Abdominal Pain

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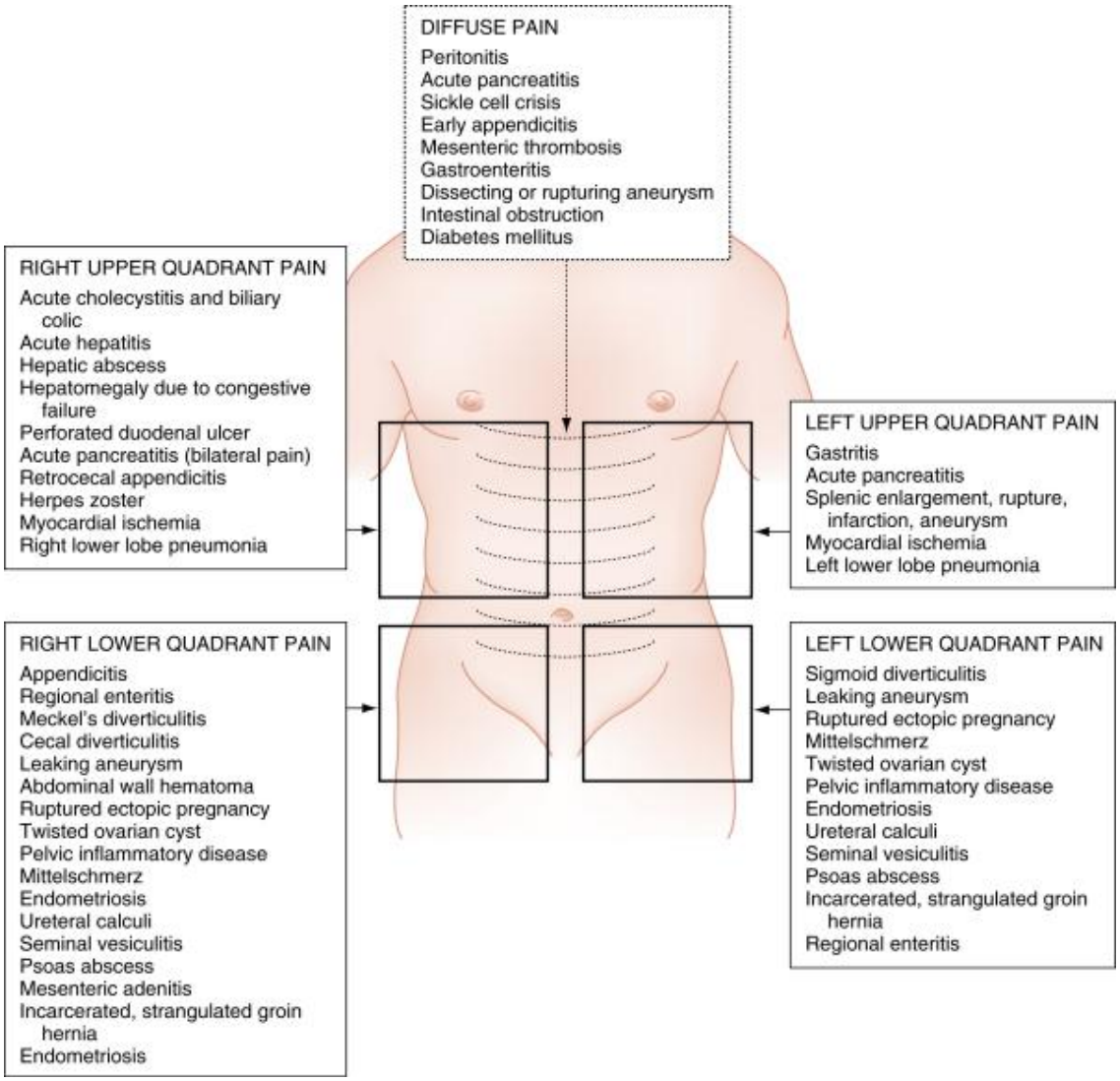

History	Physical exam	Labs	Radiography
• Inability to maintain oral intake • Projectile vomiting • Overt gastrointestinal blood loss • Syncope • Pregnancy • Recent surgery or endoscopic procedure • Fever • Caustic or foreign body ingestion	• Pathologic changes in vital signs • Bloody, maroon, or melanotic stool • Hernia (incarcerated and tender) • Hypoxia • Cyanosis • Altered mentation • Jaundice • Peritoneal signs • **Abdominal pain** out of proportion to examination	• Renal failure • Metabolic acidosis • Leukocytosis • Elevated transaminases • Elevated alkaline phosphatase and bilirubin • Anemia or polycythemia • Hyperlipasemia/hyperamylasemia • Hyperglycemia/hypoglycemia	• Abdominal free air • Gallbladder wall thickening • Pericholecystic fluid • Dilated biliary tree • Bowel obstruction • Dilated small bowel loops ± air fluid levels • Intraabdominal abscess • Bowel wall thickening • Air in the portal venous system • Pneumatosis intestinalis

Hepatopancreatobiliary:

BILIARY COLIC :

- Biliary colic occurs when then one or more gallstones transiently occlude the cystic duct à Tonic cystic duct spasm ensues .
- causing constant pain. (The term biliary colic is a misnomer)
- visceral epigastric or right upper quadrant abdominal pain àoften with radiation to the right shoulder or scapula.
- The pain is sometimes postprandial, but often there is no trigger; it is not uncommon for patients to have nocturnal pain.
- The classic time course of pain from biliary colic is one that builds over 15 to 60 minutes, lasting up to several hours before slowly dissipating.
- P/E: epigastric & RUQ tenderness.

- Invistigation: LFT & abdominal ultrasonography.

1. Transaminases, bilirubin, and alkaline phosphatase are usually normal,
2. ultrasound can verify the presence of gallstones.

- Complication: pancreatitis and cholangitis.
- Treatment for biliary Colic: elective cholecystectomy

CHOLECYSTITIS :

- > 90% --> caused by gallstones.
- The remainder of cases are termed acalculous cholecystitis, typically occur in critically ill patients, and are rarely seen in the outpatient setting .
- Path: Acute cholecystitis is most commonly caused by the obstruction of the cystic duct by the offending gallstone. Prolonged obstruction of the cystic duct (>6 hours) impairs gallbladder emptying, leading to inflammation of the gallbladder mucosa. Secondary bacterial infection of the gallbladder may ensue, leading to possible empyema, gallbladder necrosis, and perforation. Acute cholecystitis results in gallbladder perforation in up to 12% of cases, with a subsequent mortality rate of 20%.
- Emphysematous cholecystitis, characterized by air in the wall of the gallbladder, is most often seen in patients with diabetes mellitus. Approximately 75% of patients who develop acute cholecystitis have a prior history of biliary colic.
- The pain is similar to that of biliary colic, but with a longer duration. Pain lasting longer than 6 hours signifies cholecystitis rather than biliary colic. As acute gallbladder inflammation irritates the parietal peritoneum, the pain may shift from the epigastrum to the right upper quadrant. The physical examination of patients with acute cholecystitis reveals right upper quadrant tenderness. An inspiratory arrest during deep right upper quadrant palpation is referred to as Murphy's sign.

- Lab. CBC: leukocytosis with a predominance of neutrophils, LFT: elevation of alkaline phosphatase, and transaminases.
- U.S abdomen is the test of choice to diagnose acute cholecystitis, with reported sensitivity, specificity, and accuracy approaching 95%. Common findings include cholelithiasis, gallbladder wall thickening, pericholecystic fluid, and a sonographic Murphy's sign.
- The finding of cholelithiasis and a positive sonographic Murphy's sign has a positive predictive value of 92% for acute cholecystitis.
- Radionuclude cholescintigraphy scans,(HIDA scan), can be used to confirm the diagnosis of acute cholecystitis when ultrasound findings are equivocal. The sensitivity, specificity, and positive predictive value for acute cholecystitis are 95%, 99%, and 97%, respectively.
- Cholecystectomy within 24 to 48 hours of presentation has been shown to reduce mortality and shorten length of hospital stay, compared with surgery performed after weeks of conservative management aimed at “cooling off” the gallbladder.

Ascending Cholangitis :

- potentially lethal entity
- it occurs when thebile duct become obstructed.
- Once bile flow is impeded, superinfection of the stagnant bile occurs. As pus builds up under pressure, the infection can rapidly ascend into the liver and spread into the blood stream. Common
- pathogens: Escherichia coli, Klebsiella species, Bacteroides, Enterococcus, and other enteric pathogens.
- Causes:

1. The most common cause of obstruction is choledocholithiasis, accounting for approximately 85% of cases.
2. Benign biliary strictures, choledochal cysts, biliary parasites, and neoplasms are less common causes of cholangitis.

- Classic presentation: fever, jaundice, and right upper quadrant pain. (Charcot's triad)
- If the obstruction is not relieved, mental obtundation and shock can occur. (Reynold's pentad)
- This is associated with a higher morbidity and mortality rate [13].
- Laboratory findings: CBC: leukocytosis with a predominance of neutrophils, LFT: elevated alkaline phosphatase, and elevation of the transaminases. Anelevation of pancreatic enzymes can be seen in about one third of patients,especially with concomitant gallstone pancreatitis, conjugated hyperbilirubinemia is invariably present.
- Diagnosis is often made clinically, and should be confirmed with cholangiography.
- U.S. may suggest the presence of biliary obstructiont, not good for cholidecolethiasis.
- Therefore, patients should undergo cholangiography .
- Patients should be referred quickly to an emergency department or hospitalized, as the clinical course can be rapidly progressive and fatal if left untreated.
- blood cultures should be done at presentation.
- The definitive therapy for cholangitis is decompression of the obstructed biliary system. Endoscopic retrograde cholangiopancreatography (ERCP)
- ERCP is the diagnostic and therapeutic procedure of choice, and is successful in relieving the obstruction in > 95%.
- This is typically accomplished by stone extraction or placement of a stent into the common bile duct.
- ERCP is not available or is unsuccessful, options include percutaneous transhepatic cholangiography or surgical decompression.

- If choledocholithiasis is the cause of ascending cholangitis, patients should undergo elective cholecystectomy once the infection resolves.

Acute pancreatitis :

- an inflammatory disease of the pancreas that not only may cause significant morbidity but also carries a case fatality rate of 5% to 9%.
- Gallstones and alcohol account for more than 80%.
- Less common causes: medications, trauma, hypercalcemia, severe hypertriglyceridemia (O1000mg/dL), malignancy, sphincter of Oddi dysfunction, infections, iatrogenic (ERCP), and congenital abnormalities of the pancreas such as pancreas divisum. The remainder are termed idiopathic, 75% of cases of idiopathic pancreatitis may actually be due to biliary sludge or microlithiasis.
- Regardless of the etiology, diffuse pancreatic inflammation and edema develop. In severe cases, necrosis of pancreatic and peripancreatic tissue occurs, and multiorgan failure may ensue. Necrotizing pancreatitis occurs in up to 25% of patients with pancreatitis and has a mortality rate of 15% to 20%.
- Patients typically present with the acute onset of abdominal pain, nausea, and vomiting. The pain is steady and usually in the epigastrium, although patients may also note discomfort in the right or left upper quadrants of the abdomen. Pain is classically described as a boring sensation that radiates into the back.
- Patients are often unable to get comfortable when lying supine, and they will lean forward in an attempt to find relief. Because of marked fluid shifts, patients may become severely volume depleted.
- Resultant tachycardia and hypotension with orthostatic, low-grade fever and tachypnea. The latter is a poor prognostic sign, and may herald the development of sepsis or acute respiratory distress syndrome.

- The abdominal examination may reveal distension and diminished or absent bowel sounds secondary to the development of a paralytic ileus. With palpation, focal tenderness in the epigastrum is seen, although the abdomen may also be diffusely tender. +/- voluntary guarding and rebound tenderness may also be appreciated.
- Signs of hemorrhagic pancreatitis such as Gray Turner's sign (flank ecchymosis), Cullen's sign (periumbilical ecchymosis), or Fox's sign (inguinal ecchymosis) are seen in less than 1% of cases.
- Labs: ↑CBC, ↑levels of serum amylase & lipase (~x3 normal)
- Serum lipase remains elevated for longer durations than serum amylase and is more specific for acute pancreatitis.
- BUT (magnitude of serum amylase and lipase elevation does not correlate well with disease severity.)
- Hematocrit levels higher than 44% are associated with a worse prognosis, indicating potentially dangerous fluid shifts.
- Hyperbilirubinemia, ↑alk. Phos. ,ALT levels >150 mg/dL suggest gallstones as a cause.
- Because of marked fluid shifts that occur with acute pancreatitis, blood urea nitrogren, creatinine, and serum electrolytes including calcium should be assessed.
- Imaging: CT can confirm the diagnosis of acute pancreatitis. (should be reserved for patients in whom the diagnosis is in question, in cases of suspected pancreatic necrosis, or in cases of clinical deterioration despite adequate medical therapy).
- Use of intravenous contrast is highly recommended, and CT should therefore be deferred until the patient has received adequate volume resuscitation to prevent nephrotoxicity.

- Ranson's criteria, which was originally developed for alcoholic pancreatitis and later modified and validated for gallstone pancreatitis.
- Ranson's criteria has limited clinical value because it takes 48 hours to determine.
- The Imrie/Glasgow criteria and APACHE II score are two other prospective systems, but both are cumbersome to perform.
- A prognostic CT scoring system, known as the Balthazar criteria, has been validated for predicting severity in acute pancreatitis. The score is heavily weighted on the presence of pancreatic necrosis.
- The cornerstone of therapy:
  - intravenous volume resuscitation
  - Patients should be kept strictly nothing by mouth (to prevent of pancreatic stimulation)
  - Very aggressive intravenous fluid repletion is necessary to maintain intravascular volume and allow adequate perfusion of the pancreas and extrapancreatic organs such as the kidneys .

Luminal and vascular disorders :

Acute appendicitis :

- It is the most common abdominal surgical emergency
- Most cases of appendicitis are believed to result from obstructing fecaliths à increased intraluminal pressure causes local ischemia, leading to transmural inflammation.
- Secondary bacterial infection occurs, and gangrene and ? perforation.
- A thorough history and physical examination are all that is required to make a clinical diagnosis
- S/S: appendiceal hypertension and distension, a crampy visceral type pain is initially felt in the peri-umbilical region.
- There is often associated nausea, vomiting, and fever.

- As the inflammatory process progresses, and directly irritates the parietal peritoneum, the quality of the pain becomes sharp and shifts to the right lower quadrant (RLQ).
- Almost all patients with appendicitis will lose their appetite.
- Auscultation of the abdomen reveals diminished or absent bowel sounds.
- Classically, tenderness at McBurney's point (anatomically located two thirds of the way from the umbilicus to the anterior superior iliac spine).
- Guarding, rigidity, and rebound tenderness may be present from peritoneal irritation. Rovsing's sign (RLQ pain upon left lower quadrant palpation).
- The obturator and iliopsoas signs can be elicited by internal rotation of the right hip and extension of the right hip.
- Clinical Dx accuracy is ~ 95%
- However, this classic presentation of appendicitis occurs only in 1/3
- populations prone to atypical presentations: elderly, immunocompromised, or pregnant .
- nothing by mouth (NPO)
- Intravenous fluids (rehydration).
- I.V. Antibiotic
- Historically, a 20% presurgical false positive rate has been considered acceptable.
- In patients where the clinical diagnosis is uncertain, imaging studies and observation admissions for serial abdominal examinations may decrease this false positive rate.

- In any woman of childbearing age, pregnancy should be ruled out with a serum or urinary b-human chorionic gonadotropin (b-HCG) test before imaging or appendectomy.

Diverticulitis :

- ~ 30% Nearly a third of patients over the age of 50.
- Diverticulitis, a complication caused by the perforation of a diverticulum, affects up to 25% of patients with diverticular disease.
- Inspissated food, stool, and increased intraluminal pressure are believed to be involved in the pathogenesis of diverticular perforation.
- The clinical presentation of patients with diverticulitis is dependent on the extent of the perforation.
- Small perforations are walled off by surrounding mesentery and pericolonic fat .
- larger perforations can result in extensive intraperitoneal abscess formation and frank peritonitis.
- The location of abdominal pain is dependent on the location of the perforated diverticulum.
- Diverticular disease most commonly affects the sigmoid colon.
- S/S often crampy, left lower quadrant abdominal pain.
- However, a redundant sigmoid colon or diverticular disease involving the right colon may complain of RLQ abdominal pain.
- additionally complaints: nausea, vomiting, fever, and anorexia.
- P/E: reveals tenderness over the inflamed area, ? A Palpable mass.
- In patients with free perforation, peritoneal signs such as rebound, guarding, and rigidity.
- Investigation: WBC, U/E,

- CT of the abdomen and pelvis with intravenous and oral contrast is the diagnostic modality of choice, with a reported sensitivity as high as 98%.
- Colonoscopy should not be performed in patients with suspected diverticulitis, as perforation is a contraindication for endoscopy.
- Management:

1. mild, uncomplicated diverticulitis can occur on an outpatient basis, and consists of a clear liquid diet and the administration of
2. oral antibiotics that cover typical gastrointestinal pathogens.
3. Complicated diverticulitis occurs when patients develop intraabdominal abscesses, fistula, free perforation, or intestinal obstruction. Patients with complicated diverticulitis or those with mild disease who fail to respond to above therapies require hospitalization.
4. Patients should be started on intravenous antibiotics, made NPO, and be evaluated by a surgeon.
5. Intraabdominal abscesses can often be managed with percutaneous drainage catheters
6. surgery is sometimes required.
7. Free perforation or intestinal obstruction usually mandates emergent surgery.

Obstruction:

- It means that the normal flow of intestinal contents is interrupted by a mechanical blockage.
- Small bowel obstruction:
  - Adhesion :
    1. 75% are due to adhesive peritoneal bands with PSHx of abdominal surgery

2. Up to 15% of patients who undergo laparotomy will be readmitted within 2 years with SBO from adhesions
3. Up to 3% will require operative intervention as a result.
4. 10-year risk of recurrent SBO from adhesions is ~ 40%.

- Hernias are the second most common cause of SBO, and account for up to 25% of cases.
- The remainder results from a number of etiologies, including Crohn's disease, volvulus, neoplasm, intussusception, gallstones, and ischemia.

n Large bowel obstruction (LBO) :

- ~ 60% of cases are the result of malignancy, with colon cancer being the most common.
- Other causes include diverticular strictures and colonic volvulus. The cecum and the sigmoid colon are the most common locations of colonic volvulus.

n Patho:

- Obstruction à proximal bowel segment becomes increasingly distended by swallowed air, gas from bacterial fermentation, and luminal secretions à Bacterial overgrowth, bowel edema, and loss of absorptive function .
- If the obstruction is not promptly treated, then ischemia, necrosis and perforation may occur.

n Symptomps:

- The pain is a colicky, diffuse pain that waxes and wanes over 5-minute intervals.
- Nausea, vomiting, distention, and obstipation
- Emesis is often feculent due to bacterial overgrowth. The passage of stool and flatus do not eliminate SBO from the differential diagnosis, as luminal contents distal to the blockage can still pass.

- Signs:
  - Signs of volume depletion.
  - Abdomen distension with either hyperactive high-pitched or hypoactive bowel sounds.
  - The abdomen is usually diffusely tender, with findings of rigidity, rebound tenderness, or guarding suggesting peritonitis.
  - A ventral, inguinal, or periumbilical hernia should be sought as a potential etiology for the obstruction.
- Labs:
  - Usually nonspecific
  - hemoconcentration, leukocytosis, and electrolyte imbalances.
- Abd. X-rays:
  - Typical findings include air–fluid levels, small bowel distention, and a paucity of air in the rectal vault.
  - In addition, evidence of complications such as intraperitoneal free air can be seen.
- CT scan: for diagnoses and determination of etiology, sensitivity of 100% and accuracy of 90% .
- Management:
  - Admit to the hospital, both for decompression and observation.
  - Strict restriction of oral intake,(NPO)
  - Nasogastric tube decompression
  - Intravenous fluids and electrolyte repletion.
  - Early surgical evaluation is mandatory given the perforation risk if left unattended.

- The philosophy that "the sun should neither rise nor set on a bowel obstruction," still remains true today.

Ischemic bowel disease :

- Classified into 3 distinct syndromes:

1.Acute mesenteric ischemia:

- Results from the rapid loss of blood supply to the portion of the intestines supplied by the celiac, superior mesenteric, or inferior mesenteric arteries.
- The cause is most commonly thromboembolic disease.
- The consequences are severe, bowel necrosis, infarction, and death.

2.Chronic mesenteric ischemia:

- Results from the gradual loss of blood supply to the portion of the intestines supplied by the celiac, superior mesenteric, or inferior mesenteric arteries.
- The cause is usually atherosclerosis.
- Patients with chronic mesenteric ischemia present with chronic postprandial abdominal pain, which is termed intestinal angina.
- Because eating worsens the pain, patients develop a fear of eating (sitophobia), and significant weight loss may occur.

3. Colonic ischemia:

- Also known as ischemic colitis, is the most commonly encountered intestinal vascular disorder.
- Colonic ischemia occurs when there is a decrease in colonic mucosal oxygenation.
- In the vast majority of patients, colonic ischemia does not result from an occlusive vascular process, but rather occurs when the oxygen

requirements to a specific portion of the colon are not met by the vascular supply.

- Colonic ischemia occurs in the portions of the colon where blood flow is least redundant, such as the splenic flexure, and rectosigmoid junction .

n Symptoms:

- Lower gastrointestinal bleeding, is the most common presenting symptom.
- The disorder is self-limited in the majority of cases, and the prognosis is good.
- Acute interruption of blood supply in the mesenteric vasculature results from either thromboembolic disease or vasospasm.
- Of the three ischemic bowel syndromes, acute mesenteric ischemia is the disease that presents with acute abdominal pain.
- Acute onset severe periumbilical abdominal pain. Early in the disease course, the pain is often out of proportion to tenderness produced during the physical examination.
- Peritoneal signs may develop when bowel infarction has already occurred
- The stool may be positive for occult blood, but hematochezia is uncommon with acute mesenteric ischemia.

n Risk Factors

- advanced age
- hypercoaguability
- vascular disease
- cardiac disorders such as atrial fibrillation or valvular disease .

- labs:
  - leukocytosis
  - elevated hematocrit from hemoconcentration.
  - A low serum bicarbonate .
  - metabolic acidosis .
  - elevated lactate level are seen once bowel infarction has occurred.
  - elevated plasma D-dimer levels may be helpful.
- Radiology:
  - plain films, Doppler ultrasound, conventional CT, and MRI lack sensitivity and specificity to accurately make the diagnosis.
  - Mesenteric angiography: the "gold standard" test for diagnosing occlusive arterial mesenteric ischemia.
  - Its sensitivity and specificity are 75% to 100% and 100%, respectively.
  - can be diagnostic and therapeutic
- The mortality rate for patients with acute mesenteric ischemia in whom the diagnosis is not made before the onset of bowel infarction is ~ 90%.
- Early diagnosis is crucial.
- A high index of suspicion, based upon predisposing risk factors, and clinical presentation is required.
- Patients with suspected acute mesenteric ischemia should have prompt angiography and surgical evaluation.

Inflammatory bowel disease (IBD):

- IBD encompasses ulcerative colitis (UC), Crohn's disease (CD), and indeterminate colitis.
- All three disorders are chronic, characterized by disease-free intervals, followed by flares of disease.
- These disorders are generally managed in the outpatient setting, and abdominal pain is often a component of active disease.
- There are several acute, potentially life-threatening complications from IBD that may present as abdominal pain in the outpatient setting, including:
  - fulminate colitis
  - toxic megacolon
  - bowel obstruction
  - bowel perforation
  - abscess formation.

1. Fulminate colitis:

- Is typically associated with UC,
- Can be the initial presenting scenario in up to 10% of patients with UC.
- It is defined as :
  - Abdominal pain
  - >10 bloody bowel movements per day
  - Volume depletion
  - Anemia
  - And any two of the following: white blood count >10,500 cells/mL, fever >38.6_C, tachycardia, and hypoalbuminemia.

- Patients with known UC will complain of increasingly severe, crampy, generalized abdominal pain in addition to the typical complaints of bloody diarrhea, urgency, and tenesmus

2.Toxic megacolon:

- Pathologically dilated large bowel + evidence of systemic toxicity.
- Mortality rates ~ 19
- It can occur with UC, CD, infectious colitis (especially Clostridium difficile), ischemic colitis, diverticulitis, and colon cancer.
- In UC, it occurs early in the course of UC, with 30% of cases within the first 3 months and 60% of cases within 3 years of diagnosis.
- Physical examination classically reveals abdominal distension with tympany to percussion, as well as tenderness above the underlying colon.
- However, examination findings are less reliable in the setting of active corticosteroid therapy.
- In patients with peritoneal signs, perforation should be strongly suspected.
- The diagnosis is made based on the presence of colonic distension (>6 cm) on imaging + any 3 of the following:

1. fever (>38.6C)
2. leukocytosis (>10,500 cells/mL)
3. Anemia

4. tachycardia (≥120 beats/min) + any of the below:
    a. altered mental status
    b. volume depletion
    c. hypotension
    d. electrolyte abnormalities.

- The patient with either fulminate colitis or toxic megacolon should be:
    a. hospitalized immediately for aggressive medical care and surgical evaluation.
    b. b.They should be made NPO, started on intravenous hydration with appropriate electrolyte repletion, and in cases of toxic megacolon, should have a nasogastric tube placed to facilitate decompression.

3.Bowel obstruction :

- Common in CD (most frequently in the terminal ileum).
- It results from active inflammatory intestinal strictures, postinflammatory fibrotic intestinal strictures, or peritoneal adhesive disease from previous abdominal surgeries.
- However: strictures can occur in ~ 5% of patients with UC, with up to 30% representing malignant disease.

4.Perforation :

- Can occur both with CD and UC.
- In UC, it is most commonly the result of toxic megacolon, and carries a mortality rate as high as 50%.
- In CD, perforation results from unrelieved small bowel obstructions.
- Because of the powerful immunosuppressive medications that IBD patients are frequently taking, the clinical severity of a perforation may be muted.

- ??? a high index of suspicion is needed.

5.Intraabdominal abscess:

- Common in CD, occurring in approximately 25% of patients.
- They result from microperforations in patients with penetrating or stricturing disease.
- Patients typically present with fever, leukocytosis, and abdominal pain. Additionally, they may experience back or groin pain if the abscess involves the ileopsoas or pelvic structures.
- A special subset of abscess patients includes those with perianal disease, where the abscess occurs in the perirectal fascia, musculature, or adipose tissue. Approximately 30% of patients with perianal fistulizing
- CD will develop a perirectal abscess.

  ** These patients may note low pelvic/perineal pain, defecatory urgency, or tenesmus in addition to constitutional symptoms. Severity may be blunted secondary to concomitant immunosuppressive medications.

- Regardless, patients with suspected perirectal or intraabdominal abscess with a history of CD warrant hospital admission for antibiotics, may be surgical evaluation, and advancement of medical therapy when appropriate.

- Special populations :

  - Abdominal pain with atypical presentation because of the underlying condition:
    1. Elderly.
    2. Immunosuppressed (including patients with AIDS).
    3. Patients on analgesics.
    4. Women of childbearing age.
    5. Pregnant women.
    6. Under the influence of alcohol or illicit substances .

- Special populations

A. Elderly patient:

- often delay seeking medical care
- They present at a potentially more dangerous point in their disease course.
- The history and physical examination have less reliability in the elderly.
- Many factors contribute to this, including:
  - Underlying central nervous system disorders
  - Fear of losing independence
  - Hearing loss
  - Depression
  - Complex medical histories
  - Vague description of the discomfort
  - Polypharmacy
  - Change in normal physiology (eg, inability to mount leukocytosis or pyrexic response to infection).

- diagnostic accuracy is as low as 40% in elderly patients with acute abdominal pain.
- An important point to consider when evaluating elderly patients is that common disorders may manifest with uncommon presentations.
- For example, both coronary ischemia and urinary tract infections have been well-described causes of abdominal pain in the elderly.
- It is not uncommon for an elderly patient to present with altered mental status as the lone sign of an acute abdominal process.

B. Immunosuppressed patients and patients with immunodeficiency syndromes:

- generate a more expansive differential diagnosis (especially infectious causes) for their pain owing to their inability to mount a normal immune response.
- As in the elderly, the physical examination may be less accurate owing to an abnormal inflammatory response to pathologic processes.

n A long list of differential diagnosis and evaluation of gynecologic and obstetric processes manifesting as acute abdominal pain .

n A few points need to be stressed.

- All women of childbearing age require a pelvic examination and evaluation for elevated b-HCG in the workup of acute abdominal pain.
- As the gravid uterus enlarges in a pregnant patient, the normal topography of the small and large intestines may be altered due to mass effect, thereby making the location of abdominal tenderness atypical.
- This is classically true with appendicitis.

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