Gastrointestinal System

Erika Sigrist ND, LAc.

History

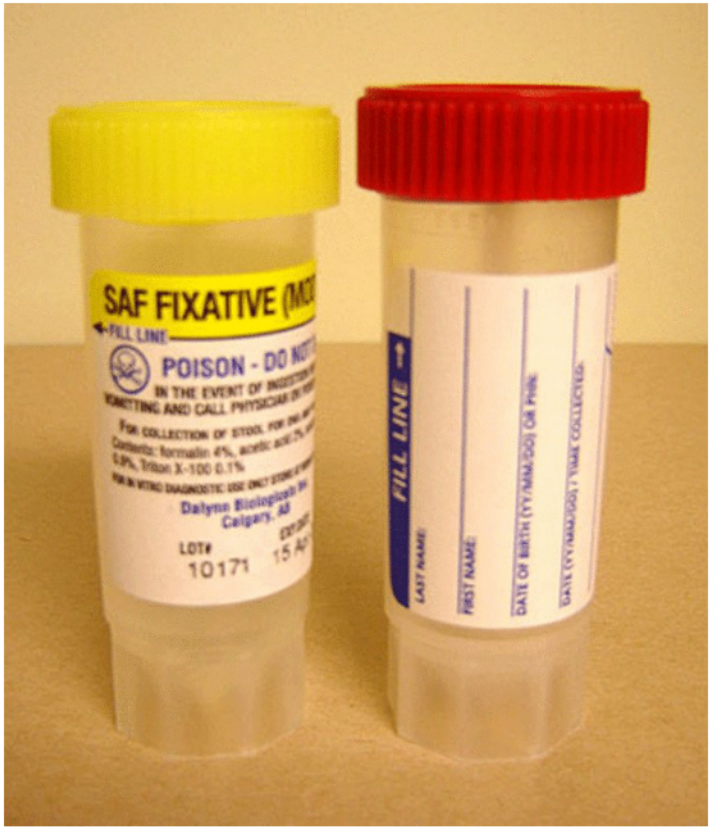
1. Appetite, weight change
2. Upper GI
3. BMs
4. Blood
5. Jaundice, hepatitis
6. Diet History
7. Coffee, alcohol, tobacco
8. Stress, exercise
9. Travel, camping
10. Hx of GI disorders, abdominal surgeries
11. Family Hx of GI disorders

Physical Exam

1. General
2. Inspection
3. Auscultation
4. Percussion
5. Palpation

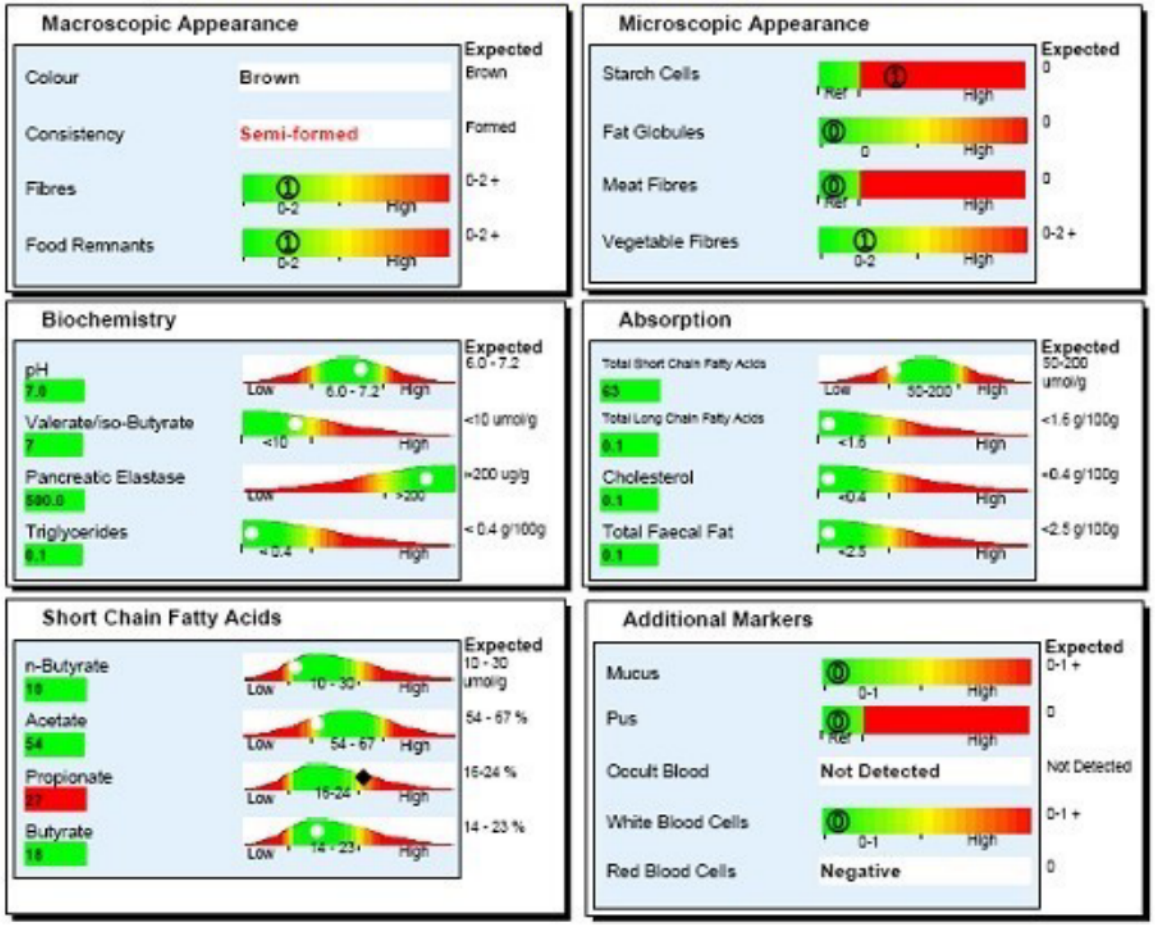
Labs

1. CBC
2. ESR
3. CMP
4. Serum amylase
5. Stool Cultures
6. O & P
7. Fecal fat
8. Comprehensive stool analysis
9. Fecal occult blood
10. Stool antigens



Fecal O&P containers

COMPLETE DIGESTIVE STOOL ANALYSIS - (CDSA) Level 2



Digestion

		Reference Range
Chymotrypsin	5.3	0.9-26.8 U/g
Putrefactive SCFAs (Total*)	0.9	1.3-8.6 micromol/g

* Total values equal the sum of all measurable parts.

	Inside	Outside	Reference Range
Meat Fibers ◆	None		None
Vegetable Fibers	Rare		None - Few

Absorption

		Reference Range
Triglycerides	0.3	0.2-3.3 mg/g
Long Chain Fatty Acids	12.4	1.3-23.7 mg/g
Cholesterol	0.5	0.2-3.5 mg/g
Phospholipids	1.5	0.2-8.8 mg/g
Fecal Fat (Total*)	14.7	2.6-32.4 mg/g

* Total values equal the sum of all measurable parts.

Metabolic Markers

		Reference Range
Beneficial SCFAs (Total*)	21.3	>= 13.6 micromol/g
n-Butyrate	3.9	>= 2.5 micromol/g
Beta-Glucuronidase	1,019	337-4,433 U/g
pH ◆	6.9	6.1-7.9

* Total values equal the sum of all measurable parts.

SCFA distribution

Acetate %	61.0	44.5-72.4 %
Propionate %	20.8	<= 32.1 %
n-Butyrate %	18.3	10.8-33.5 %

Immunology

	Inside	Outside	Reference Range
Fecal Lactoferrin ◆	Negative		Negative

Macroscopic

Color	Brown		Brown
Mucus	Negative		Negative

Microbiology

Bacteriology

Beneficial Bacteria

Lactobacillus species		*NG
Escherichia coli		4+
Bifidobacterium		4+

Additional Bacteria

alpha haemolytic Streptococcus	NP	4+
gamma haemolytic Streptococcus	NP	4+
Mucoid Escherichia coli	NP	4+
Klebsiella pneumoniae	PP	4+
Enterobacter asburiae	NP	4+
Staphylococcus aureus	PP	4+

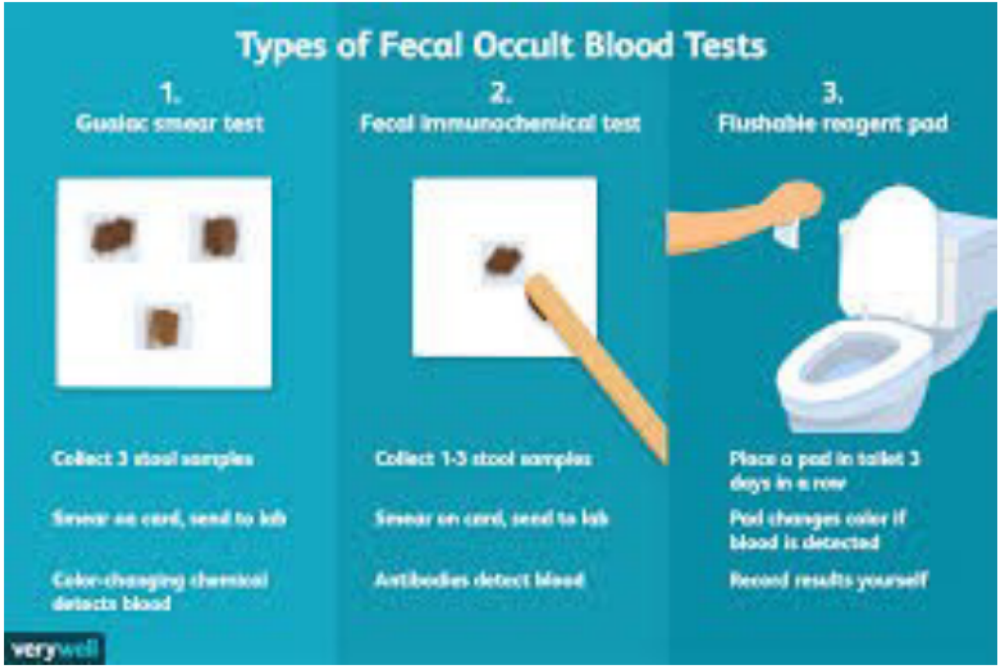
Mycology

Yeast, not Candida albicans	NP	1+

*NG	NP	PP	P
*NG			

Fecal Occult Blood test

Fecal Occult blood test



Types of fecal occult blood tests

Imaging

1. X-ray
2. Ultrasound
3. CT scan -with and without contrast

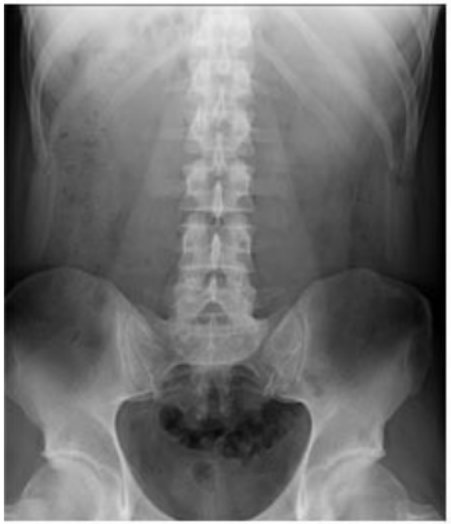


Figure 1

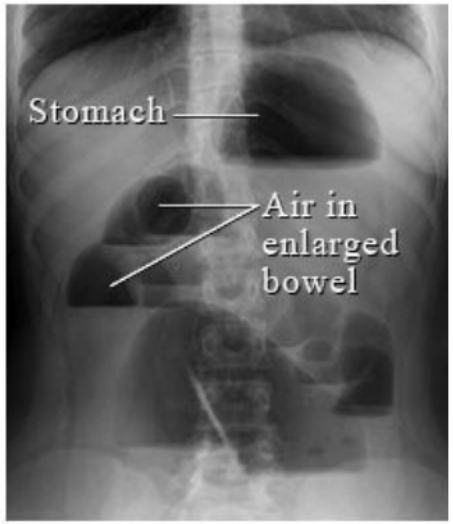
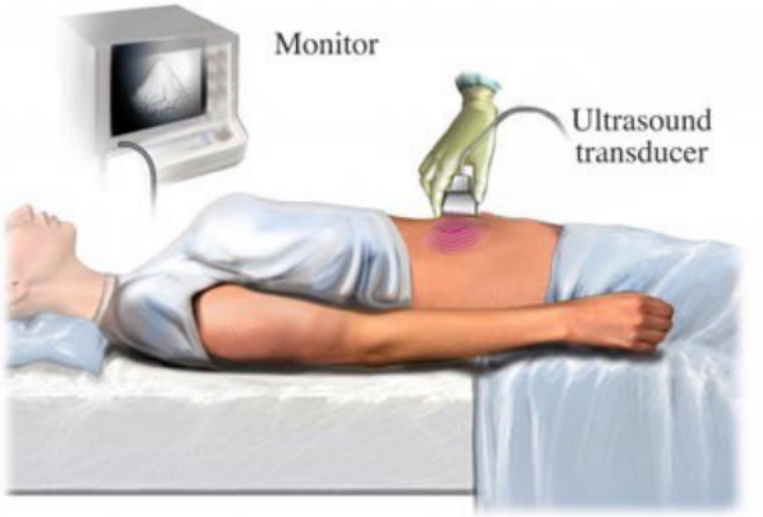
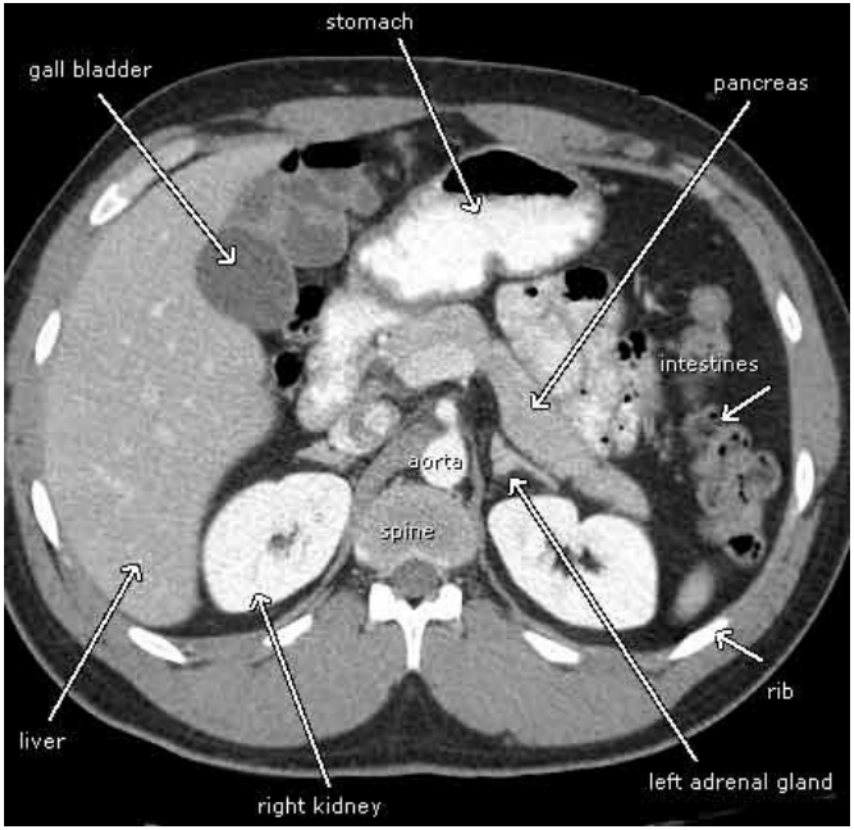


Figure 2

Abdominal x-ray



Abdominal ultrasound

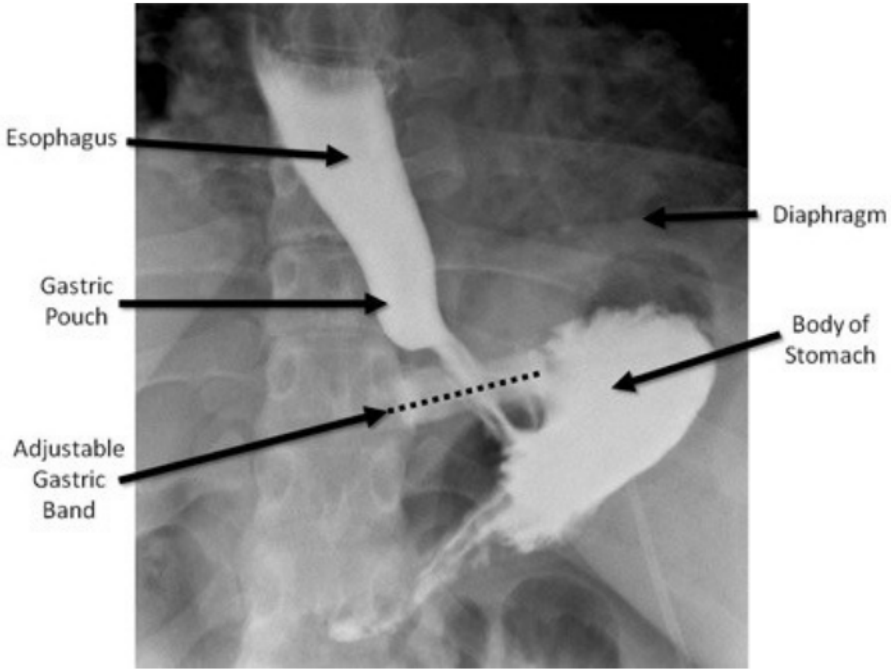


Abdominal CT scan

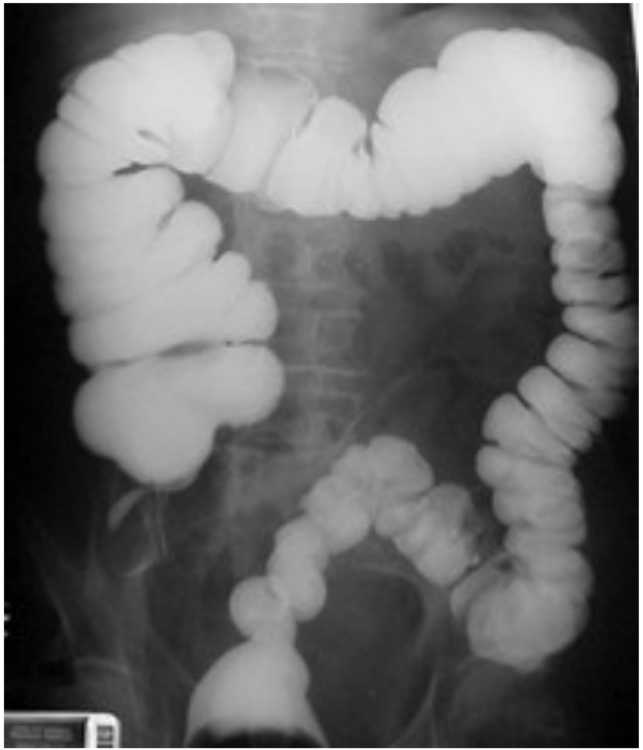
Special Studies

1. Upper GI series
2. Lower GI series
3. Endoscopy
4. Cytology
5. Biopsy
6. Nasogastric intubation
7. Radiotelemetry
8. Manometry
9. ERCP

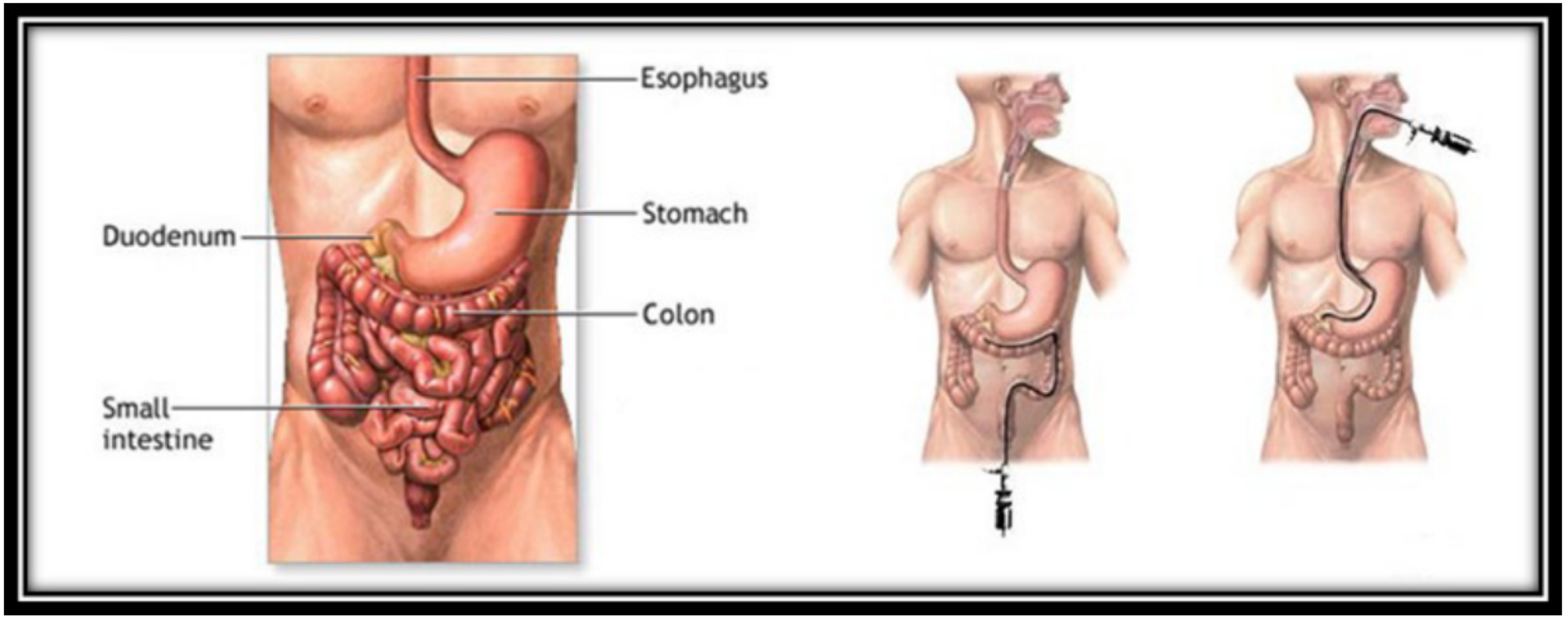
   -endoscopic retrograde cholangiopancreatography
10. Laparoscopy
11. Laparotomy


Esophagus
Diaphragm
Gastric Pouch
Body of Stomach
Adjustable Gastric Band

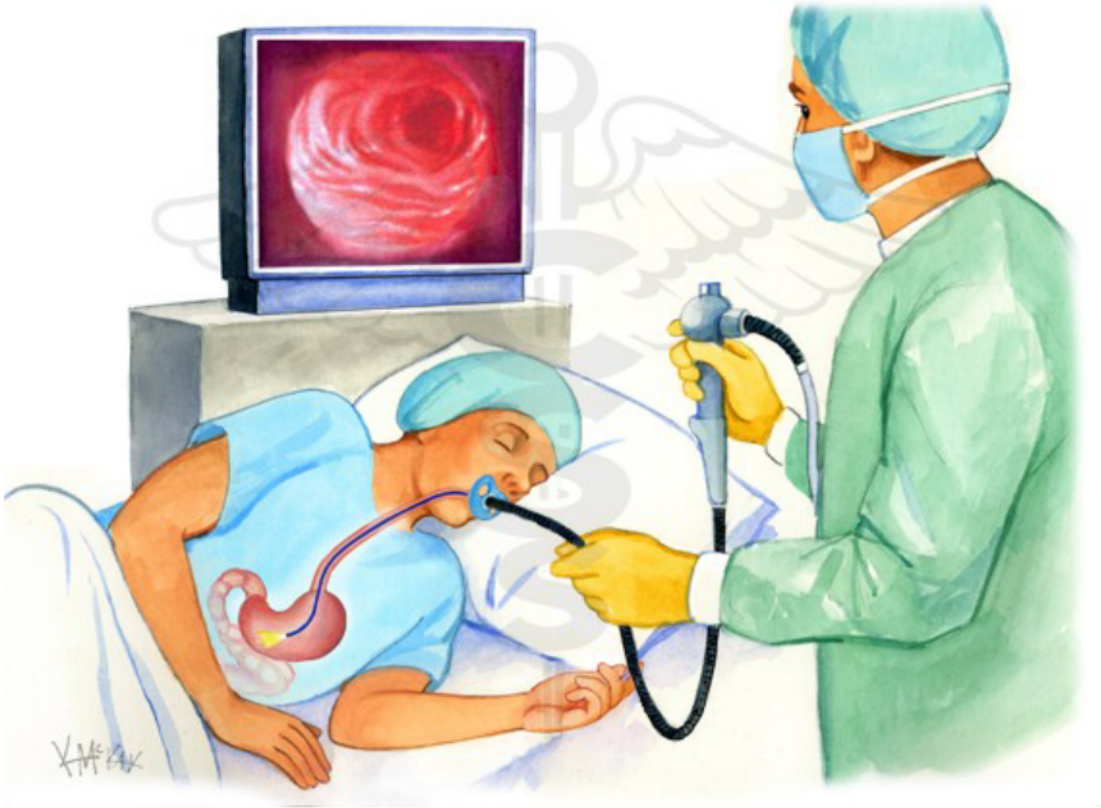
Upper GI



Lower GI



Endoscopy



Gastroscopy

Video capsule endoscopy caps

Capsule endoscopy

A capsule fitted with a disposable mini video camera can examine parts of the small intestine that standard scopes can't reach for diagnosing unexplained bleeding or other abnormalities. The video data is transmitted and stored in a recorder worn on a belt, and is later downloaded to a computer that the doctor can study.

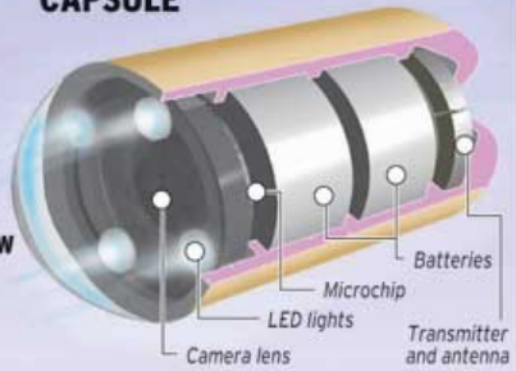
THE PROCEDURE

1. Fasting necessary prior to swallowing capsule
2. Capsule glides smoothly through digestive tract
3. Wireless recorder worn on a belt around waist receives signals transmitted by capsule through sensors placed on patient's body
4. Capsule naturally excreted

What it can show

- Stomach
- Colon
- Small intestine disorders
- Rectum
- Small intestine

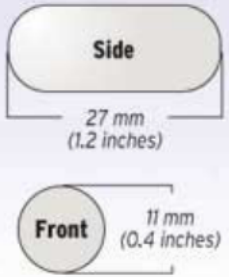
THE CAPSULE



Advantages:

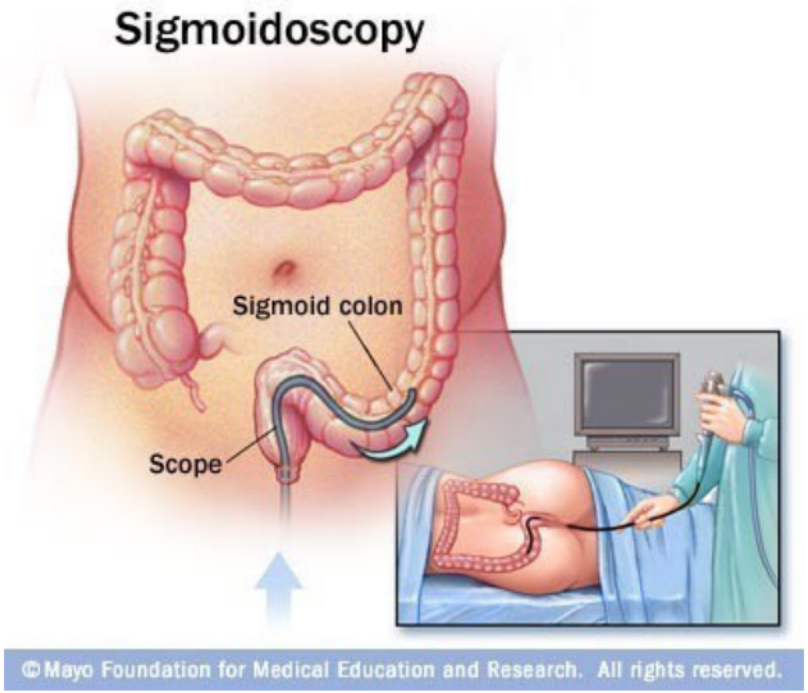
- Painless
- No sedation
- Provides 3-D, color images of small intestines without surgery
- Allows doctors to make early, accurate diagnosis of problems so they can recommend most appropriate treatment

Size:

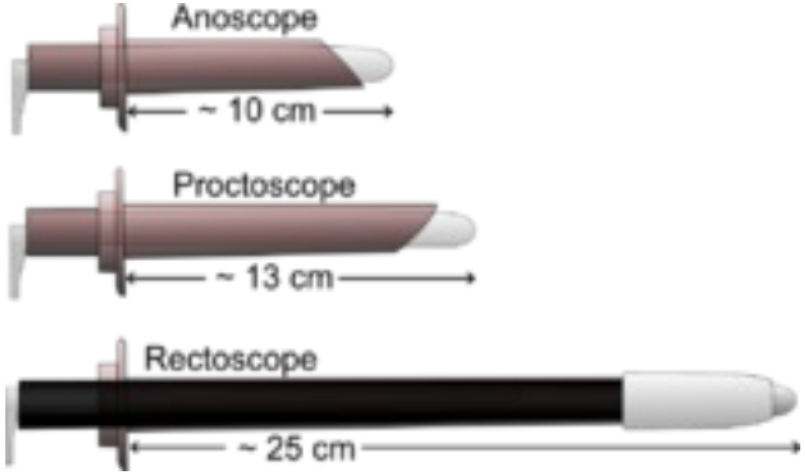


SOURCE: GIVEN IMAGING

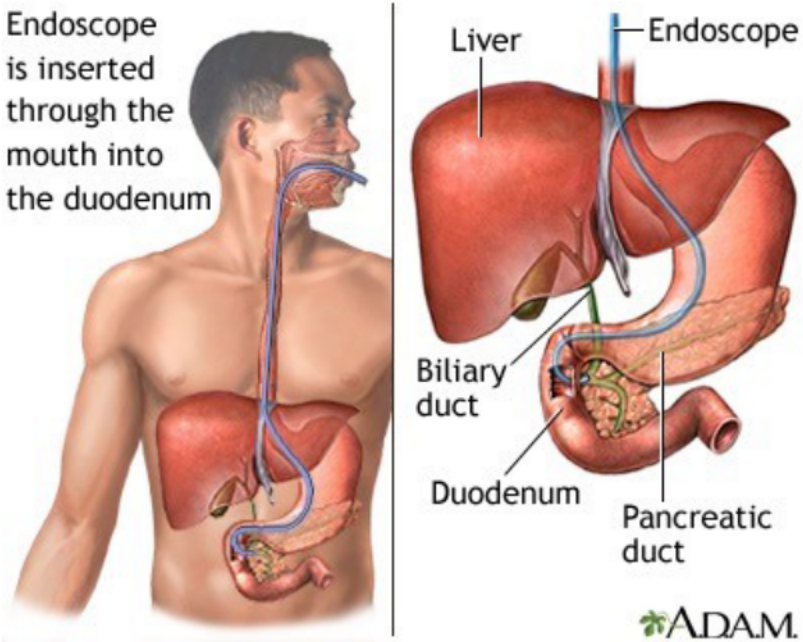
KNIGHT RIDDER/TRIBUNE



Sigmoidoscopy



Scopes


Endoscope is inserted through the mouth into the duodenum
Liver
Endoscope
Biliary duct
Duodenum
Pancreatic duct
A.D.A.M.

ERCP

Emergencies

“Never let the sun set on an acute abdomen”

~ Cope

Emergencies- Abdominal Pain

Pain, especially acute and severe, is an intra-abdominal disorder.

Must decide quickly if patient has a surgical abdomen.

Gangrene and perforation can occur in as little as 6 hours after interruption of intestinal blood supply.

Abdominal Pain -etiology

Appendicitis, perforated peptic ulcer, intestinal obstruction, peritonitis, perforated diverticulitis, twisted ovarian cyst, ectopic pregnancy, leaking abdominal aneurysm, mesenteric embolism or thrombosis.

Biliary tract disease, pancreatitis, renal calculi usually need urgent care.

Abdominal Pain -History

1. Acute or chronic

   Chronic usually functional or needing a long dx work-up

2. Sudden onset

   Perforation, pancreatitis, ruptured aneurysm

3. Length of attack

   If gone now, biliary or renal colic

Abdominal Pain -History cont.

Severity, location, radiation

Type of pain:

1. Severe, knife-like -emergency
2. Burning -functional, ulcers
3. Waves of sharp, constricting pain -biliary or renal colic
4. Tearing -dissecting aneurysm
5. Colicky pain that becomes steady -appendicitis, obstruction, vascular accident

Abdominal Pain -History cont.

What ameliorates it

Associates sx -immediately before onset of pain

If nausea or vomiting precede pain, surgery not likely

Past hx of sx

Drug hx

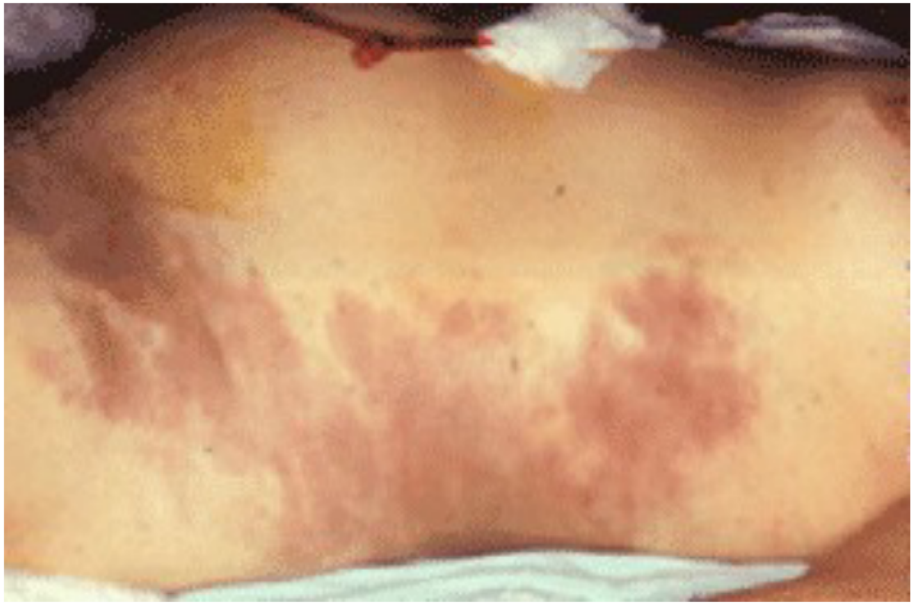
Abdominal pain -signs and symptoms

1. Vital signs -Temp, HR, RR, BP
2. Shock, pallor, sweating
3. Abdominal peristalsis
4. Bowel sounds
5. Distention, contraction, masses
6. Tenderness, rebound tenderness -Murphy’s sign, McBurney’s point
7. Grey Turner’s sign -extravasation of hemorrhagic exudates to flanks
8. Cullen’s sign -extravasation of hemorrhagic exudates to umbilical region

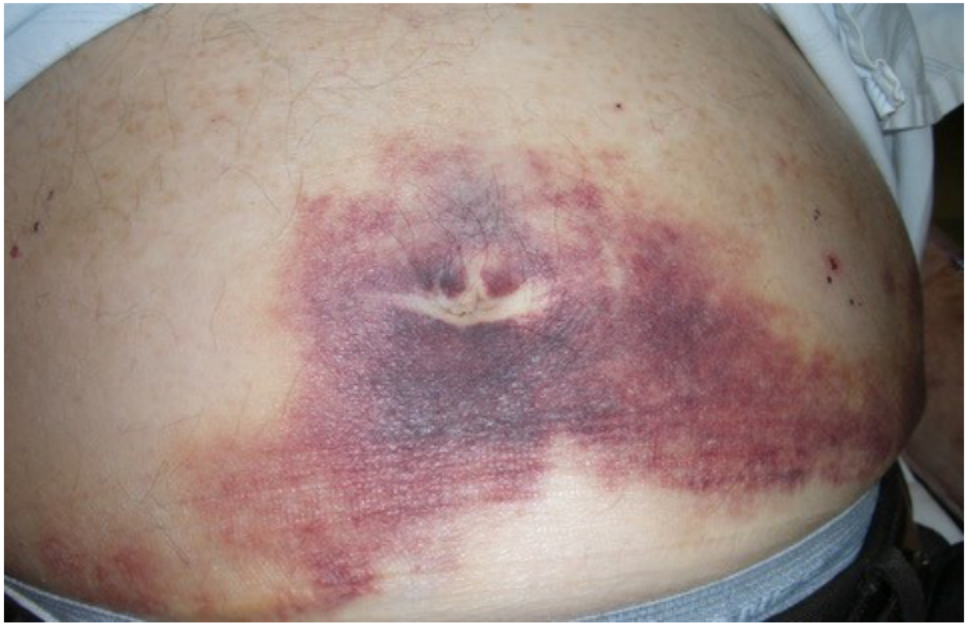
Diagnosis -every test possible!

Ominous signs in Acute Abdomen

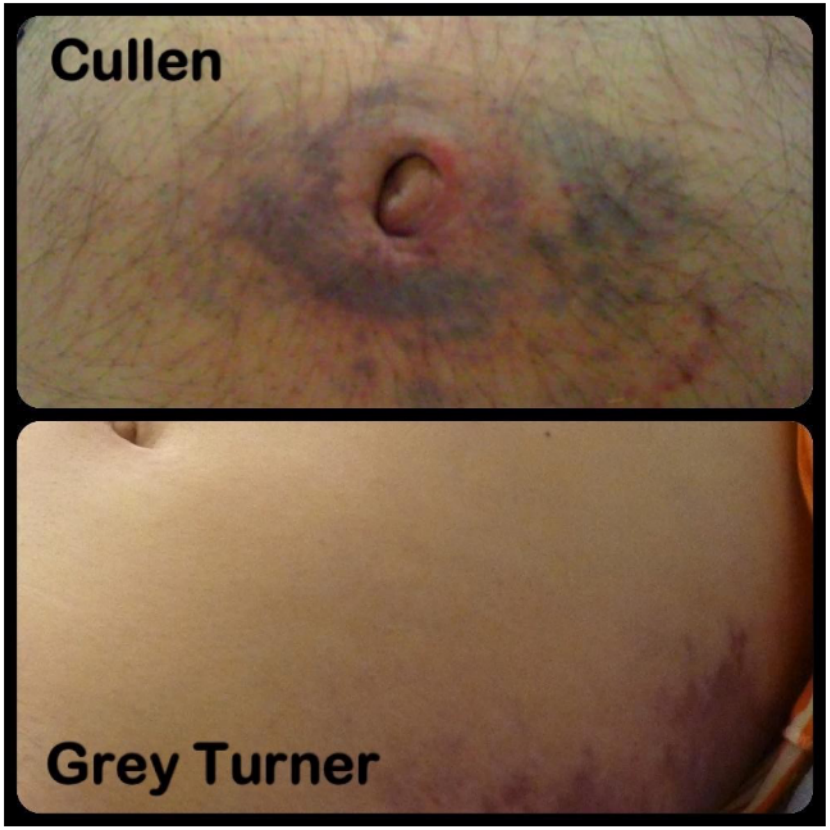
1. Sudden onset with max intensity
2. Pain disrupts sleep
3. Pain followed by vomiting
4. Migration and localization of pain
5. Pain with movement
6. Inability for oral intake
7. Fever
8. Pain out of proportion to the examination



Grey Turner’s sign



Cullen’s sign

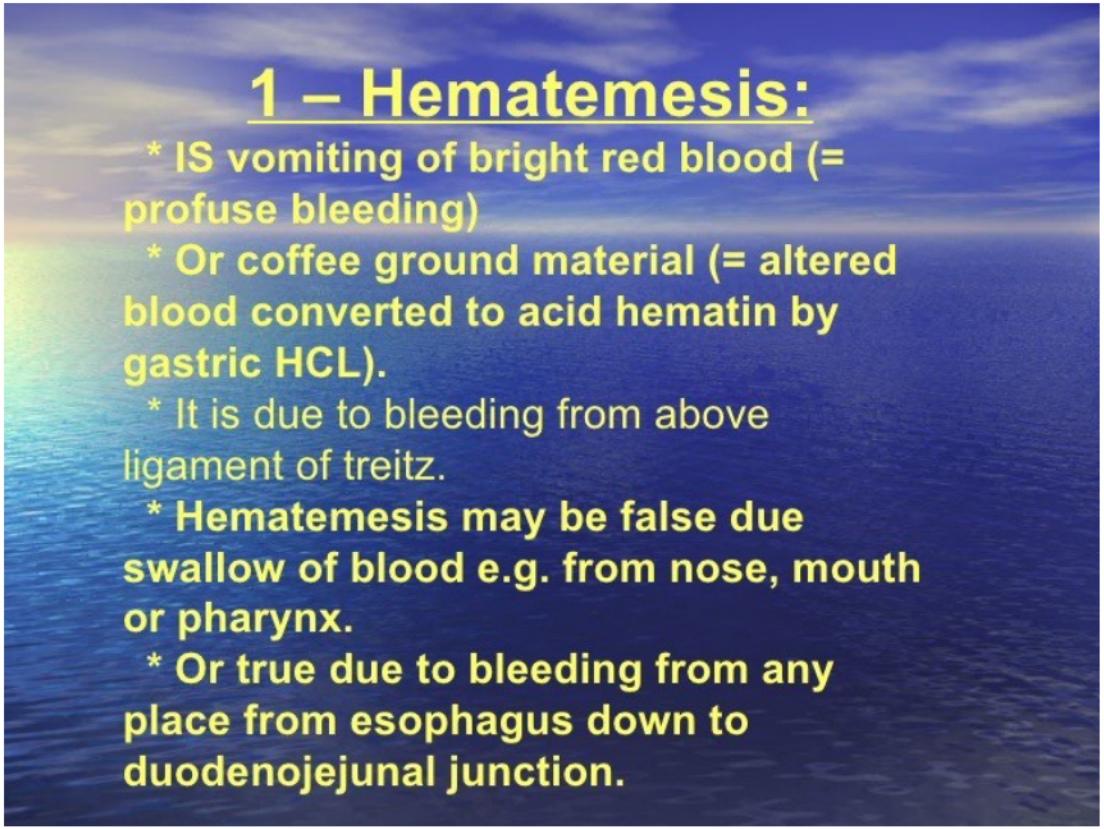


Cullen and Grey Turner signs

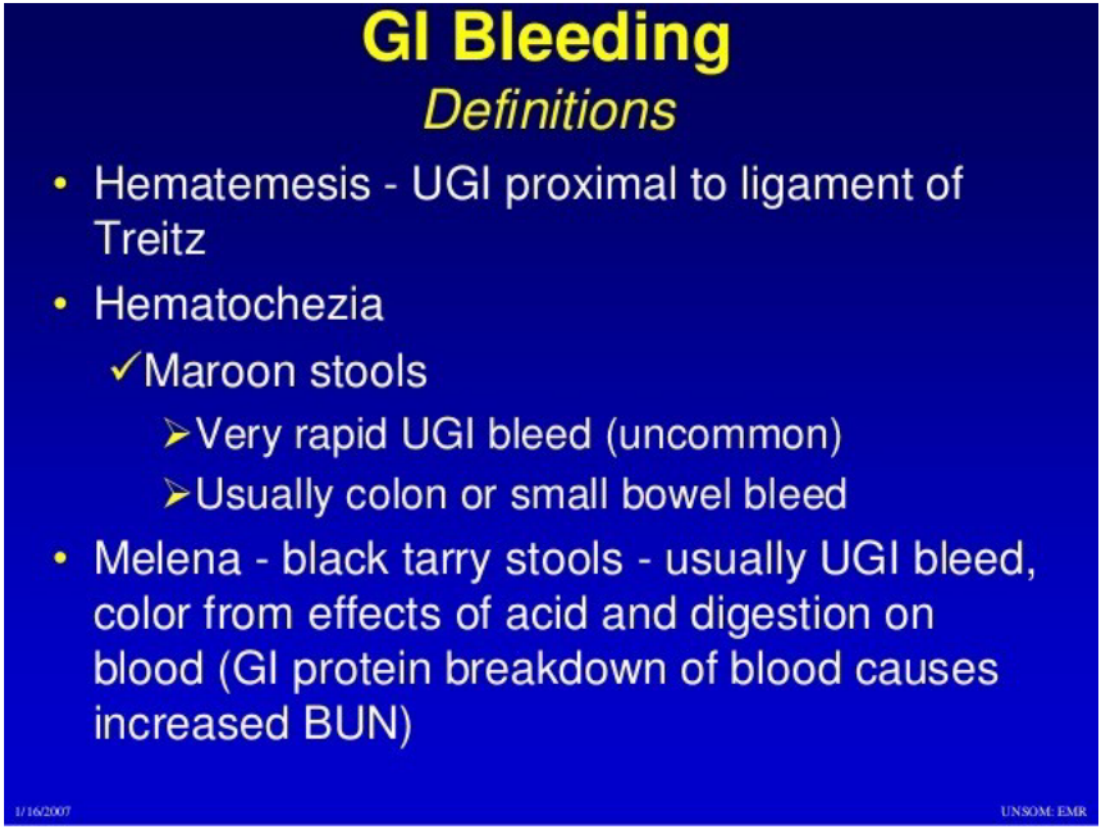
Emergencies- GI Bleeding

Etiology:

Duodenal ulcer, gastric or duodenal erosions, varices, gastric ulcer, diverticular disease, colon CA, colon polyps, IBD, colitis, hemorrhoids, anal fissure, SI neoplasm



GI bleed definitions



GI bleed -definitions

GI Bleeding -history

1. Weight loss, anorexia -neoplasm
2. Abdominal pain better with food, antacids -peptic ulcer
3. Dysphagia -esophageal
4. Bloody diarrhea, fever, pain -IBD, infectious
5. Changes in bowel habits -colon CA, polyps
6. Fresh blood on surface of stools -hemorrhoids, rectal lesion
7. Drug ingestion -aspirin, NSAIDs
8. trauma

GI Bleeding -signs and symptoms

1. Depends on source, rate, underlying disease process
2. Weakness, fatigue, pallor, dizziness, chest pain
3. Shock, orthostatic pulse or BP changes
4. Check nasopharynx for bleeding source

GI bleeding - diagnosis and treatment

1. Occult blood in stool requires extensive testing
2. Nasogastric aspiration
3. Panendoscopy -esophagus, stomach, duodenum
4. Anoscopy, sigmoidoscopy, colonoscopy

Treatment:

Emergency referral to ER.

Emergencies- Intestinal Obstruction

1. Complete arrest or serious impairment to the passage of intestinal contents.

2. Ileus of mechanical

“ a silent abdomen demands a laparotomy”

~ Cope

Intestinal Obstruction- Ileus

A temporary arrest of intestinal peristalsis

Usually with intraperitoneal infection

Signs and sx:

1. Abdominal distension, vomiting, obstipation, cramps
2. Silent to auscultation

Treatment:

Surgery if present for more than 1 week.

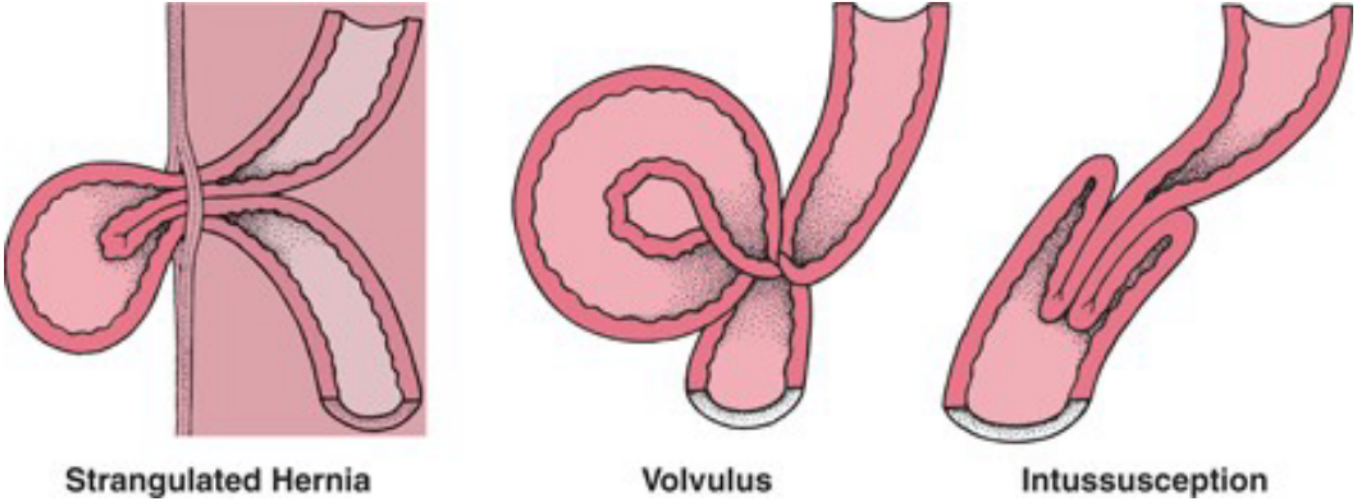
Intestinal Obstruction- mechanical

Simple or strangulating

Strangulating type cuts off blood flow

Etiology

Adhesions, hernias, tumors, foreign bodies, IBD, fecal impaction, volvulus, intussusception, Hirschsprung's



Types of intestinal obstruction

Intestinal obstruction- mechanical SI

Signs and symptoms

1. Cramps around umbilicus
2. Vomiting
3. Obstipation
4. Strangulation occurs in 25% of SI obstruction and can progress to gangrene in 6 hours
5. No tenderness if no strangulation
6. High pitched peristalsis with cramps
7. tenderness , distention, silence with strangulation
8. Dx CT scan, laparotomy

Intestinal obstruction - mechanical LI

Signs and symptoms

1. More gradual appearance of sx
2. Increasing constipation, obstipation, distention
3. Lower abdominal cramps
4. Distended abdomen with loud borborygmus
5. Possible palpable mass
6. Dx by x-ray, endoscopy, barium enema

Treatment:

Every patient with possible obstruction should be hospitalized.

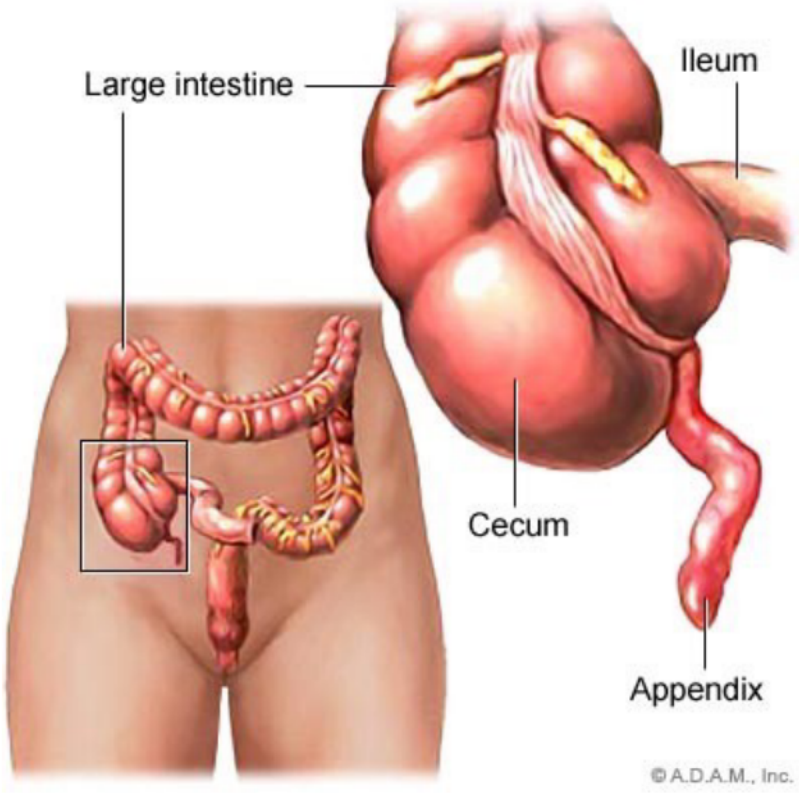
Emergencies- Appendicitis

Acute inflammation of the appendix

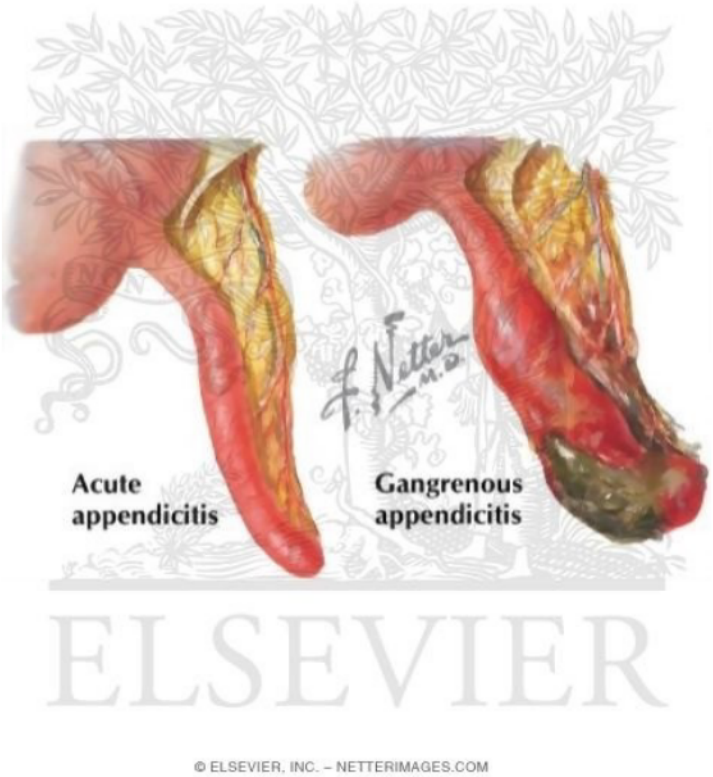
Incidence:

Most common cause for an attack of acute abdominal pain and surgery in the US.

15% of surgeries for this lead to other findings.



Appendix



Types of appendicitis

Appendicitis -signs and symptoms

1, Sudden onset of epigastric or periumbilical pain.

2. Nausea and vomiting

3. RLQ pain after a few hours

4. RLQ tenderness and rebound tenderness

5. Localized pain on cough

6. Decreased BMs

7. Low grade fever

8. Mild leukocytosis

9. Tenderness at McBurney’s point

10. Rovsing sign

11. Psoas sign

12. Obturator sign

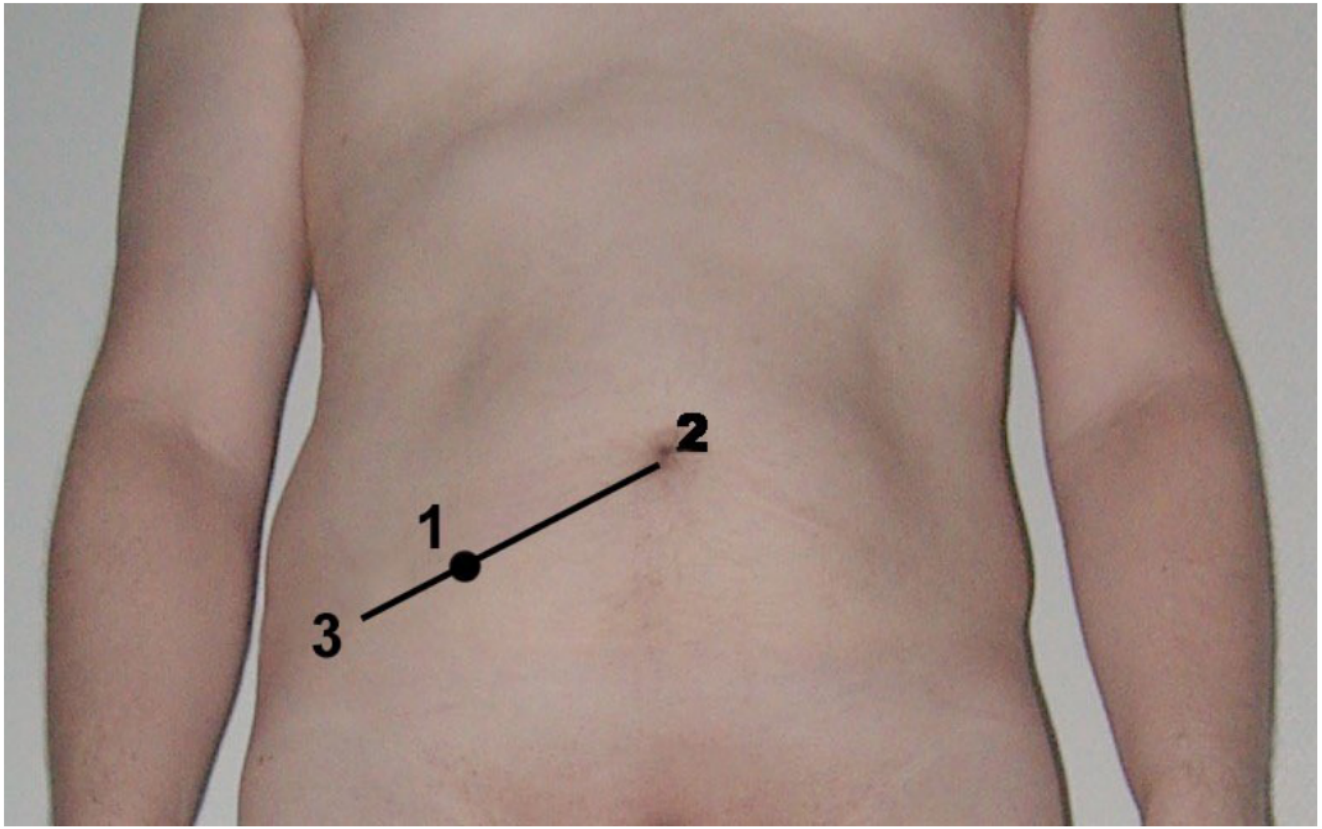
13. Pain on rectal exam

Appendicitis

Typical signs and symptoms in less than 50% of patients.

Many variations

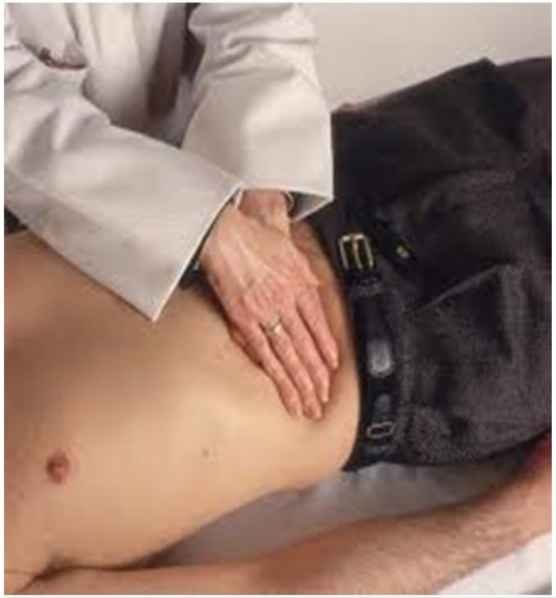
1. Non localized pain
2. Absent or diffuse tenderness even with pain, fever, leukocytosis,



McBurney’s point

CLINICAL FEATURES

ROVSING'S SIGN



Continuous deep palpation starting from the left iliac fossa upwards (anti clockwise along the colon) may cause pain in the right iliac fossa, by pushing bowel contents towards the ileocaecal valve and thus increasing pressure around the appendix. This is the Rovsing's sign.

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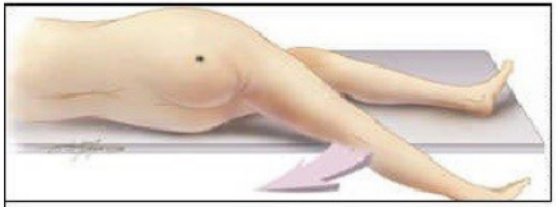
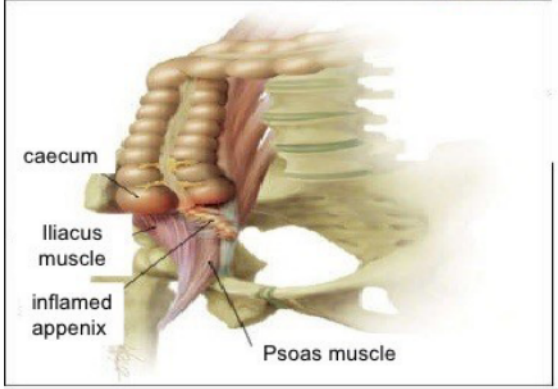
Rovsing's sign

CLINICAL FEATURES

PSOA'S SIGN





Psoas sign is right lower-quadrant pain that is produced with the patient extending the hip due to inflammation of the peritoneum overlying the psoas muscles and inflammation of the psoas muscles themselves. Straightening out the leg causes the pain because it stretches the muscles, and flexing the hip into the "fetal position" relieves the pain.

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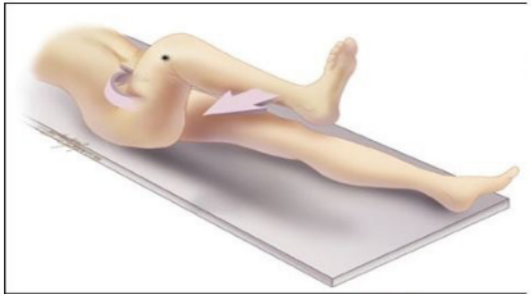
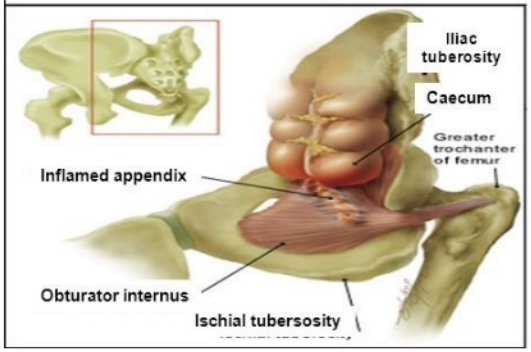
Psoas sign

CLINICAL FEATURES

OBTURATOR'S SIGN





Pain on passive internal rotation of the flexed thigh. Examiner moves lower leg laterally while applying resistance to the lateral side of the knee (asterisk) resulting in internal rotation of the femur..

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Obturator sign

Table – Sensitivity and specificity values for signs and symptoms of acute appendicitis in non-pregnant patients

Sign or symptom	Sensitivity (%)	Specificity (%)
Right lower quadrant pain	81	53
Rigidity	27	83
Migration of pain	64	82
Psoas sign	16	95
Fever	67	79
Rebound tenderness	63	69
Guarding	74	57
No history of similar pain	81	41
Rectal tenderness	41	77
Anorexia	68	36
Nausea	58	37
Vomiting	51	45

Adapted from Wagner JM et al. *JAMA*. 1996.[20]

Sensitivity and specificity values for appendicitis

Appendicitis- diagnosis

1. Clinical -ALVARADO score for appendicitis
2. Leukocytosis
3. X-ray, ultrasound, CT scan of little use in the early stages
4. In late stages, ultrasound and CT scan can help
5. Contrast CT fairly accurate

Appendicitis- Treatment

1. Perforation can occur in less than 24 hours after onset of sx.

2. If suspected clinically, rapid surgery to avoid perforation and peritonitis.

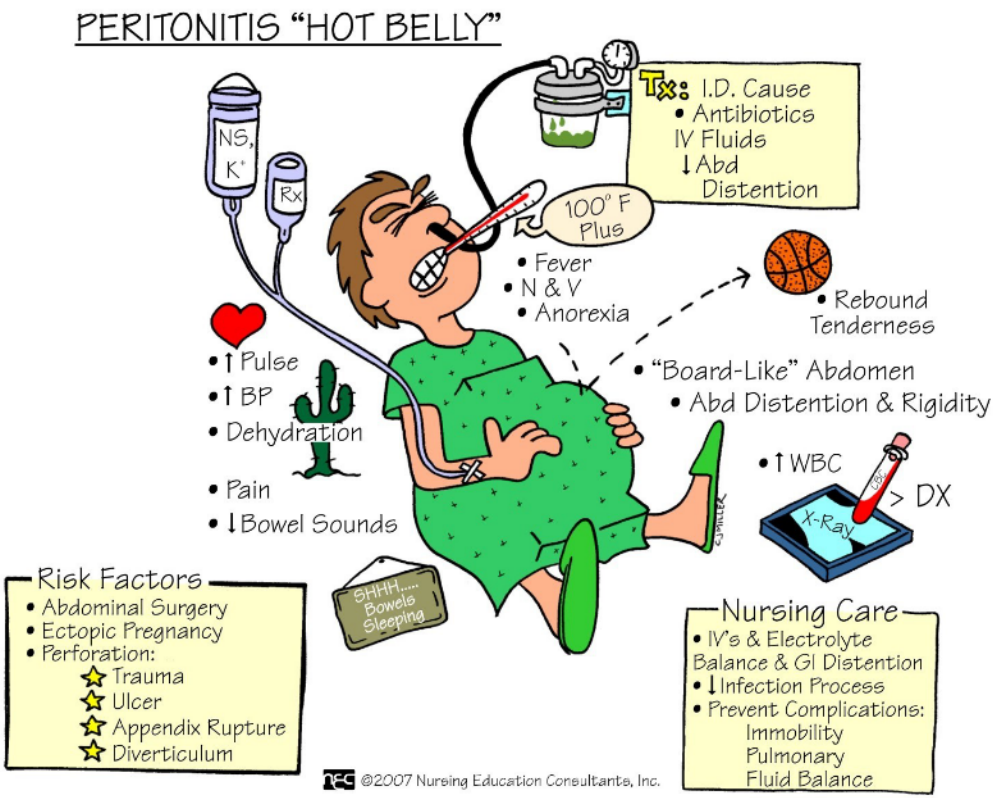
3. Refer to ER of suspected.

Emergencies- Peritonitis

Inflammation of the peritoneal cavity

Etiology:

Perforation of the GI tract, trauma, blood, pancreatitis, PID, vascular accidents, ruptured appendix



Peritonitis signs and symptoms

Peritonitis

Diagnosis

Determine the cause as rapidly as possible.

X-rays, laparotomy

Complications

Rapid multi-system failure, dehydration,

Respiratory distress, DIC

Treatment

Refer to ER

Emergencies- Pancreatitis

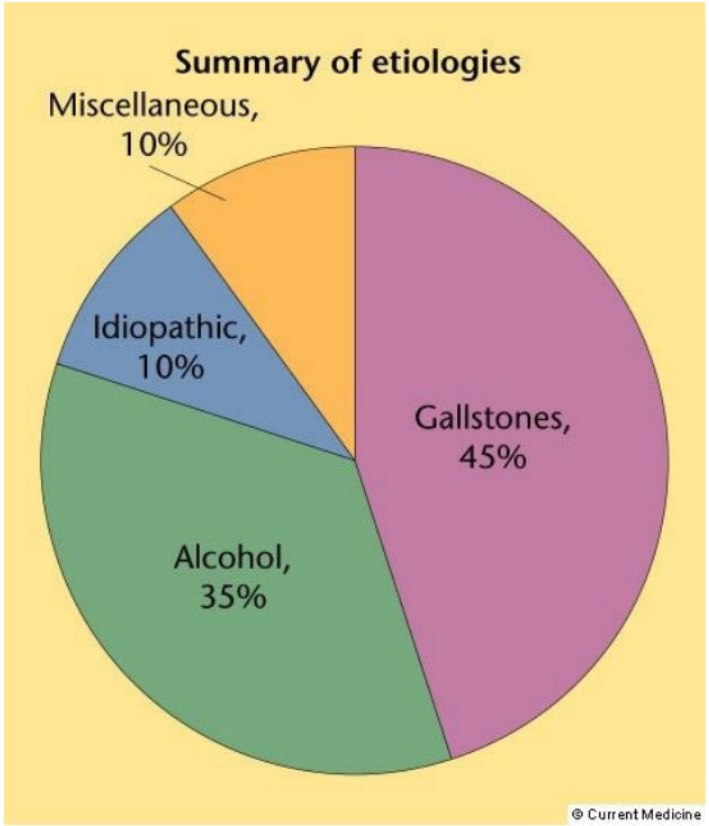
Inflammation of the pancreas.

Signs and symptoms

1. Sudden severe abdominal pain.
2. Pain radiates straight though back in 50%
3. Steady, boring pain
4. Lasts hours to several days without relief.

Emergencies- Pancreatitis signs and symptoms

5. Nausea and vomiting
6. Upper abdominal tenderness and muscular rigidity
7. Sweaty, rapid HR
8. Postural hypotension
9. T: 100-101 degrees
10. Semi-comatose



Etiologies of pancreatitis

Pancreatitis Causes

knowmedge

I	IDIOPATHIC	
G	GALLSTONES	2nd most common cause in the US
E	ETHANOL	Most common cause in the US
T	TRAUMA	
S	STEROIDS	
M	MUMPS / MALIGNANCY	
A	AUTOIMMUNE	May have IgG4 antibody present
S	SCORPION STING	
H	HYPERTRIGLYCERIDES OR HYPERCALCEMIA	Usually TG >1000
E	ERCP	
D	DRUGS	(e.g. HCTZ, Didanosine, Pentamidine, Bactrim, Azathioprine)

Mnemonic for Pancreatitis

Pancreatitis- Ddx

Acute pancreatitis should be considered in diagnosis of every acute abdomen.

- Perforated ulcer, mesenteric infarction, intestinal obstruction with strangulation, ectopic PG, dissecting aneurysm, biliary colic, appendicitis, diverticulitis

Pancreatitis: testing and treatment

Serum amylase and lipase, leukocytosis, plain films of abdomen, ultrasound, CT scan, ERCP

Treatment:

1. Nothing by mouth and refer to ER

Study Questions

Describe the typical clinical presentation of acute appendicitis.

What are some potential positive physical exam findings?

What are some complications of untreated appendicitis?

Describe the typical clinical presentation of acute pancreatitis.

What are some of the most common causes of acute pancreatitis?

What are some potential non GI causes of acute abdomen?