

The EM Educator Series

The EM Educator Series: Abdominal Pain that won't go away...Gastric/Bowel Perforation

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Case 1: A 35-year-old male with no past medical history presents with mid epigastric pain for 2 weeks. He has no relief after three rounds of opioid medication, with significant tenderness to palpation. Upright chest x-ray reveals free air in the abdomen.

Case 2: A 44-year-old female with no past medical history presents with severe abdominal pain and involuntary guarding on exam.

Questions for Learners:

1. What's your approach to abdominal pain, and what is your differential?
2. Who is at risk for gastric or bowel perforation, and how can it present?
3. Do analgesics mask exam findings?
4. What is the utility, and limitations of, obtaining an upright chest x-ray or acute abdominal series?
5. What antibiotics should you consider in the patient with perforation?
6. If imaging is delayed or not obtainable, when should you call the surgeon? If perforation is suspected, should you wait for imaging to discuss the case with the surgeon?

Suggested Resources:

- Articles
 - [EM Basic](#)
 - [Radiopaedia](#)
 - [WikEM](#)
- Journal Articles
 - [EM Clinics of NA – EBM Approach to Abdominal Pain](#)
 - [EM Clinics of NA – Approach to Epigastric Pain](#)

Answers for Learners:

1. What's your approach to abdominal pain, and what is your differential?

The most common approach to the diagnosis of abdominal pain focuses on the location of the pain, with a separate grouping for causes of diffuse abdominal pain.

Table 1: Differential Diagnosis of abdominal pain by location

Right Upper Quadrant	Left Upper Quadrant
<ul style="list-style-type: none">• Biliary colic• Cholangitis• Cholecystitis• Fitz-Hugh-Curtis Syndrome• Hepatitis• Hepatic abscess• Hepatic congestion• Herpes zoster• Mesenteric ischemia• Perforated duodenal ulcer• Pneumonia (RLL)• Pulmonary embolism• Pyelonephritis/nephrolithiasis	<ul style="list-style-type: none">• Gastric ulcer• Gastritis• Herpes Zoster• Myocardial ischemia• Pancreatitis• Pneumonia (LLL)• Pulmonary embolism• Splenic rupture/distension• Pyelonephritis/nephrolithiasis
Right Lower Quadrant	Left Lower Quadrant
<ul style="list-style-type: none">• Aortic aneurysm• Appendicitis• Crohn disease• Diverticulitis• Ectopic pregnancy• Endometriosis• Epiploic appendagitis• Herpes zoster• Inguinal hernia• Ischemic colitis• Meckel diverticulum• Mittelschmerz	<ul style="list-style-type: none">• Aortic aneurysm• Diverticulitis• Ectopic pregnancy• Endometriosis• Epiploic appendagitis• Herpes zoster• Inguinal hernia• Ischemic colitis• Meckel diverticulum• Mittelschmerz• Ovarian cyst• Ovarian torsion

- Ovarian cyst
- Ovarian torsion
- Pelvic inflammatory disease
- Psoas abscess
- Regional enteritis
- Testicular torsion
- Ureteral calculi

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Table 2: Differential Diagnosis for diffuse abdominal pain

- Aortic aneurysm
- Aortic dissection
- Appendicitis (early)
- Bowel obstruction
- Diabetic gastric paresis
- Diabetic ketoacidosis
- Familial Mediterranean Fever
- Gastroenteritis
- Heavy metal poisoning
- Hereditary angioedema

- Malaria
- Mesenteric ischemia
- Metabolic disorder
- Narcotic withdrawal
- Pancreatitis
- Perforated bowel
- Peritonitis
- Sickle cell crisis
- Volvulus

2. Who is at risk for gastric or bowel perforation, and how can it present?

Causes:

Peptic ulcer disease

Malignancy

Diverticulitis

Appendicitis

Abdominal trauma (penetrating > blunt)

Bowel obstruction

Foreign body ingestion

Necrotizing enterocolitis (premature infants)

Iatrogenic (i.e., endoscopy)

History

- Abdominal pain, abdominal distention / rigidity
 - Occasionally focal if regionally confined (less common)
- Nausea, vomiting, fever, and anorexia often present

Physical exam

- Perforation with peritonitis
 - Abdominal tenderness, distention

- Involuntary guarding
- Rebound tenderness
- Perforation without peritonitis
 - Abdominal tenderness
 - Voluntary guarding

3. Do analgesics mask exam findings?

The traditional teaching of withholding pain medication in patients with acute abdominal pain stems from a time when medicine was without modern diagnostic techniques and when the intravenous titration of opiates was not routinely practiced. Early and appropriate pain relief for patients with acute abdominal pain is humane, does not adversely affect diagnostic acumen or clinical decision making, and should be considered part of the initial management of every such patient.

4. What is the utility, and limitations of, obtaining an upright chest x-ray or acute abdominal series?

Easily available in all emergency departments, but sensitivity can be low and x-ray can be delayed based on your department needs.

5. What antibiotics should you consider in the patient with perforation?

Start as soon as possible; ideally within the first hour

- Community-acquired:
 - Therapy should target enteric gram-negative aerobic and facultative bacilli, obligate anaerobic bacilli, and enteric gram-positive streptococci
 - Adult regimen (see **TABLE 1**):
 - **Mild to moderate severity community acquired GI perforation:**
 - **Single agent:** [Cefoxitin](#), [ertapenem](#), [moxifloxacin](#), [tigecycline](#), or [ticarcillin/clavulanic acid](#)
 - **Combination therapy:**
 - [Cefazolin](#), [cefuroxime](#), [ceftriaxone](#), [cefotaxime](#), [ciprofloxacin](#), or [levofloxacin](#) -AND-
 - [Metronidazole](#)
 - **High risk/severity community acquired GI perforation:**
 - **Single agent:** [Imipenem-cilastatin](#), [meropenem](#), [doripenem](#), or [piperacillin/tazobactam](#)
 - **Combination therapy:** [Cefepime](#), [ceftazidime](#), [ciprofloxacin](#), or [levofloxacin](#) -AND-
 - [Metronidazole](#)
 - Pediatric regimen: (for dosage, see **TABLE 1**)
 - **Community acquired GI perforation:**
 - **Single agent:** [Ertapenem](#), [meropenem](#), [imipenem-cilastatin](#), [ticarcillin/clavulanate](#), and [piperacillin/tazobactam](#)
 - **Combination therapy:**
 - [Ceftriaxone](#), [cefotaxime](#), [cefepime](#), or [ceftazidime](#), each in combination with [metronidazole](#)
 - [Gentamicin](#) or [tobramycin](#), each in combination with [metronidazole](#) or [clindamycin](#), and with or without [ampicillin](#)

- Iatrogenic/hospital-associated perforation: Therapy should be driven by local microbiologic results.
 - Drug-resistant bacteria regimen (common in hospital-associated perforation):
 - <20% Resistant ***Pseudomonas aeruginosa***, ESBL-producing ***Enterobacteriaceae***, ***Acinetobacter***, or other MDR GNB:
 - Single agent: [Carbapenem](#), [piperacillin-tazobactam](#)
 - [Ceftazidime](#) or [cefepime](#), each in combination with [metronidazole](#)
 - ESBL-producing ***Enterobacteriaceae***: [Carbapenem](#), [piperacillin/tazobactam](#), or [aminoglycoside](#)
 - ***P. aeruginosa*** >20% resistant to [ceftazidime](#): [Carbapenem](#), [piperacillin/tazobactam](#), or [aminoglycoside](#)
 - **MRSA**: [Vancomycin](#) only
- **Fungal infection**: Antifungal therapy for patients with severe community-acquired or health care-associated infection is recommended if candida is grown from intra-abdominal cultures ([fluconazole](#); echinocandins for triazole-resistant species)

6. If imaging is delayed or not obtainable, when should you call the surgeon? If perforation is suspected, should you wait for imaging to discuss the case with the surgeon?

Perforations need to go to the OR emergently / urgently. If you are at all concerned about your patient's exam (ie peritonitis or an acute abdomen), do not hesitate to let them know and have them come evaluate the patient.