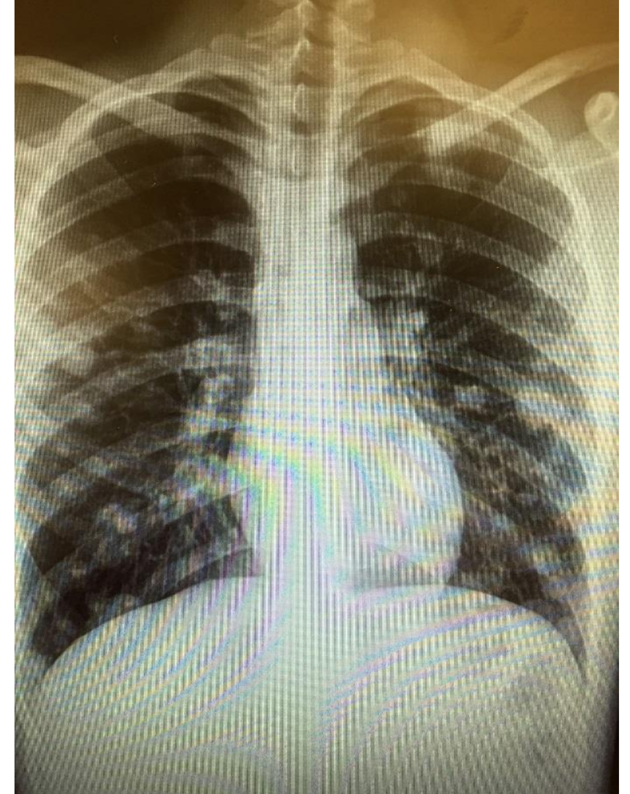

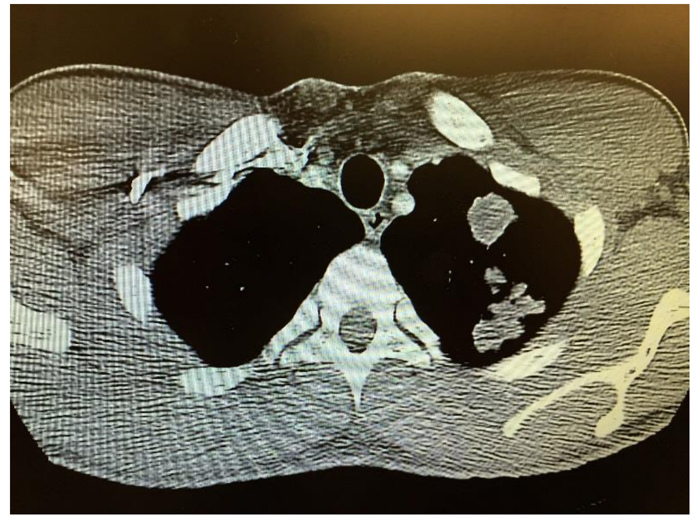

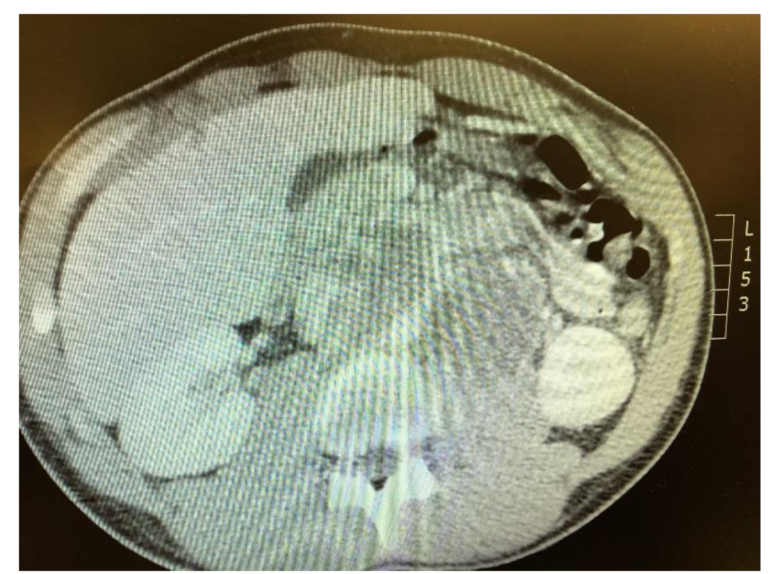
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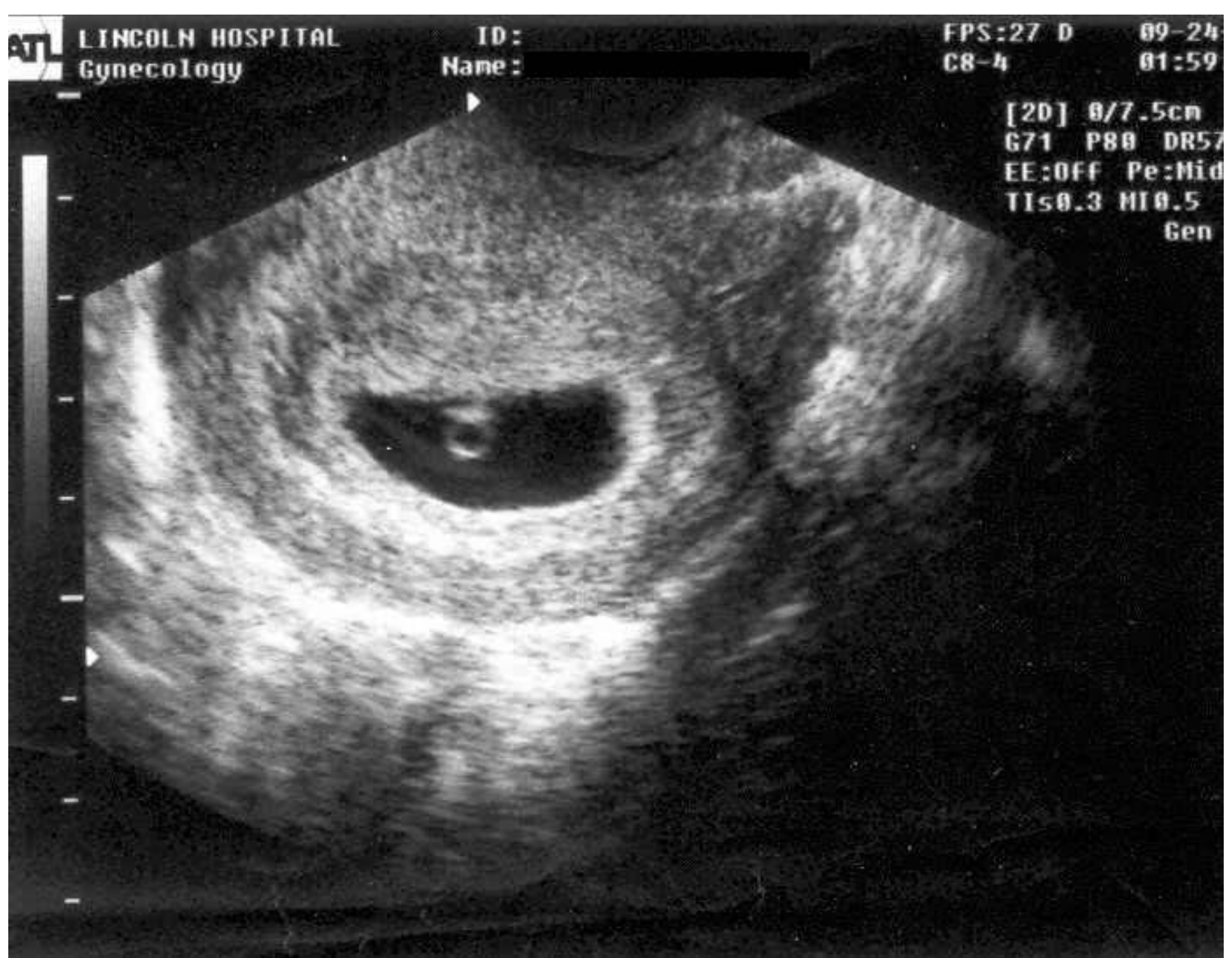
ULTRASOUND

- Abdominal US you can see
  - Gestational sac at 5th week
  - Fetal pole at 6th week
  - Embryonic mass with cardiac motion at 7th week

IUP



CAUSES OF BLEEDING DURING PREGNANCY

- Abortion
- Ectopic pregnancy

< 20 weeks

- Placenta previa
- Abruption placenta
- Molar pregnancy

> 20 Weeks

SPONTANEOUS ABORTION

- Most common presentation
  - Pain followed by bleeding

ABORTION

- Termination of pregnancy before the 20th week of gestation
- Different classifications
- Signs and symptoms include cramping, abdominal pain, backache, and vaginal bleeding
- Treat for shock
- Provide emotional support

ABORTION

- Complete
  - All product of conception (POC) is out
- Incomplete
  - Some POC is still in the uterus
- Missed
  - Fetus without fetal heart activity and less than 20 weeks (if above 20 weeks is called fetal demised/still birth)
- Blighted ovum
  - Fertilized egg that does not develop an embryo
- Threatened
  - Bleeding but still with IUP, subchorionic hemorrhage

- A seventeen y/o pregnant patient presents with the recent onset of lower abdominal pain, but no vaginal bleeding. She has a BHCG of 5700 mIU/mL and has a transvaginal ultrasound which shows an empty sac in the uterus. This is consistent with which if the following?
- a. Normal pregnancy
- b. Ectopic pregnancy
- c. Completed miscarriage
- d. Incomplete miscarriage

ECTOPIC PREGNANCY

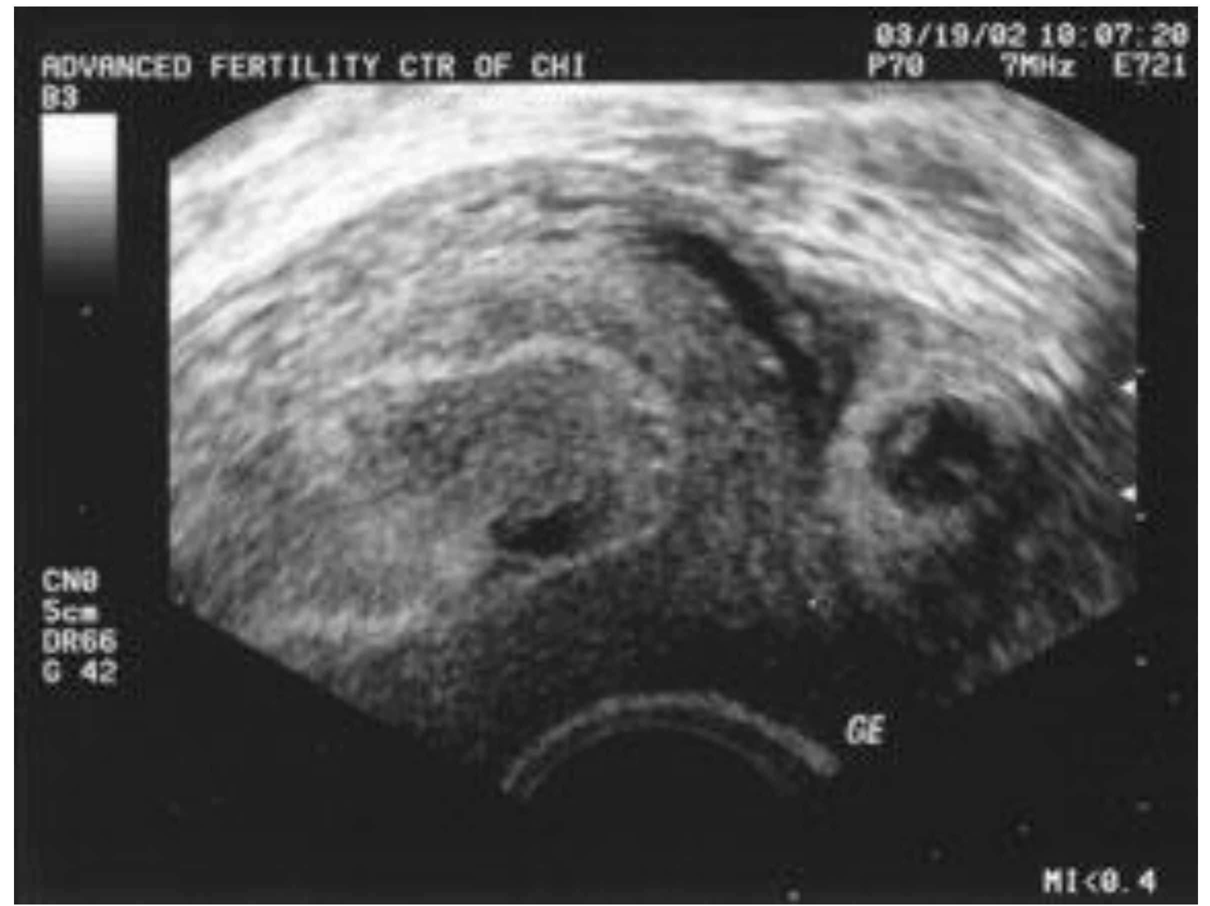
- Assume that any female of childbearing age with lower abdominal pain is experiencing an ectopic pregnancy.
- Ectopic pregnancy is life-threatening. Transport the patient immediately.

ECTOPIC PREGNANCIES

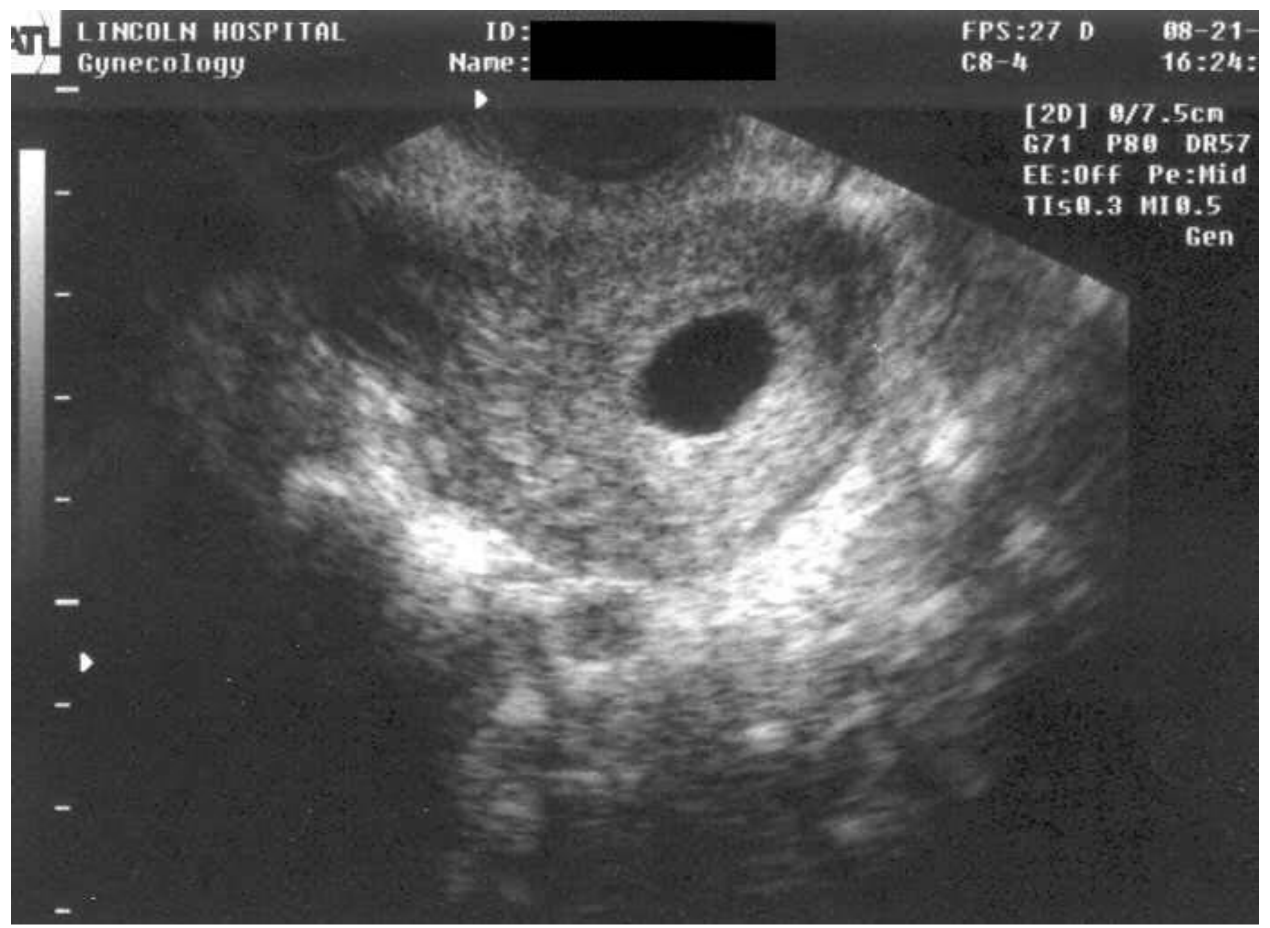
- Most common presentation
  - Amenorrhea followed by pain
- Most common finding on pelvic exam
  - Unilateral adnexal tenderness

US

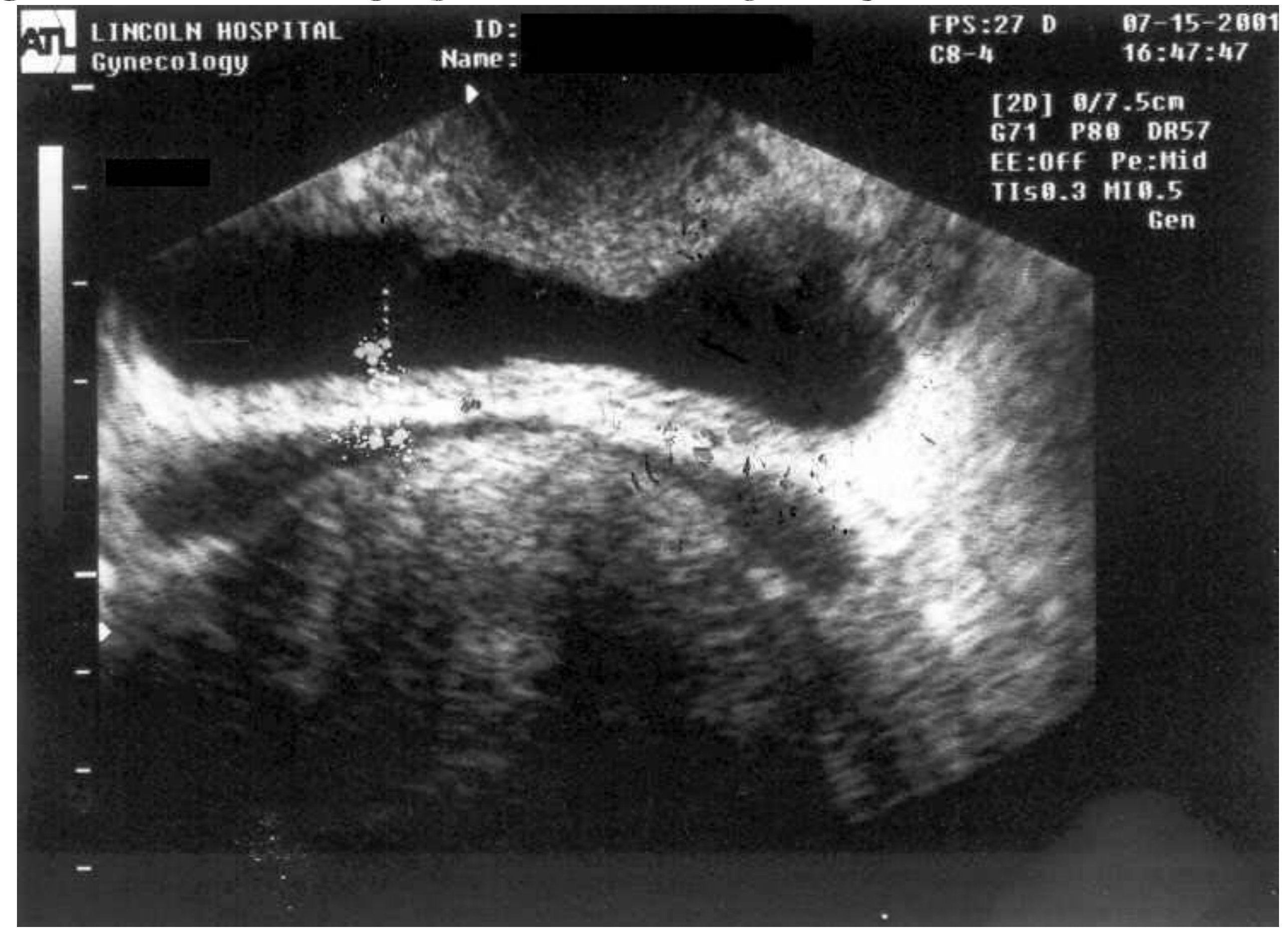
ECTOPIC PREGNANCY



EMPTY GESTATIONAL SAC



FREE FLUID IN CUL-DE-SAC



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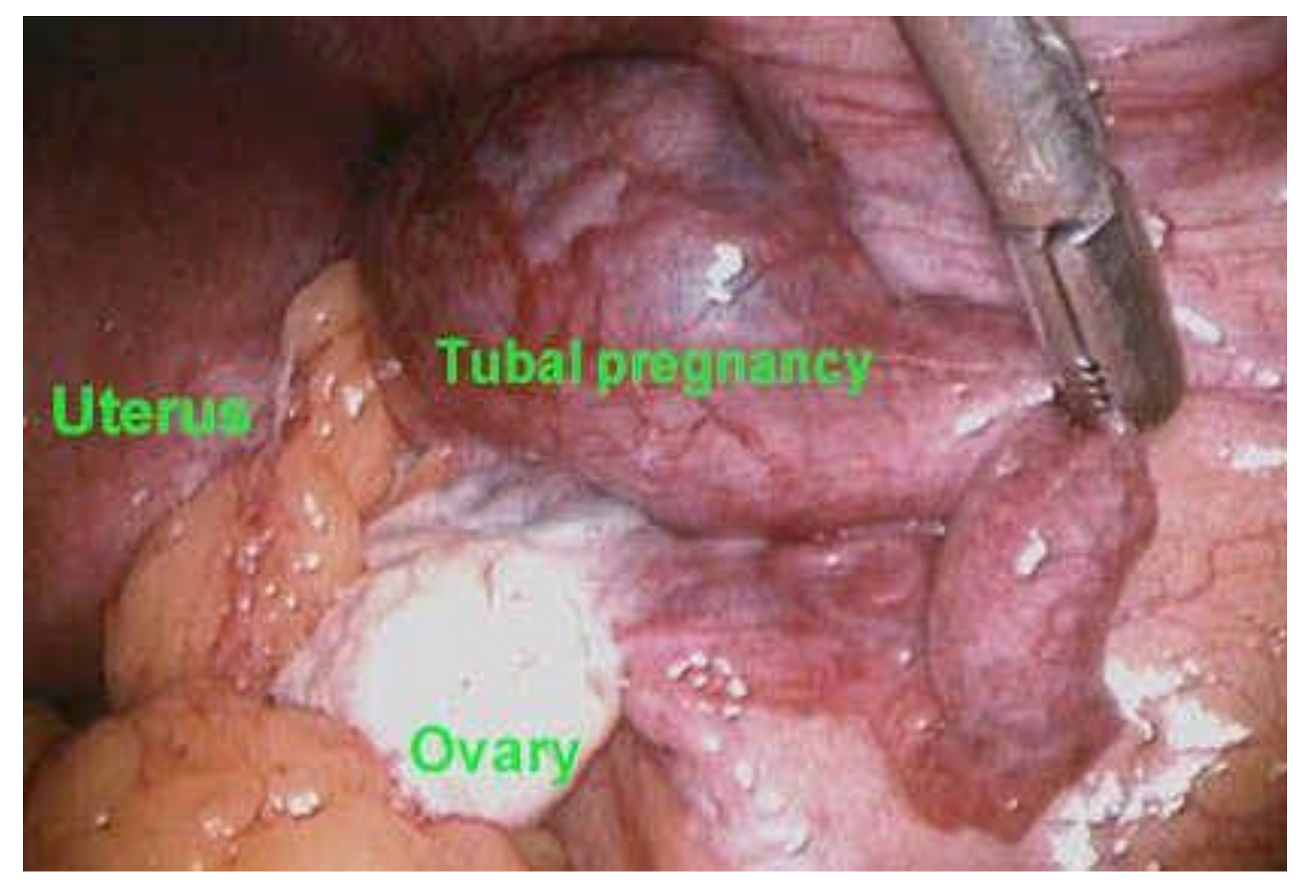
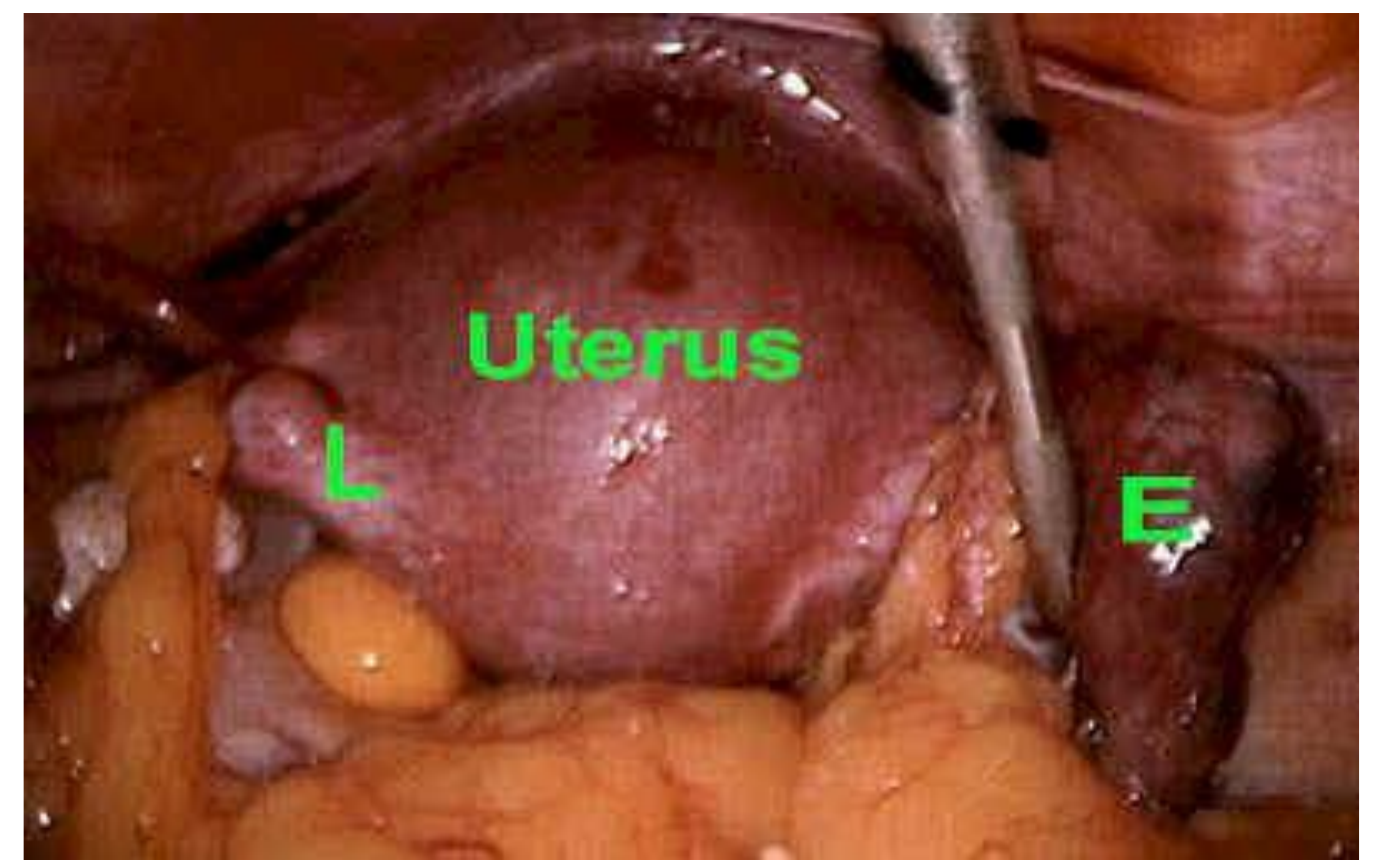
Ruptured Ectopic With Free Fluid and Clots
Long Axis / Saggital View

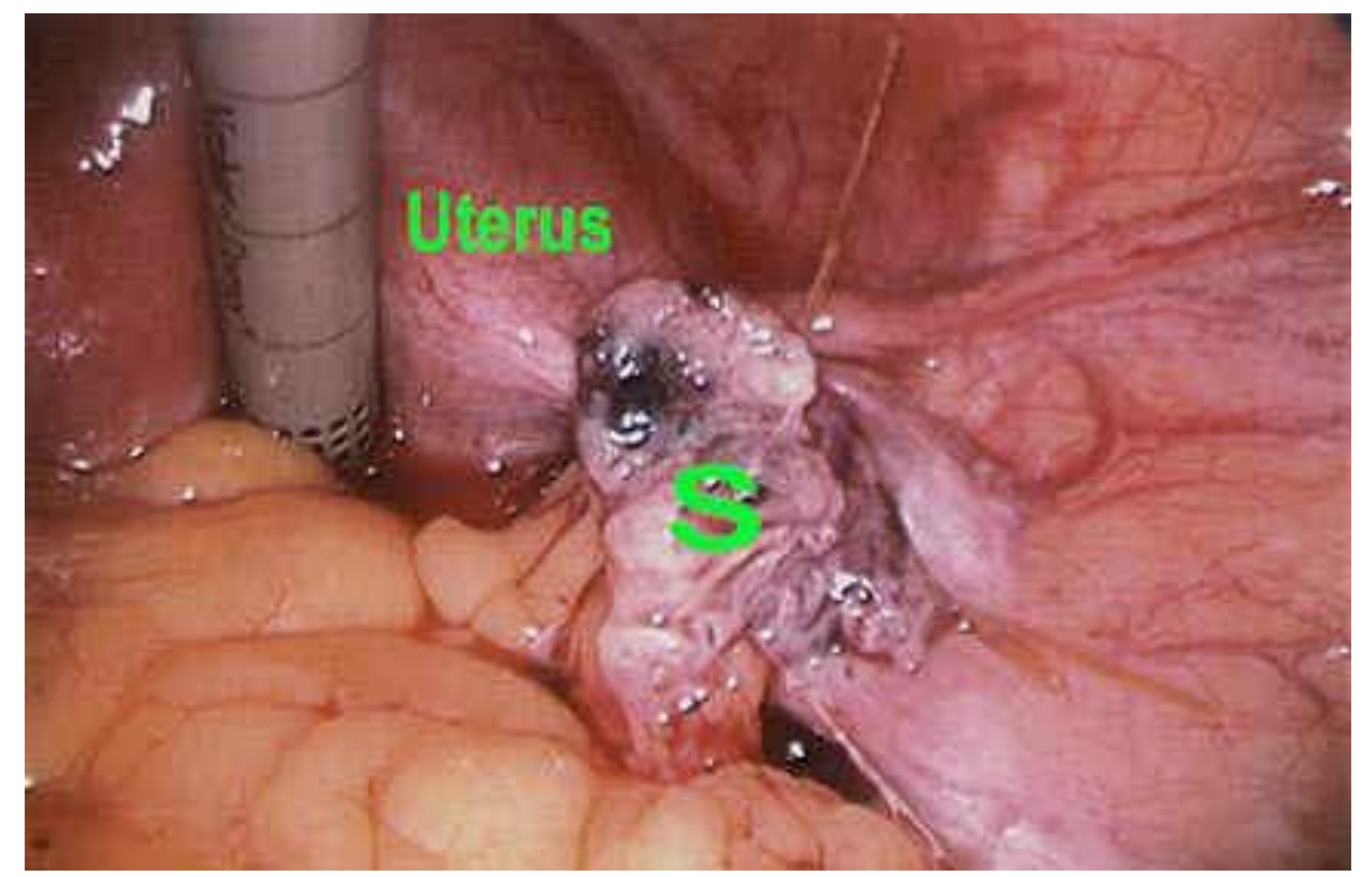
ECTOPIC PREGNANCY

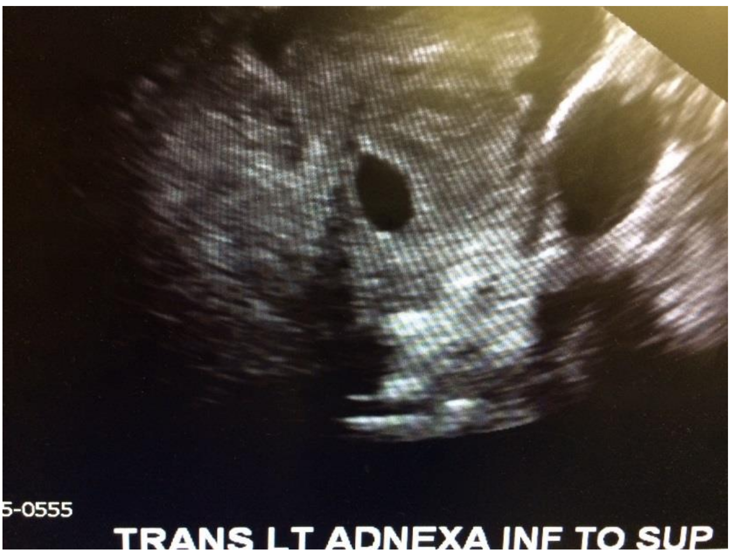


ECTOPIC PREGNANCY



ECTOPIC PREGNANCY

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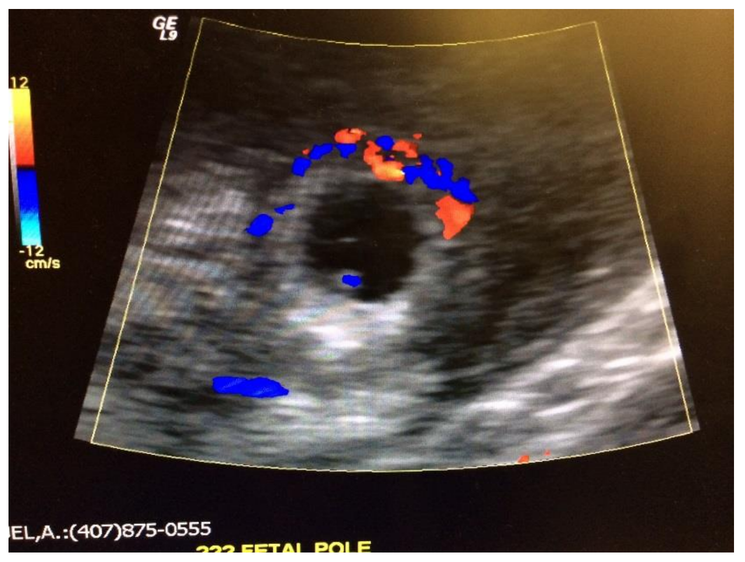
TRANS LT ADNEXA INF TO SUP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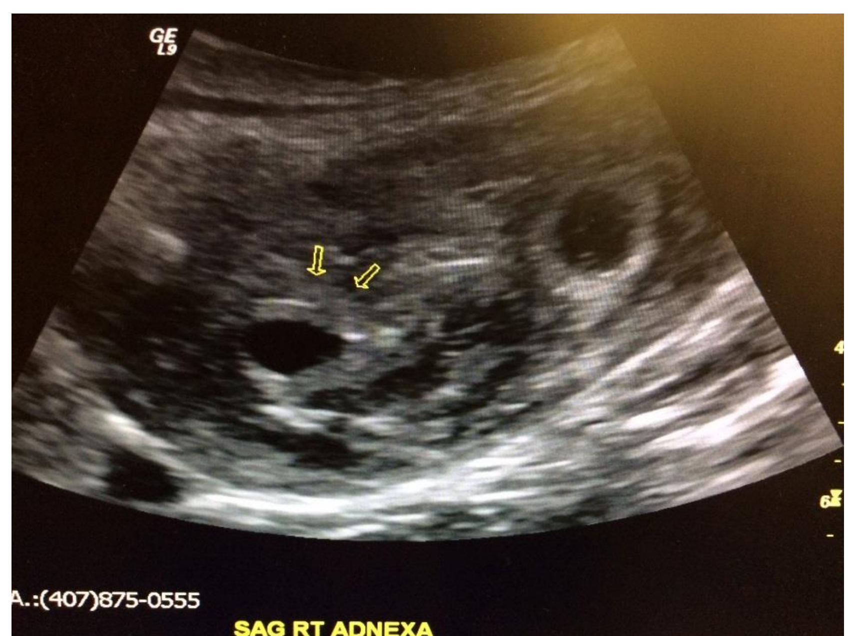
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SAG RT ADNEXA

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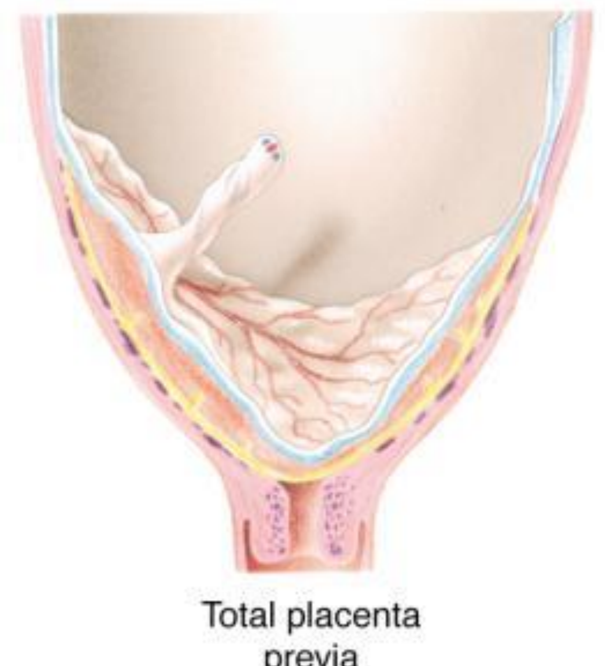
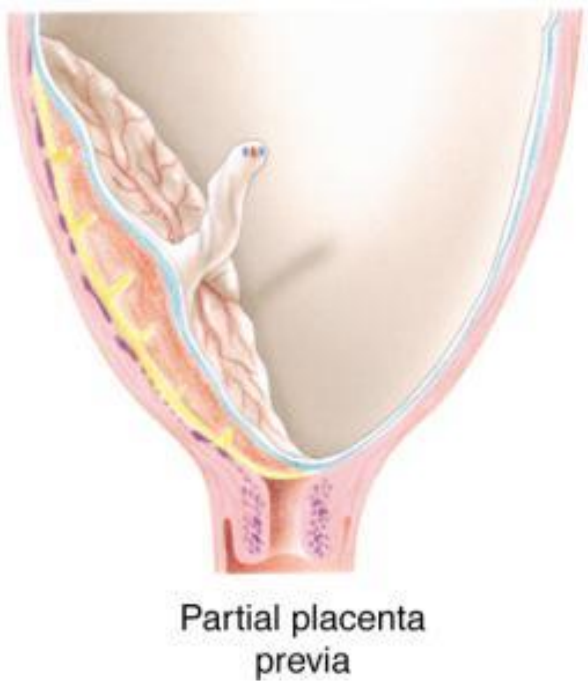
PLACENTA PREVIA

- Usually presents with painless bright, red bleeding
- Never attempt vaginal exam
- Treat for shock
- Transport immediately—treatment is delivery by c-section

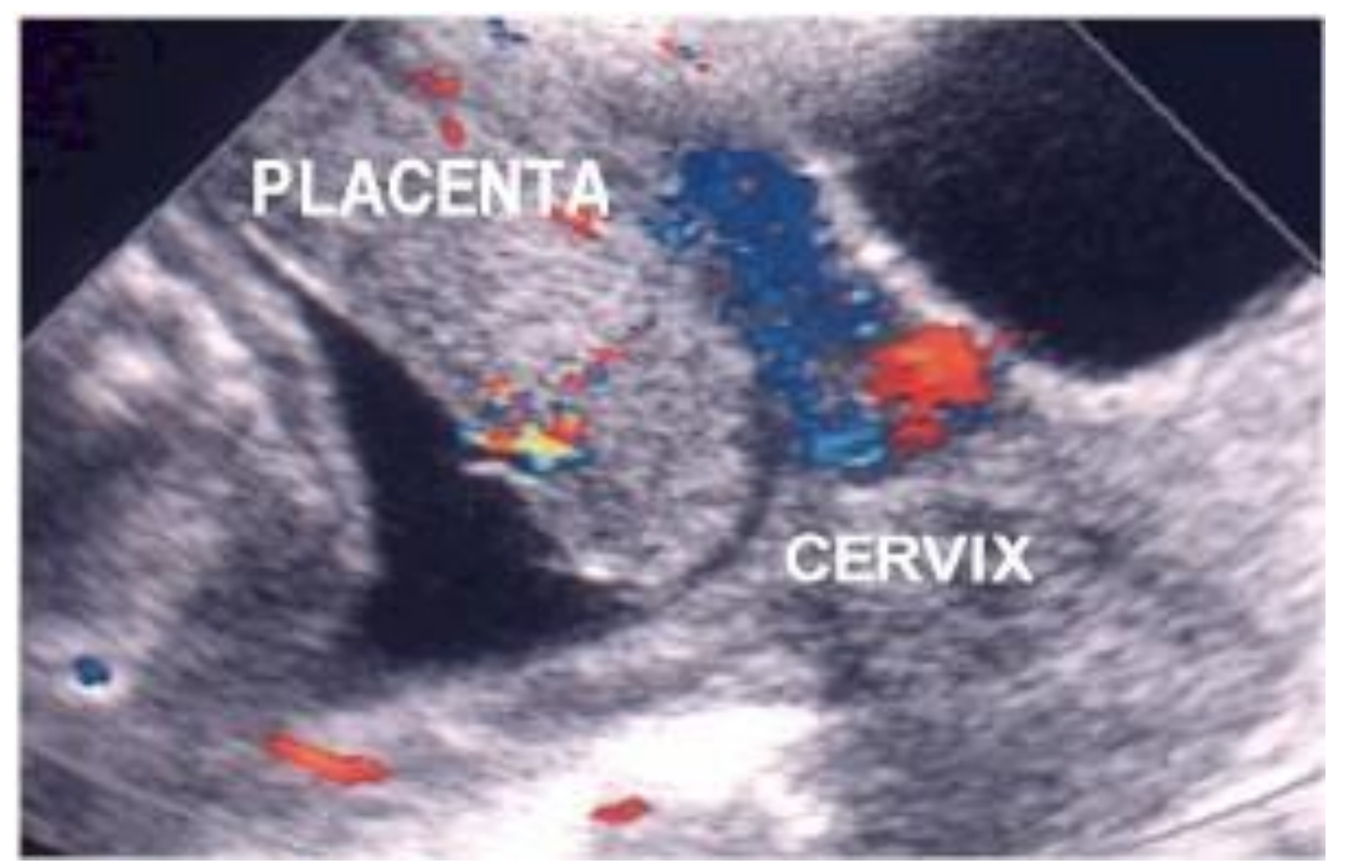


Total placenta previa



Partial placenta previa

Figure 1: Ultrasound (sagittal view) shows placenta previa.


PLACENTA
CERVIX

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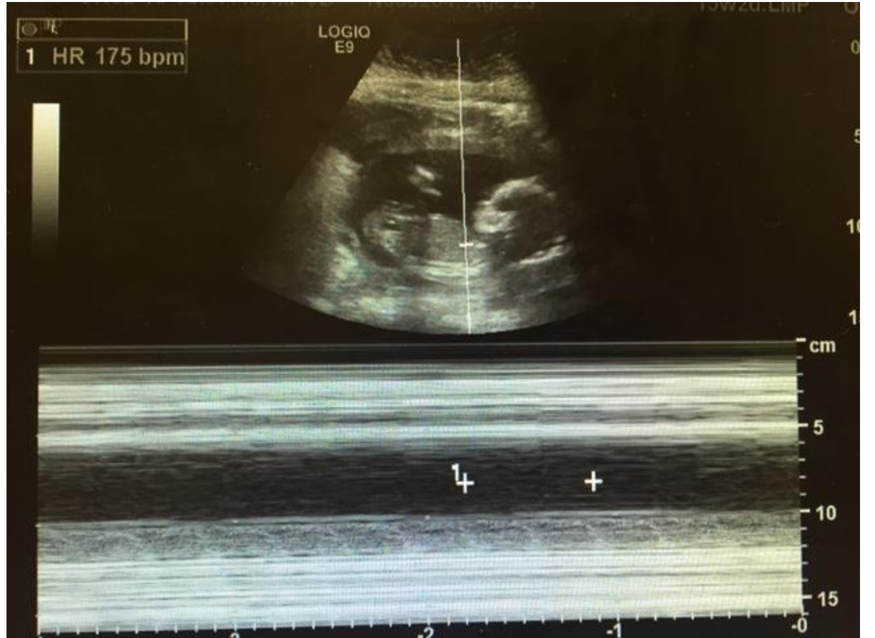
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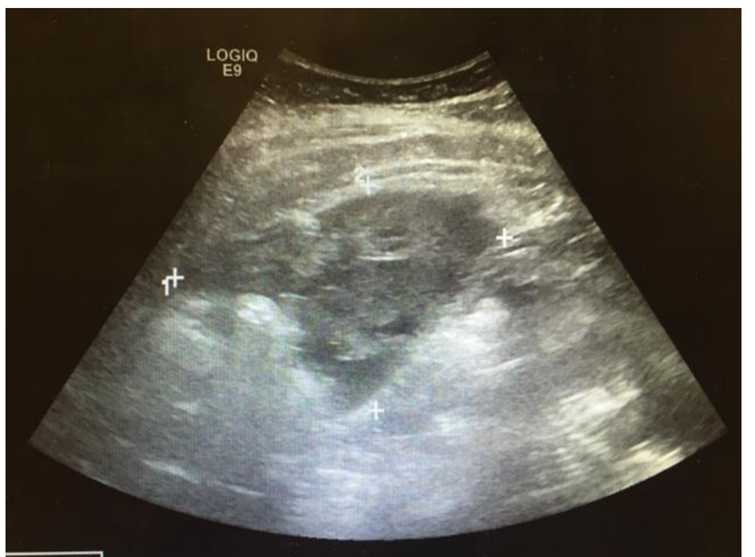
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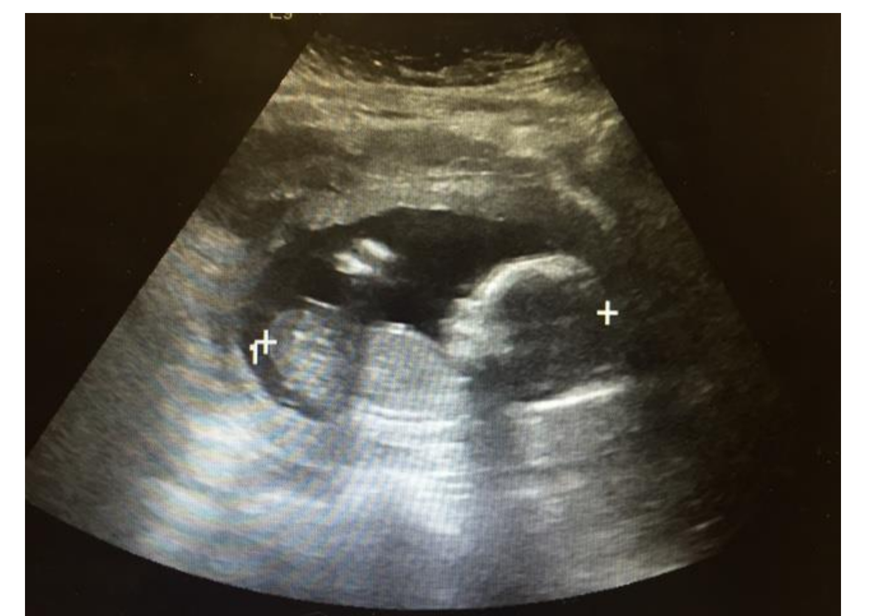

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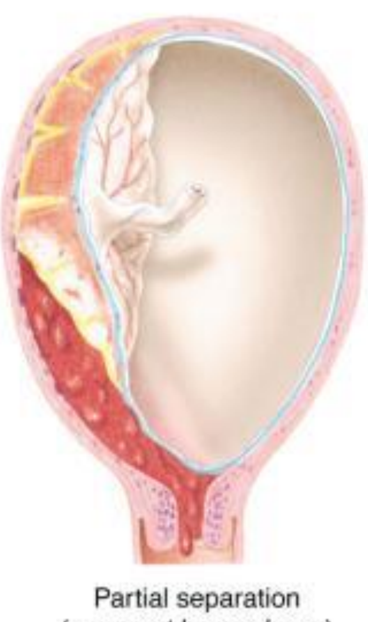
ABRUPTION PLACENTA

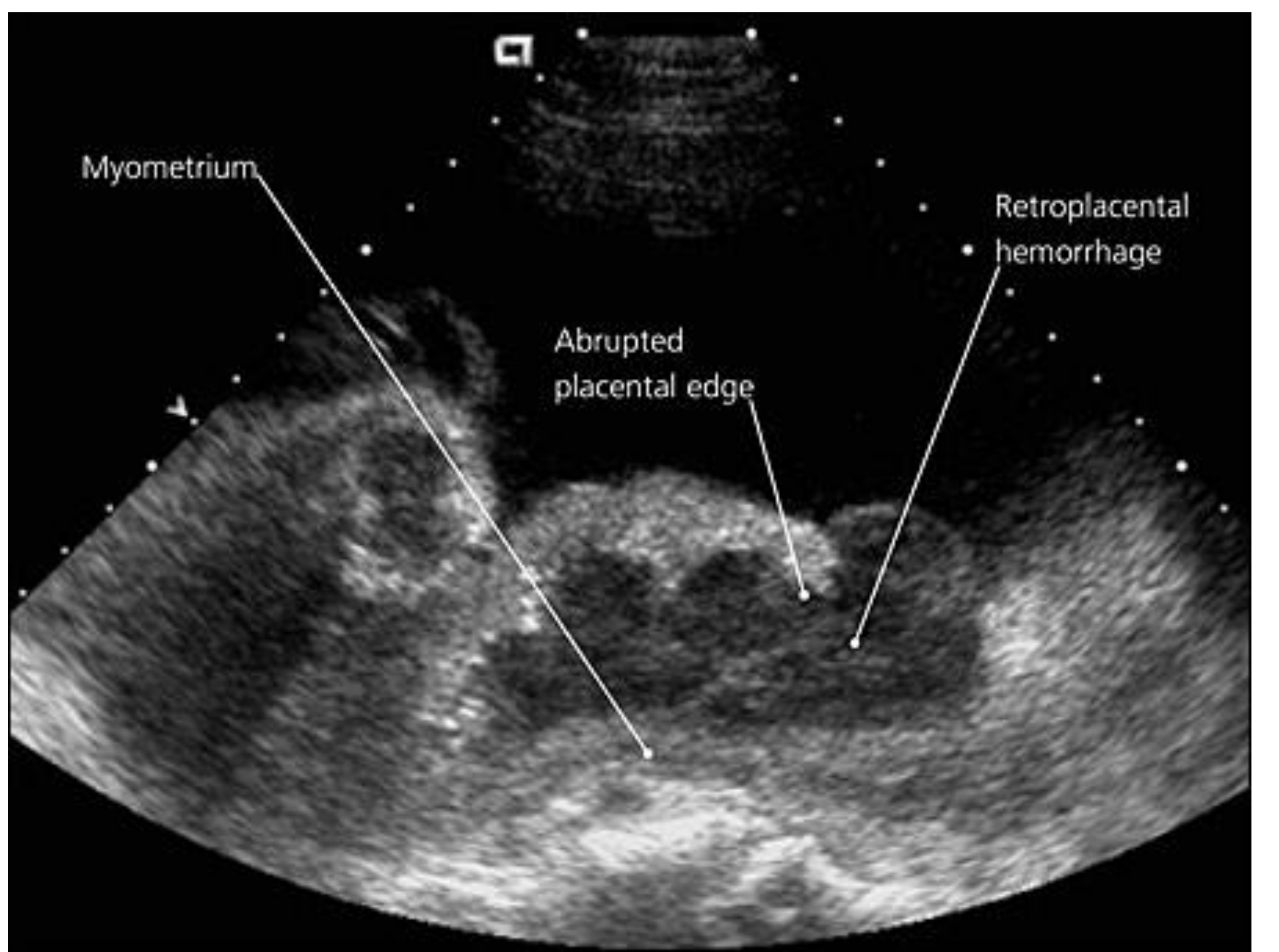
- Signs and symptoms vary; dark, brown bleeding; painful
- Classified as partial, severe, or complete
- Life-threatening, DIC
- Treat for shock, fluid resuscitation
- Transport left lateral recumbent position

Partial separation (concealed hemorrhage)



Partial separation (apparent hemorrhage)

Complete separation (concealed hemorrhage)


Myometrium
Retroplacental
hemorrhage
Abrupted
placental edge

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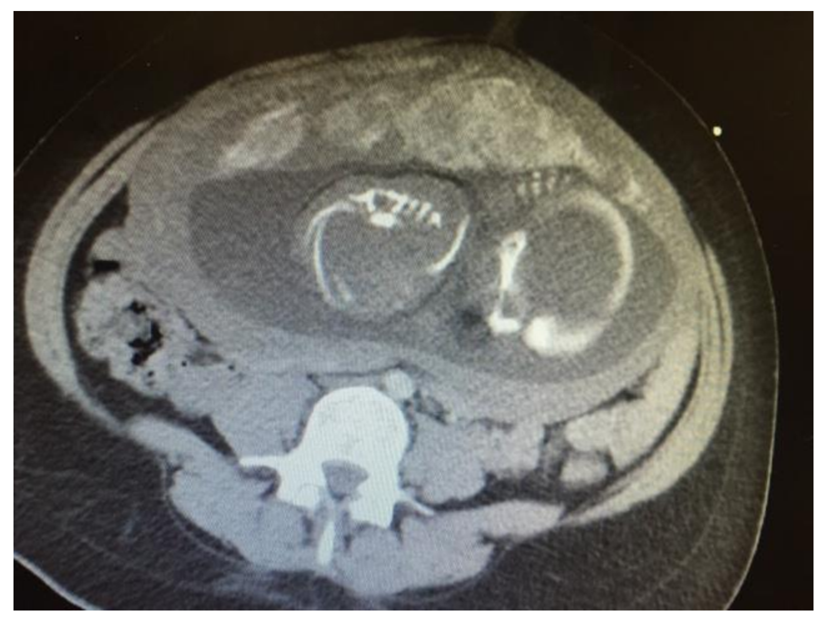

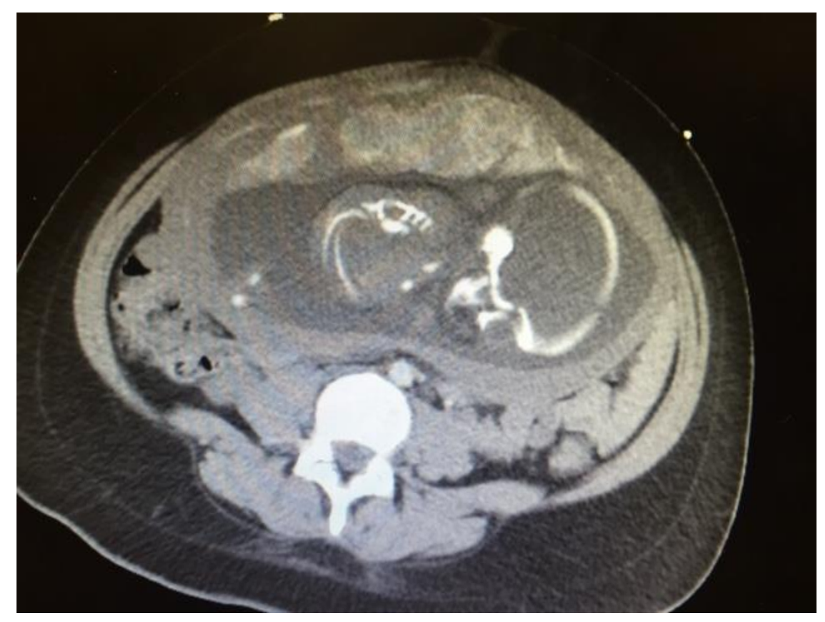

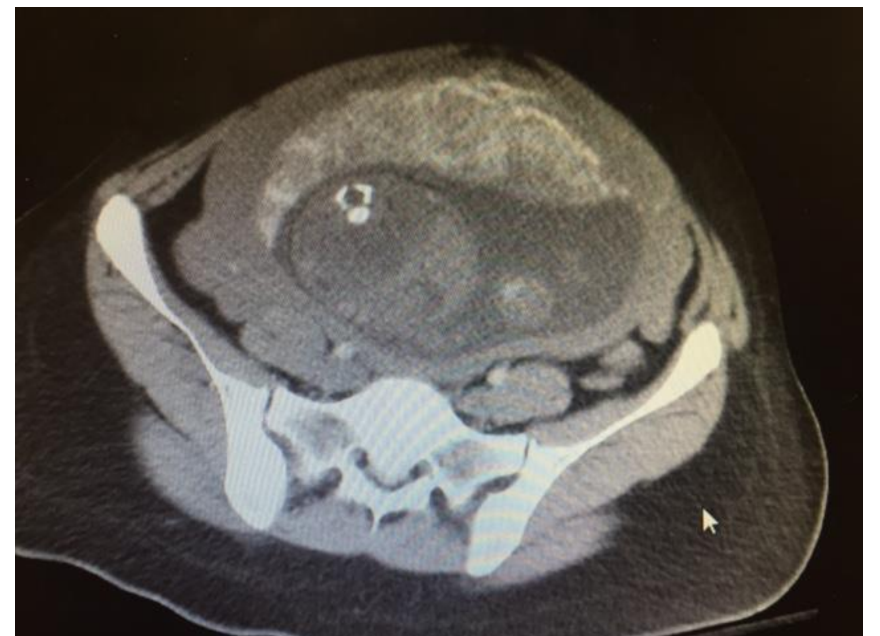

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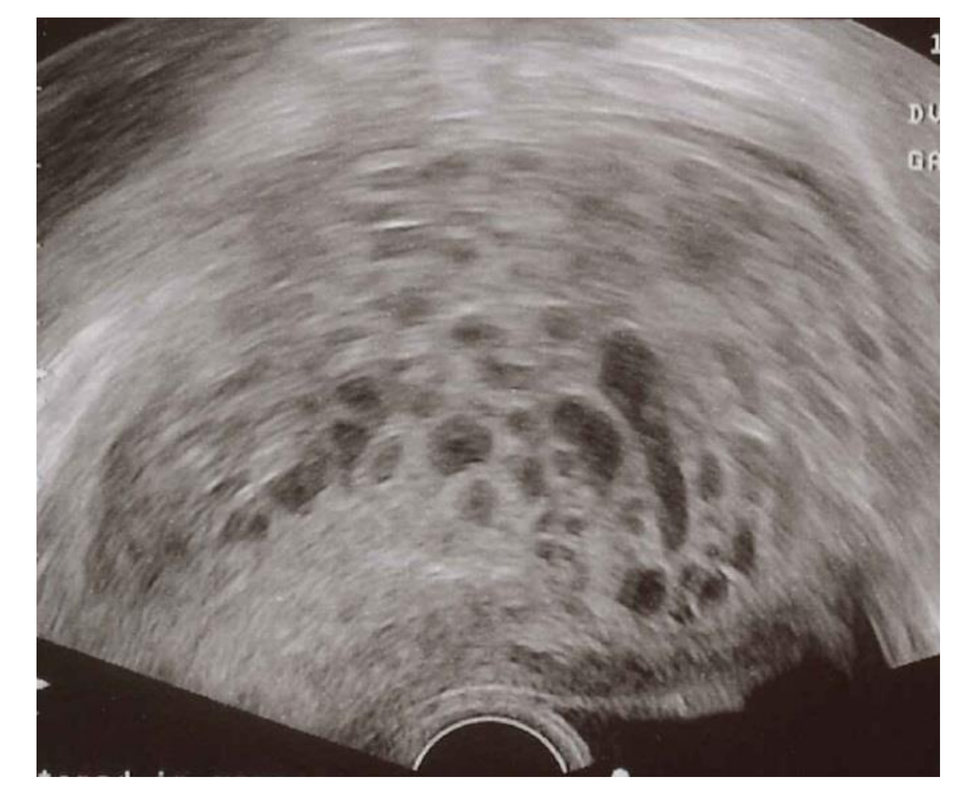
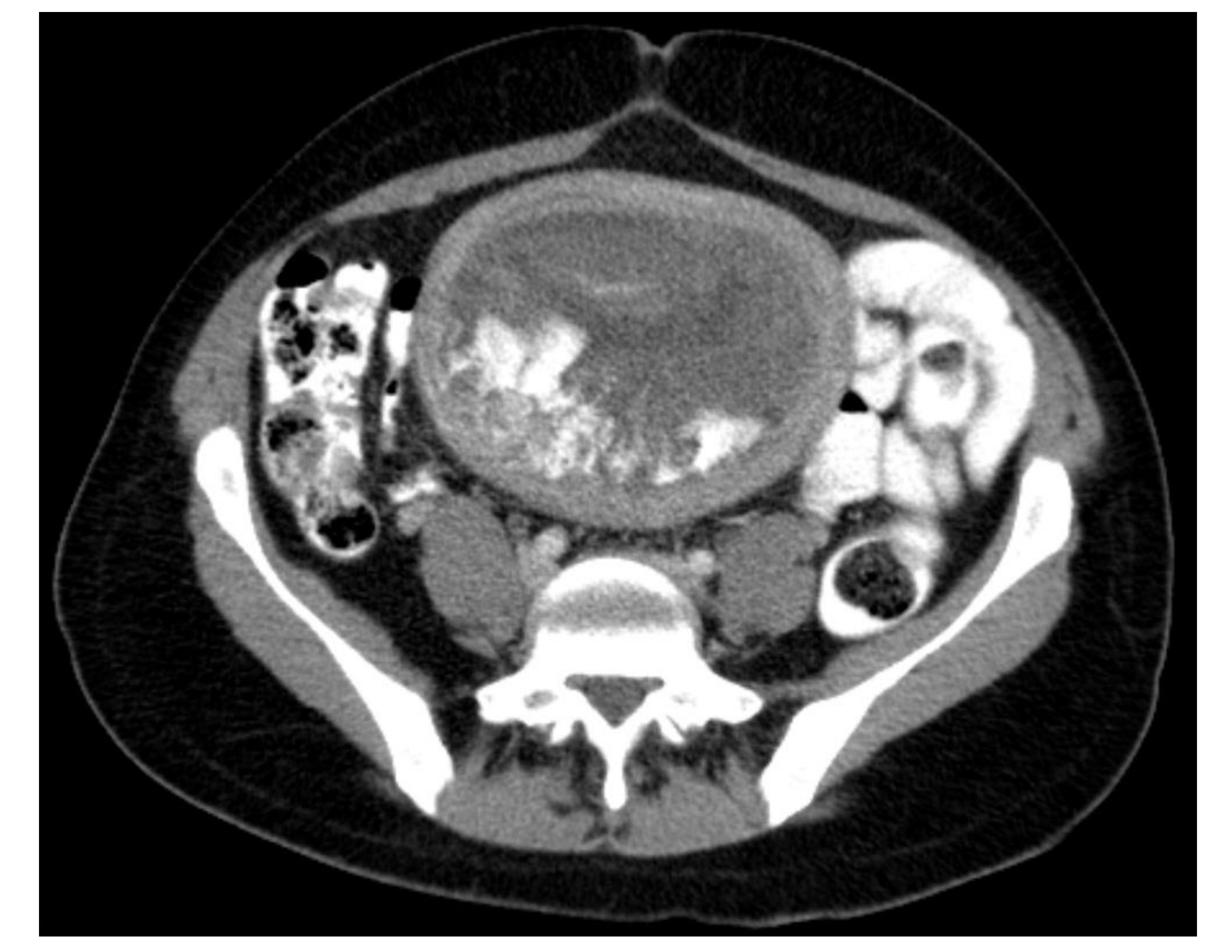
MOLAR PREGNANCY (HYDATIFORM MOLES)

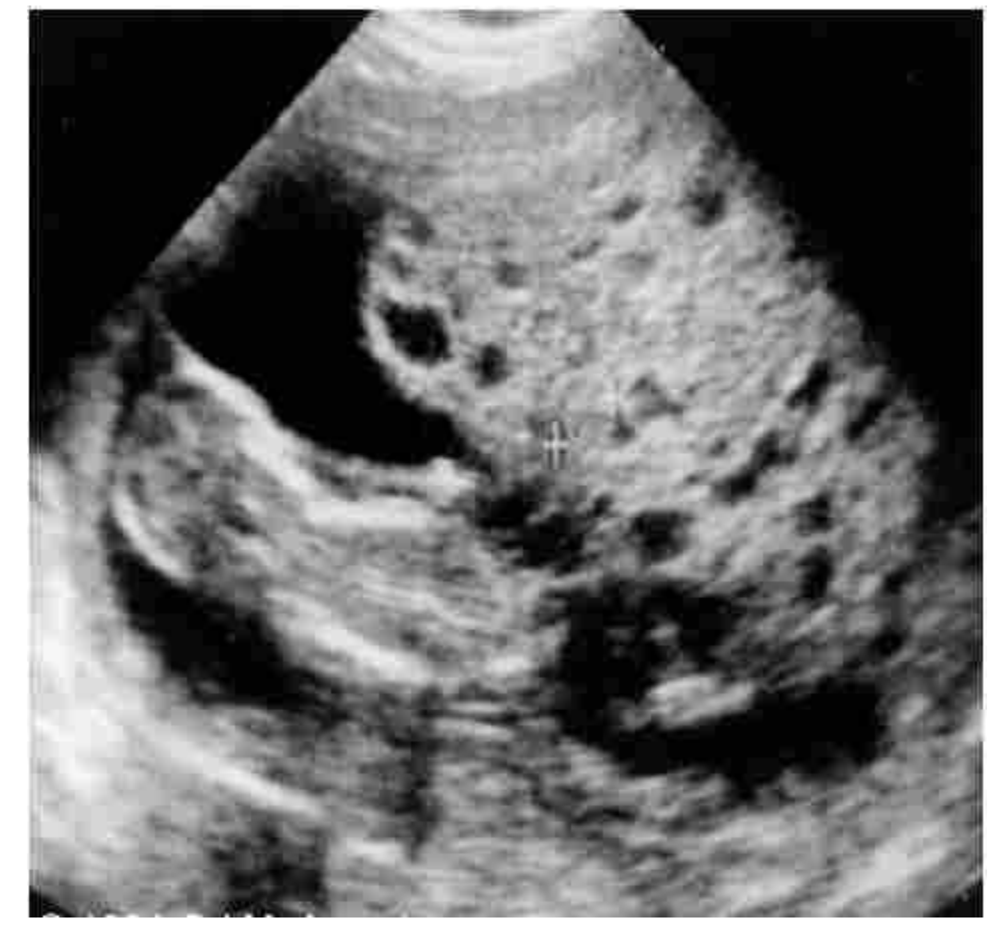
- Abnormal form of pregnancy in which a non-viable fertilized egg implants in the uterus and will fail to come to term.
- A molar pregnancy is a gestational trophoblastic disease which grows into a mass in the uterus that has swollen chorionic villi. These villi grow in clusters that resemble grapes



- Complete hydatidiform moles have a 2–4% risk of developing into choriocarcinoma
- Molar pregnancies usually present with painless vaginal bleeding in the fourth to fifth months of pregnancy.
- The uterus may be larger than expected, or the ovaries may be enlarged.
- There may also be hyperemesis.



- Sometimes there is an increase in blood pressure along with protein in the urine.
- Blood tests will show very high levels of human chorionic gonadotropin (hCG).
- On ultrasound, the mole resembles a bunch of grapes ("cluster of grapes" or "honeycombed uterus" or "snow-storm“
- Treatment: D&C in order to avoid the risks of choriocarcinoma.



- A 39 y/o pregnant patient of her last trimester c/o headache, and swelling of her face, hands, and feet. BP 160/100. BUN=15, Creat=1.1, Urine protein is 3+ on dipstick. What will not be part of the treatment for this patient?
- a. Magnesium drip
- b. Labetalol
- c. Enalapril
- d. C-section
- e. Hydralazine

MEDICAL COMPLICATIONS OF PREGNANCY

- Hypertensive Disorders
- Supine Hypotensive Syndrome
- Gestational Diabetes

HYPERTENSIVE DISORDERS

- Pre-eclampsia and Eclampsia
- Chronic Hypertension
- Chronic Hypertension Superimposed with Preeclampsia
- Transient Hypertension

PREGNANCY AND HTN

- PIH (pregnancy induced HTN)
- Pre-eclampsia
  - HTN after 20 wk EGA with generalized edema or proteinuria
- Eclampsia
  - Pre-eclampsia plus grand mal seizures or coma

PREGNANCY AND HTN

- Decreased BP slowly with hydralazine, Ca channel blocker, or propranolol (do not use ACEI's)
- $MgSO_4$ to prevent or treat seizures
- Definitive treatment for pre-eclampsia and eclampsia is delivery

SUPINE HYPOTENSIVE SYNDROME

- Treat by placing patient in the left lateral recumbent position, or elevate right hip
- Monitor fetal heart tones and maternal vital signs
- If volume is depleted, initiate an IV of normal saline

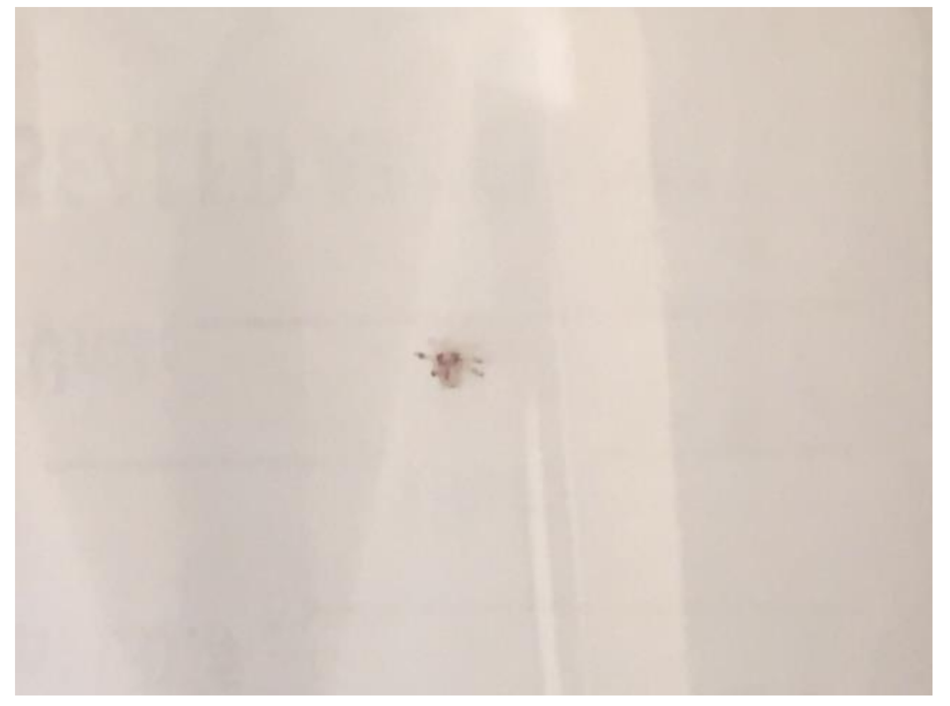
GESTATIONAL DIABETES

- Consider hypoglycemia when encountering a pregnant patient with altered mental status
- Signs include diaphoresis and tachycardia
- If blood glucose is below 60 mg/dl, draw a red top tube of blood, start IV-NS, give 25 grams of D50
- If blood glucose is above 200 mg/dl, draw a red top tube of blood, administer 1–2 liters NS by IV per protocol

HELLP SYNDROME

- Hemolysis
- Elevated
- Liver enzymes
- Low
- Platelets

- A young woman has vaginal itching with a small amount of a white vaginal discharge. On examination, patient has some cervical motion tenderness. Thinking on the most common reasons for STD'd, what will be the best treatment?
- a. Ceftriaxone and azithromycin
- b. Metronidazole 2 gms PO
- c. Clindamycin and gentamicin
- d. Monistat vaginal cream



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PID

- Physical examination
  - Discharge with gram negative intracellular diplococci, leukocytosis
  - Adnexal tenderness
  - Cervical and uterine tenderness
  - Abdominal tenderness

BACTERIAL VAGINOSIS

ELEVATED PH

DO YOU SMELL THAT, WATSON?

CLUE CELLS

CAUSED BY GARDNERELLA VAGINALIS

CANDIDIASIS

CONDITIONS THAT PROMOTE C. ALBICANS INFECTION INCLUDE: SYSTEMIC ANTIBIOTICS, DIABETES, PREGNANCY, AND BIRTH CONTROL PILLS

NORMAL PH

YEAST BUDS AND PSEUDOHYPHAE

TRICHOMONIASIS

MOTILE, PEAR-SHAPED, FLAGELLATED TRICHOMONADS

ELEVATED PH

HELP.

STRAWBERRY CERVIX

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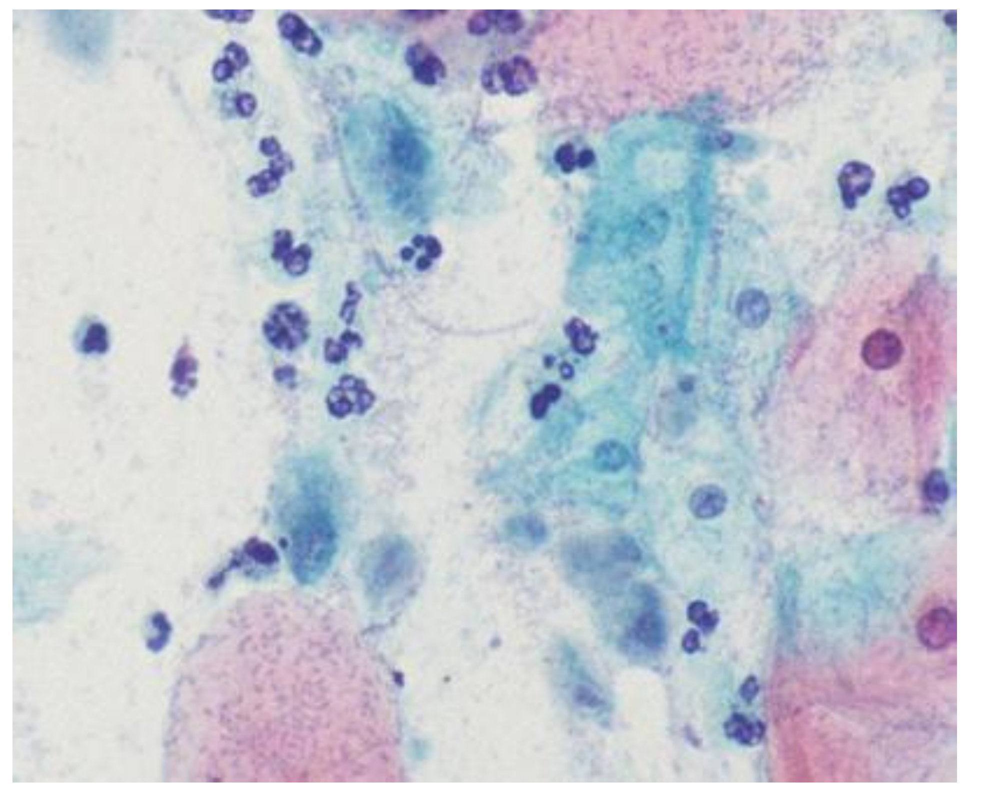
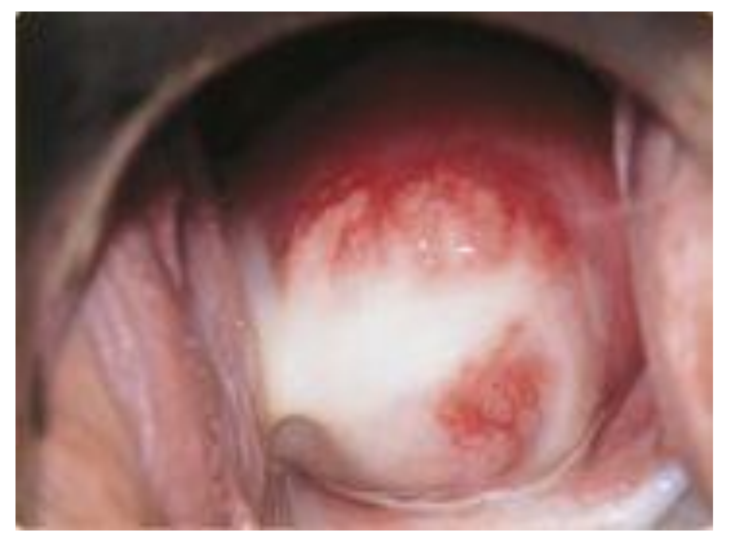
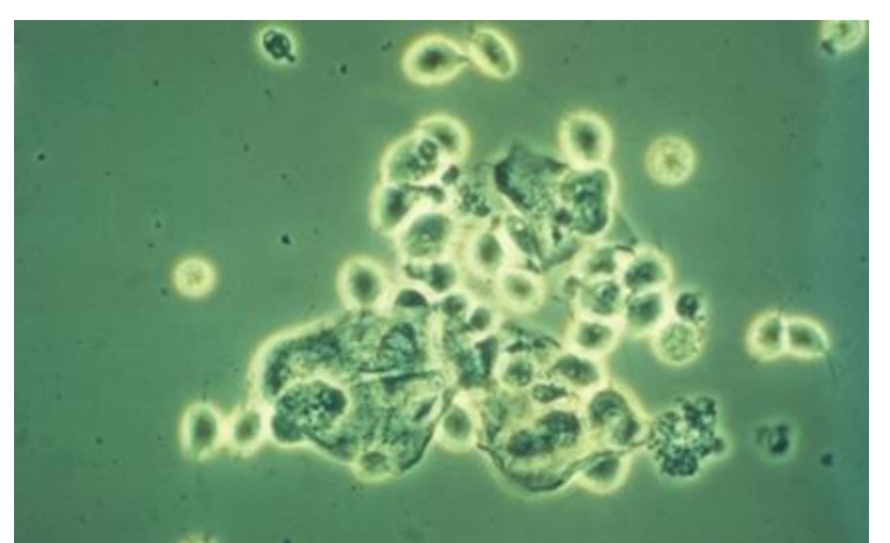


CLUE CELLS:

Gardenella

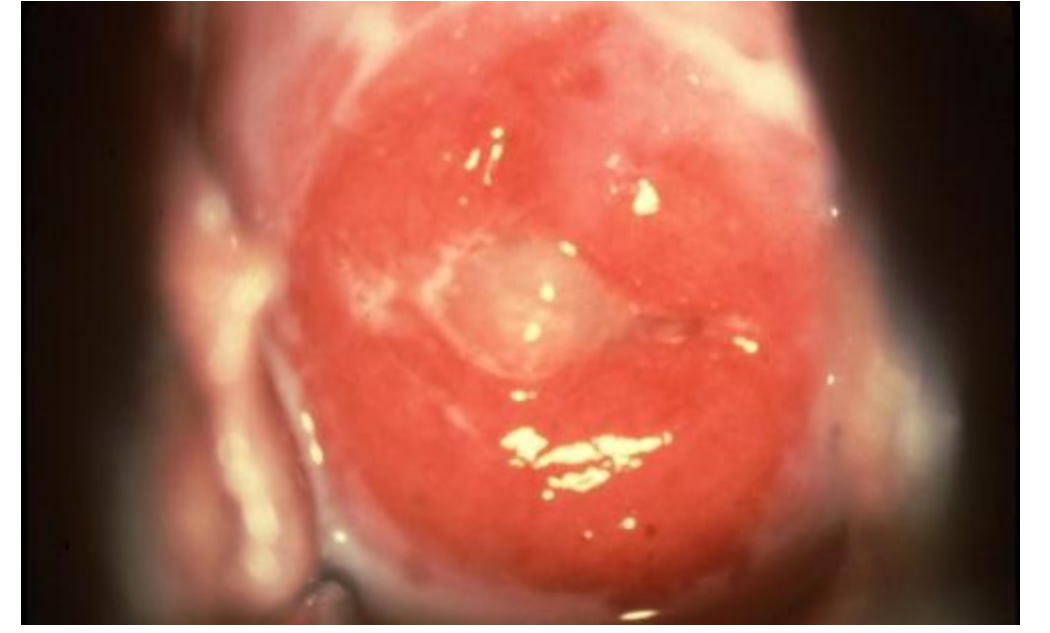


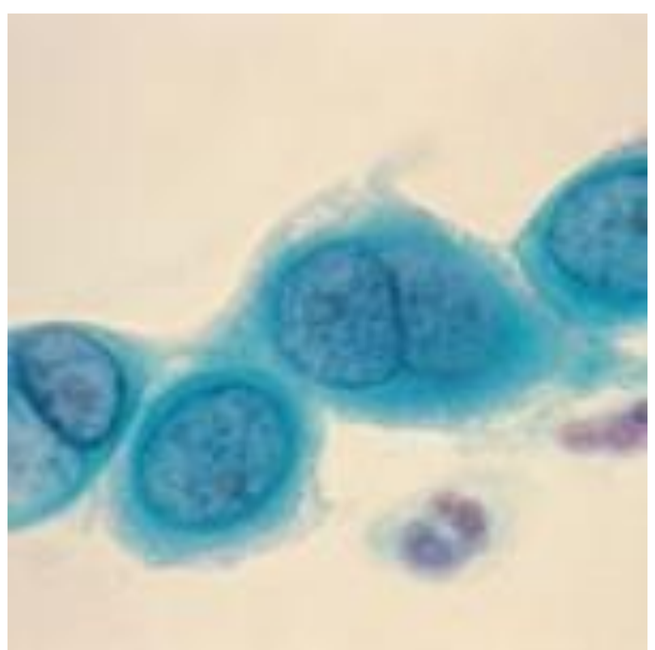


TRICHOMONAS

GRAM NEGATIVE DIPLOCOCCI:

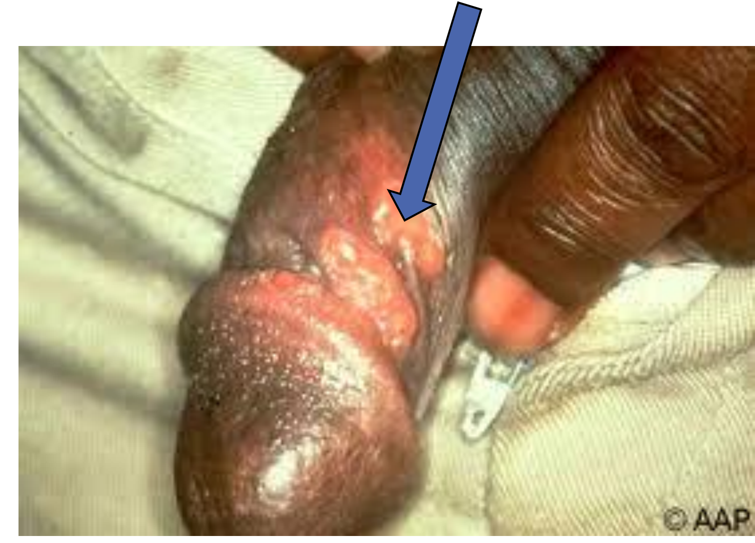
Gonorrhea

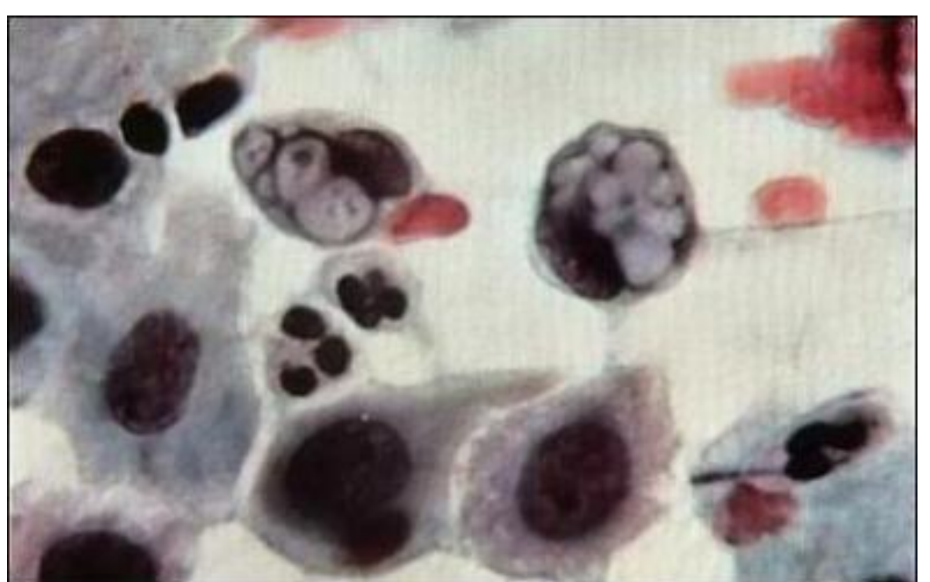




CHLAMYDIA

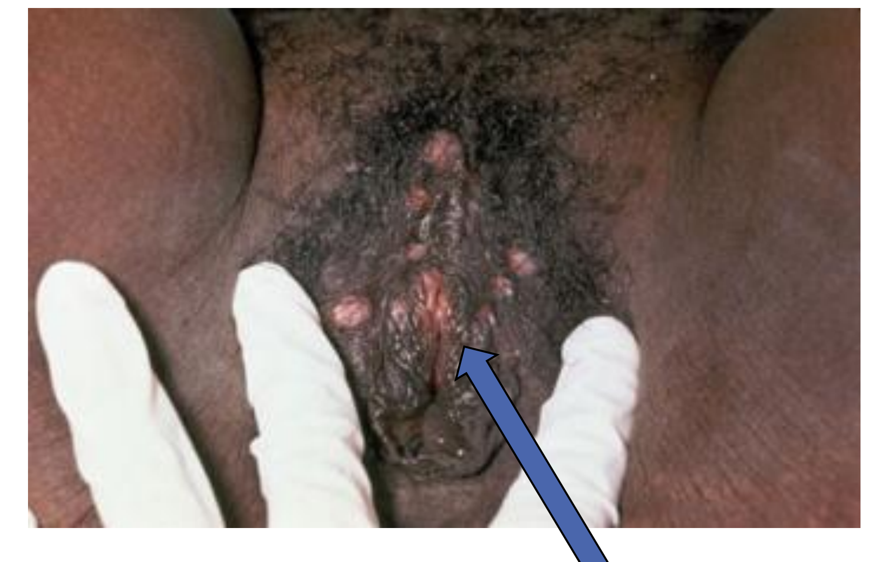
painful

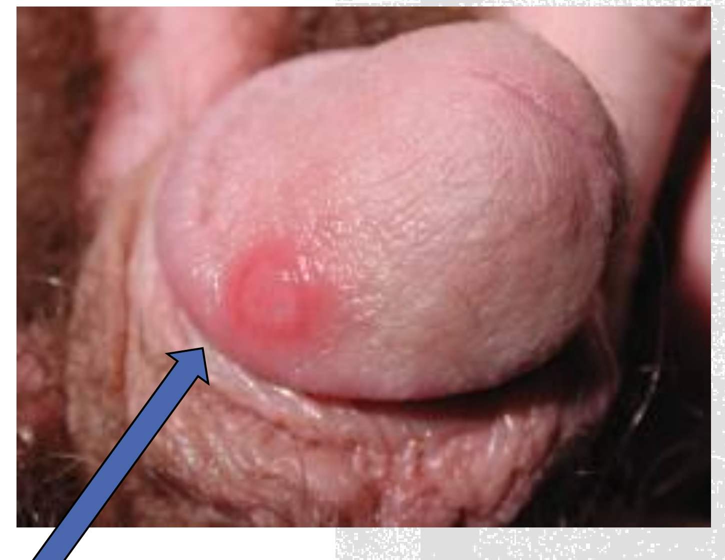




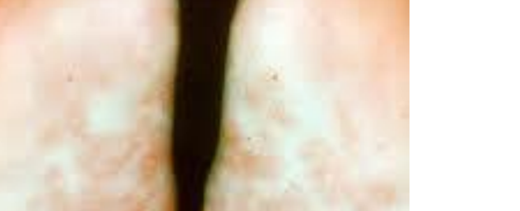
CHANCROID:

H. ducreii





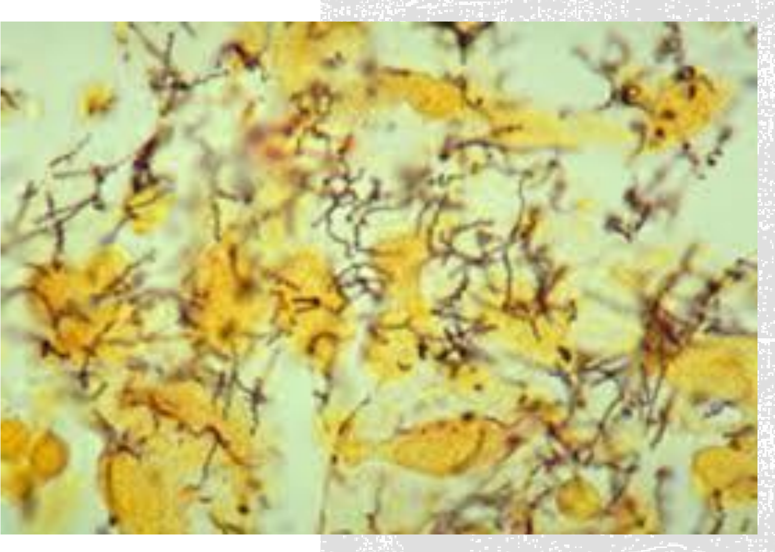
No painful



secondary

CHANCRE:

Syphilis



Herpes

PAINFUL VESICLES:

CALYMMATOBACTERIUM GRANULOMATIS

STD'S

- Clue cells: Gardenella
  - Metronidazole
- *Trichomonas*
  - Foul smelling, fishy odor; strawberry cervix
  - Metronidazole
- Gram negative diplococci: *Gonorrhea*
  - Ceftriaxone, quinolone
- *Chlamydia* most common STD's in male and females
  - Azithromycin, doxycycline

STD'S

- Chancre: *Syphilis*
  - PCN
- Candidiasis
  - Fluconazole, creams
- Genital warts: HPV
  - resection
- Painful vesicles: herpes
  - acyclovir
- Chancroid: *H. ducreii*
  - Ceftriaxone, quinolone, azithromycin

PID

- Admission
  - Pregnant
  - Fever
  - N/V
  - TOA
  - Peritoneal signs
  - IUD's

PID

- Rocephin
- Quinolones
- Zithromax
- Doxycycline
- Flagyl