



Acute Abdomen in the Emergency Department



Objectives

- Define acute abdomen and its urgency
- Understand pain physiology and localization
- Explore detailed quadrant/system-based differential diagnosis
- Apply diagnostic algorithms
- Recognize red flags and surgical emergencies
- Outline management pathways



Pain Physiology



- Visceral pain: dull, poorly localized (stretching, ischemia)
- Parietal pain: sharp, localized (peritoneal irritation)
- Referred pain: shared nerve pathways (e.g., diaphragmatic irritation → shoulder pain)

💡 “Why does appendicitis pain migrate from periumbilical to RLQ?”

Differential Diagnosis by Quadrant

Quadrant	Common Causes	Advanced Considerations
RUQ	Cholecystitis, Hepatitis, Liver abscess	Fitz-Hugh–Curtis syndrome, Subphrenic abscess
LUQ	Splenic infarct/rupture, Gastritis, Pancreatitis	Splenic abscess, Gastric volvulus
RLQ	Appendicitis, Crohn's flare, Meckel's diverticulum	Mesenteric adenitis, Cecal carcinoma
LLQ	Diverticulitis, Sigmoid volvulus, Ovarian torsion	Ischemic colitis, Rectus sheath hematoma
Epigastric	Peptic ulcer perforation, Pancreatitis, MI	Gastric outlet obstruction, Mesenteric ischemia
Periumbilical	Early appendicitis, SBO, AAA	Intussusception, Omphalitis (rare)
Diffuse	Peritonitis, Mesenteric ischemia, DKA	Bowel perforation, Severe sepsis



System-Based Differential

- Gastrointestinal: Appendicitis, diverticulitis, perforated ulcer, obstruction
- Hepatobiliary: Cholecystitis, cholangitis, hepatic abscess
- Pancreatic: Acute pancreatitis, pseudocyst rupture
- Vascular: AAA rupture, mesenteric ischemia, splenic infarct
- Gynecological: Ectopic pregnancy, ovarian torsion, ruptured cyst
- Urological: Renal colic, pyelonephritis, bladder rupture
- Metabolic/Other: DKA, porphyria, sickle cell crisis

💡 Case challenge: “How would you distinguish mesenteric ischemia from pancreatitis clinically?”



Investigations

- Labs: CBC, CRP, lactate (ischemia), amylase/lipase, LFTs, coagulation profile
- Imaging: X-ray: free air, obstruction
Ultrasound: gallstones, AAA, gynecological causes
CT abdomen: gold standard for many causes
- Advanced: Diagnostic laparoscopy in unclear cases
- 💡 “Which lab marker is most sensitive for mesenteric ischemia?”



Red Flags

- Shock (tachycardia, hypotension)
- Peritonitis (rigid abdomen, rebound)
- GI bleeding (hematemesis, melena)
- Sepsis (fever, altered mental status, organ dysfunction)

💡 “Which red flag mandates immediate surgical intervention?”



Management Principles

- Resuscitation: IV fluids, oxygen, analgesia, monitoring
- NPO: prevent aspiration, prepare for surgery
- Antibiotics: broad-spectrum if perforation suspected
- Definitive treatment:
 - Appendectomy, cholecystectomy, laparotomy
 - Endoscopic intervention (bleeding, obstruction)
 - Conservative (pancreatitis, mild obstruction)

💡 “What’s the role of early antibiotics in perforated diverticulitis?”



Special Populations

- Children: intussusception, Meckel's diverticulum
- Pregnancy: ectopic pregnancy, ovarian torsion
- Elderly: vascular causes (AAA, mesenteric ischemia)
- Immunocompromised: atypical presentations, opportunistic infections

💡 “Pregnant woman with acute abdomen — what’s your first imaging choice?”



Surgical Emergencies

- Peritonitis
- Perforated viscus
- Bowel obstruction
- AAA rupture

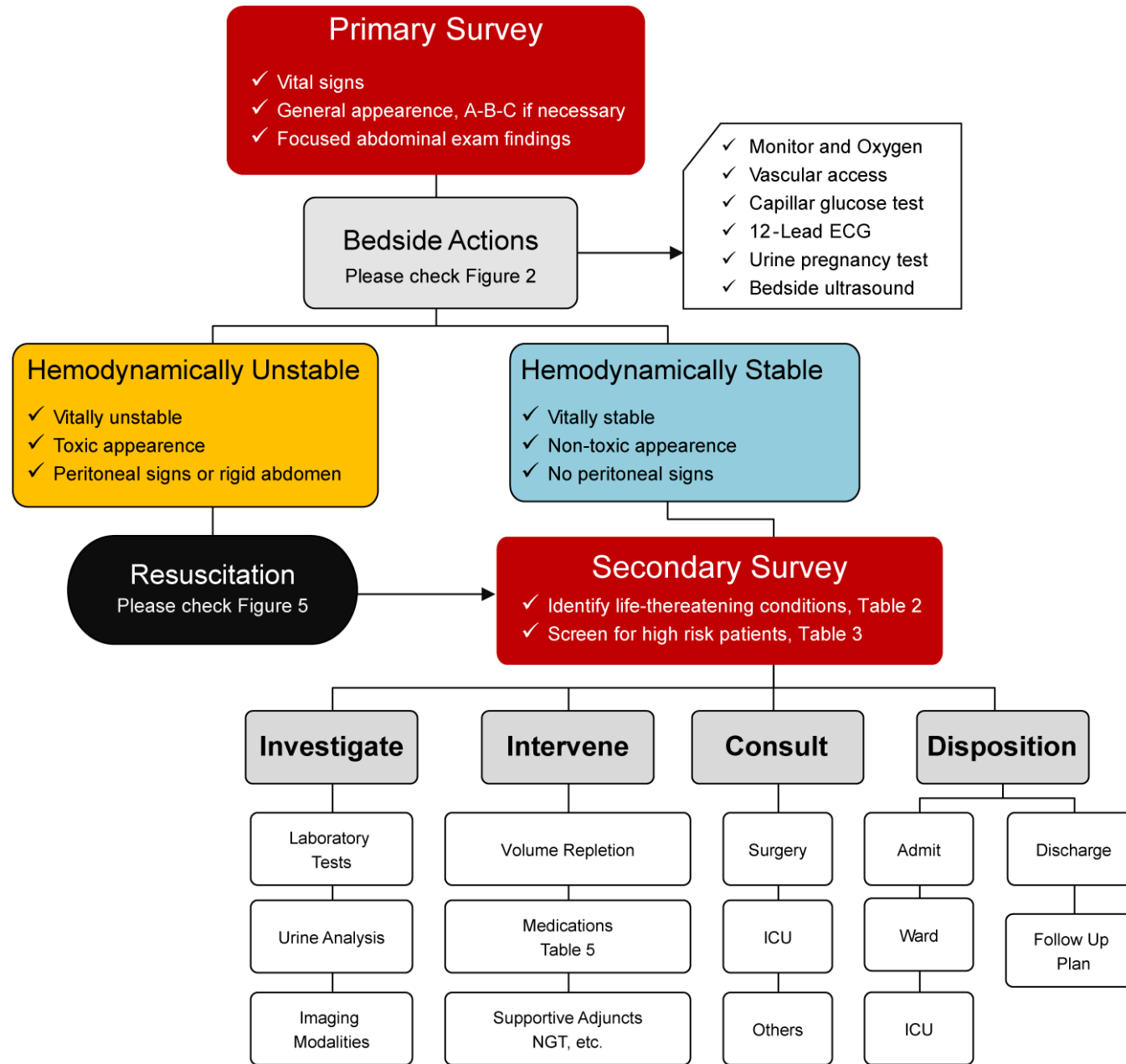
💡 “Which of these requires immediate laparotomy without delay?”



Initial Evaluation Algorithm

- ▶ ABC assessment → Airway, Breathing, Circulation
- ▶ Vitals & monitoring → BP, HR, O₂ saturation
- ▶ Focused history & exam
- ▶ Red flags? YES → Immediate resuscitation & surgical consult
NO → Continue evaluation

Figure 1: Approach to Abdominal Pain Algorithm *produced by Shaza Karrar*

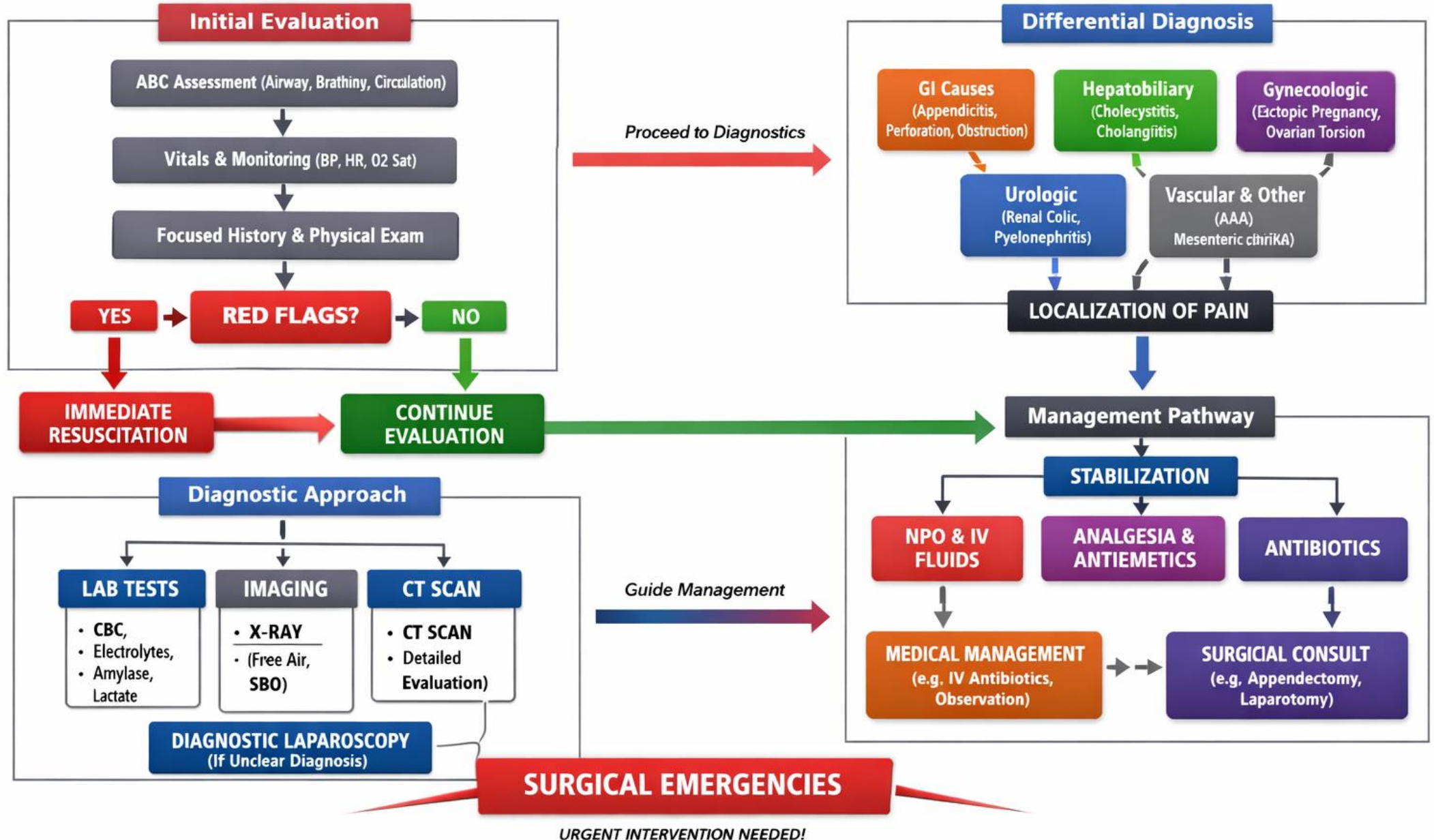




Summary & Key Takeaways

- Acute abdomen = urgent, systematic approach
- Always stabilize before definitive diagnosis
- Think anatomically + physiologically
- Prioritize life-threatening causes
- Tailor management to patient population

Acute Abdomen Evaluation & Management Algorithms

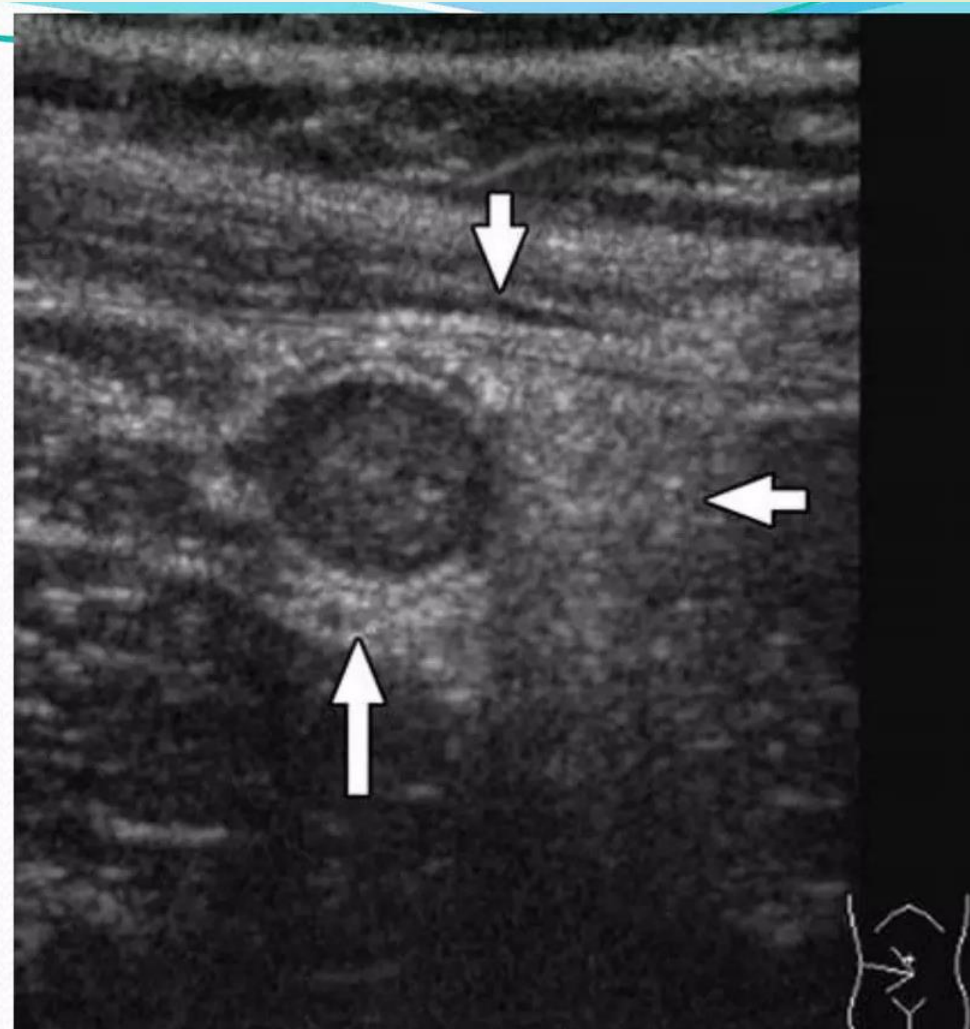
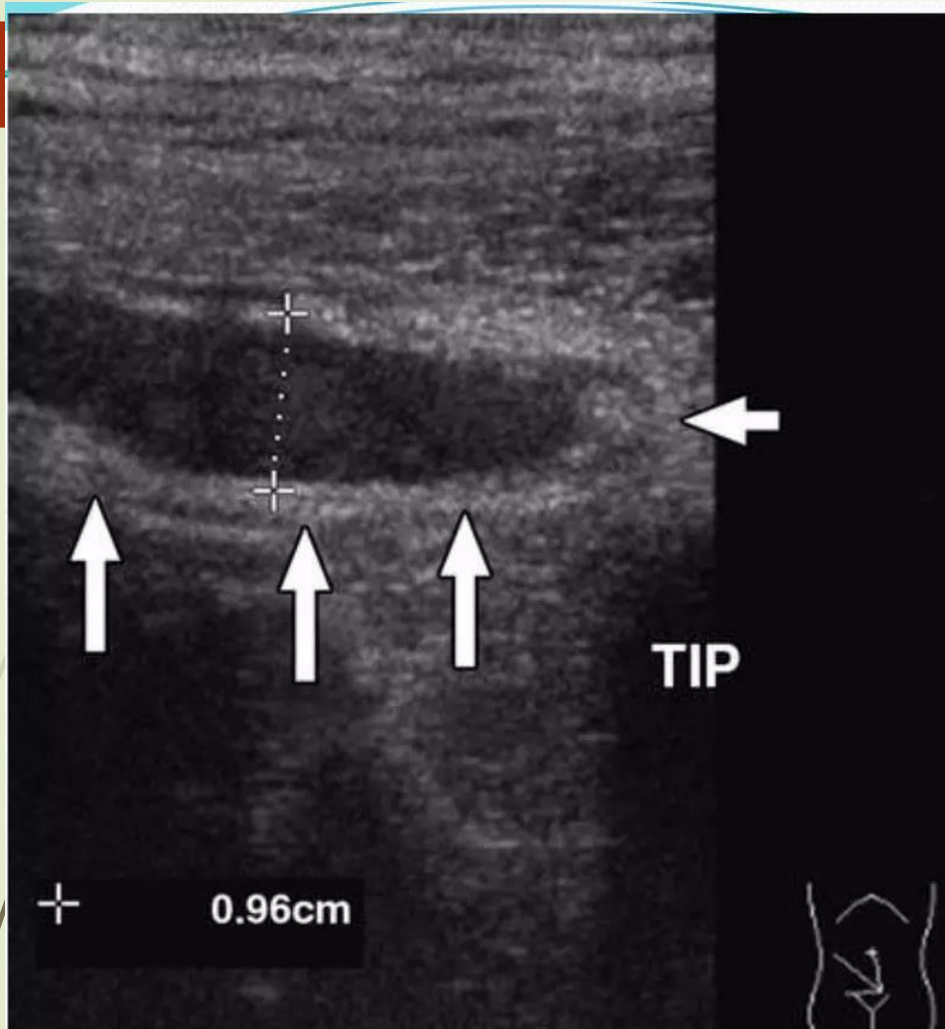




Case 1

A 24-year-old male presents with 12-hour history of periumbilical pain that migrated to the right lower quadrant. He has nausea, low-grade fever, and tenderness at McBurney's point.

- What is the most likely diagnosis?
- Which investigation confirms it?
- What is the initial management step before surgery?
- Name one differential diagnosis in females with similar pain.





Case 1

- **Answers:**
- **Diagnosis:** Acute appendicitis
- **Investigation:** CT abdomen (most accurate) or ultrasound in young/thin patients
- **Initial management:** IV fluids, analgesia, antibiotics, NPO before surgery
- **Differential in females:** Ectopic pregnancy, ovarian torsion, PID
- 💡 *Key insight:* Pain migration from periumbilical to RLQ reflects progression from visceral to parietal peritoneal irritation.
- 💡 *Teaching point:* Appendicitis pain migration reflects visceral → parietal peritoneal irritation.

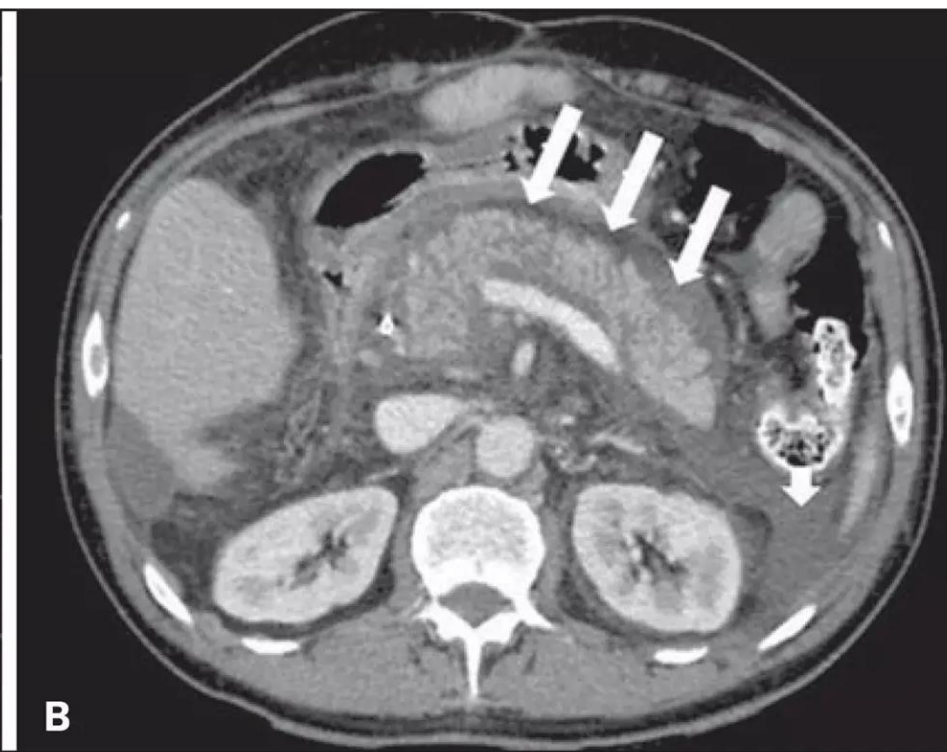
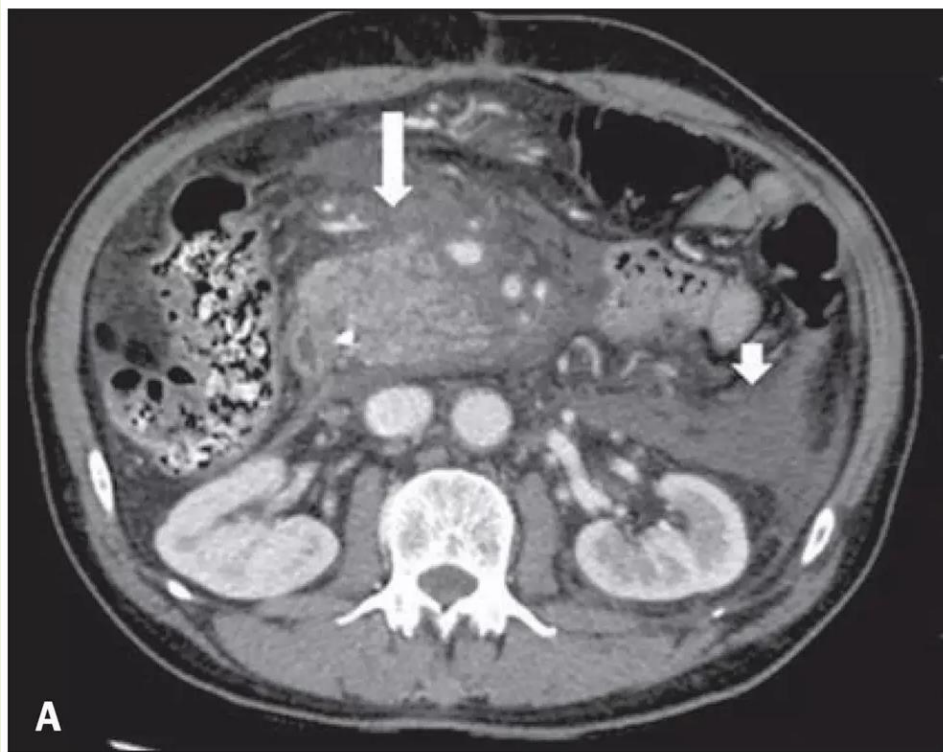


Case 2

A 55-year-old alcoholic male presents with severe epigastric pain radiating to the back, vomiting, and elevated serum amylase.

- What is the most likely diagnosis?
- Which scoring system assesses severity?
- What are two key complications?
- What imaging modality is preferred for detecting necrosis?

Case 2





Case 2

- **Answers:**
- **Diagnosis:** Acute pancreatitis
- **Severity scoring:** Ranson's criteria or BISAP score
- **Complications:** Pancreatic necrosis, pseudocyst, ARDS, hypocalcemia
- **Imaging:** Contrast-enhanced CT for necrosis assessment
- 💡 *Key insight:* Elevated amylase/lipase confirms diagnosis; CT defines severity and complications.
- 💡 *Teaching point:* Pancreatitis pain radiates due to retroperitoneal inflammation.



Case 3

A 60-year-old man with a history of peptic ulcer disease presents with sudden severe generalized abdominal pain and rigid abdomen. Upright chest X-ray shows free air under the diaphragm.

- What is the diagnosis?
- What immediate management is required?
- Which antibiotic regimen is appropriate?
- What surgical procedure is indicated?

Case 3





Case 3

- **Answers:**
- **Diagnosis:** Perforated peptic ulcer
- **Immediate management:** IV fluids, broad-spectrum antibiotics, nasogastric decompression
- **Antibiotics:** Third-generation cephalosporin + metronidazole
- **Surgery:** Exploratory laparotomy with Graham patch repair
- 💡 *Key insight:* Free air under diaphragm = perforation until proven otherwise; prompt surgery saves lives.
- 💡 *Teaching point:* Free air under diaphragm = perforated viscus until proven otherwise.



Case 4

A 70-year-old man presents with LLQ pain, fever, and leukocytosis. CT shows thickened sigmoid wall and pericolic fat stranding.

- What is the diagnosis?
- What is the first-line management?
- When is surgery indicated?
- Name one complication of diverticulitis.



Case 4

- **Answers:**
- **Diagnosis:** Acute diverticulitis
- **First-line management:** IV antibiotics, bowel rest, fluids
- **Surgery indication:** Perforation, abscess, fistula, obstruction, recurrent attacks
- **Complication:** Colovesical fistula, abscess formation
- 💡 *Key insight:* CT is diagnostic; avoid colonoscopy during acute inflammation due to perforation risk.
- 💡 *Teaching point:* CT is diagnostic; avoid colonoscopy during acute phase.



Case 5

A 68-year-old hypertensive smoker presents with sudden severe back pain and hypotension. Palpable pulsatile mass in the abdomen.

- What is the diagnosis?
- What is the immediate management priority?
- Which imaging confirms diagnosis in stable patients?
- What surgical options exist?



Case 5

- **Answers:**
- **Diagnosis:** Ruptured abdominal aortic aneurysm (AAA)
- **Immediate management:** Aggressive resuscitation, surgical consult — do not delay for imaging if unstable
- **Imaging (if stable):** CT angiography
- **Surgery:** Open repair or endovascular aneurysm repair (EVAR)
- 💡 *Key insight:* Classic triad — hypotension, back pain, pulsatile mass — mandates immediate surgical intervention.
- 💡 *Teaching point:* AAA rupture = surgical emergency; do not delay for imaging if unstable.



THANK YOU!