Belly Pain and Vomiting: When to Worry?

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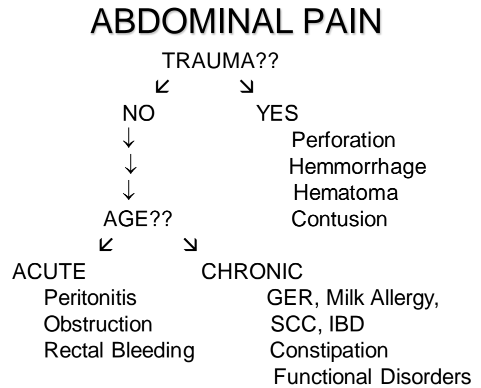
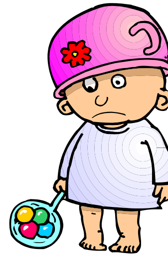
ABDOMINAL PAIN



INFANTS: Birth to 1 Year

- NEWBORNS
  - Anomalies of the GI tract
  - NEC
  - Perforation
  - Volvulus
- INFANTS up to 1 year
  - Colic, Constipation
  - Gastroenteristis
  - UTI
  - Incarcerated Hernia
  - Intussusception
  - Volvulus
  - Hirschsprung's Disease

TWO TO FIVE YEARS



- Gastroenteritis
- Constipation
- Appendicitis
- UTI
- Intussusception
- Volvulus
- Trauma
- Sickle Cell
- HSP
- Pharyngitis

SCHOOL AGE: 6 to 11 Years

- Appendicitis
- Gastroenteritis
- Constipation
- Functional pain
- UTI
- Trauma
- Sickle Cell
- HSP
- Mesenteric Adenitis

ADOLESCENTS: 12 to 18 yrs.

- Appendicitis
- Ovarian / Testicular Torsion
- IBD
- Gastroenteritis
- Constipation
- Dysmenorrhea
- Mittelscherz
- PID

Is All Belly Pain The Same?

- Visceral Pain
  - Irritation to viscus⇒tension, stretching, ischemia
  - Visceral pain fibers: bilateral, unmyelinated, enter spinal cord at various levels
  - Pain: dull, poorly localized and midline
- Parietal Pain
  - From the body wall, peritoneum
  - Myelinated fibers to specific dorsal root ganglia
  - Pain: sharp, intense, localized
  - Aggravated by movement or coughing
- Referred Pain
  - Similar to parietal pain
  - Results from shared central neuron pathways
  - Pain: felt in distant location--Shoulder, Flank

STEPWISE APPROACH

- HISTORY
  - Medical, Surgical, Family
- REVIEW OF SYSTEMS
  - Sequence of events, Extra-intestinal symptoms, Growth failure, Weight loss, Recent illness
- THOROUGH PHYSICAL EXAM
- Laboratory Studies
- Radiologic Studies

HISTORY: RED FLAGS

- Young age
- Pain History indicating acute process
- Poor growth or weight loss
- Rash, Joint pain
- Blood in stool
- Blood in Urine
- Multiple sexual partners, unprotected sex

ABDOMINAL PAIN: RED FLAGS

- Age of patient
- Pain aggravated by movement
- Well-localized pain
- Night time awakening; restriction of activities
- Poor growth / weight loss
- Associated symptoms: vomiting, diarrhea, urinary tract symptoms, respiratory, sore throat
- Extra-intestinal manifestations: rash, mucosal ulcers, joint pain
- Abnormal physical exam
- Abnormal labs +/- radiographic studies

Bilious emesis is a surgical emergency until proven otherwise.

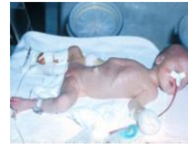
VOMITING
When Should You Worry?

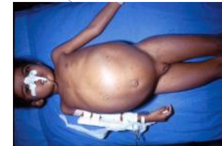
- Bilious
- Bloody
- Associated with other symptoms
- Poor Growth
- Electrolyte imbalance

Physical Exam: General Appearance

- Moving?
- Involuntary guarding?
- Color: pale, jaundice, rash, purpura
- Breathing pattern
- Hydration status
- Development

Physical Exam: Inspection





- Contour
- Scars, Bruising
- Hernias
- Visible Peristaltic Waves

Physical Exam

- Auscultation
  - Bowel sounds
- Percussion
  - Dullness, Tympani
- Palpation
  - Superficial then deep
  - Painful area last
  - Voluntary vs Involuntary Guarding
  - Peritoneal Signs?
  - Rebound tenderness

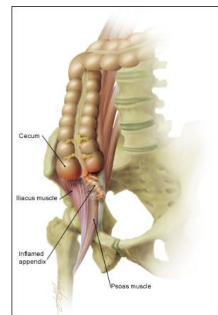


FIGURE 1B. Anatomic basis for the psoas sign: inflamed appendix is in a retroperitoneal location in contact with the psoas muscle, which is stretched by this maneuver.

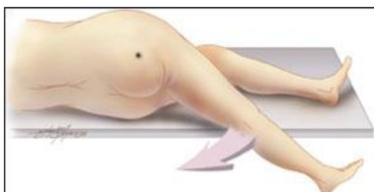


FIGURE 1A. The psoas sign. Pain on passive extension of the right thigh. Patient lies on left side. Examiner extends patient's right thigh while applying counter resistance to the right hip (asterisk).

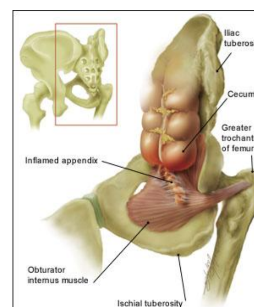


FIGURE 2B. Anatomic basis for the obturator sign: inflamed appendix in the pelvis is in contact with the obturator internus muscle, which is stretched by this maneuver.

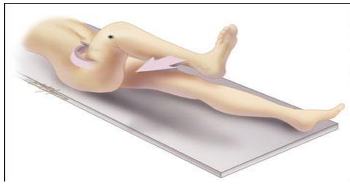
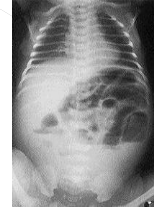
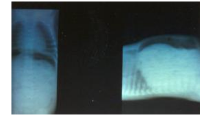


FIGURE 2A. The obturator sign. Pain on passive internal rotation of the flexed thigh. Examiner moves lower leg laterally while applying resistance to the lateral side of the knee (asterisk) resulting in internal rotation of the femur.

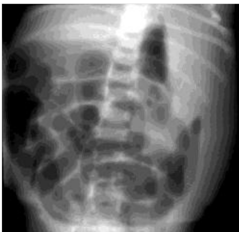
Radiologic Work-Up

- Plain Films
  - CXR: r/o pneumonia
  - Air-Fluid Levels
  - Free Air
  - Masses, FB, Calcifications
- Contrast Studies
- Ultrasound
- CT

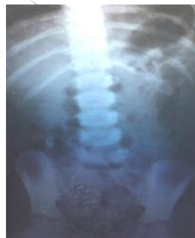




Plain Films

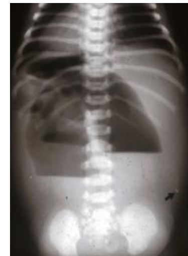


Dilated Loops

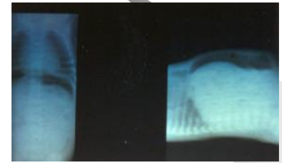


Fecalith

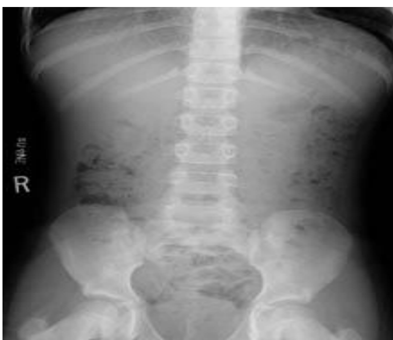
Plain Films



Air-Fluid Levels



Free Air



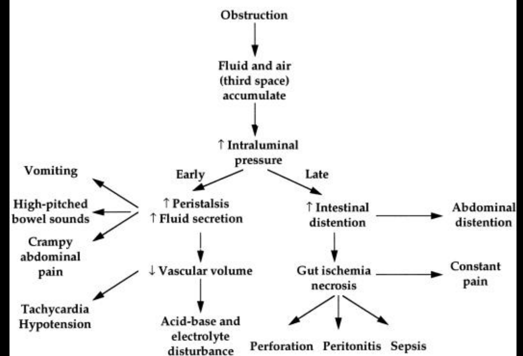
Constipation

Laboratory Work-Up

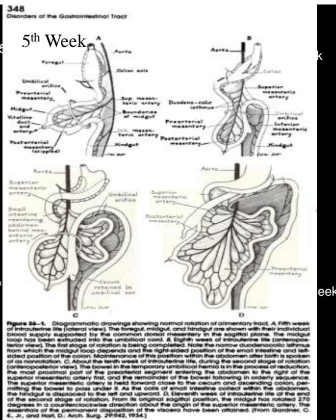
- CBC, with differential (? Bandemia)
- Chemistries
- Urine pregnancy test
- Urinalysis
- +/- LFT's, amylase, lipase
- +/- Rapid Strep
- Stool studies: occult blood, culture, white cells

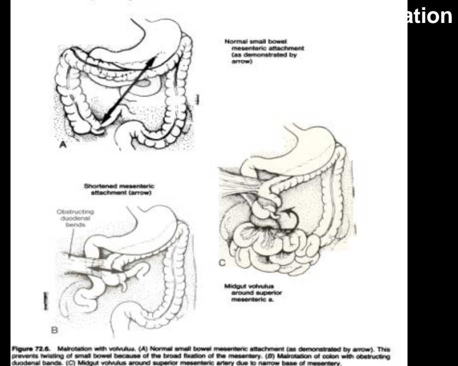
Causes of Intestinal Obstruction

Mechanical Obstruction		Paralytic Ileus	
Intraluminal	Extrinsic	Abdominal Conditions	Systemic Conditions
Atresia or stenosis	Malrotation	Hirchsprung's disease	Trauma
Pyloric stenosis	Volvulus	Intestinal pseudo-obstruction	Shock
Foreign body	Hernia	Severe gastroenteritis	Sepsis
Meconium	Annular pancreas	Perforation of viscus	Hypokalemia
Medications	Duplication cysts	Peritonitis	Drugs
Cholestyramine	Adhesions/bands	Pancreatitis	Diabetic acidosis
Antacid	Tumor	Necrotizing enterocolitis	
Kaolin	Granulomatous process	Toxic megacolon	
Intussusception			
Parasitic infection			



Normal Rotation

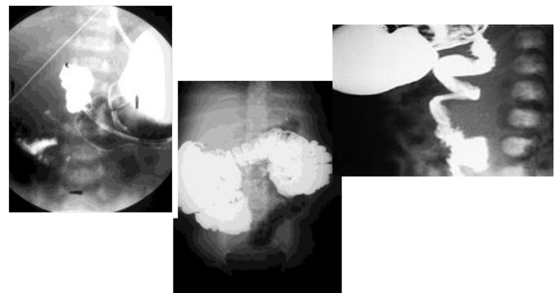




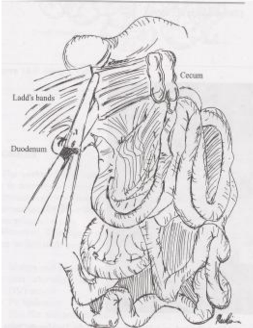
MALROTATION

- Failure of normal rotation & fixation
- Abnormal bands form
- Free floating bowel twists around SMA
- Diagnosed with UGI
- If found incidentally surgery still performed
- 2-3 hours of compromised blood supply leads to gut necrosis

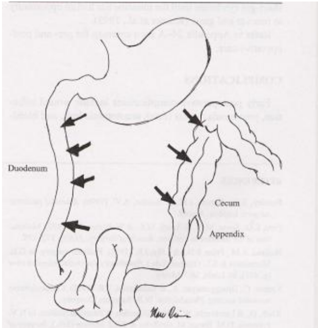
Malrotation



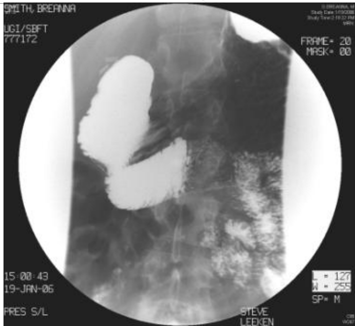
Division of Ladd's Bands



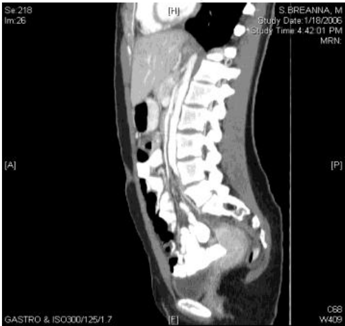
Spreading the Mesentary



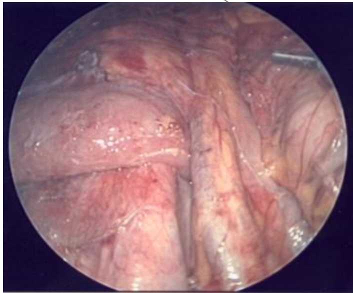
SMA Syndrome

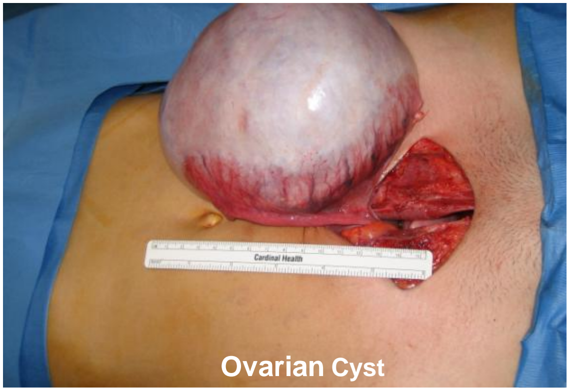


SMA Syndrome

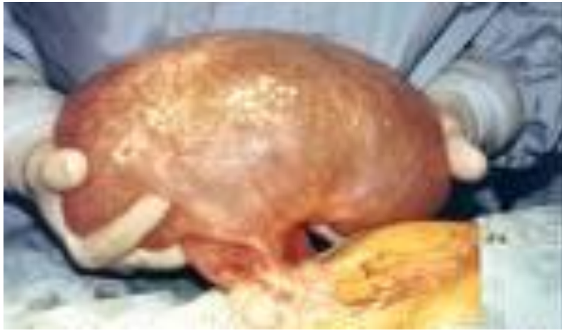


SMA Syndrome

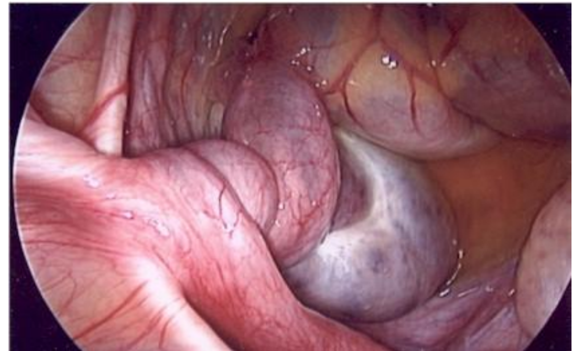




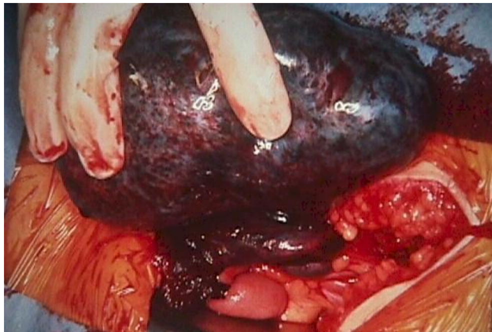
Ovarian Cyst



Giant Mesenteric Cyst

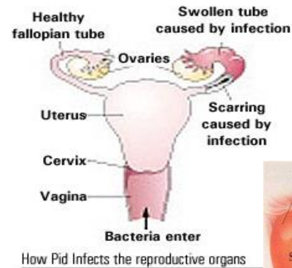


Ovarian Torsion

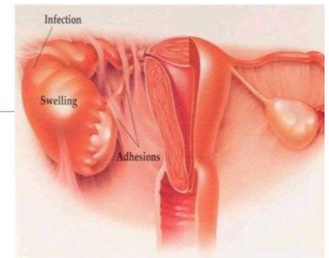


Ovarian Cyst with Torsion

Pelvic Inflammatory Disease



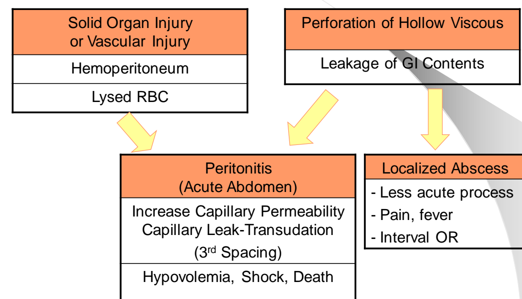
Treatment:
- Medical
- Antibiotics
- Counseling



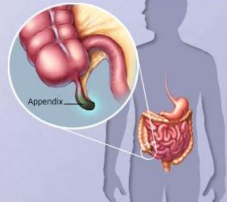
Acute Abdomen

- **Definition** - Any intra-abdominal condition requiring urgent surgical intervention.
- **Etiology**
  1. Abdominal Inflammation/ Peritonitis: NEC, perforated appendicitis, infection, pancreatitis
  2. Obstruction: gut ischemia and necrosis with subsequent perforation
  3. Perforation: Blunt or penetrating trauma, IBD,anastomotic leak, iatrogenic cause
  4. Hemorrhage: vascular injury

Pathophysiology of Peritonitis and Perforation



APPENDICITIS

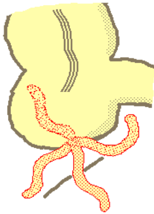


- Most common acute surgical condition of the abdomen
- 7% of the population affected
- Peak age: 10 to 30 years
- Diagnosis: Based on H & P
- Can be very unpredictable

APPENDICITIS

- Classic Symptoms: PAIN- Periumbilical then localizes to RLQ, followed by nausea and vomiting, fever
- Only 50% of cases present this way
- Onset of symptoms over 12 to 24 hours
- Perforation thought to be at about 36 to 48 hours after onset of symptoms

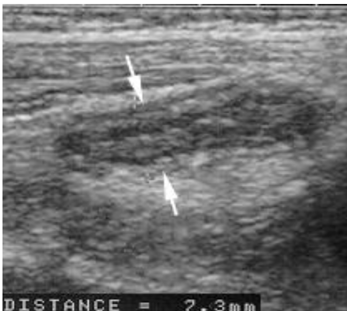
APPENDICITS

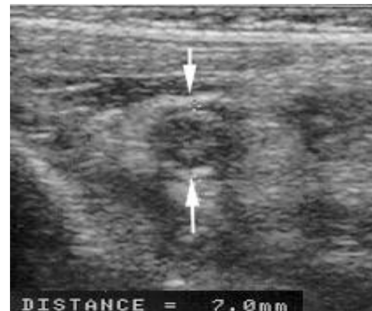


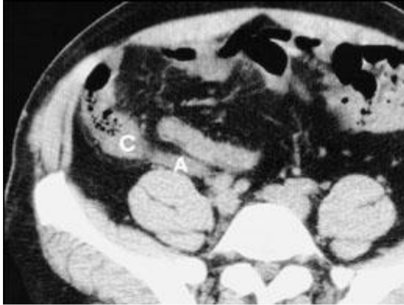
- Appendix may lie in a variety of positions, including retrocecal
- Up to 30% of cases may have a “hidden” appendix, thus affecting the disease presentation and physical exam

APPENDICITIS: WORK UP

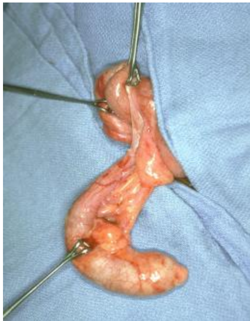
- History-pulmonary Sx, sore throat?
  - Sequence of events: pain first?
- Physical Exam-include rectal exam
  - Peritoneal Signs?
  - pelvic exam for adolescent girls
- Plain Films
  - CXR, Obstruction Series
- Laboratory
  - CBC w/ diff, UA, HCG, Chemistries
  - Stool cultures
- Ultrasound; Abdominal CT



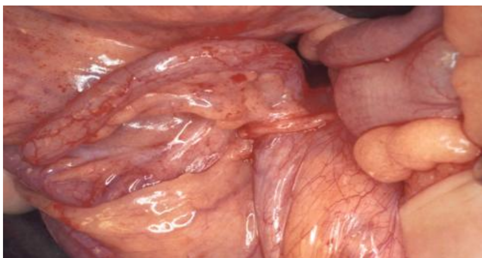


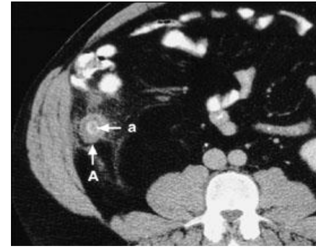


Thickened Appendix with Suppuration at Tip

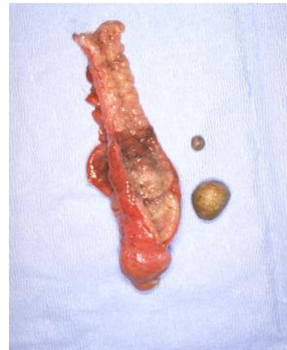


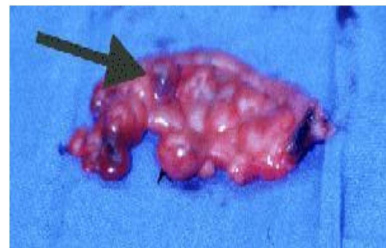
Inflamed Appendix





Appendix with Fecalith

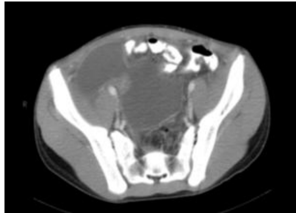




Perforation

Appendiceal Abscess

- Delayed surgical intervention can result in abscess formation
- Attempt IR drainage
- PICC line and IV Antibiotics 10 to 14 days
- Readmit for “Interval Appendectomy”



IBD: Clinical Presentation

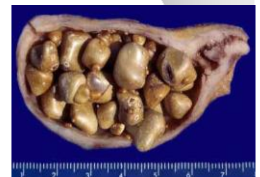
- Poor growth, weight loss
- Poor appetite, nausea, vomiting
- Anemia, fatigue, malaise
- Extra-intestinal manifestations: fever, joint pain, uveitis, rash, mouth ulcers
- Malabsorption: abdominal pain/ cramping, frequent loose stools with mucous and/or blood.
- Perianal disease: fistulas

Urgent Intervention in Crohn’s Disease

- Severe Inflammation with impending perforation
- Abscess secondary to fistulous or perianal disease
- Stricture

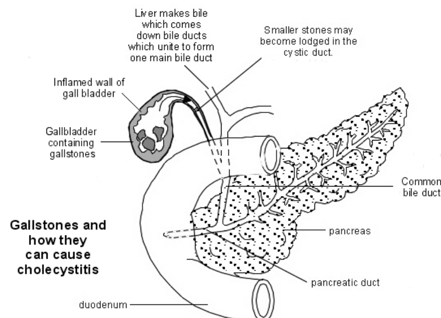
Gall Bladder Disease

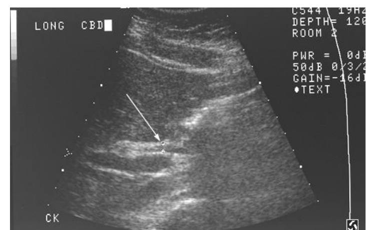
- Biliary Colic
- Acute Cholecysitis

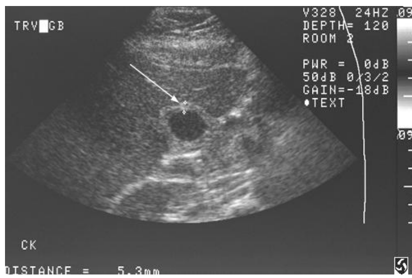


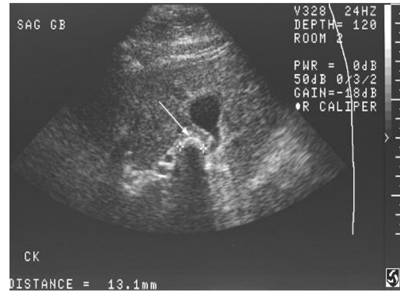
- Acute Cholangitis
- Biliary Pancreatitis

Gall Bladder Disease



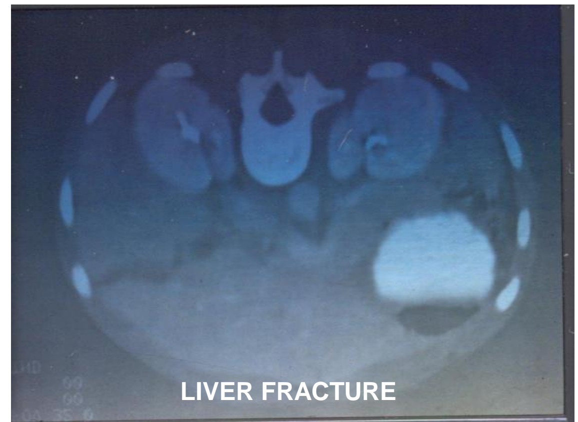




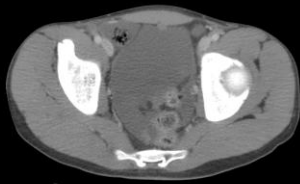


Abdominal Trauma

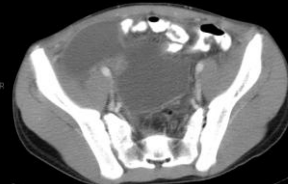
- More often blunt injury
- Blunt trauma treated conservatively unless there is clinical deterioration
  - Includes bedrest, serial exams, serial labs and films, slowly liberalize activity
- Vascular injury and hemoperitoneum causes peritoneal irritation--operative intervention if hemodynamically unstable
- Perforative injury requires urgent surgical intervention



Seat Belt Injury: Bowel Wall Thickening



Seat Belt Injury: Abscess



Pancreatic Trauma

"Don't Mess with the Pancreas" M. Nance, MD

- Different than liver or spleen
- This is a glandular organ—very secretory
- Can have diffuse pancreatitis with autodigestion of surrounding tissues
- May or may not subsequently develop a pseudo-cyst
- Requires bowel rest and conservative management
- ERCP for stent placement to internally drain pseudocyst
- Open surgical intervention ("cystgastrostomy") last resort

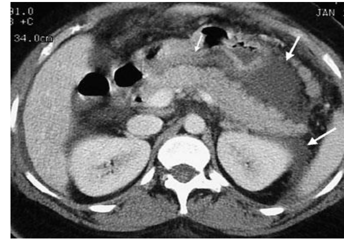
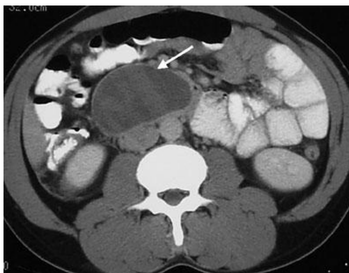


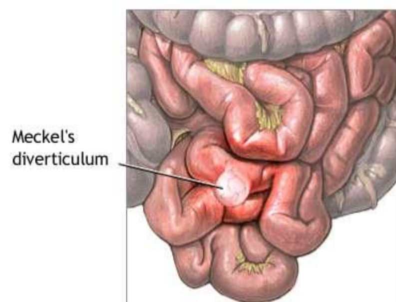
FIGURE 2. Contrast-enhanced axial computed tomographic section of the upper abdomen showing peripancreatic and retroperitoneal edema *(large arrows)* and stranding. The pancreas itself *(small arrow)* appears relatively normal

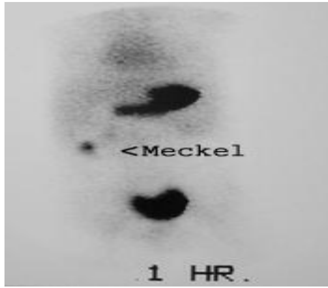
Pancreatic Pseudocyst



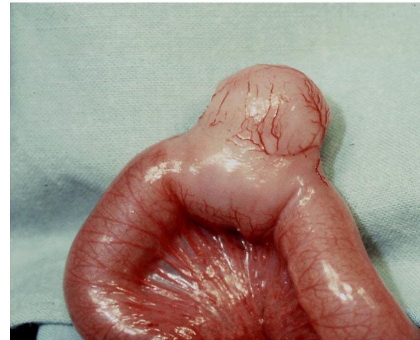
Meckel's Diverticulum

- Remnant of omphalomesenteric duct
- Located on antimesenteric border of terminal ileum within 60cm of: ileocecal valve
- 57% are lined with ectopic gastric mucosa often leading to ulceration & painless hemorrhage
- Also can lead to diverticulitis, intussusception, obstruction, perforatioon, requiring surgical intervention





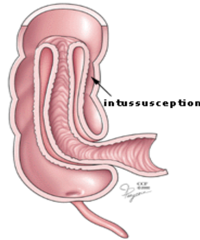
- Diagnostic Test: “Meckel’s Scan”
- Nuclear Med Scan where isotope is taken up by gastric mucosa, whether within the stomach or ectopic.



Meckel’s Diverticulum

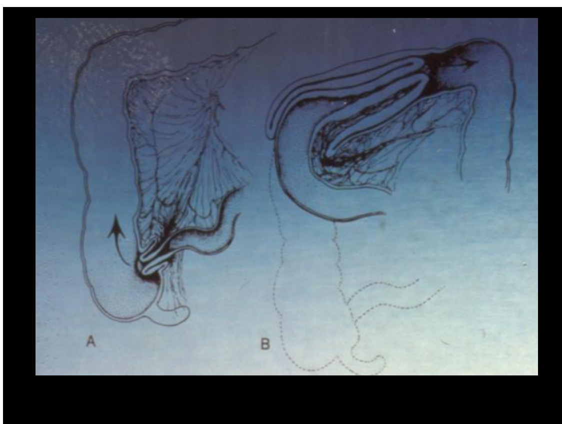
Intussusception

- Folding of the intestine into itself (telescoping)
- Second most common cause of intestinal obstruction
- 90% near the ileocecal valve
- Lead Points: Meckel’s, polyp, tumor, anastomosis
- Gastroenteritis →
  Hyperperistalsis
- 5% of cases recur after treatment



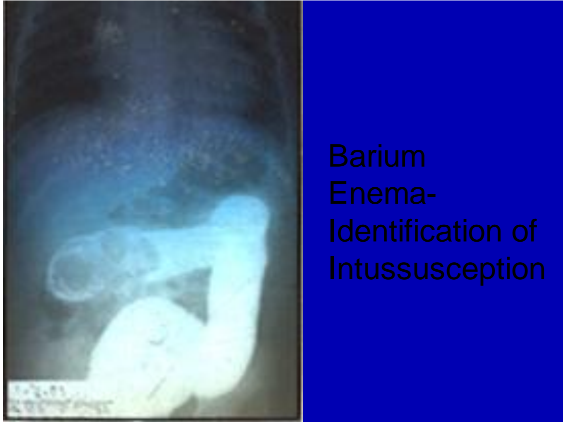
Signs and Symptoms Intussusception

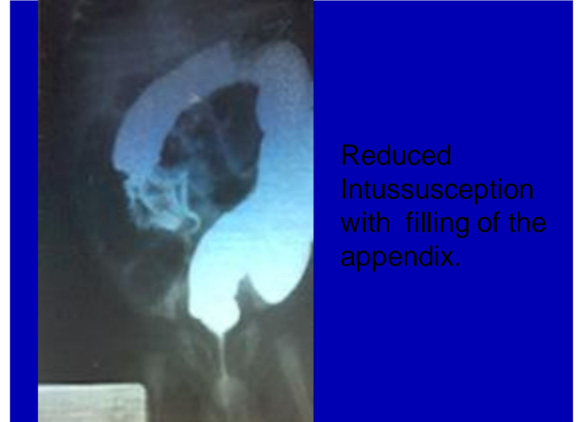
- Sudden onset of intermittent, crampy abdominal pain
- Anorexia
- Vomiting (nonbilious then becoming bilious)
- Irritable, then lethargic between episodes
- Currant jelly stool (heme positive)
- Tachycardic, hypotensive, temperature elevation-late signs (impending necrosis)



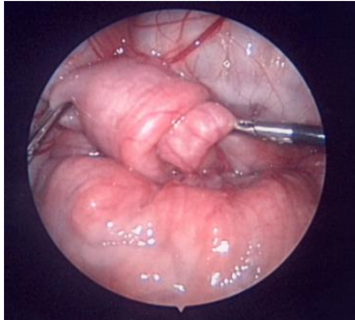
Radiographs

- **Plain Film -** paucity of gas and stool in the colon
- **Air or Barium Enema -** can be both diagnostic and therapeutic
  - Surgeon present for contrast enema
  - IV access: fluids, sedation, pain relief, and antibiotics





Ileo-Ileal Intussusception



Surgical Treatment

- **Indications**
  - Failed air or barium reduction
  - Evidence of bowel perforation or peritonitis
- **Surgical Management**
  - Transverse incision (RLQ)
  - Manual reduction
  - Resection and end-to-end anastomosis
  - Incidental appendectomy