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Mini Review

Diagnosis And Treatment of Abdominal Pain in the Emergency Room

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Abstract

Abdominal pain is among the most frequent presenting complaints in emergency medicine, accounting for approximately 5-10% of all ED visits annually in the United States. It represents one of the broadest diagnostic challenges a clinician can face: the same symptom may arise from a self-limiting gastrointestinal illness or from a life-threatening surgical emergency. The ability to distinguish the benign from the catastrophic - rapidly and systematically- is a core competency of emergency medicine [1].

Introduction

a) Safe disposition requires a clear diagnosis or a confident explanation for a benign course. Patients with undifferentiated abdominal pain who are hemodynamically stable, tolerating oral intake, and have reassuring labs and imaging may be discharged with strict return precautions and close follow-up.

b) All others - including those with diagnostic uncertainty in the setting of high-risk features - warrant admission.

c) Always document your diagnostic reasoning, the degree of certainty in your assessment, and your explicit safety-netting instructions. The patient who returns within 24 hours with worsening pain deserves a fresh clinical assessment, not reassurance based on prior workup.

d) Remember that referred pain frequently crosses anatomical boundaries. Diaphragmatic irritation (from blood, pus, or gas) classically refers to the shoulder. Retroperitoneal structures - pancreas, aorta, kidneys - often present with back or flank pain rather than anterior abdominal pain.

Epidemiology

Roughly 15–20% of patients presenting with abdominal pain require surgical intervention. High-risk populations include patients over 65, immunocompromised individuals, those on steroids or NSAIDs (which can blunt signs of peritoneal irritation), and pregnant patients in whom physiologic changes alter both presentation and diagnostic interpretation.Age is a particularly powerful modifier. In the elderly, classic findings are frequently absent: fever may not occur, rigidity may be minimal, and laboratory values may appear surprisingly normal [2].

Anatomical Framework for Localization

Systematic localization of pain by quadrant is the first step in narrowing the differential. The following table summarizes key anatomical territories: This is to be reported to the radiologist and highlighted on the requistion [3].

Region	Key Structures	Priority Diagnoses
RUQ	Liver, gallbladder, right kidney	Cholecystitis, hepatitis, renal colic
LUQ	Spleen, stomach, left kidney	Splenic rupture, gastric ulcer, renal colic
RLQ	Appendix, cecum, right ovary/tube	Appendicitis, ovarian torsion, ectopic pregnancy
LLQ	Sigmoid colon, left ovary/tube	Diverticulitis, IBD, ovarian torsion
Epigastric	Stomach, duodenum, pancreas, aorta	PUD, pancreatitis, AAA, GERD
Periumbilical	Small bowel, aorta	SBO, early appendicitis, mesenteric ischemia
Suprapubic	Bladder, uterus, prostate	UTI, PID, urinary retention
Diffuse	Peritoneum, aorta	Peritonitis, AAA rupture, bowel perforation
abdominal wall pain,;trigger point (myofascial pain), nerve entrapment (ACNES), or a muscle strain.	These conditions produce a sharp, localized tender spot, often diagnosed by a positive Carnett sign, where pain persists or worsens when abdominal muscles are tensed.	Analgia injction into trigger point

History Taking& Physical Examination

A focused yet comprehensive history remains the cornerstone of diagnosis. The abdominal exam begins before you touch the patient. Observe posture: patients with peritonitis lie motionless; those with renal colic cannot find a comfortable position. The sequence is inspection → auscultation → percussion → palpation, in that order.

a) **Onset:** Sudden, explosive onset (within seconds) is characteristic of perforation, rupture (AAA, ectopic), or volvulus - treat as surgical emergency until proven otherwise.

b) **Provocation/Palliation:** Pain worsened by movement or deep breathing suggests peritoneal irritation. Pain relieved by leaning forward is classic for pancreatitis.

c) Quality: Colicky, cramping pain suggests hollow viscus obstruction (bowel, ureter, biliary). Constant, severe pain suggests ischemia, perforation, or solid organ involvement.

d) **Radiation:** To the right shoulder (cholecystitis/hepatitis), to the back (pancreatitis, AAA), to the flank and groin (renal/ureteral colic).

e) **Severity:** A pain severity of 9-10/10 in an elderly patient with vascular risk factors must prompt consideration of AAA or mesenteric ischemia [4].

Key Physical Examination Signs

a) **Murphy's Sign:** Inspiratory arrest on deep palpation of the RUQ - sensitivity ~65% for acute cholecystitis.

b) **McBurney's Point Tenderness:** Classic for appendicitis; located one-third of the way from the anterior superior iliac spine to the umbilicus.

c) **Rovsing's Sign:** RLQ pain with LLQ palpation - indicates peritoneal irritation from appendicitis.

d) **Psoas Sign:** Pain with passive hip extension - suggests retrocecal appendicitis or iliopsoas abscess.

e) **Obturator Sign:** Pain with internal hip rotation - suggests pelvic appendicitis or pelvic abscess.

f) **Rebound Tenderness and Guarding:** Indicates peritoneal irritation; involuntary guarding (rigidity) is particularly alarming.

g) **Cullen's and Grey Turner's Signs:** Periumbilical or flank ecchymosis-classic for retroperitoneal hemorrhage (hemorrhagic pancreatitis, AAA).

h) Always perform a rectal exam when bowel ischemia, obstruction, or lower GI bleeding is suspected. In female patients of reproductive age, a pelvic exam is essential to evaluate for PID, cervical motion tenderness, and adnexal pathology.

i) **Appendicitis:** Surgical consult; antibiotics (ceftriaxone + metronidazole) preoperatively. Selected uncomplicated cases may be managed non-operatively with antibiotics.

j) **Acute Cholecystitis:** NPO, IV fluids, analgesia, antibiotics (piperacillin-tazobactam); surgery typically within 24-72 hours [5].

k) **Pancreatitis:** Aggressive IV fluid resuscitation (lactated Ringer's preferred); analgesia; correct electrolytes. Reserve antibiotics for confirmed infected necrosis.

l) **Perforated Viscus**: Emergent surgical consult; broad-spectrum antibiotics; NPO; avoid CT delays.

m) **AAA Rupture:** Immediate vascular surgery activation; type and crossmatch; permissive hypotension (target SBP 70-90 mmHg) until operative control. Do not delay for imaging if clinically obvious.

n) **Mesenteric Ischemia:** Emergent vascular surgery or interventional radiology consultation; anticoagulation; bowel rest. Mortality exceeds 50% - time is bowel.

o) **Ectopic Pregnancy:** OB/GYN consult immediately; RhoGAM if Rh-negative; hemodynamically unstable patients go directly to the OR.

Treatment IN THE ED

Treatment in the ED is driven by the simultaneous pursuit of stabilization, analgesia, and definitive diagnosis.

a) Do not withhold opioid analgesia out of concern for masking findings - evidence clearly demonstrates that adequate analgesia does not impair diagnostic accuracy and is both humane and appropriate standard of care. IV opioids (morphine 0.1 mg/kg or hydromorphone 0.015 mg/kg) remain first-line for moderate-to-severe pain [6].

b) IV acetaminophen and IV ketorolac are valuable adjuncts in non-surgical patients without contraindications.

Immediate Stabilization

a) IV access, supplemental oxygen, and continuous monitoring for all patients with severe pain.

b) Fluid resuscitation: Isotonic crystalloid for volume depletion, sepsis, or hemorrhage (though hemorrhagic shock ultimately requirNPO status for surgical candidates; NGT decompression for SBO or ile

Diagnostic testing should be targeted by clinical probability, not ordered as a universal panel. That said, the following are commonly indicated in moderate-to-severe abdominal pain:

Laboratory Studies

a) **CBC with differential:** Leukocytosis suggests infection or inflammation; anemia raises concern for bleeding.

b) **CMP/BMP:** LFTs elevated in hepatobiliary disease; creatinine assesses renal function before contrast administration.

c) **Lipase:** Elevated (>3x normal) is the primary marker for acute pancreatitis; amylase adds little.

d) **Lactate:** Elevated lactate (>2 mmol/L) suggests tissue hypoperfusion - mesenteric ischemia, sepsis, or hemorrhagic shock.

e) **Beta-hCG:** Mandatory in all female patients of childbearing age to rule out ectopic pregnancy.

f) **Urinalysis:** Evaluate for UTI, renal calculi, or hematuria.

g) **Coagulation studies (PT/INR):** Required if surgery or invasive procedure is anticipated.

Imaging

a) **Plain abdominal X-ray (KUB):** Rapidly identifies free air under the diaphragm (perforation) and dilated bowel loops (obstruction). Limited sensitivity overall.

b) **Ultrasound:** First-line for RUQ pain (cholecystitis, biliary dilation), pelvic pathology (ectopic, ovarian torsion), and FAST exam in trauma. Rapid, no radiation.

c) **CT Abdomen/Pelvis with IV contrast:** The workhorse of emergency abdominal imaging. High sensitivity and specificity for appendicitis, diverticulitis, obstruction, pancreatitis, and AAA. Order unenhanced CT for suspected renal calculi.

d) **CT Angiography:** Indicated when mesenteric ischemia or vascular emergency (AAA rupture) is suspected. Time-sensitive - do not delay.

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