Approach to Abdominal Pain

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Overview

- Approach to abdominal pain
- Acute Appendicitis
- Intestinal Obstruction
- Acute Cholecystitis and Biliary Pain
- Acute Pancreatitis
- Abdominal Aortic Aneurysm
- Mesenteric Ischemia
- Inflammatory Bowel Disease
- Diverticulitis

High Yield Questions

1. Age?
   - Increased age = higher risk

2. Which came first the pain or the vomiting?
   - Pain first = usually surgical cause

3. How long did you have the pain?
   - Acute VS Chronic

4. Surgical history?
   - Previously opened abdomens are more likely to have surgical problems

5. Is the pain intermittent or constant?
   - Constant pain is worse

High Yield Questions

7. Do you have any PHx of immunocompromise, pancreatitis, diverticulitis, renal failure, cancer or IBD?
   - PHx of any of those suggest serious cause

8. Pregnancy?
   - Child bearing age —> ectopic pregnancy should be considered

9. Recent antibiotics or steroids?
   - Abx and steroid use may mask serious conditions

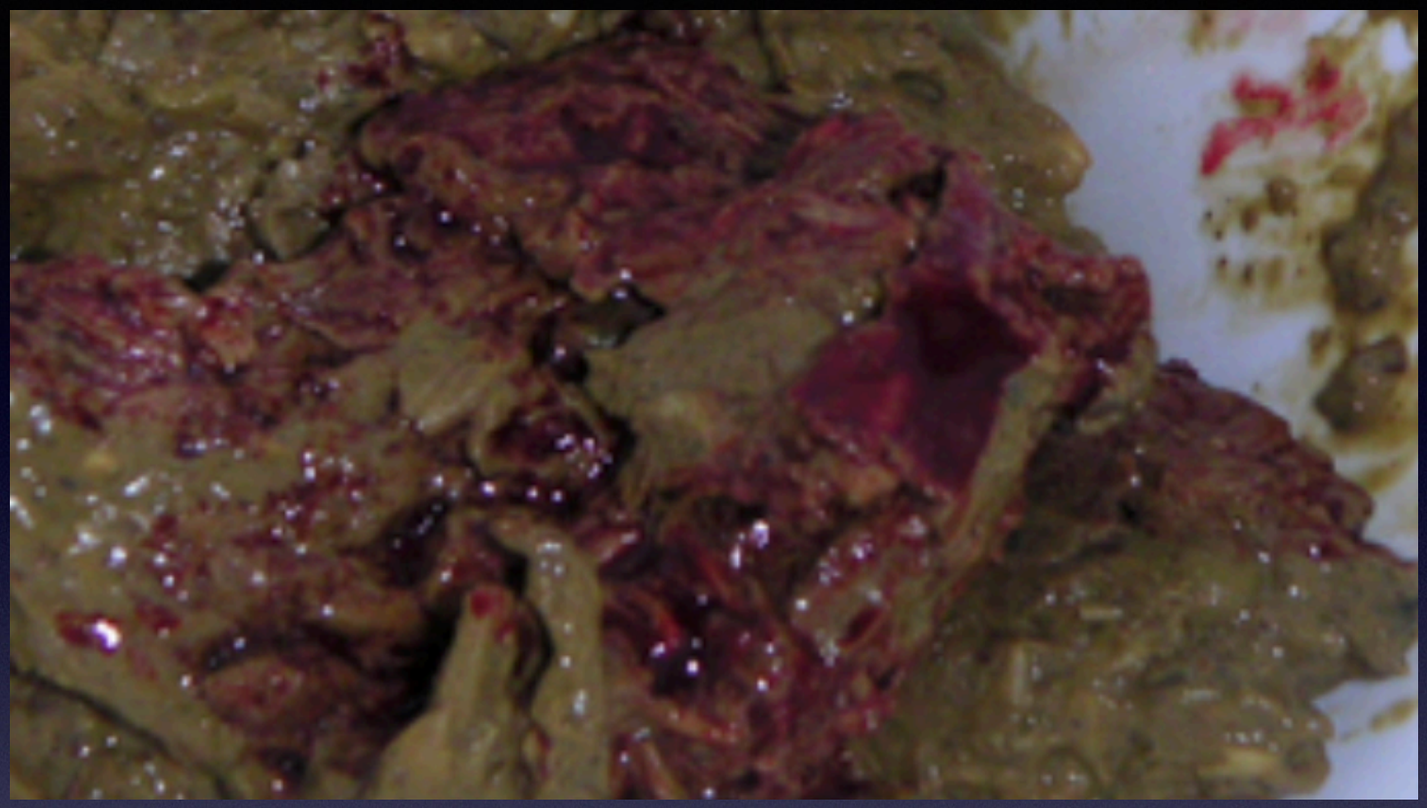
10. PHx of heart disease, vascular disease , or AF?
    - Positive PHx suggests Mesenteric Ischemia

GI habit and Vomiting

- Habit
  - Change in bowel habit
    - Amount
    - Frequency
    - Consistency
    - Abnormal stools

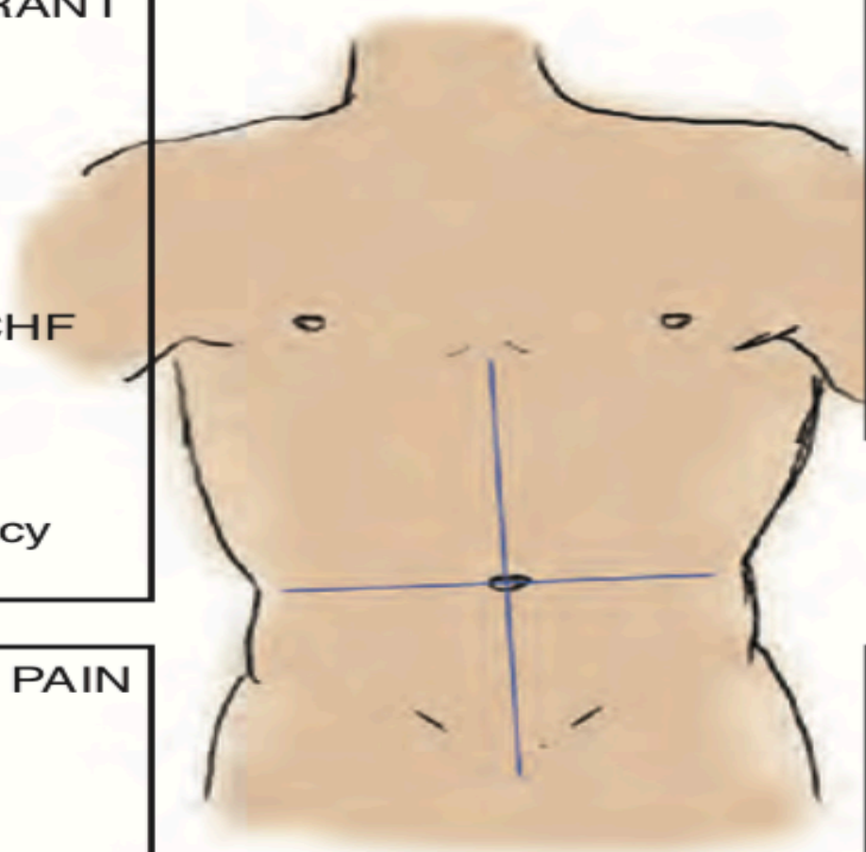
- Vomiting
  - Amount
  - Color
  - Contents
  - Character

Abnormal Stool



DIFFUSE PAIN
Peritonitis
Pancreatitis
Sickle cell crisis
Early appendicitis
Mesenteric thrombosis
Gastroenteritis
Dissecting or ruptured aneurysm
Intestinal obstruction
Diabetes mellitis
Inflammatory bowel disease
Irritable bowel

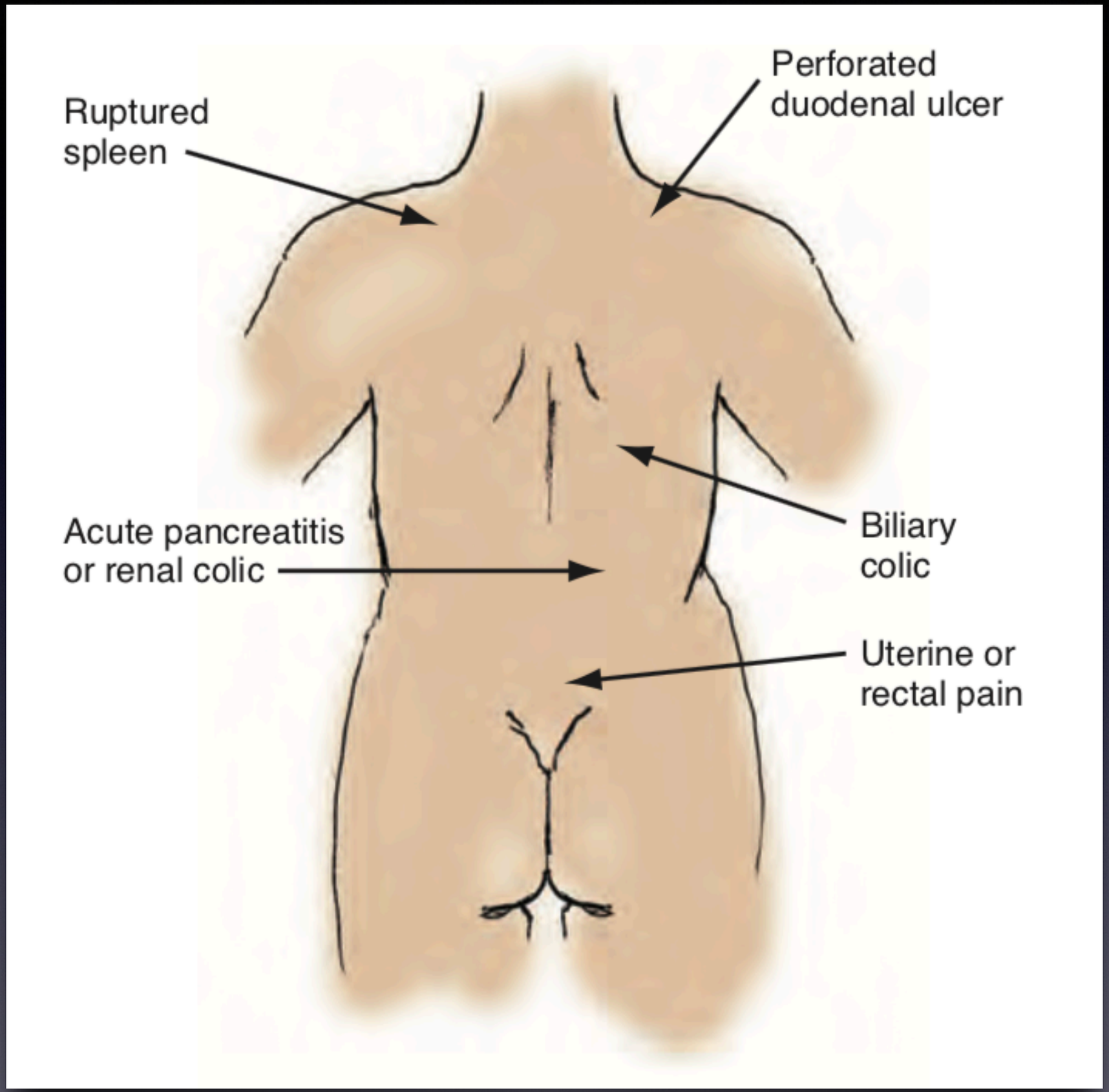
RIGHT UPPER QUADRANT PAIN
Biliary colic
Cholecystitis
Gastritis
GERD
Hepatic abscess
Acute hepatitis
Hepatomegaly due to CHF
Perforated ulcer
Pancreatitis
Retrocecal appendicitis
Myocardial ischemia
Appendicitis in pregnancy
RLL pneumonia



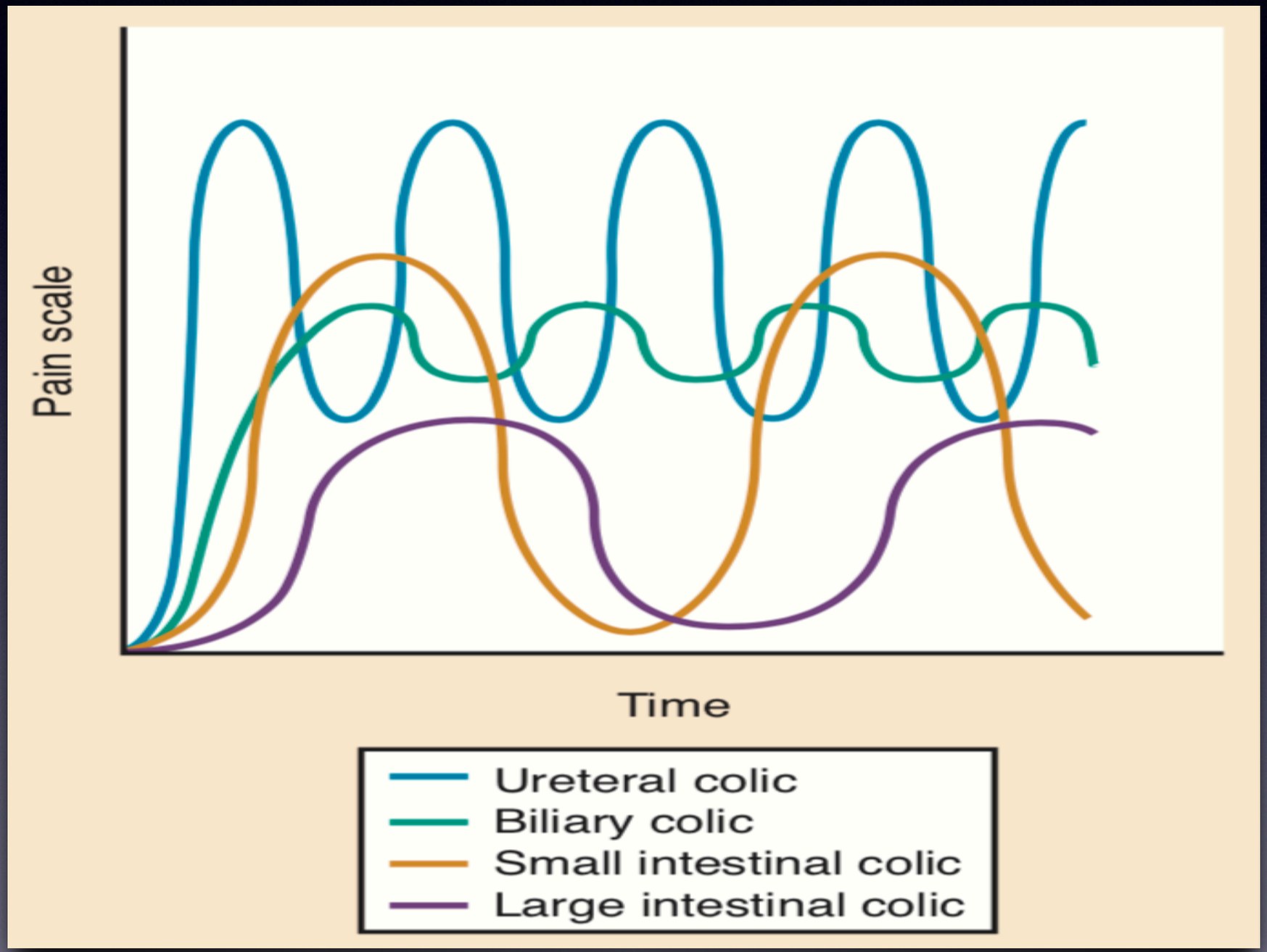
LEFT UPPER QUADRANT PAIN
Gastritis
Pancreatitis
GERD
Splenic pathology
Myocardial ischemia
Pericarditis
Myocarditis
LLL pneumonia
Pleural effusion

RIGHT LOWER QUADRANT PAIN
Appendicitis
Meckel's diverticulitis
Cecal diverticulitis
Aortic aneurysm
Ectopic pregnancy
Ovarian cyst
Pelvic inflammatory disease
Endometriosis
Ureteral calculi
Psoas abcess
Mesenteric adenitis
Incarcerated/strangulated hernia
Ovarian torsion
Tubo-ovarian abscess
Urinary tract infection

LEFT LOWER QUADRANT PAIN
Aortic aneurysm
Sigmoid diverticulitis
Incarcerated/strangulated hernia
Ectopic pregnancy
Ovarian torsion
Mittelschmerz
Ovarian cyst
Pelvic inflammatory disease
Endometriosis
Tubo-ovarian abscess
Ureteral calculi
Psoas abscess
Urinary tract infection


Ruptured spleen
Perforated duodenal ulcer
Acute pancreatitis or renal colic
Biliary colic
Uterine or rectal pain

The Pain progression



Extra-Abdominal Causes of Abdominal Pain

- ACS
- Pneumonia
- PE
- Pericarditis / Myocarditis
- Testicular Torsion
- DKA
- Glaucoma
- AKA
- Uremia
- SCD

- Black widow spider bite
- Snake bite
- Methanol toxicity
- Lead poisoning
- Hyperthyroidism
- SLE
- GAS Pharyngitis
- RMSF
- Lyme Disease
- Porphyria
- Anaphylactoid Purpura

Consider the life-threatening causes

- **Emergent**
  - AMI
  - Leaking AAA
  - Aortoenteric fistula
  - Acute Hemorrhagic Pancreatitis
  - Mesenteric Ischemia / Infarction
  - Splenic Rupture
  - Ectopic Pregnancy
- **Urgent**
  - Perforated Bowel
  - Volvulus
  - Ascending cholangitis
  - Strangulated hernia
  - Tubo-ovarian Abscess
  - Bowel Obstruction
  - Diverticulitis
  - Ovarian Torsion

Acute Appendicitis

Common findings in Acute Appy

Symptoms

- Abdominal Pain
- Anorexia
- Nausea and Vomiting
- Fever
- Chills
- Diarrhea

Signs

- Abdominal Tenderness
  - Periumbilical
  - RIF pain
- Rebound Tenderness
- Guarding
- Rigidity
- CMT
- Obturator sign
- Psoas sign
- Rovsing’s sign

Causes of Appendicitis

- Feacolith
- Mesenteric Lymphadenopathy
- Worms
- Granulomatous Disease
- Tumors
- Adhesions
- Diet (seeds)

Diagnosis

- Labs
  - CBC
  - Pregnancy test
  - UA
- Imaging
  - AXR
  - US
  - ***CT***

Mimics of Appendicitis

- Mesenteric Adenitis
- Yersinia Gastroenteritis
- PID
- Ectopic Pregnancy
- Ruptured Ovarian cyst
- Pyelonephritis
- Crohn’s Disease
- Black Widow spider bite

Management

- NPO
- Fluids
- Abx if suspected rupture
- Analgesia
- Early surgical consultation

Intestinal Obstruction

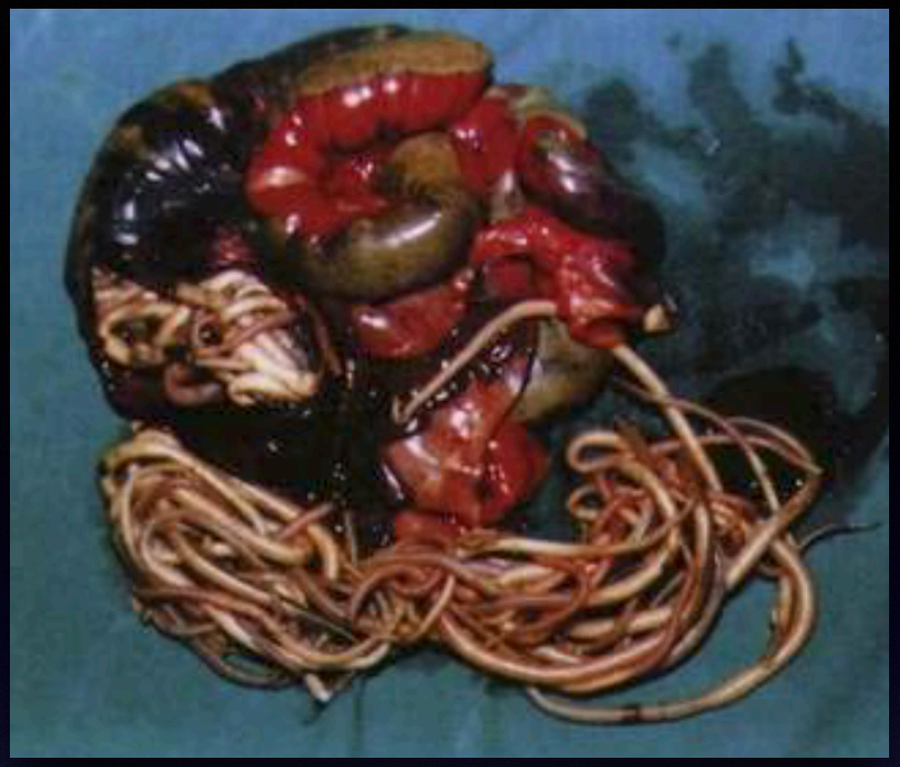
Causes of Bowel Obstruction

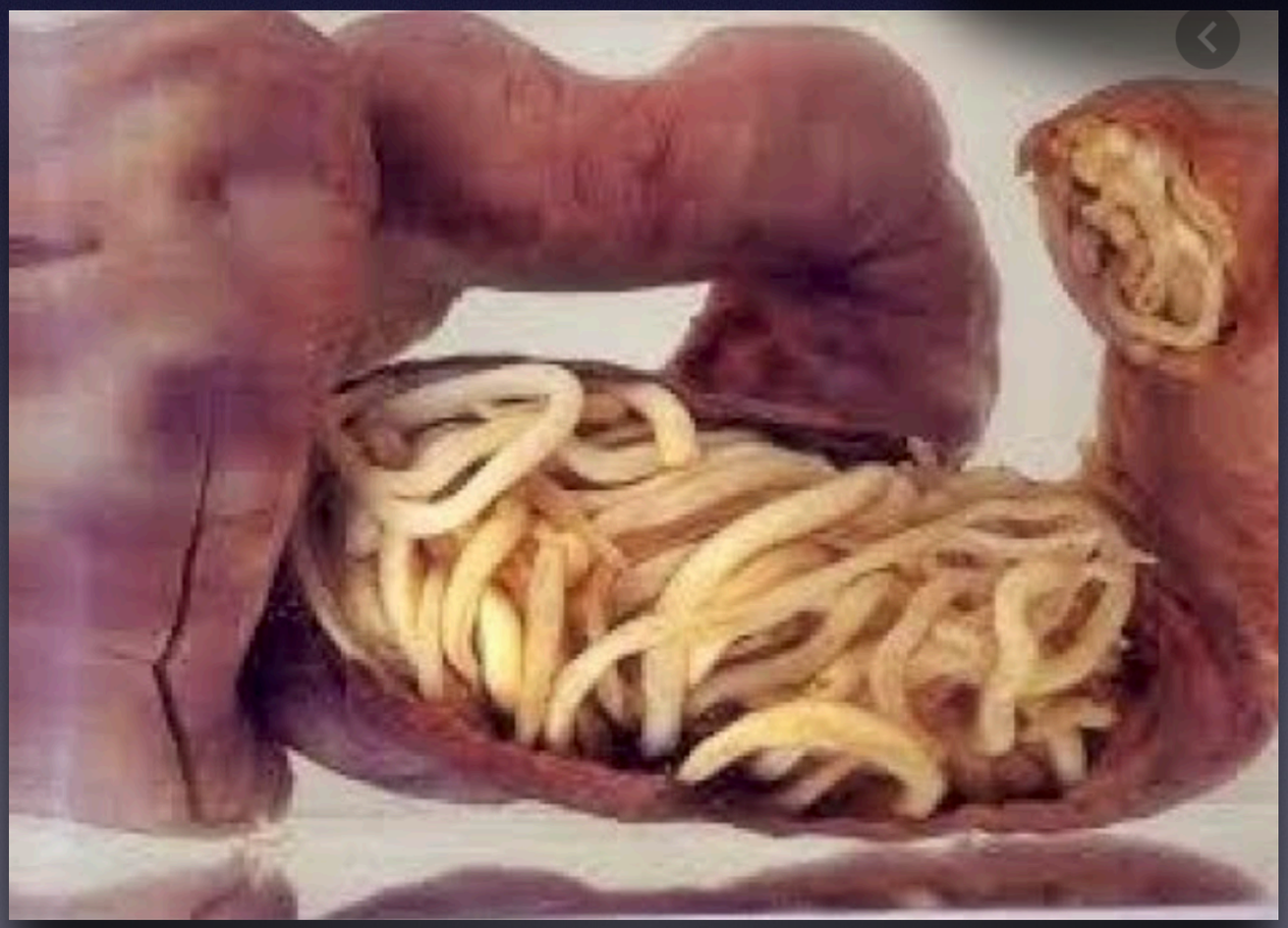
Small Bowel

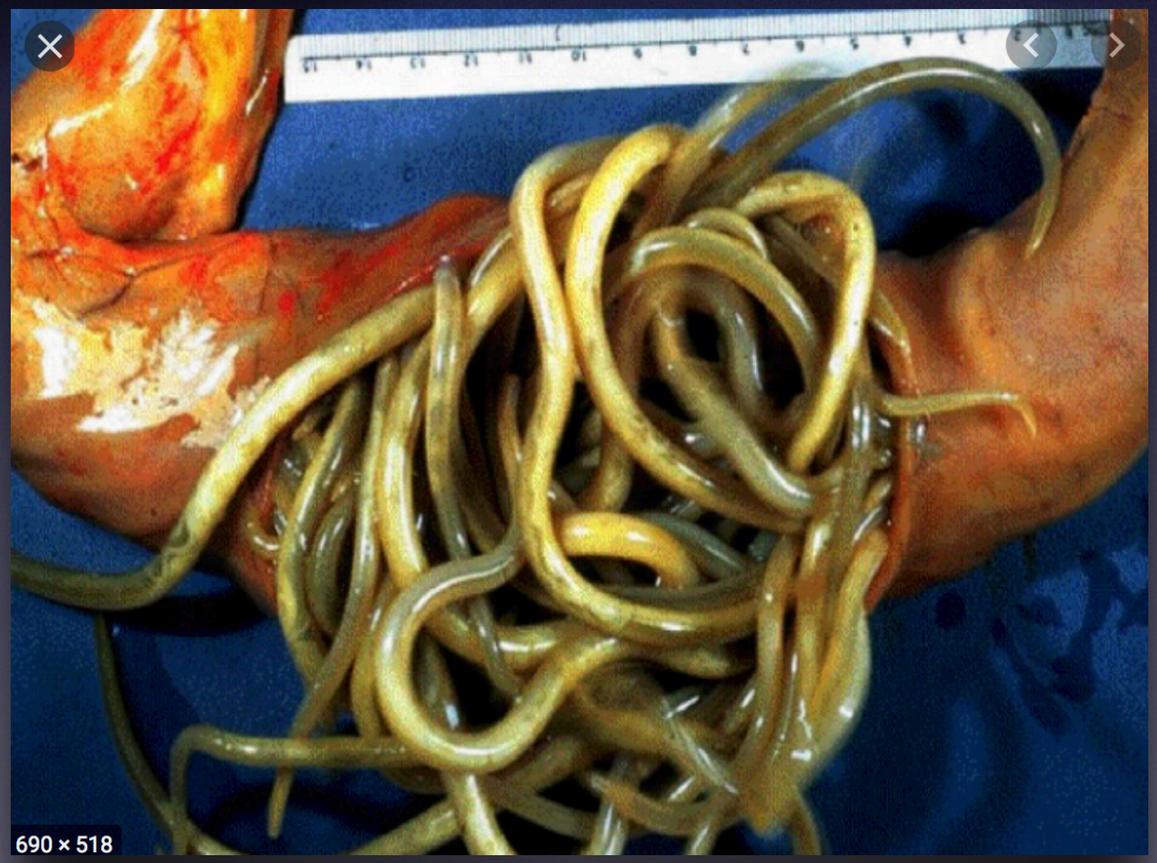
- Adhesions (MC)
- Hernia (2nd MC)
- Neoplasm
- Intussusception
- Gall stones
- Bezoars / Worms
- Crohn’s Disease
- Radiation enteritis
- FB ingestion

Large Bowel

- Tumor (most common)
  - Bowel tumor
  - External compression
- Crohn’s Disease
- Diverticulitis
- Volvulus
- Fecal Impaction
- Hernia







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SSx

- **Pain**
  - Crampy, intermittent, and poorly localized

- **Vomiting**
  - The more prominent , the more proximal the obstruction is
  - Bilious vomiting suggest and obstruction distal to the pylorus
  - Feculent vomiting suggests distal SBO or LBO that is long standing, probably with gangrenous bowel

- **Abdominal Distension**
  - The more the distension, the more distal the obstruction is
  - Obstipation vs. constipation

- **3rd Spacing**

Imaging

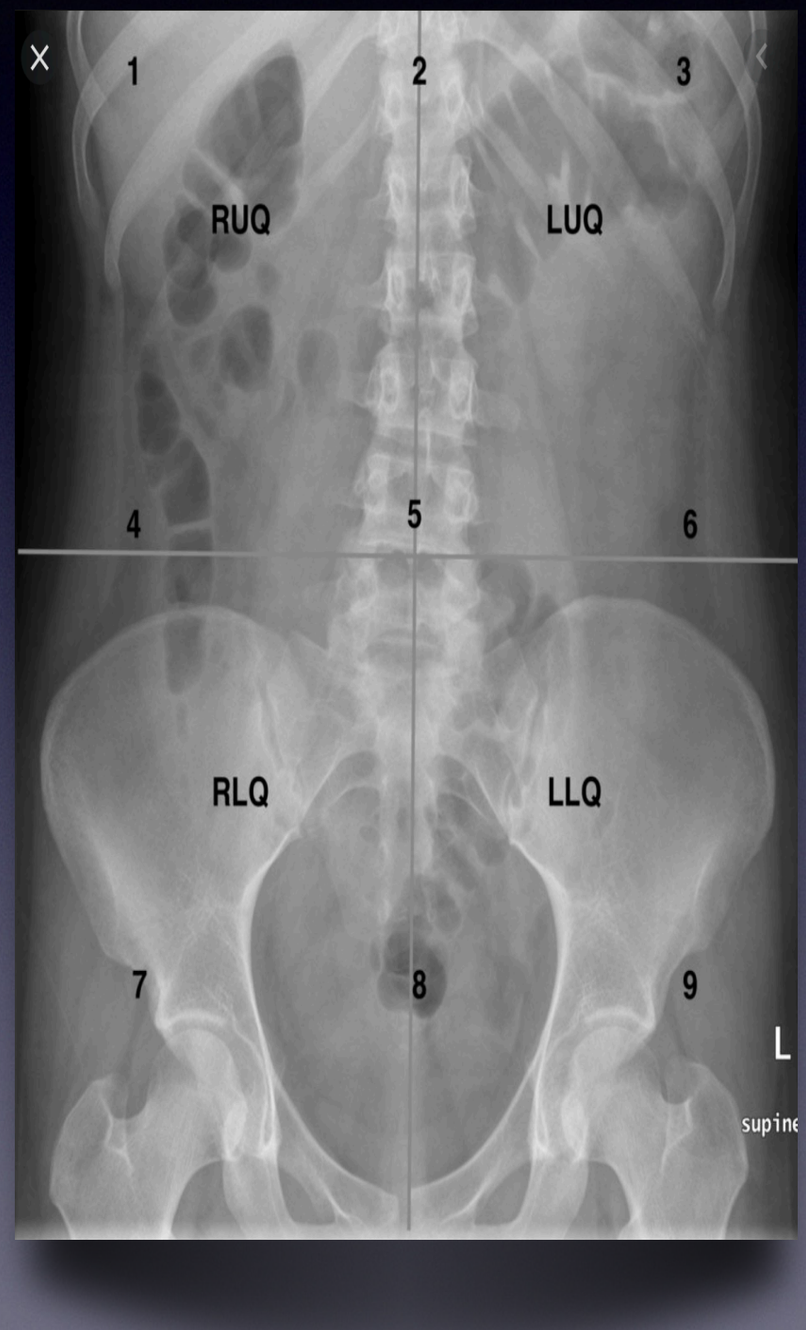
- Abdominal X ray (upright and supine)
  - Small bowel should not be seen on AXR
  - Colonic gas is usually distributed peripherally
  - Air fluid levels should not exceed 4

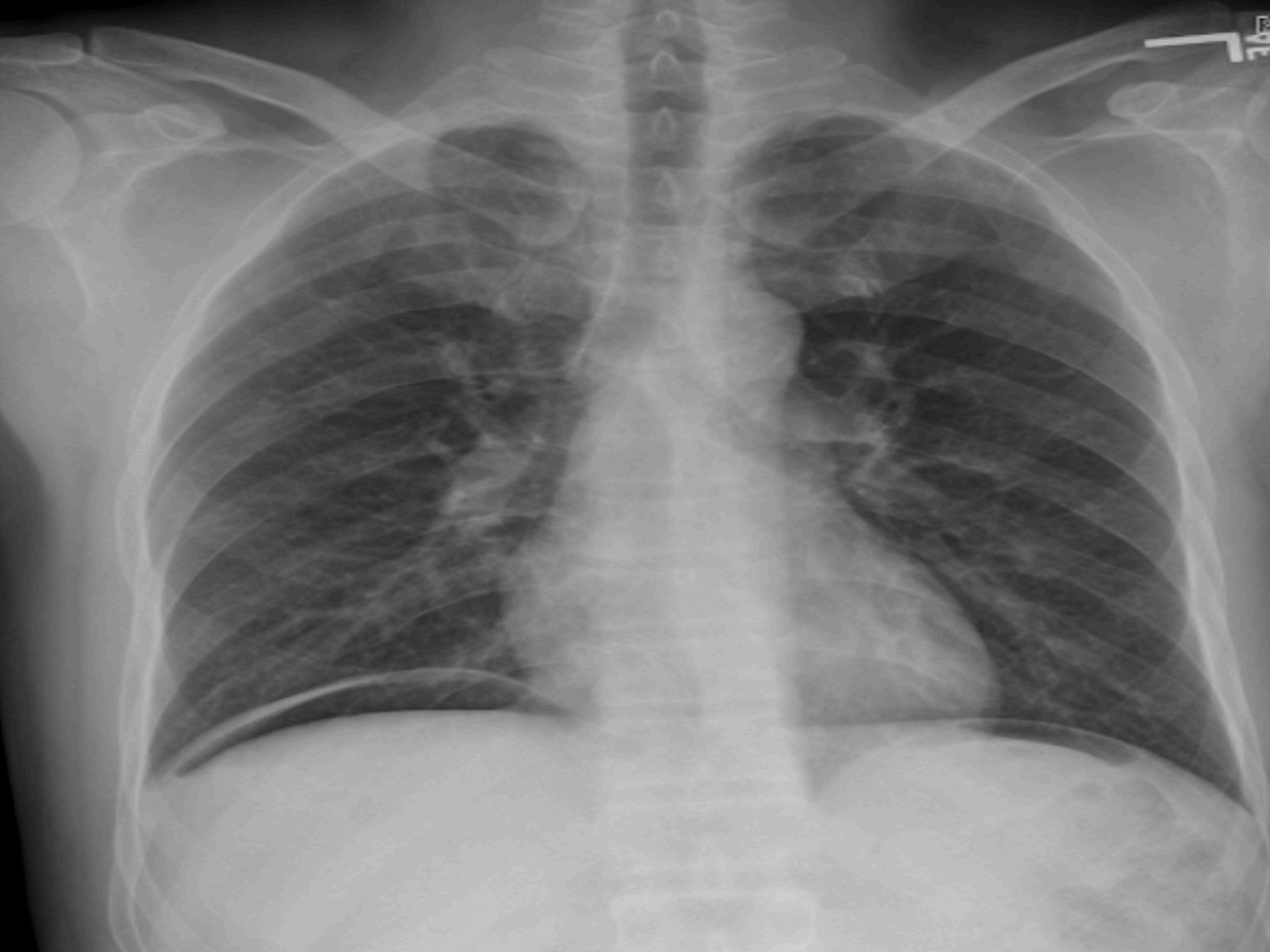
- US in intestinal obstruction is useless due to the distended bowel

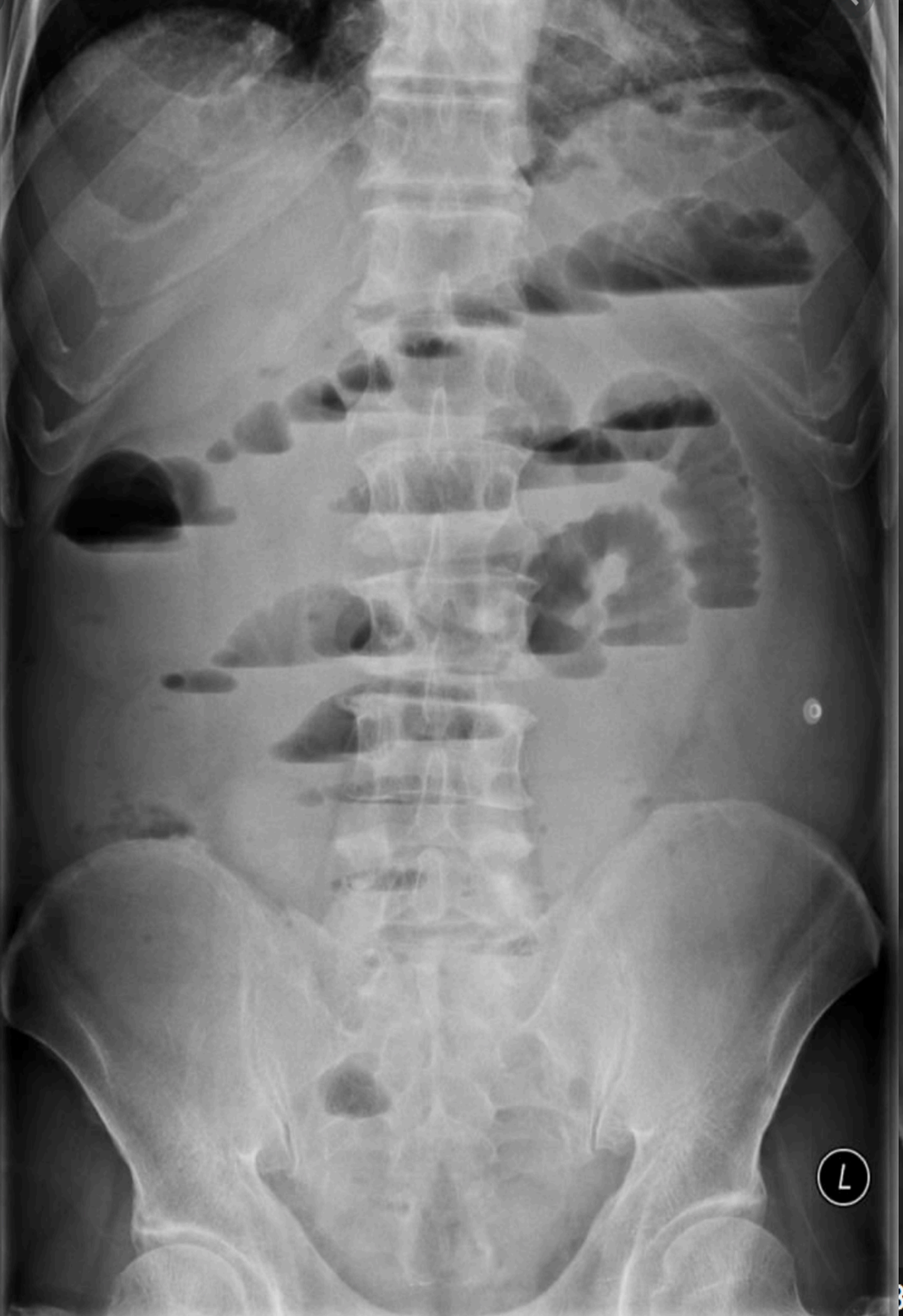
- CT is the best modality for diagnosing bowel obstruction

Abdominal X-rays

- Air distribution
  - Where air should be
  - Where air should not be
- Air-Fluid levels
- Differentiating Large from small bowel
- Constipation or G.E.
- Foreign Body



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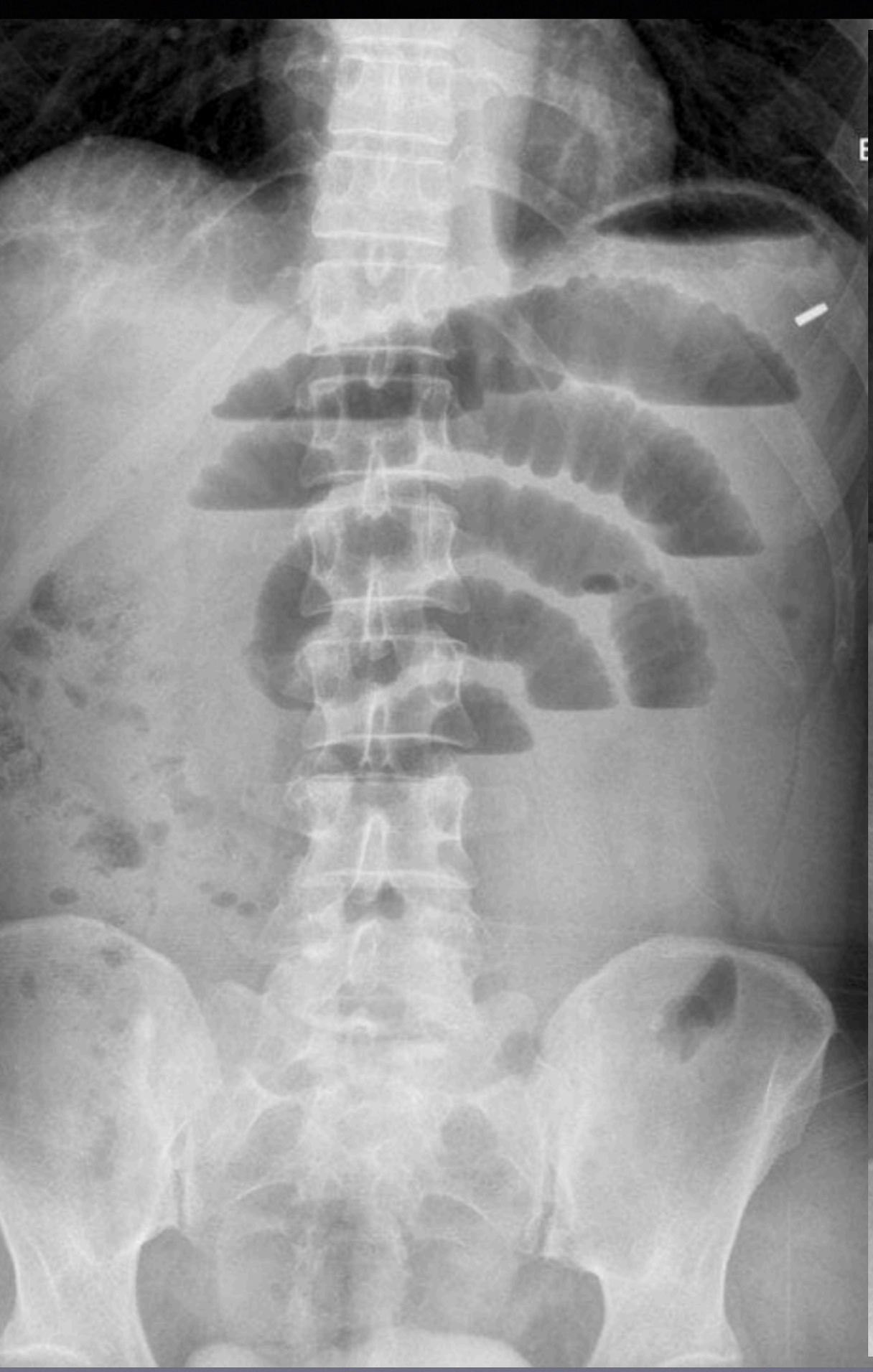
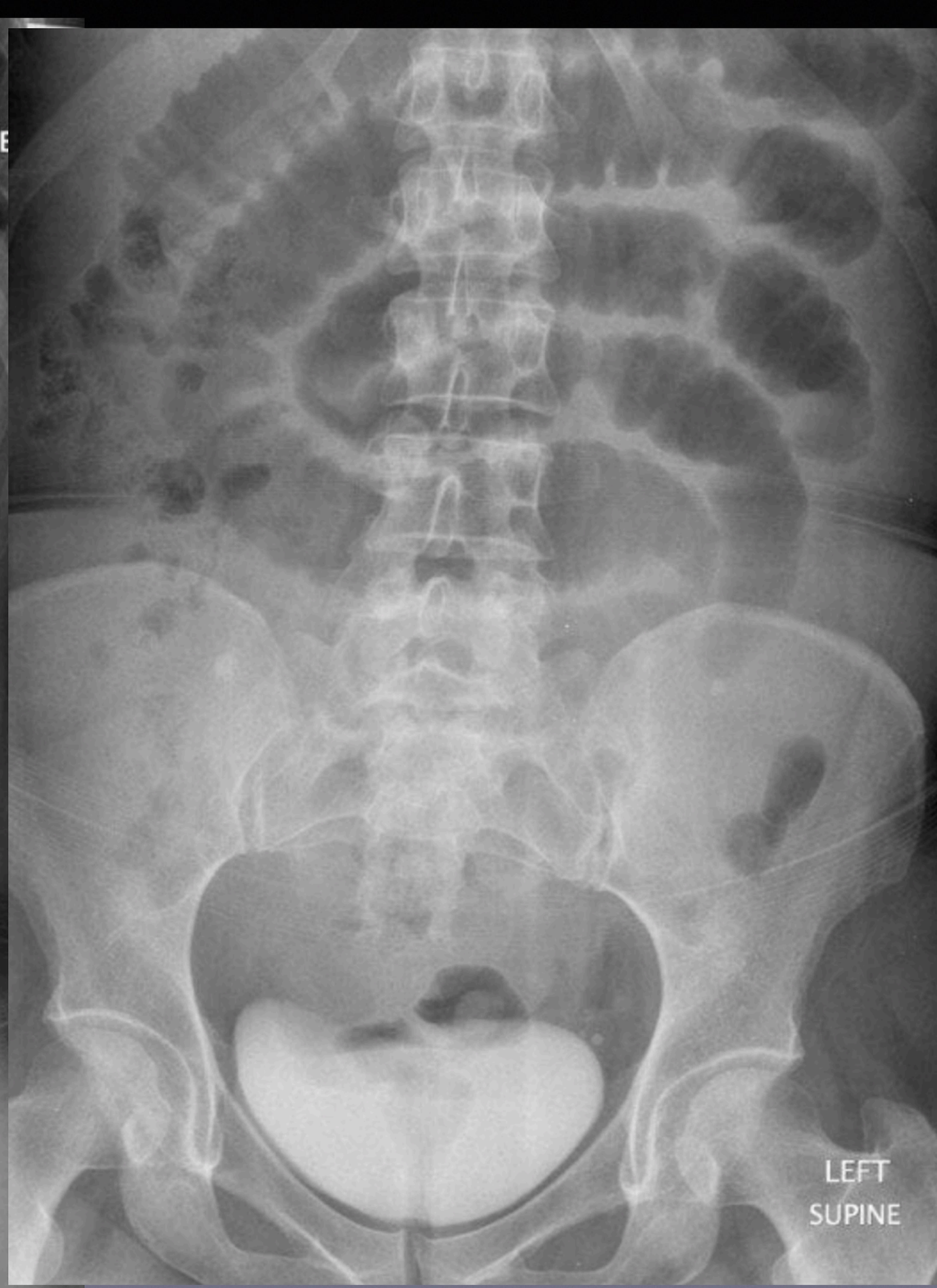
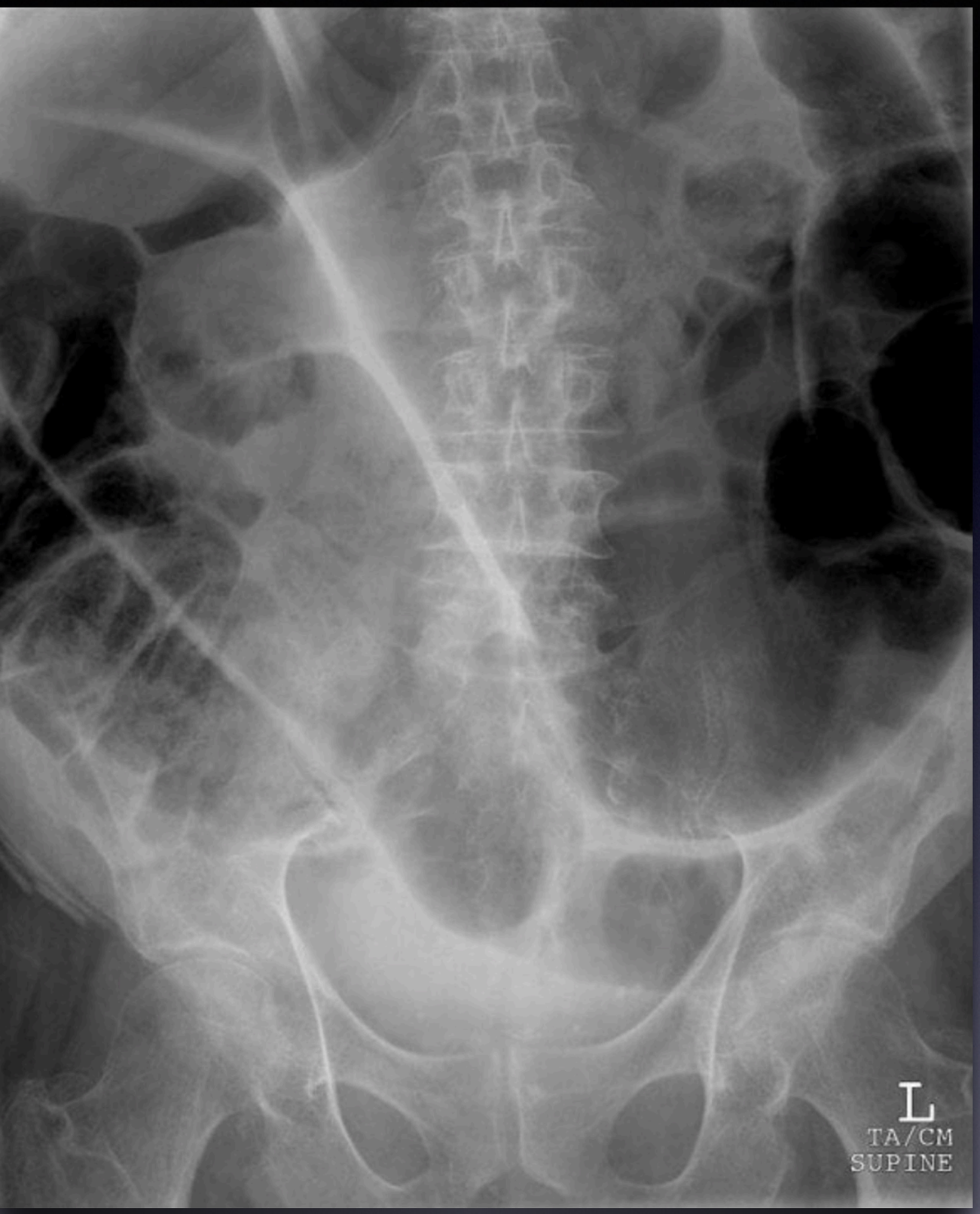
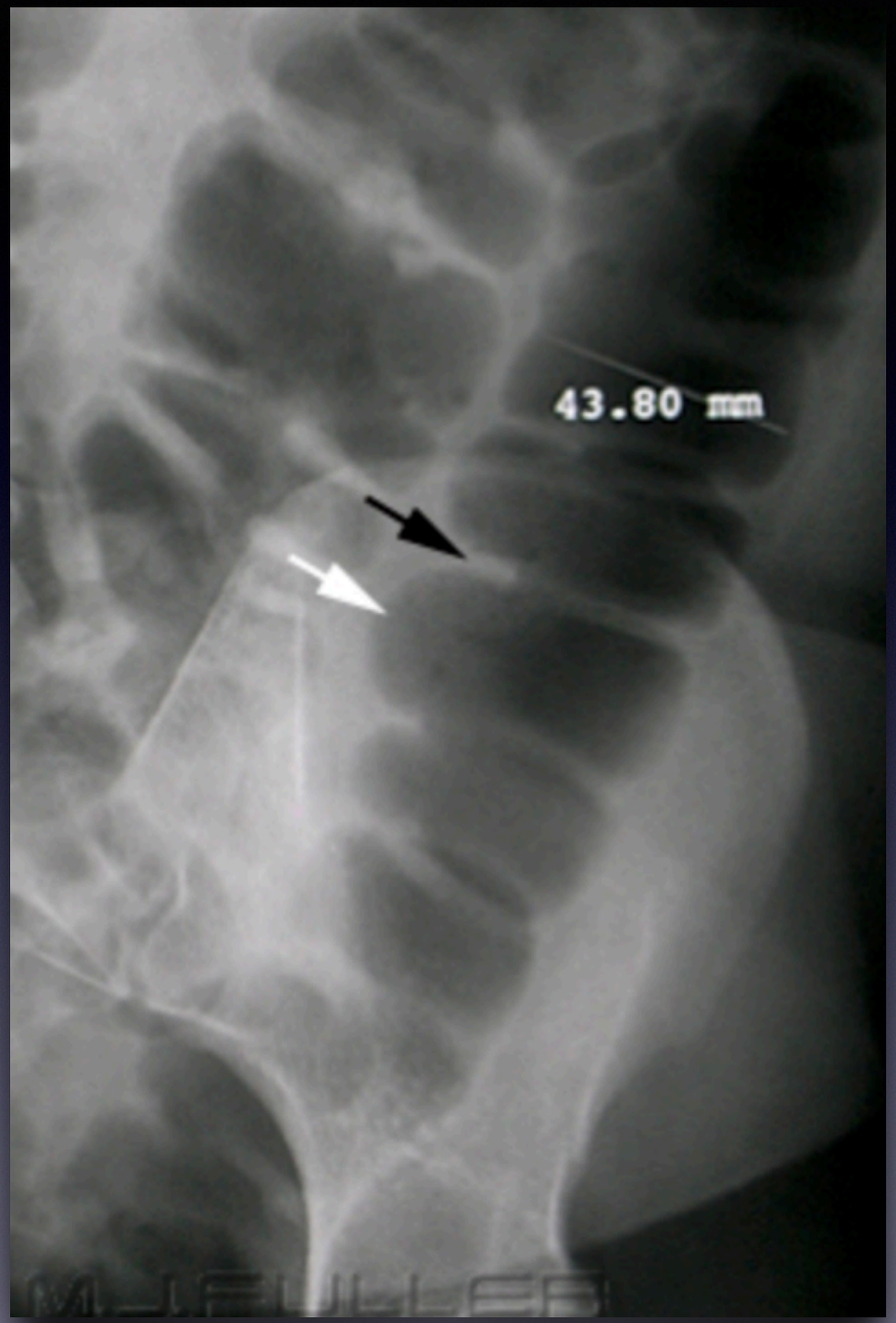



LEFT
SUPINE

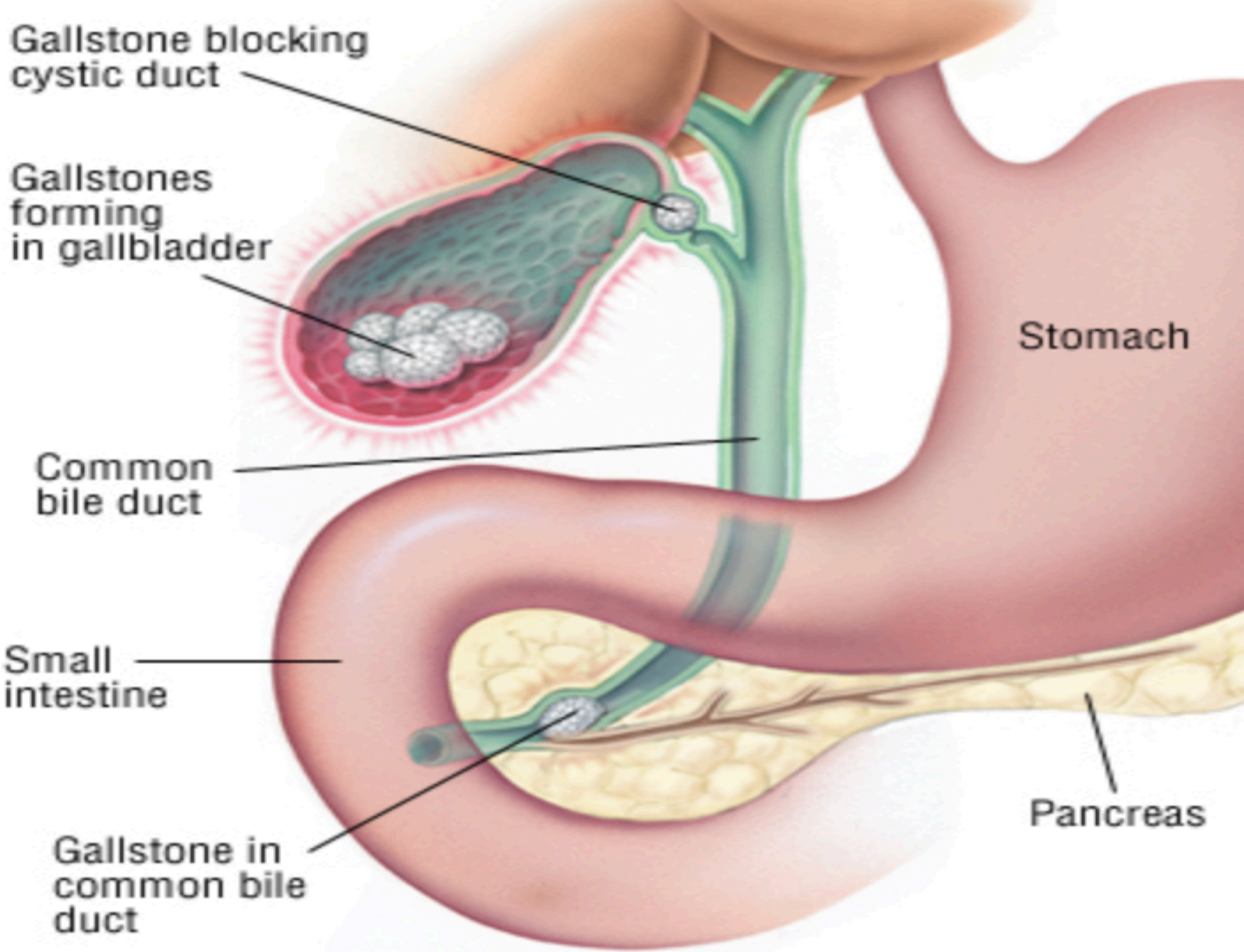

L
TA/CM
SUPINE

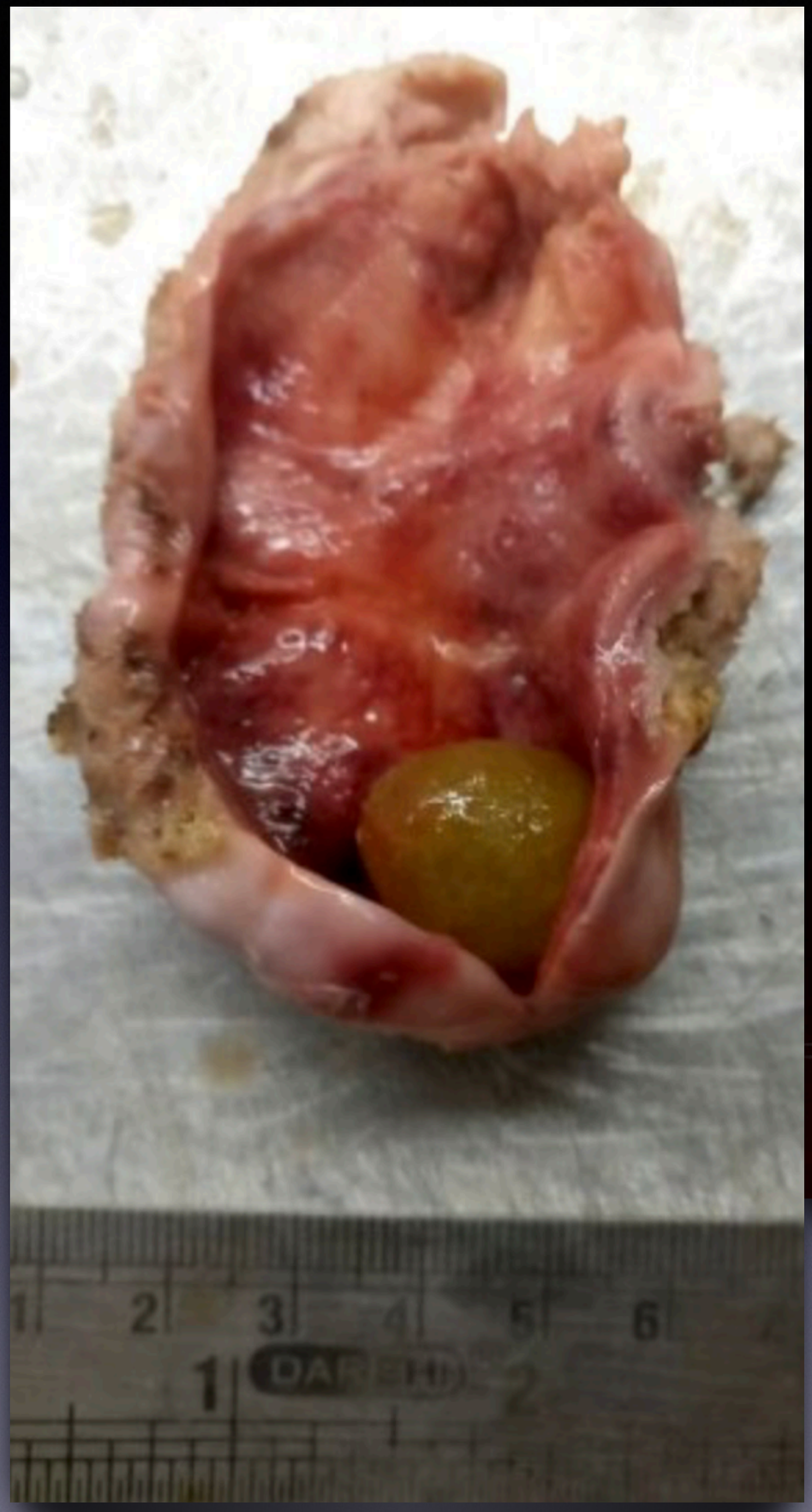

43.80 mm

Acute Cholecystitis and Biliary Colic

Risk Factors for Cholecystitis

- Female gender (Female)
- Increasing parity (Fertile)
- Obese (Fat)
- Advancing age (Forty)
- Drugs
- Cystic Fibrosis
- State of chronic hemolysis


Gallstone blocking cystic duct
Gallstones forming in gallbladder
Stomach
Common bile duct
Small intestine
Pancreas
Gallstone in common bile duct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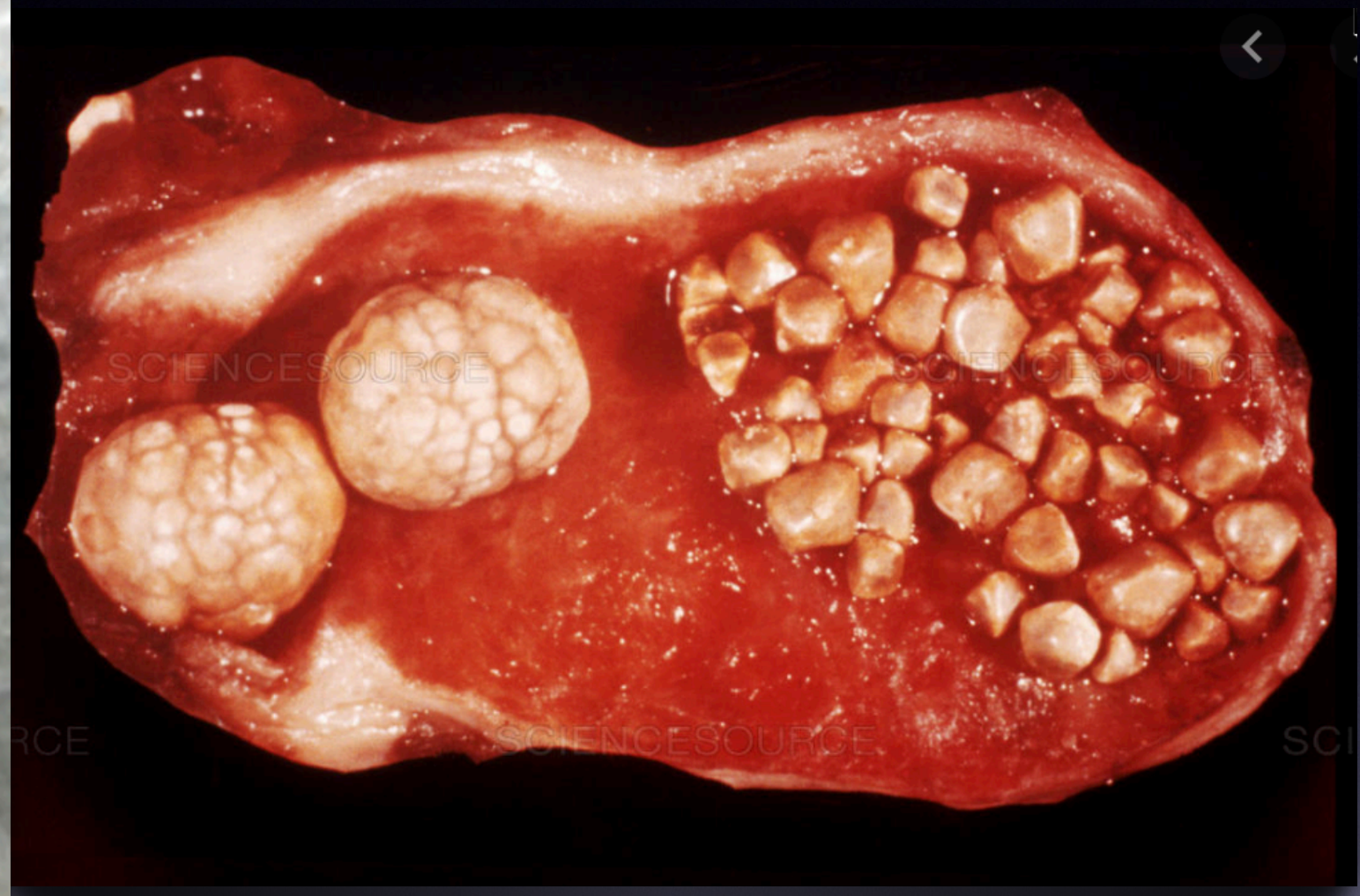
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Types of GB inflammation

- **Acalculous Cholecystitis**
  - No stones
  - Usually in elderly
  - Associated with trauma, burns, DM, sepsis, CHF
  - Gangrene and perforation is frequent
- **Calculous Cholecystitis**
  - Stones present in the cystic duct or CBD
  - Inflamed GB
- **Ascending Cholangitis**
  - GB stones present in the CBD
  - Purulent infection that extends up into the liver
- **Emphysematous Cholecystitis**
  - Cholecystitis with gas forming bacteria
- **Empyema of the GB**

Management

- NPO
- IV fluids
- Antiemetics and Analgesics
- Broad Spectrum Abx
- Surgical Consultation

Acute Pancreatitis

Presentation

- Epigastric pain, dull aching and radiating to the back, eased on leaning forward
- Nausea and Vomiting
- Tachycardia
- Tachypnea
- Rebound is not usually present
- Grey-turner and Cullen signs (rare)

Causes of Acute Pancreatitis

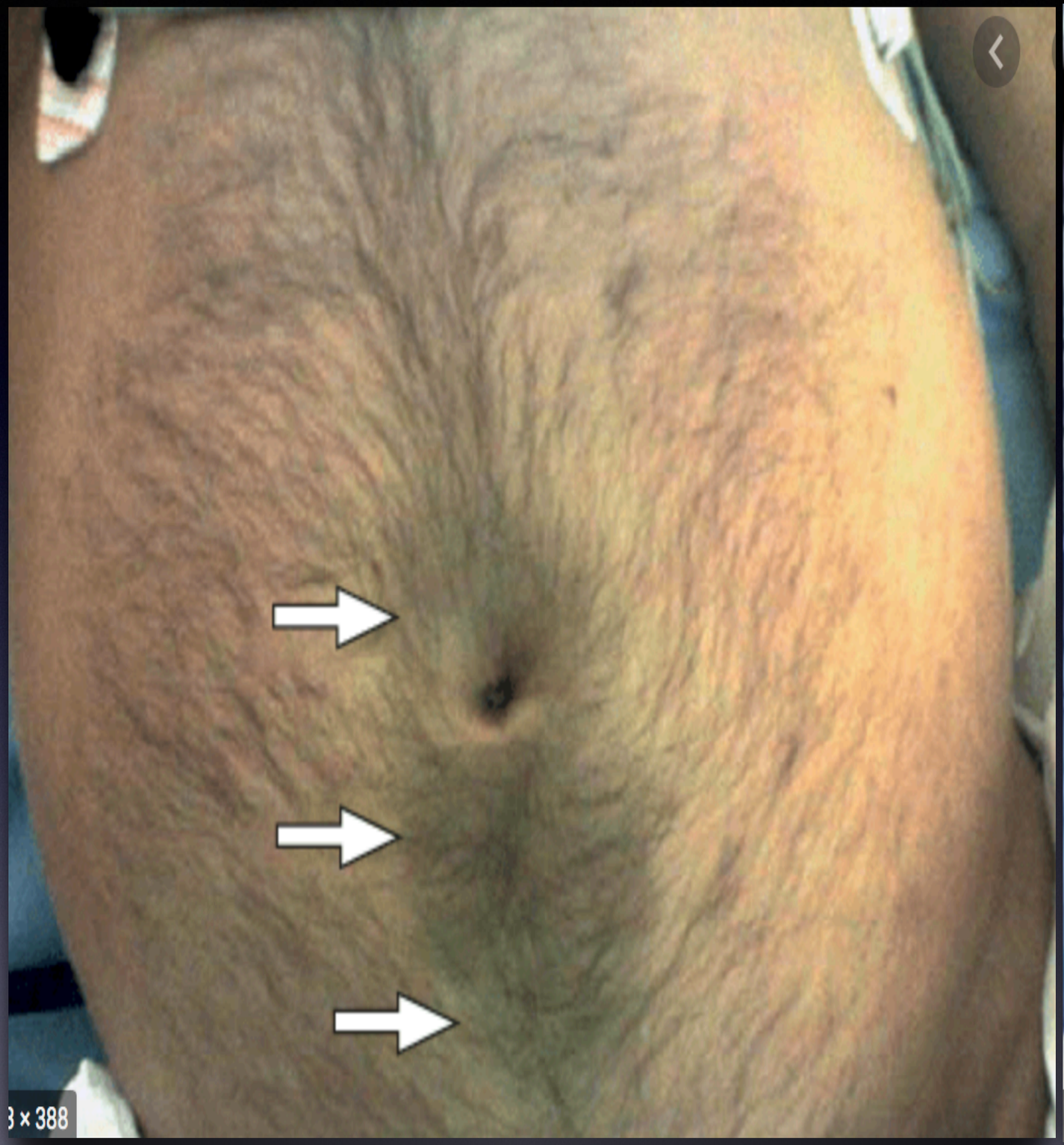
TOXIC—METABOLIC
Alcohol
Drugs
Hyperlipidemia
Hypercalcemia
Uremia
Scorpion venom

MECHANICAL—OBSTRUCTIVE
Biliary stones
Congenital—pancreas divisum, annular pancreas
Tumors—ampullary, neuroendocrine, pancreatic carcinoma
Post-ERCP
Ampullary dysfunction or stenosis
Duodenal diverticulum
Trauma

INFECTIOUS
Viral—mumps, coxsackie, HIV, CMV, EBV, varicella
Bacterial—TB, *Salmonella, Campylobacter, Legionella, Mycoplasma*
Parasitic—*Ascaris*

VASCULAR
Vasculitis
Embolism
Hypoperfusion, ischemia
Hypercoagulability

OTHER
Idiopathic
Hereditary
Diabetes mellitus, DKA
Autoimmune



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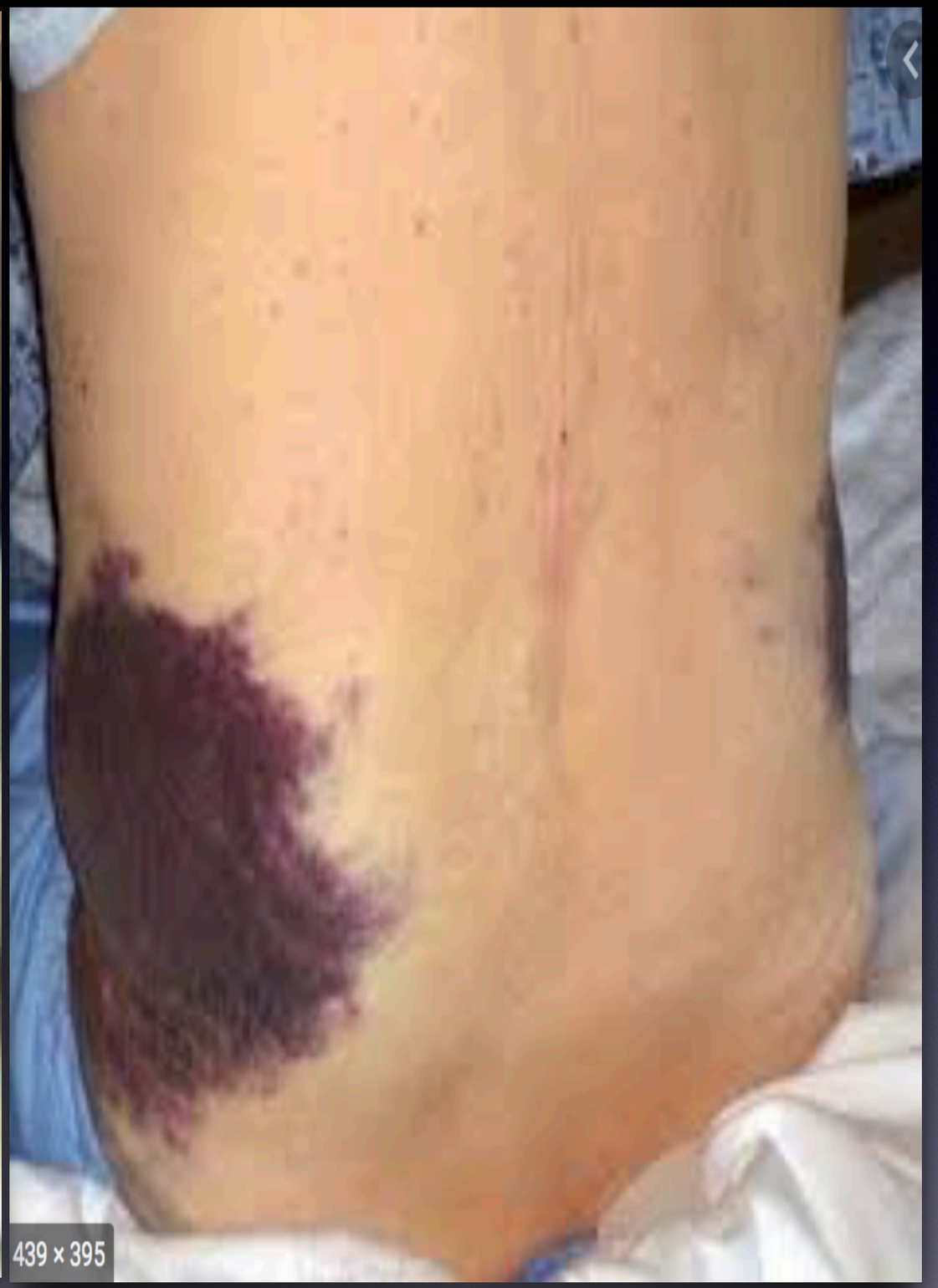

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Revised Atlanta Classification of Acute Pancreatitis

MILD

No organ failure
No local or systemic complications

MODERATE

Transient organ failure (<48 h)[a]
Local or systemic complications

SEVERE

Persistent organ failure (>48 h)[a]

Diagnosis and Management

- ***Diagnosis***
  - Serum Amylase
  - Serum Lipase
  - Imaging (CT is the modality of choice)

- ***Management***
  - Aggressive fluid therapy
  - NPO and Anti-emetics
  - Painkillers
  - Surgical Consultation

Signs of Poor Prognosis (Ranson's Criteria)

Ranson's Criteria[a]

AT ADMISSION
Age > 55 yr
WBC > 16,000/mm^3
Glucose > 200 mg/dL
AST > 250 IU/L
LDH > 350 IU/L

AT ADMISSION (if biliary cause)
Age > 70 yr
WBC > 18,000/mm^3
Glucose > 220 mg/dL
AST > 250 IU/L
LDH > 400 IU/L

AT 48 HOURS
Hematocrit drop > 10%
BUN rise > 5 mg/dL
Calcium < 8 mg/dL
Po_2 < 60 mm Hg
Base deficit > 4 mEq/L
Fluid sequestration > 6 L

AT 48 HOURS (if biliary cause)
Hematocrit drop > 10%
BUN rise > 2 mg/dL
Calcium < 8 mg/dL
Base deficit > 5 mEq/L
Fluid sequestration > 4 L

Complications

Local Complications of Acute Pancreatitis

INTERSTITIAL EDEMATOUS PANCREATITIS

- Acute peripancreatic fluid collection—homogeneous fluid collection adjacent to pancreas; seen within 4 wk of symptom onset
- Pancreatic pseudocyst—homogeneous fluid collection with well-defined wall; seen >4 wk from symptom onset

NECROTIZING PANCREATITIS

- Acute necrotic collection—heterogeneous collection of fluid and necrosis; intrapancreatic and/or extrapancreatic
- Walled-off necrosis—heterogeneous collection of fluid and necrosis with well-defined wall; intrapancreatic and/or extrapancreatic; seen >4 wk from symptom onset

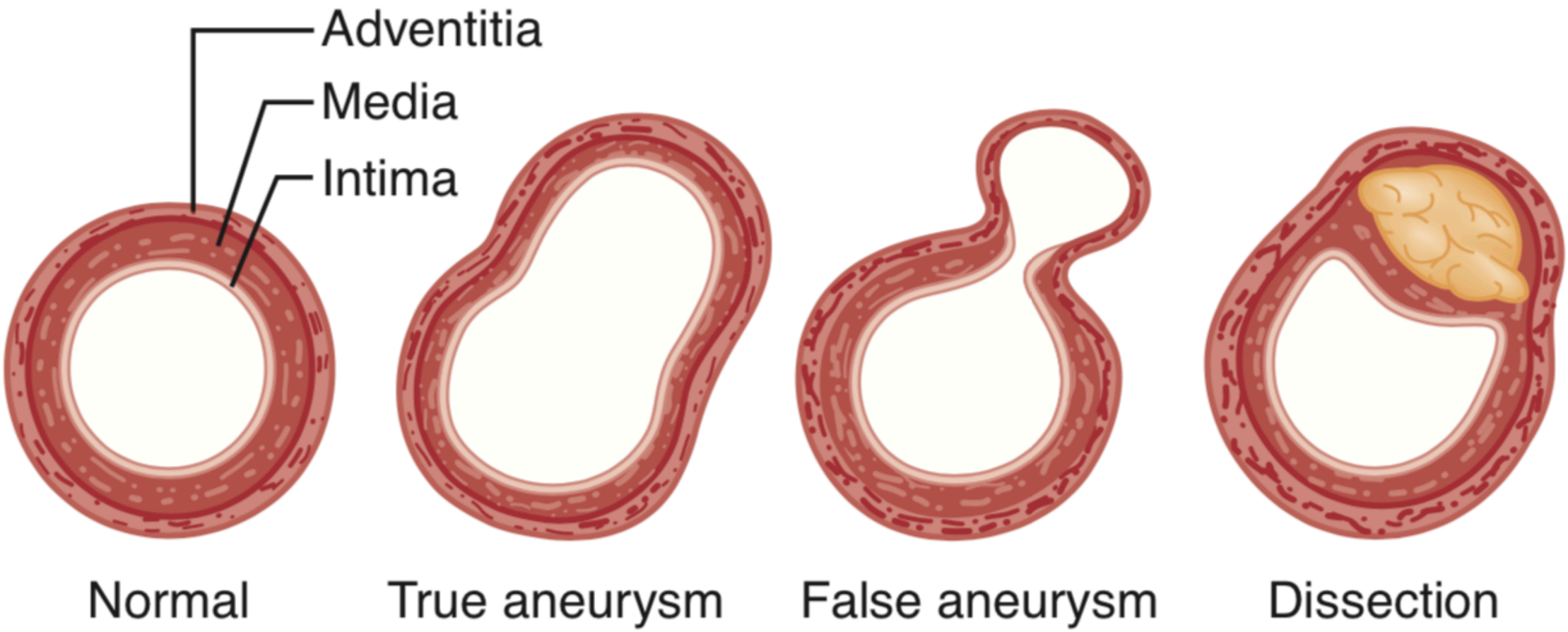
- Pleural Effusion
- ARDS
- Fluid sequestration
- ATN
- DIC

Abdominal Aortic Aneurysm

True and False Aneurysms

- A true aneurysm is a dilatation in the vessel wall, that involves ALL the wall layers

- A Pseudoaneurysm (false) is a dilatation in the vessel wall that only involves the adventitia


Adventitia
Media
Intima
Normal
True aneurysm
False aneurysm
Dissection

Risk Factors for AAA

- Advanced age (75% of AAA are in pts. > 60yrs)
- Male sex (esp. Caucasians)
- Having a 1st degree relative with a AAA
- Smoking
- Hypertension
- Hx of CAD or PAD
- Dyslipidemia
- Collagen disease

Presentation

- Sudden severe abdominal pain that is radiating to the back or left flank
- May be associated with an episode of syncope
- Lower back pain with radiation to the legs
- Scrotal hematoma
- L.L. ischemia
- Pulsatile mass
- Bruits heard over abdominal aorta or femorals

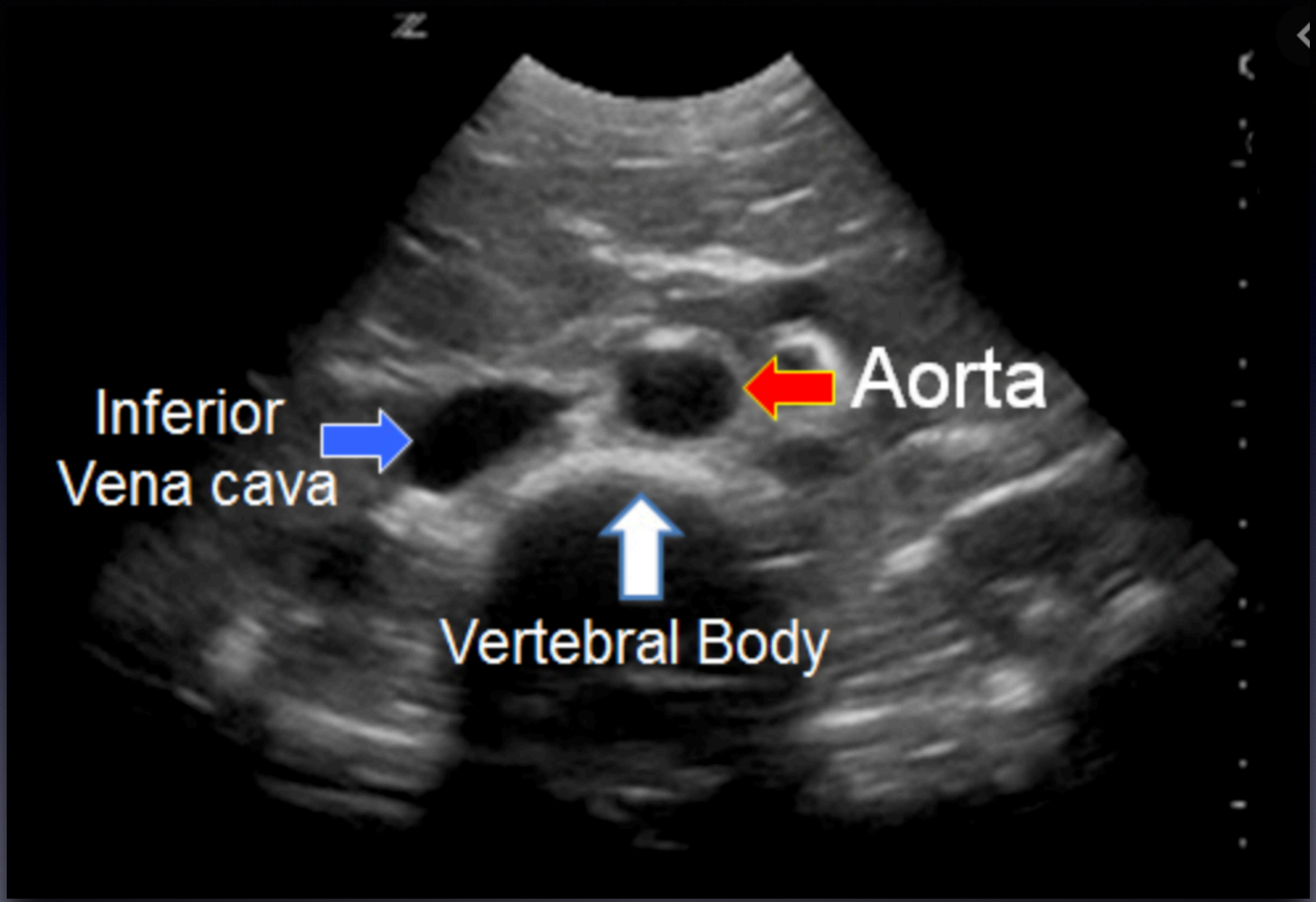
Diagnosis

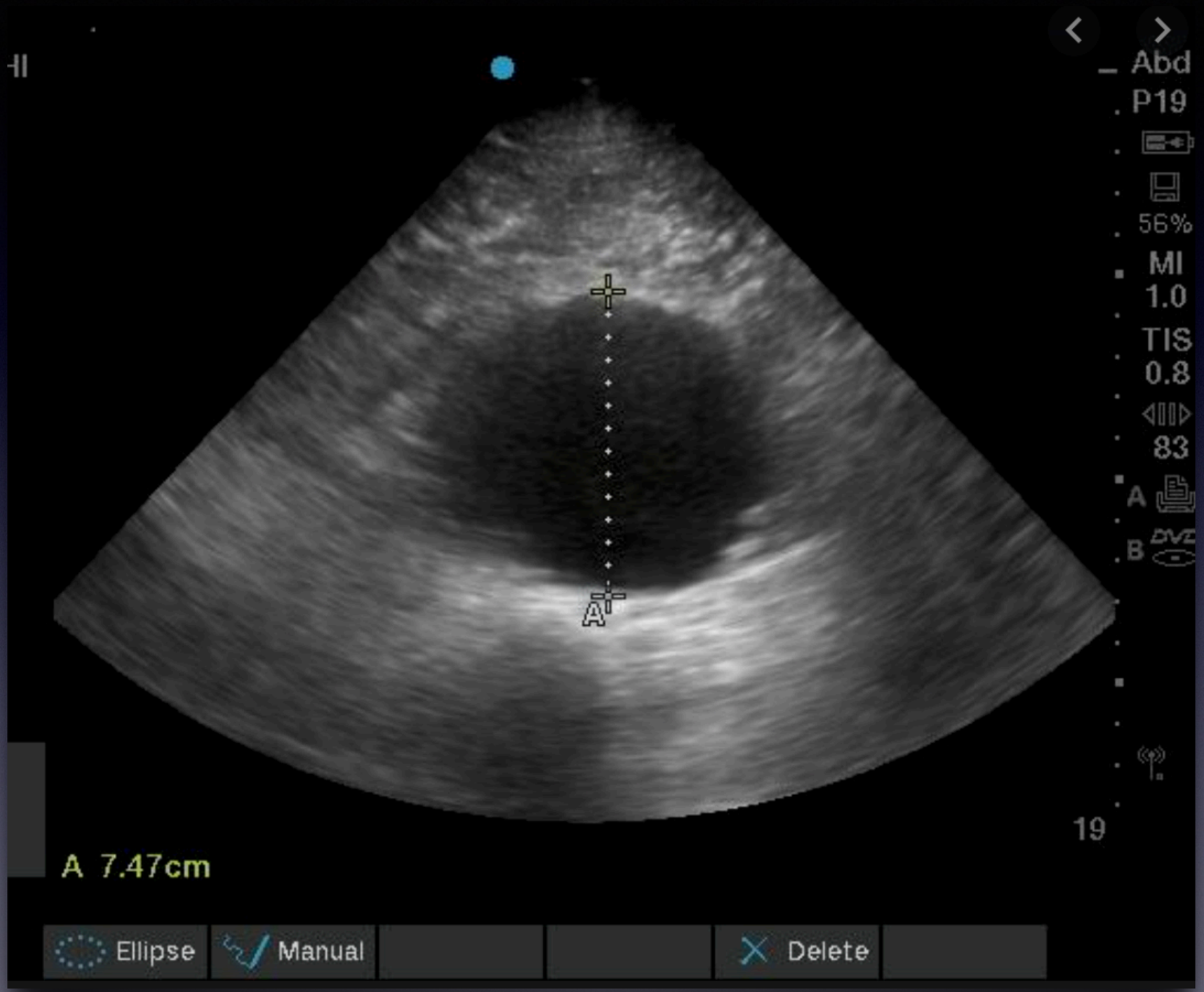
- ANY UNSTABLE PATIENT WITH A SUSPECTED AAA GOES DIRECTLY TO THE THEATER

- AXR can be suggestive

- ***US is a good diagnostic modality, it is easy , 100% Sn. > 95% Sp. and can be done at bedside***

- CT angiography is the only way to tell if the AAA is leaking or not


Aorta
Inferior
Vena cava
Vertebral Body


Abd
P19
56%
MI
1.0
TIS
0.8
83
A
B
19
A 7.47cm
Ellipse
Manual
Delete

Management

- NPO
- 2 large bore IV lines
- Cross match for at least 4 units of blood
- IV fluids
- Vascular surgery consultation
- ICU and anesthesia consultation
- Control of BP
- Pain killers

Acute Mesenteric Ischemia

Types of Mesenteric Ischemia

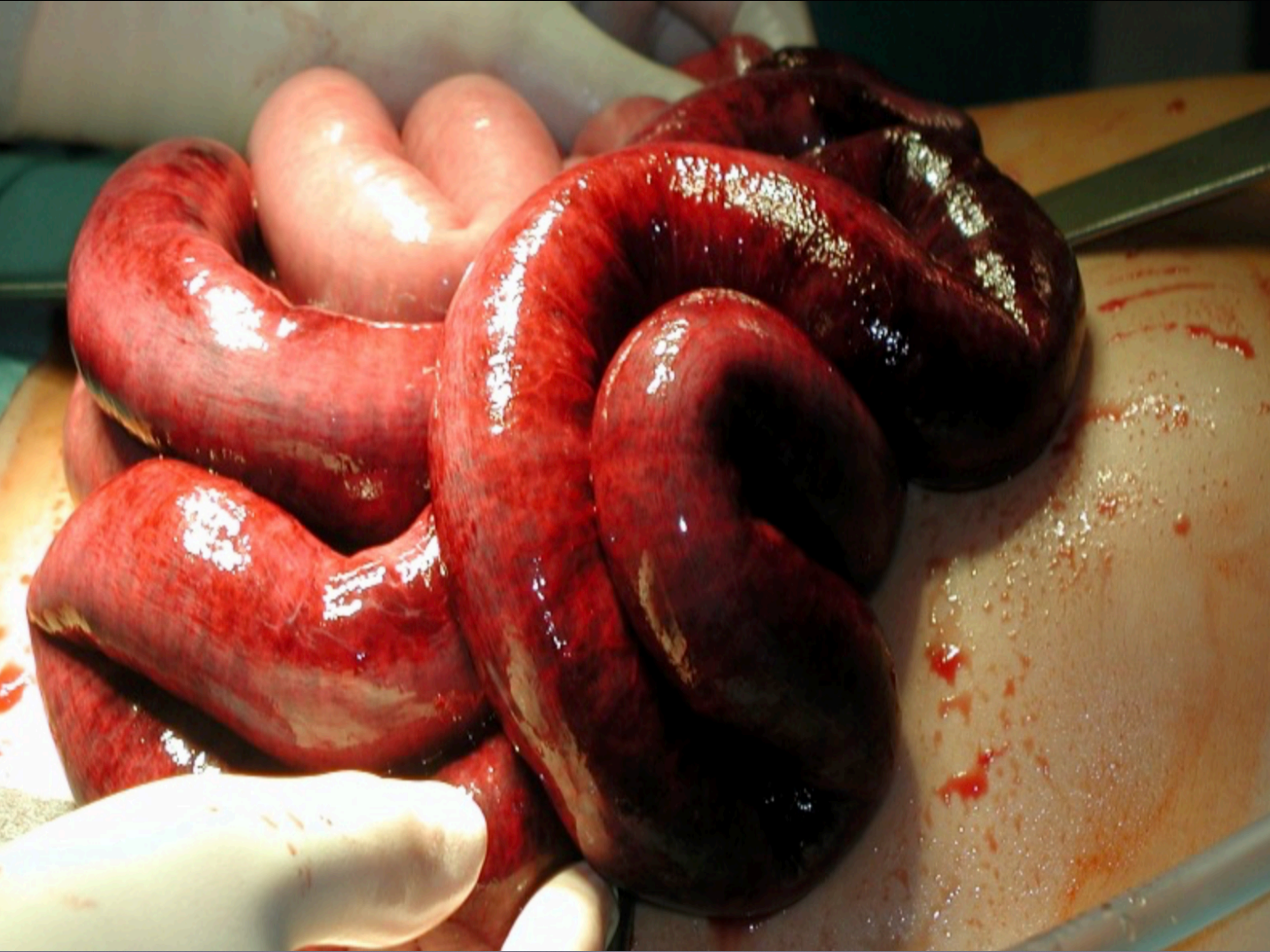
- Embolic
  - Secondary to acute SMA occlusion by an embolus that originated in the left heart (75% of the time)
- Thrombotic
  - This is mesenteric venous thrombosis due to the presence of a hypercoagulable state
- Non-occlusive
  - This is ischemia that is occurring secondary to low flow state due to cardiac pathology

The risk factors for Mes. Isch.

- Arterial
  - Dysrhythmias (esp. AF)
  - Atherosclerotic heart disease
  - Valvular Heart disease
  - Recent AMI
- Venous thrombosis
  - Hx of prior VTE
  - Hypercoagulable state (polycythemia vera, AT III def., chemotherapy, estrogen use)
- Non-occlusive
  - Hypotension
  - Sepsis
  - CHF

Presentation

- Abdominal pain that is **OUT OF PROPORTION** with the clinical exam
- Diarrhea (with OB positive)
- Bleeding per rectum
- Anorexia
- Nausea and vomiting



Management

- All types get:
  - IV fluids
  - Abx
  - Pain killers
- Embolic type
  - Papaverine
- Venous thrombosis
  - Anticoagulation
- Low flow state
  - Correction of the underlying problem

Surgical Consultation is done in all but surgical intervention is only done if:

1. A surgical abdomen and peritonitis develops
2. Patient requires revascularization procedure
3. Resection of necrotic bowel is needed

Ileitis and Colitis (Inflammatory Bowel Disease)

Crohn's Disease

- An immune mediated disease AKA
  - Terminal ileitis
  - Granulomatous ileocolitis
  - Regional Enteritis
- Can affect any segment of the GI tract from the mouth to the anus

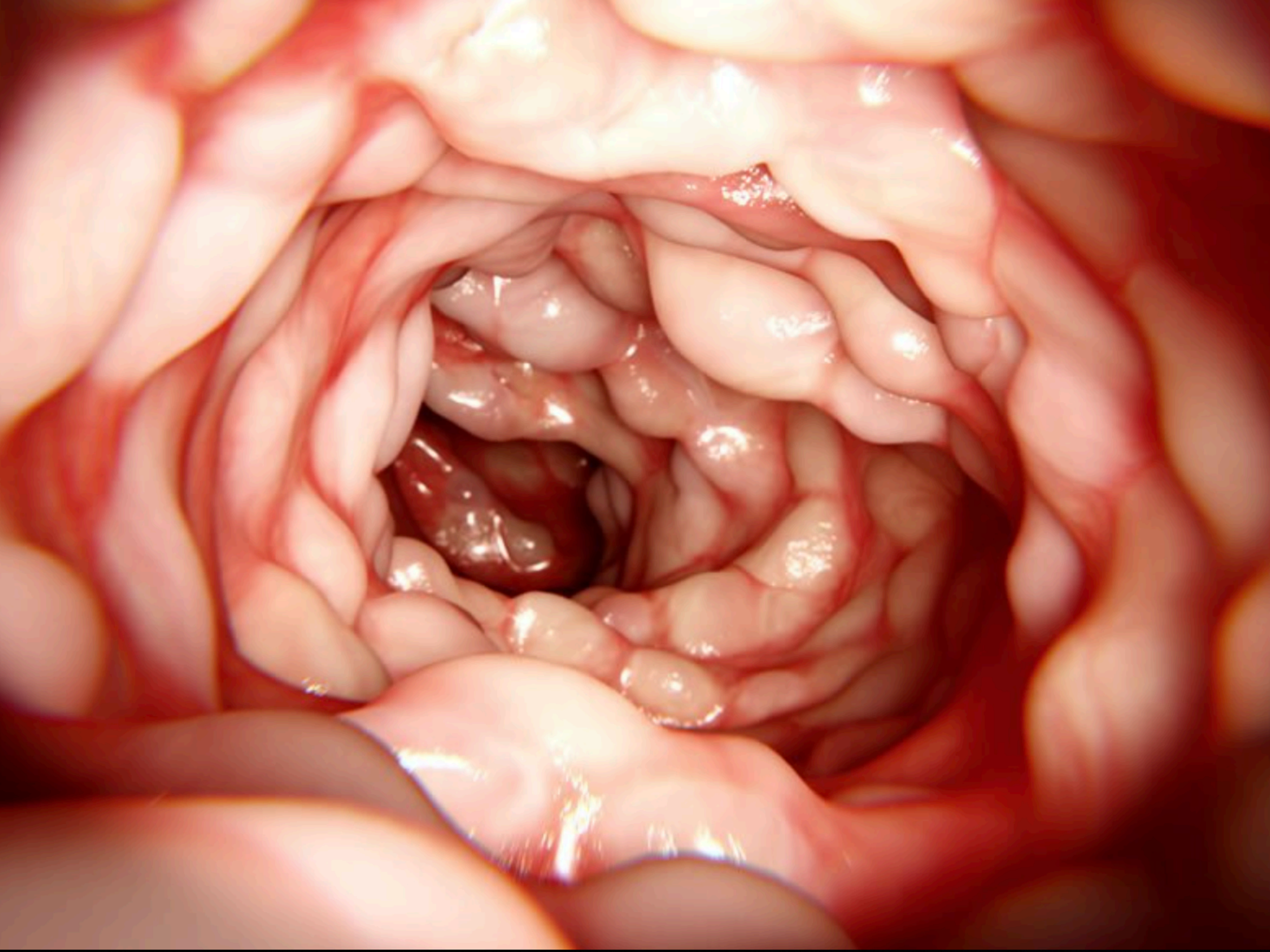
- The disease is characterized by involved sections and "skip areas"
- The bowel wall is thickened, which leads to narrowing of the lumen
- There is longitudinal fissuring and ulceration of the bowel
- The pathology involves all the three layers of the bowel

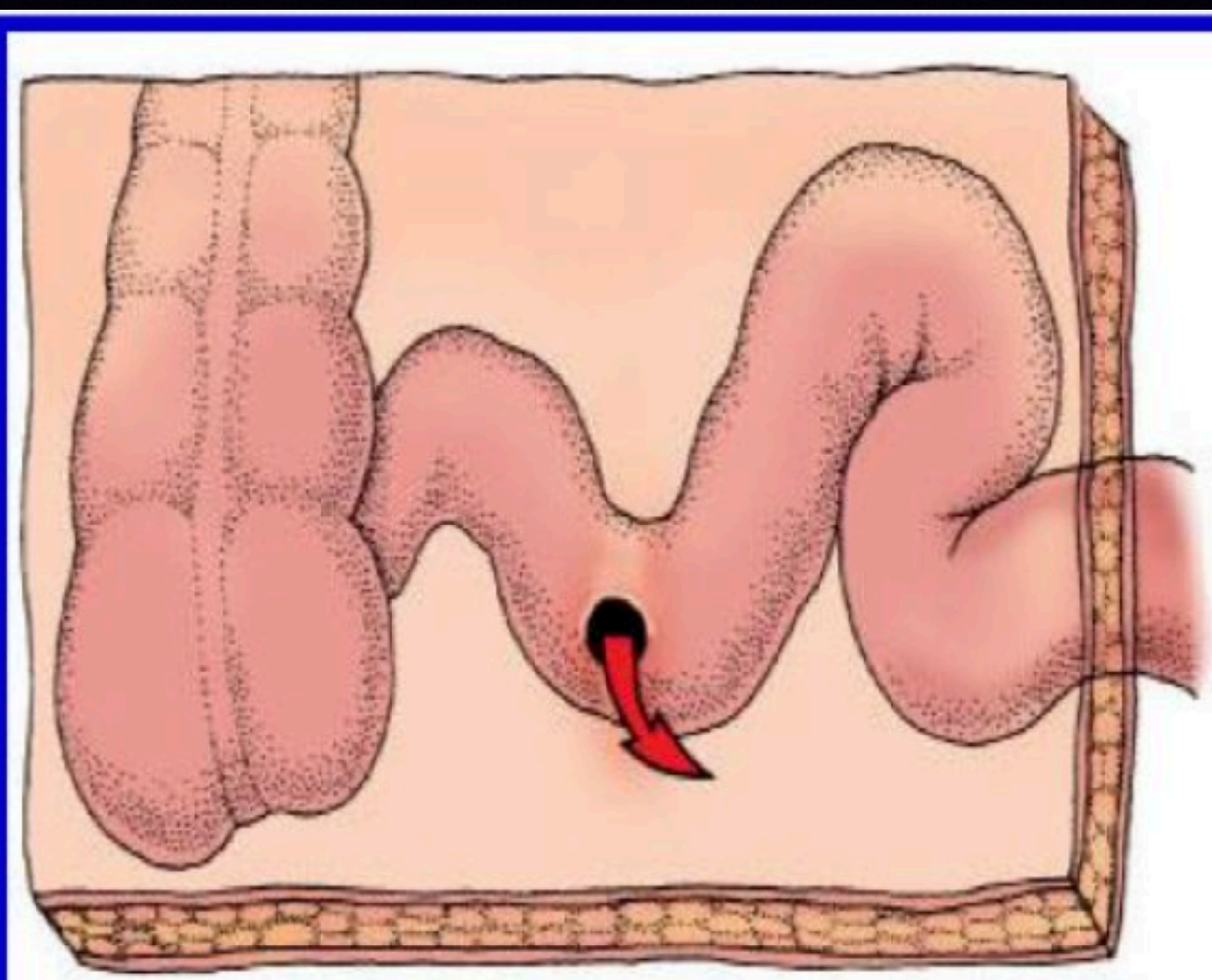
Extra Intestinal Manifestations of IBD

- Arthritis
- Ankylosing Spondylitis
- Vasculitis
- Venous Thromboembolism
- Hepato-Biliary Disease
- Erythema Nodosum
- Pyoderma Gangrenosum
- Iritis / Uveitis / Episclaritis
- Hyperoxaluria and renal stones

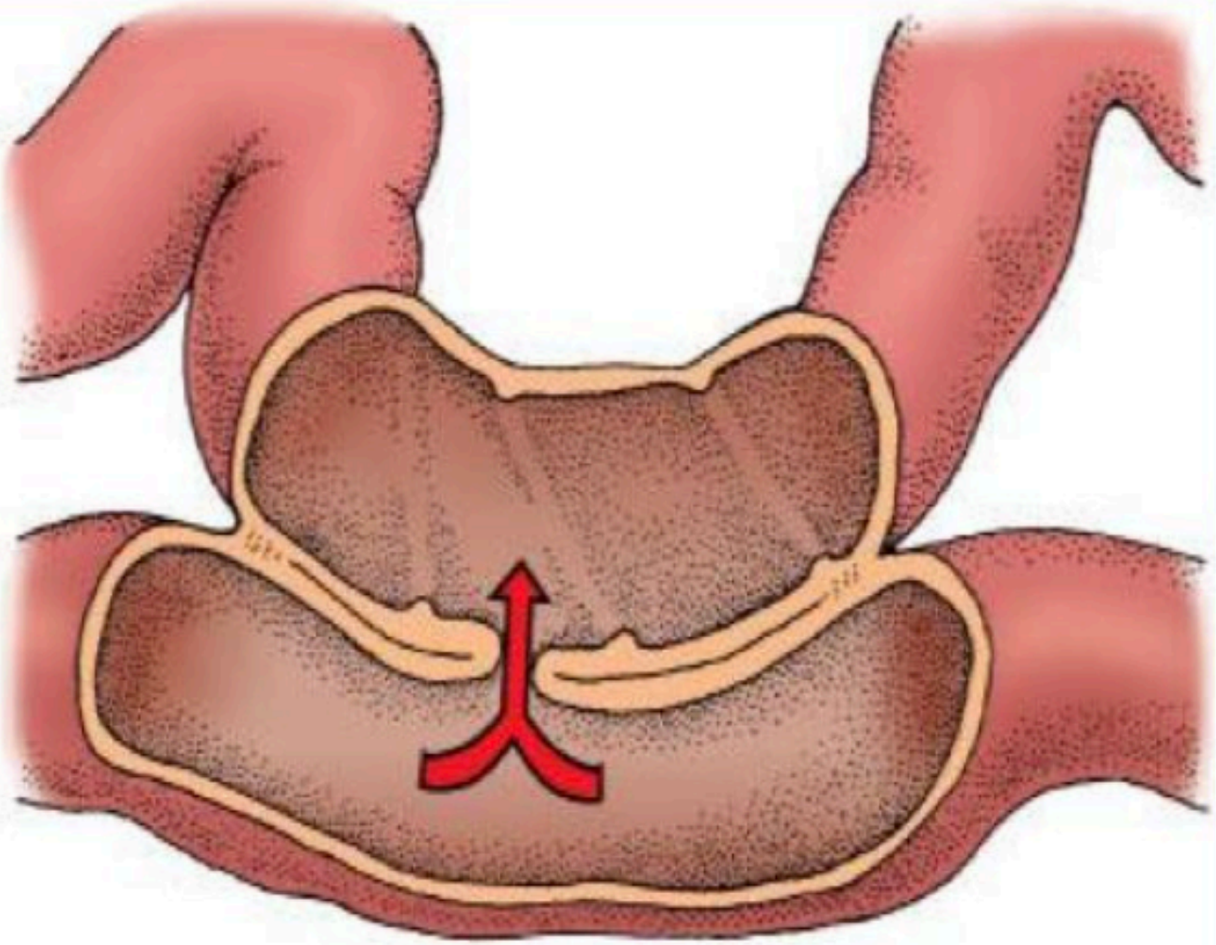
Complications of Crohn's D.

- Perianal
  - Abscess formation
  - Ileocutaneous fistula
  - Rectovaginal fistula
  - Rectal prolapse
- Intestinal
  - Obstruction
  - Abscess / Fistula
  - Perforation
  - Hemorrhage
- Toxic Megacolon
  - Associated with massive GI bleed > 50% of cases
- Malignancy
  - Neoplasms of both the small and large bowel





External enterocutaneous
(between skin and intestine)



Enteroenteric
(between intestine and intestine)

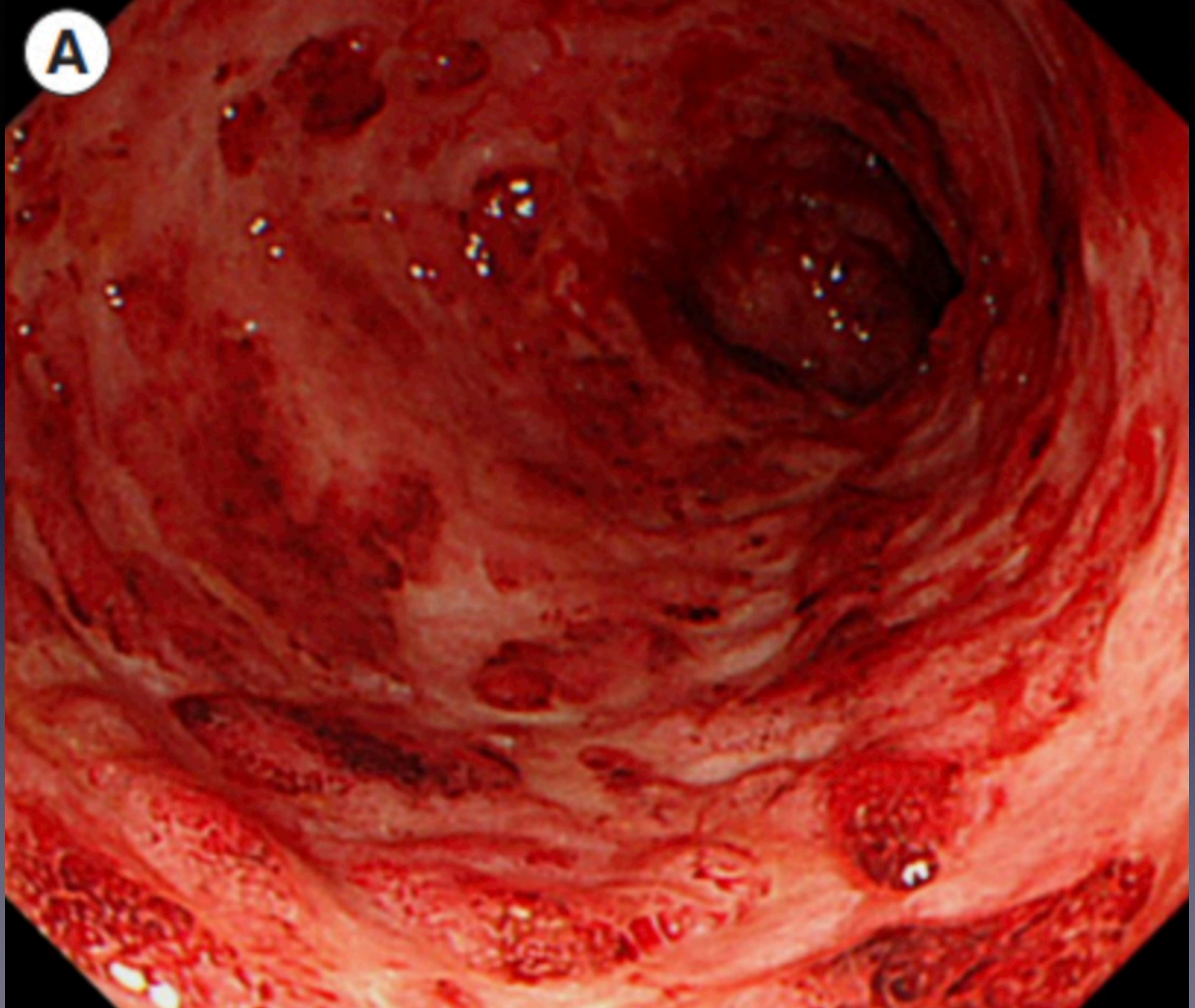
Management of Crohn's

- IV fluids and electrolyte replacement
- Steroid administration
- Antibiotic administration
- Azathioprine (immunosuppressant)
- Deal with complications

Ulcerative Colitis (UC)

- UC is a chronic inflammatory and ulcerative disease of colon and rectum
- Inflammation is limited to the mucosa and submucosa
- UC has no skip lesions, it is continuous
- UC is confined to the colon and does not extend beyond it

480 × 377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Severity of Attacks of UC

- Mild > 60% of cases
  - < 4 bowel movements per day
  - No systemic manifestations
  - Few extra-intestinal manifestations
- Severe
  - > 6 bowel motions per day
  - Fever
  - Tachycardia
  - Wt. loss
  - Anemia
  - Many Extra-intestinal manifestations

Complications of UC

- Hemorrhage (most common)
- Toxic Megacolon
- Hemodynamic instability
- Perforation
- Obstruction due to stricture
- Fistula / Abscess formation
- Carcinoma transformation

Management

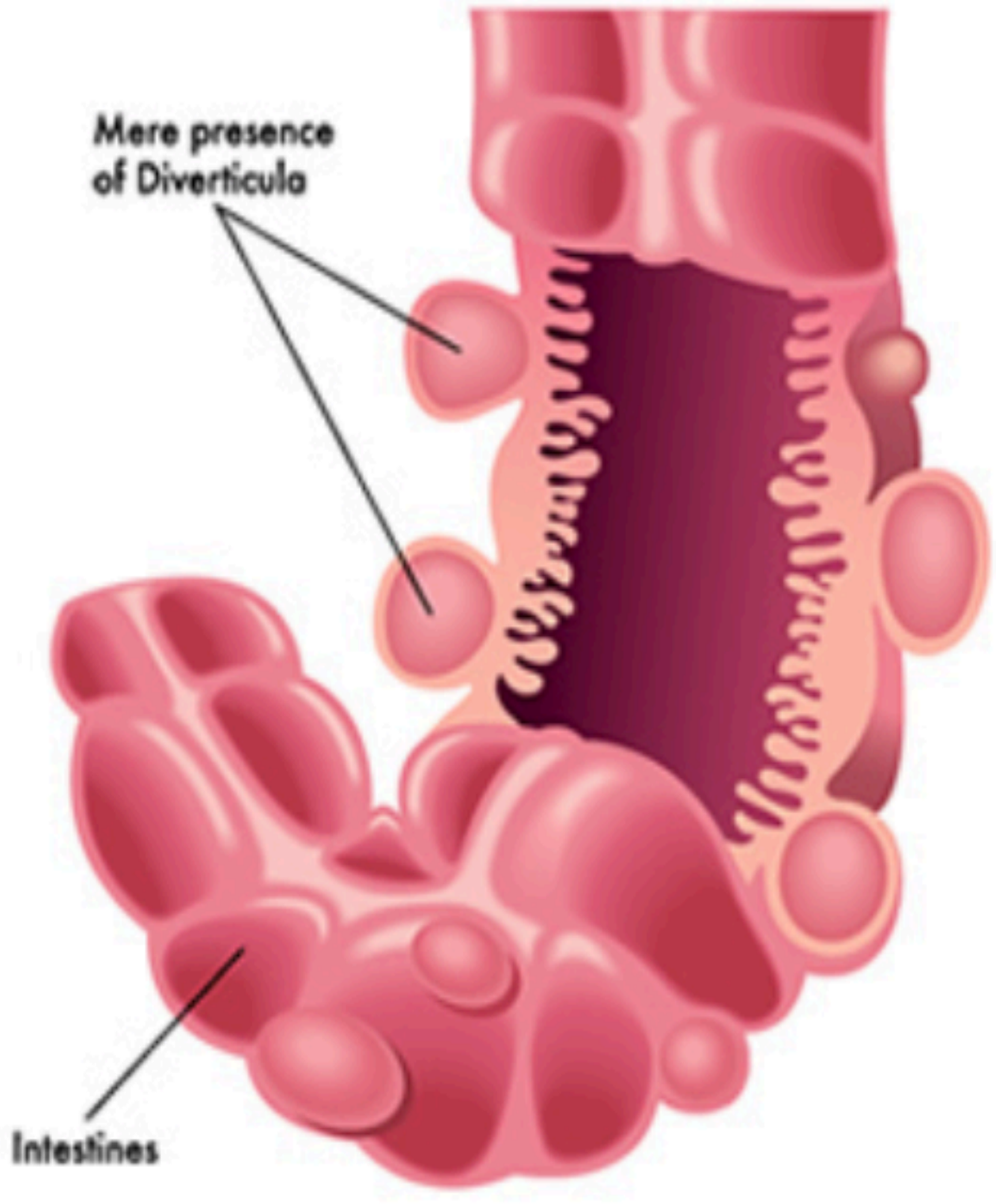
- Mild attack
  - Sulfasalazine
  - Steroids
  - Azathioprine
  - Iron and antidiarrheal agents
- Severe
  - IV fluid and electrolyte replenishment
  - IV steroids
  - IV Abx
  - Blood Tx
  - Surgical Consultation

Diverticulitis

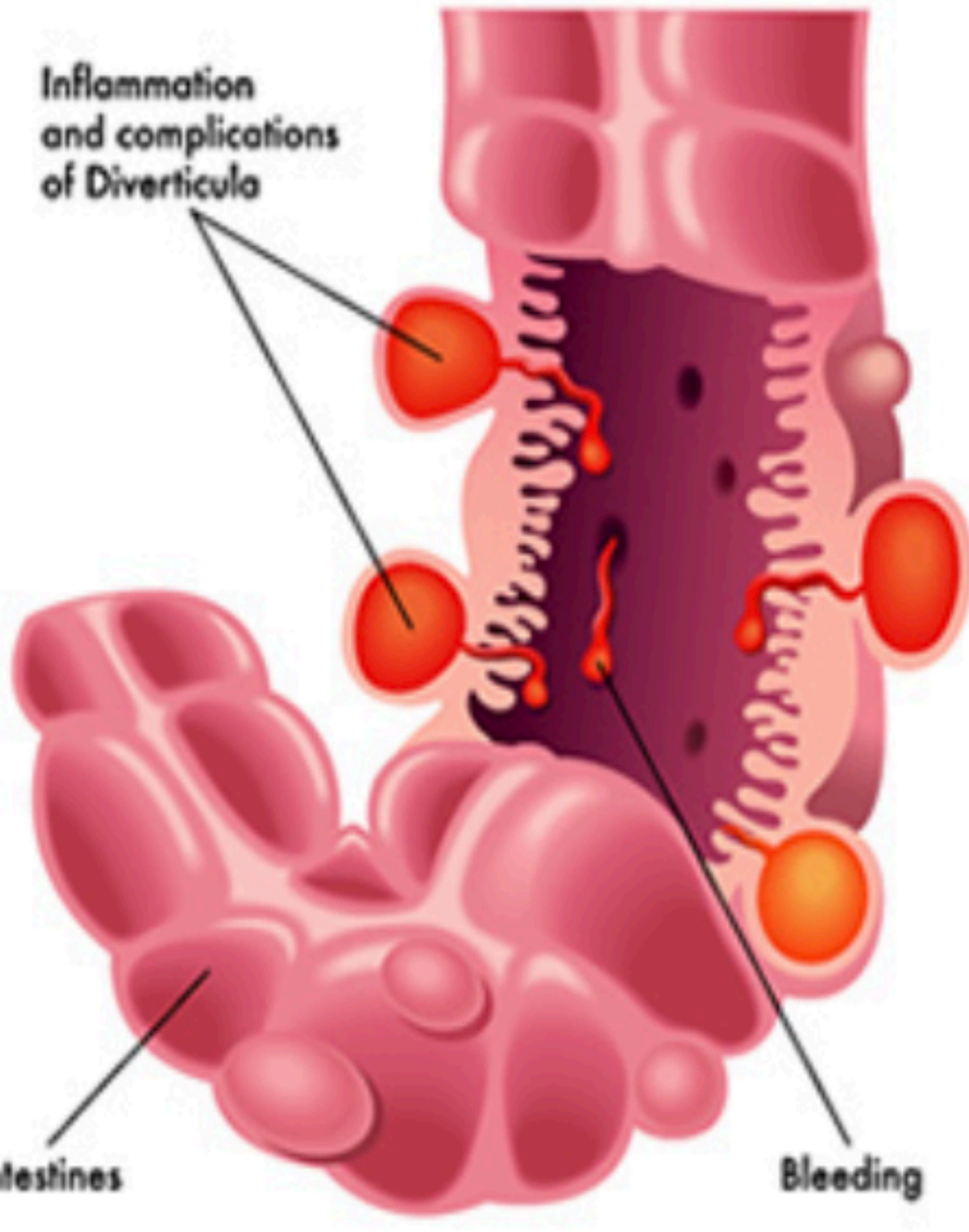
Definitions

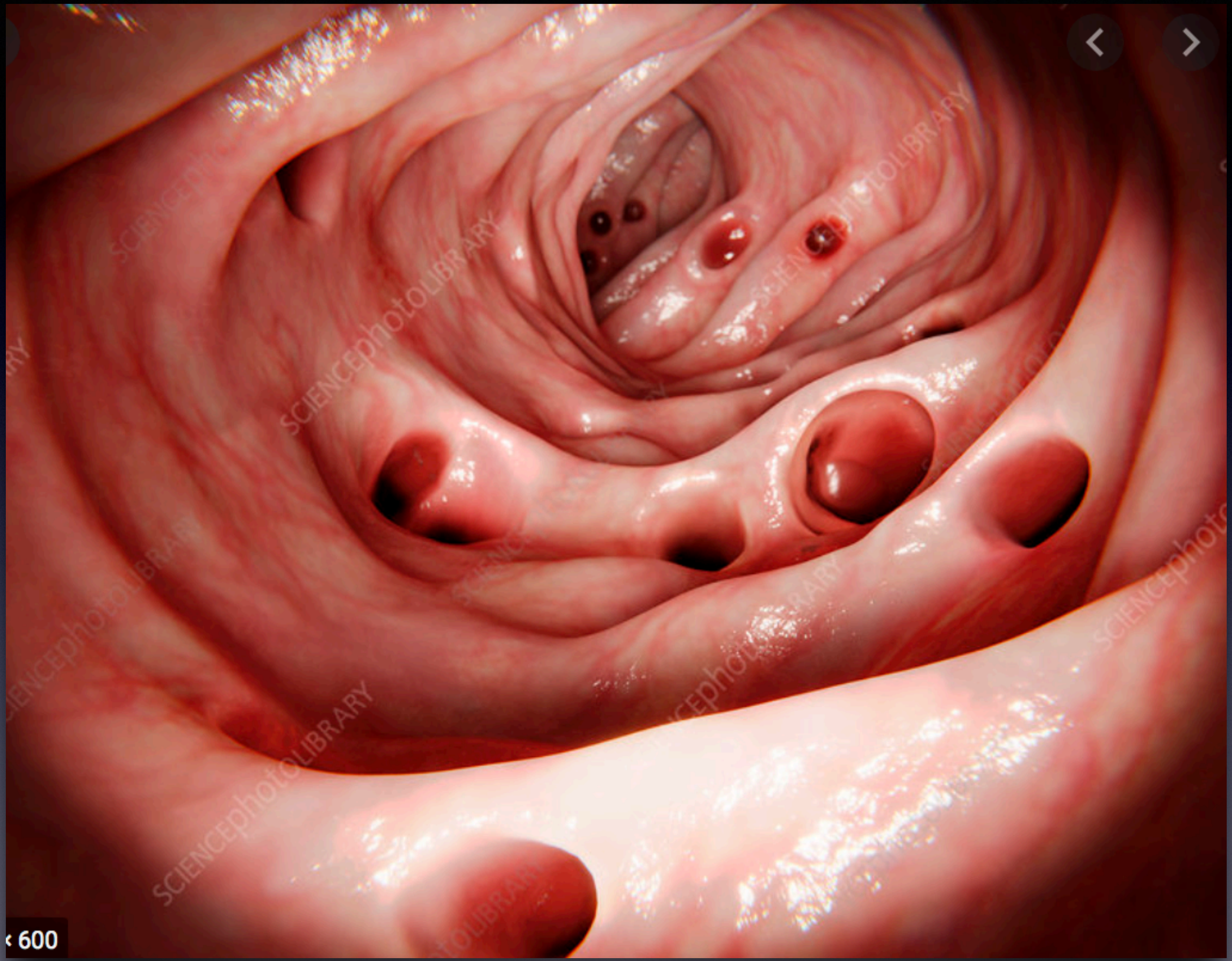
- Diverticular Disease
  - The disease of having sac like herniations of colonic mucosa
- Diverticulosis
  - A clinical state of a patient with diverticular disease presenting with lower GI bleeding
- Diverticulitis
  - The clinical state of a patient with diverticular disease with inflammation, infection and hemorrhage

Diverticulosis



Diverticulitis

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Presentation

- Abdominal pain with signs of peritonitis mainly in the left lower quadrant
- Bloody stools
- Fever
- Abdominal distention
- Anorexia
- Nausea and Vomiting

Management

- NPO
- IV fluids
- Broad Spectrum Abx
- Surgical consult
- Analgesia

Take home Message

- The abdomen is a closed box

- Always think of the structures present at the site of the pain, and then their neighbors

- We do not treat lab readings, (context trumps result always) look at the clinical status of your patient

- It does not matter if it a rare cause, if it will kill your patient , you need to think of it!

QUESTIONS?