Acute Abdominal Pain
Decision Making Pearls

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Objectives

• To recognize the major diagnostic patterns of the acute abdomen

• To examine the relevant anatomy and physiologic basis of acute abdominal pain

• To describe a diagnostic approach and management plan.
• Relevant anatomy and physiologic basis of acute abdominal pain
  • Visceral
  • Somatic
  • Referred

• Major diagnostic patterns of the acute abdomen
  • Importance of history
  • Importance of physical exam
  • Establishing the differential

• Diagnostic approach and management plan.
  • Labs
  • Imaging
  • Pharmacology and Treatment
  • Disposition
Basic Fundamentals

- History
- Physical Exam
- Review of Symptoms
- Anatomy
- Pathophysiology
- Epidemiology
- Pre-Test Probability
Definition: Acute Abdominal Pain

- What is “Acute”
- What is “Chronic”
- Why does it matter?
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<th>Right Hypochondriac</th>
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<td>Ascending Colon</td>
<td>Esophagus</td>
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<td>Cecum &amp; Ascending Colon</td>
<td>Rectum</td>
<td>Left Ovary (F)</td>
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<td>Right Fallopian Tube (F)</td>
<td>Right &amp; Left Fallopian Tubes (F)</td>
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<td>Right Ovary (F)</td>
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Presence of pain

- Visceral pain
  - Due to distention of a hollow viscus and transmits through the sympathetic, parasympathetic or somatic pathways.

- Somatic pain
  - Stems from an irritation of the innermost parietal surface and is transmitted through the segmental spinal nerves.

- Referred pain
  - Example: Kehr’s sign—diaphragmatic pain from blood or pus under the diaphragm which produces pain on the top of the shoulder.
Anatomy

- **Parietal Peritoneum (Somatic pain)**
  - Surrounds the anterior and posterior abdominal walls, undersurface of the diaphragm and the cavity of the pelvis
  - Pain stimuli starts in the parietal peritoneum, innervated by peripheral nerves
    - Patient experiences pain by TOUCH
    - CNS interprets at a specific cortical location
    - Described precisely as SHARP, localized with great accuracy by patient
Anatomy

- Visceral peritoneum
  - Continuation of the parietal peritoneum, which leaves the posterior wall of the abdominal cavity
  - Has no nerve supply
  - Is insensitive to touch and heat, or any condition that promotes an inflammatory reaction.
  - Pain is experienced due to traction, distention, spasm...
    - Vague, poorly described localization
    - Dull
    - Associated with nausea and vomiting
  - Primitive, therefore related to embryologic development
History (PQRST)

- Precipitating or Palliative
- Quality
- Radiates
- Severity
- Timing
- Associated Symptoms
Differential Diagnosis

- Rule out life-threatening pathology
- Consider Anatomy, Physiology and Epidemiology
  - Risk Factors
  - History and Physical
  - Workup
  - Differential
  - Referral
Lower Abdominal Pain

- Left Lower Quadrant
  - Diverticulitis
  - IBS
  - Colon Cancer
  - Constipation
  - Pelvic/Ovarian
  - Testicular Torsion
  - Ureterolithiasis

- Suprapubic
  - UTI
  - Pelvic/Uterine

- Right Lower Quadrant
  - Appendicitis
  - Mesenteric Adenitis
  - Pelvic/Ovarian
  - Testicular Torsion
  - Ureterolithiasis
Diverticulitis

- Most commonly Left Lower Quadrant

- In the United States, diverticula are present in approximately 50-80% of patients older than 65 years.

- More common in females over age 40 with hx of constipation, LLQ pain and diarrhea

- Occasionally low grade fever

- Elderly patients with diverticulitis are often afebrile, and an elevated WBC count is observed in less than one half.

- Only approximately 25% of patients have guaiac positive stool.

Risk stratification:
- Labs, CT, Colonoscopy
Irritable bowel syndrome

- Chronic abdominal pain with altered bowel habits in absence of any organic cause
  - No specific motility or structural correlates consistently present
  - Altered GI motility, visceral hyperalgesia, microscopic inflammation
- Altered bowel habits
  - Postprandial urgency
  - Alteration between constipation and diarrhea
- Abdominal pain
  - Diffuse without radiation, usually LLQ
  - Acute episodes superimposed on constant dull ache
- Be alert to red flags—differential diagnoses
Colon Cancer

- Consider that in older patients, a similar presentation to IBD with abdominal pain, change in bowel habits may indicate Cancer.

- Risk factors should be identified (age, family history)

- Among elderly patients discharged from the ED with a diagnosis of nonspecific abdominal pain, approximately 10% eventually are diagnosed with an underlying malignancy
Constipation

- Most common cause of acute abdominal pain in children is constipation

- YES! Do the rectal examination in any child with chronic constipation, regardless of age

- Exclude underlying anatomic abnormalities that might account for the constipation
  - imperforate anus with perineal fistula
  - intestinal obstruction (mass effect)
  - Hirschsprung disease

- In young infants, the anus should be sufficiently large to permit the introduction of a pinkie finger.
In young infants, functional constipation often develops at the time of a dietary transition (eg, from breast milk to formula, the addition of solid foods into the diet, from formula to whole milk).

In toddlers, functional constipation often develops near the time of toilet training. In toddlers and young children, constipation may develop following an illness associated with either a severe diaper dermatitis or dehydration.

In older children, functional constipation often develops at the time of school entry, because they refuse to defecate while they are at school.
Pediatric Constipation

Differentials

- Hirschsprung disease
- Spinal or Neuromuscular abnormalities
- Cerebral Palsy
- Hypothyroidism
- Anal Stenosis
- Imperforate anus with fistula
- Lactose Sensitivity vs Allergy
- Celiac Disease
 Constipation in Elderly

- Laxative use/Abuse
- Don’t miss the differentials
- Have a high index of suspicion for concerning pathology
Pelvic/Ovarian

- Ovarian Cyst
- Ovarian Torsion
- Ectopic
- PID
Ureterolithiasis

- Lower abdominal pain can reflect retroperitoneal pathology
- May begin in flank and migrate through abdomen to groin, testes or labia
- May mimic an acute abdomen
  - DDx: AAA
- Check a UA
  - WBCs
  - RBCs
  - pH
  - BUN/Cr
- KUB vs CT vs IVP
Appendicitis

- Classic Presentation
  - Periumbilical initially, localizing to RLQ
  - Not wanting to move or eat
- Fever, CBC are not reliable
- UA can be abnormal, but don’t be fooled
- X-ray vs US vs CT scan?
**Appendicitis in the Elderly**

- **Less common**
  - Only approximately 10% of cases of acute appendicitis occur in patients older than 60 years.
  - However, one half of all deaths from appendicitis occur in this age group.
  - The rate of perforation in elderly patients is approximately 50%, 5 times higher than in younger adults.
  - This is largely because 75% of elderly patients wait more than 24 hours to seek medical attention.

- **More than 50% of patients in this age group do not present with fever or leukocytosis.**

- Approximately one third do not localize pain to the right lower quadrant.

- One fourth do not have appreciable right lower quadrant tenderness.

- Only 20% of elderly patients present with anorexia, fever, right lower quadrant pain, and leukocytosis.

- The initial diagnosis is incorrect in 40-50% of patients in this age range.

- A high index of suspicion is necessary to avoid missing this diagnosis.
Mesenteric Adenitis

- Inflammatory condition of mesenteric lymph nodes, usually in RLQ
- Etiology
  - Viral and Bacterial gastroenteritis
  - GABHS
  - IBD
  - Lymphoma
- Mimics Appendicitis
- Presence of lymph nodes on diagnostic imaging does not by itself, exclude a diagnosis of appendicitis.
Testicular Torsion

- Torsion of the spermatic cord structures with subsequent loss of blood supply to ipsilateral testicle.

- Can occur at any age, most common in adolescent, and is the most frequent cause of testicle loss in that population.

- Early urologic consultation is mandatory if suspected.

- Presentation:
  - Pain duration of less than 24 hours
  - Nausea/vomiting
  - High position of testicle
  - Abnormal cremasteric reflex

- Success rates of manual detorsion vary from 26-80%.

- Testicular Torsion associated with testicular malignancy.
Upper Abdominal Pain

- Right Upper Quadrant
  - Biliary Colic
  - Cholelithiasis
  - Ureterolithiasis
  - Hepatitis
  - Ureterolithiasis
  - Pyelonephritis
- Epigastric
  - AAA
  - Gastritis
  - GERD
  - Dyspepsia
  - PUD
- Left Upper Quadrant
  - Pancreatitis
  - Ureterolithiasis
  - Pyelonephritis
- Periumbilical
  - SBO
  - Mesenteric Infarction/Ischemia
Biliary Colic

- Peritoneal irritation by direct contact with the gallbladder localizes the pain to the right upper quadrant, but it may radiate to the back or epigastrium.

- Typical gallbladder colic generally includes 1-5 hours of constant pain, most commonly in the epigastrium or right upper quadrant.

- The pain is severe, dull or boring, constant (not colicky).

- The onset of pain develops hours after a meal, occurs frequently at night, and awakens the patient from sleep.
Cholecystitis

• Persistence of biliary obstruction leads to cholecystitis and persistent right upper quadrant pain.

• The character of the pain is similar to gallbladder colic, except that it is prolonged and lasts hours (usually >6 h) or days.

• Nausea, vomiting, and low-grade fever are associated more commonly with cholecystitis.

• Diagnostics:
  • Labs
  • X ray vs U S vs CT vs ERCP vs M RCP
Acute cholangitis is a bacterial infection superimposed on an obstruction of the biliary tree most commonly from a gallstone, but it may be associated with neoplasm or stricture.

It is believed that bacteria gain access to the biliary tree by retrograde ascent from the duodenum or from portal venous blood.

As a result, infection ascends into the hepatic ducts, causing serious infection.

Increased biliary pressure pushes the infection into the biliary canaliculi, hepatic veins, and perihepatic lymphatics, leading to bacteremia.

The infection can be suppurative in the biliary tract.

Triad of findings of right upper quadrant (RUQ) pain, fever, and jaundice.
Acute Hepatitis

• Inflammation of the liver

• Infectious
  • Viral, bacterial, fungal and parasites

• Noninfectious
  • Alcohol, drugs, autoimmune dx, metabolic dx

• Symptoms
  • Fatigue, anorexia, n/v

• Diagnostics
  • Labs, INR, Ultrasound
Abdominal Aortic Aneurysm (AAA)

- Risk increases with age (women > 70, men > 55). The male-to-female ratio is 7:1.

- Suspect in any older patient with back, flank, or abdominal pain especially with a renal colic presentation.

- If the diagnosis of ruptured AAA is made in the hemodynamically stable patient, the mortality is approximately 25%.

- In patients presenting in shock, the mortality is 80%.

- Approximately 30% of patients with ruptured AAA are misdiagnosed initially.

Diagnostics

- US
- CT

- When suspected, consult vascular surgeon EARLY.
Pancreatitis

- History
  - Gallstones
  - ETOH abuse
  - Hypertriglycerides
  - Upper abd pain radiating to back, n/v

- Diagnostics
  - CBC, CMP, lipase
  - US vs CT scan

- Ranson’s criteria
Ranson's Criteria:

**Prognostic Implications**

- **On Admission**
  
  - Age > 55 years
  - WBC > 16,000/μL
  - Glucose > 200 mg/dL (>11 mmol/L)
  - LDH > 350 IU/L
  - SGOT (AST) > 250 IU/L

- **48 hours of admission**
  
  - Fall in hematocrit > 10%
  - Increase in BUN to > 5 mg/dL (>1.98 mmol/L)
  - Calcium < 8 mg/dL (<2 mmol/L)
  - PO2 < 60 mmHg
  - Base deficit > 4 meq/L (>4 mmol/L)
  - Fluid sequestration > 6 liters
**Ranson’s Scoring - Mortality**

- Score: 0 --- Predicted mortality about 1%
- Score: <3 --- Predicted mortality about 1%
- Score: 3-4 -- Predicted mortality of 15%
- Score: 5-6 -- Predicted mortality of 40%
- Score: >6 -- Predicted mortality of 100%
Dyspepsia / GERD / Gastritis

- Challenging epigastric pain that is less acute
  - Exclude pancreatitis, AAA, hepatobiliary pain
- Bloating, Abdominal fullness, heartburn, nausea
- Risk stratification
  - Can you categorize based on history alone?
  - Which patients require further investigation
  - Which patients can safely undergo therapeutic trial
  - Which patients deserve watchful waiting
  - Any red flags?
Peptic Ulcer Disease

- Incidence among elderly patients is increasing.
  - This may be due in part to the increasing availability and use of nonsteroidal anti-inflammatory drugs (NSAIDs).
  - Users of NSAIDs are 5-10 times more likely to develop PUD than nonusers.

- Mortality of elderly patients with PUD is approximately 100 times higher than that of younger patients with PUD.

- Approximately 35% of elderly patients with PUD have no pain.

- The most common presenting symptom is melena.

- Complications include hemorrhage and perforation.

- In elderly patients perforation is often painless, and free air may be absent on plain radiographs in more than 60% of patients.
Perforated Peptic Ulcer Disease

- History of PUD, NSAID use, Coumadin use, Steroids or recently been critically ill
- History of pain worse with ingestion of food
- History of melena, hx of ETOH use/abuse

- Exam:
  - Generalized peritonitis
  - Rigid abdomen

- Decisions:
  - Refer today
GI Bleed

Upper GI
- PUD
- Mallory Weiss

Lower GI
- Erosive Gastritis
- Erosive Esophagitis
- Gastric Cancer

Classified:
- Massive
- Moderate
- Occult
Bowel obstruction accounts for approximately 12% of cases of abdominal pain in elderly patients.

Obstruction is classified as blockage of either the small bowel or the large bowel, although the distinction can be difficult to make clinically.

Cecal volvulus is relatively rare and typically presents clinically as small bowel obstruction.

Sigmoid volvulus is much more common and often can be identified by plain abdominal radiography.

Distension of the colon of more than 9 cm can signal impending perforation.

Risk factors for sigmoid volvulus include inactivity and laxative use, both of which are common in elderly patients.

Diagnostics
- Labs
- Imaging: Xray vs CT
Mesenteric Infarction

- Consider with pain out of proportion to physical findings

- Consider with risk factors
  - CHF, recent MI, hypotension, hypovolemia, sepsis, cardiac surgery

- Consider with hx of atherosclerosis, HTN, intestinal angina

- Diagnostics:
  - Labs, including ABD, serum lactate levels
  - Angiography vs CT
Diffuse Abdominal Pain

- Gastrointestinal Infection
  - Gastroenteritis
  - Colitis
  - Diarrheal illness
- Abdominal Migraine
Gastrointestinal infection

- Primary manifestation is diarrhea, but may have n/v and diffuse abd pain
- Natural course
- Diagnostic Studies
- Significant abdominal tenderness should never be attributed to gastroenteritis
- In general, pain that precedes vomiting and diarrhea is more likely to be due to abdominal pathology other than gastroenteritis.
- Incidence of gastroenteritis in elderly is very low
Gastroenteritis

Differentials

- DKA
- Pancreatitis
- Appendicitis
- Foreign Body Ingestion
- Intussusception
- Pyloric Stenosis
- UTI/Pyelo

Gastritis

- Peptic Ulcer Disease
- Giardiasis
- Hemolytic Uremic Syndrome
- Hepatitis
- Inflammatory Bowel Disease
- Shock/Sepsis
Pediatric Vomiting and Diarrhea

- The history and physical examination serve 2 vital functions
  - Differentiating gastroenteritis from other causes of vomiting and diarrhea in children
  - Estimating the degree of dehydration.

- Abdominal tenderness on examination, with or without guarding, should prompt consideration of diseases other than gastroenteritis

- When symptoms of vomiting predominate, one should consider other diseases
  - gastroesophageal reflux disease
  - diabetic ketoacidosis
  - pyloric stenosis
  - acute abdomen
  - urinary tract infection
Gastroenteritis in the Elderly

- Consider gastroenteritis a diagnosis of exclusion in elderly patients with vomiting and diarrhea.

- Vomiting and diarrhea can be caused by many illnesses.
  - Reviews of cases of missed appendicitis reveal that approximately one half of patients initially were diagnosed with gastroenteritis.

- Even when more dangerous conditions have been excluded, realize that gastroenteritis can cause serious morbidity in elderly patients.

- Of all deaths due to gastroenteritis, approximately two thirds occur in patients older than 70 years.
Extra-Abdominal Causes

- Cardiac
- Respiratory/Pulmonary
- Henoch-Scholein Purpura (HSP)
- Sickle Cell
- Strep Pharyngitis
- Viral Illness
- PID
- Metabolic Conditions
Infant/Peds
(can’t tell you where it hurts)

- Malrotation with midgut volvulus
- Incarcerated inguinal hernia
- Necrotizing enterocolitis
- Intussusception
- Colic
- Pyloric Stenosis
Neonatal Vomiting Alone

- Pyloric Stenosis
  - Usual age 3 weeks of life (1-18 weeks typical)
  - Marked hypertrophy and hyperplasia of the pylorus musculature
- History
  - Classically, infant presents with nonbilious vomiting or regurg, may be projectile
  - Infant remains hungry, but shows signs of dehydration and malnutrition
- Exam
  - Firm, nontender and mobile hard pyloris 1-2 cm in diameter in RUQ
  - Best palpated after vomiting and when calm
  - Dehydration
8 month old with vomiting

- Intussusception
  - **Classic triad** of signs and symptoms:
    - vomiting, abdominal pain, and passage of blood per rectum.
    - Pain is colicky, severe, and intermittent.
    - Initially, vomiting is nonbilious and reflexive, but when the intestinal obstruction occurs, vomiting becomes bilious.
    - Parents also report the passage of stools that look like currant jelly. This is a mixture of mucus, sloughed mucosa, and shed blood. Diarrhea can also be an early sign of intussusception.
  - Two thirds of children with intussusception are younger than 1 year;
    - most commonly, in infants aged 5-10 months.
Colic

- Typical in age 2 weeks to 4 months, peaks age 6 weeks
- Excessive paroxysmal crying, typical in evenings, without any identifiable cause
- Stiffen, draw up legs and pass flatus
- Most common reasons parents seek care during first 3 months of life
- Diagnosis of exclusion
  - Consider hair in eye, corneal abrasion, digit tourniquet otitis, hernia, sepsis
- Medications are not recommended unless other ddx noted (i.e. GERD).
- Try dietary changes, eliminate cow’s milk...
Potentially Life Threatening

- Immediately
- Cardiac
- Splenic rupture
- Hemorrhagic pancreatitis
- Ruptured ectopic pregnancy
- AAA, dissecting
Potentially Life Threatening: Within Hours

- **Surgical:**
  - Appendicitis
  - Cholecystitis
  - Infarcted Bowel
  - Ovarian Torsion
  - Incarcerated Hernia
  - Perforated Viscus

- **NonSurgical:**
  - Pancreatitis
  - PID
  - Diverticulitis
Referral Decisions

- Which patients need to be admitted
- Which patients should be sent from clinic to ED
- Which patients should be seen same day appt
- Which patients deserve close followup
Remember your patient population

- Pregnant
- Young
- Old
- Diabetic
- Immunocompromised
- Psychiatric
Diagnostic Tests
(take-home)

- Abdominal Series
- Ultrasound
- CT Abd/Pelvis
- MRI

Labs
- CBC
- Chem LFTs
- Lipase/ Amylase
- UA, Ucx, U hcg
- GC/ Chlamydia
- Lactate
- Coag studies
Final Clinical Pearls

• Most patients have a benign and/or self-limited etiology

• Patients with acute abdominal pain should be first assessed for a surgical abdomen.

• Always perform a genital examination with lower abd pain (males and females, young and old)

• In older patients with renal colic symptoms, exclude AAA.

• Have a high index of suspicion with elderly abdominal pain