

Diverticulitis: Outpouchings of Doom

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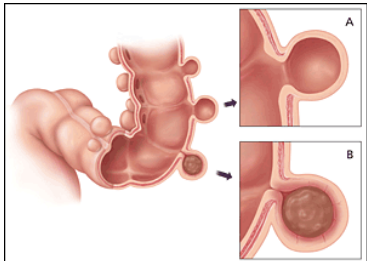
Board Bombs

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Introduction and Quick Pathophysiology

Diverticulosis is a disease of colonic outpouchings. These outpouchings, diverticula, occur when intraluminal pressure builds up in the colon and creates weak spots in its wall. As pressure builds, the pressure pushes against the walls, and any weak points expand outwards. Mucosal blood vessels are often exposed to pressure and mechanical stress, therefore causing bright, red hematochezia. Diverticulosis is the most common cause of a lower GI bleed in adults.¹



Box A - Diverticulosis; Box B - Diverticulitis

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Diverticulitis is when a diverticulum becomes infected. Blockages of diverticula (often by fecaliths) can cause stool stasis, which acts as a nidus for colonic-filled bacteria to grow. Infection along with mechanical damage to the diverticula can lead to local inflammation and ultimately cause diverticulitis. Left-sided colonic diverticula are more likely to get infected, whereas right-sided colonic diverticula often present with bleeding complications. About 4% of all patients with diverticulosis end up having diverticulitis at some point in their lifetime.²

Diverticulitis can be either **complicated** or **uncomplicated**. It is deemed complicated when there is either perforation or abscess formation.

Risk Factors

Most of the known risk factors are modifiable via lifestyle changes: healthy diet and exercise. Constipation, obesity, and straining are all known risk factors, and all increase colonic intraluminal pressure. Low fiber diets along with diets heavy on red meat and fat are associated with an increased risk of diverticulosis.¹ It is said the average daily intake of fiber in the U.S. is around 11 g/day while the recommended amount is upwards of 30-35g/day. NSAIDs and possibly smoking have been shown to be correlated with increased complications.³

The only unmodifiable risk factor is age. People 60 years and older are the most susceptible population due to decreased muscle and connective tissue strength in the colon. It is estimated that half of the 60-year-old population and older have diverticulosis.⁴ The idea that eating seeds, nuts, popcorn, and similar grains can cause diverticulitis episodes by clogging diverticula has been debunked as a myth and we should not continue to perpetuate it any further.⁴ Let the people eat their popcorn!

Presentation

Expect patients >50 to have this diagnosis.⁵ That said, ~16% of admissions for acute diverticulitis are patients <45 years old!⁶ This likely reflects the fact that younger patients have a high risk of more complications, and the younger patients are, the more severe their symptoms seem to be.

Abdominal pain: classically left lower quadrant as the sigmoid colon is involved. Some patients might also have suprapubic or even right lower quadrant pain, either due to a redundant inflamed sigmoid or cecal diverticulitis.⁷ Of those presenting with acute diverticulitis, 50% of them have had one or more prior episodes of similar pain.⁸

Nausea/vomiting: common in many diseases and nonspecific to those with diverticulitis.

Change in bladder/bowel movements: always ask your patients about constipation, diarrhea, or blood in the stool. The bladder may be irritated as well, causing suprapubic pain or urinary symptoms due to compression from the colon.

Lab findings: nonspecific is the word of the day in these patients. Many have CRP elevations and leukocytosis, but who cares? These tests are not sensitive nor specific to rule in or rule out diverticulitis. They can just add to your pre-imaging pre-test probability and possibly help risk stratification of your patient following diagnosis. Of course, as part of your abdominal pain workup, you should get a CBC, CMP, and urine studies (don't forget the hCG for females).⁹

Imaging: Let's talk CT. We all know this is the preferred study in the ED. On the scan, diverticulitis is suspected when there is localized bowel thickening >4 mm or fat stranding, in or around the colonic diverticula (sensitivity 94%, specificity 99%).¹⁰ Abscesses and bowel obstructions might be identified as complications and are usually straightforward. In most cases, a non-contrasted study can be used for accurate diagnosis. The addition of IV or oral contrast should be used in cases of patients who have a low BMI <25 or have prior history of abdominal surgery and other diagnoses like SBO are in the differential.

Complications

25% of patients will develop complicated diverticulitis either upon initial presentation or after diagnosis.¹ As mentioned earlier, the complications include perforations, fistulas, obstructions, and abscesses.³ Let's talk about how to identify these.

Abscess: these happen in about 17% of hospitalized diverticulitis patients. The symptoms of an abscess are very similar to good ole acute diverticulitis. These are typically found on the initial CT or need to be suspected in patients who fail to improve despite three

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days of antibiotics. Abscess management depends on their size. Abscesses ≥ 3 cm likely need percutaneous drainage. In general, anything < 3 cm should have an “antibiotic first” strategy after discussion with your surgical colleagues.¹¹

Obstruction: partial colonic obstruction can occur due to luminal narrowing from pericolonic inflammation but beware of full obstruction (very rare).

Fistula formation: very rare and are usually the result of more chronic recurrent infections. They most commonly are colovesicular due to close contact. This fistula is clinically evident by signs of pneumaturia and fecaluria. CT bladder can also show pneumaturia. Even without a fistula, patients can present with dysuria and recurrent UTIs due to bladder irritation from contact with an inflamed sigmoid.¹²

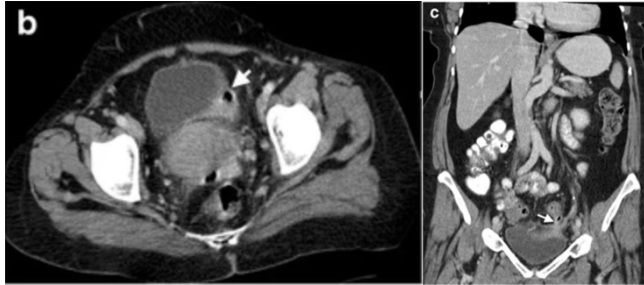


Image B - CT of bladder wall thickening due to local diverticulitis¹²
Image C - CT of colovesicular fistula¹²

Perforation: expect classic symptoms of generalized abdominal tenderness with guarding. In those who are hemodynamically unstable, a bedside upright chest x-ray should be performed as you resuscitate your patient to look for air under the diaphragm.¹³

Diagnosis

So, the labs are not helpful, the exam and history might provide context, but the diagnosis really rests with CT. Any patient with lower abdominal pain and change in bowel habits and LLQ tenderness should make you suspect diverticulitis. Remember that some patients may have RLQ tenderness, but you will likely CT those patients anyway out of

concern for appendicitis.

Management

Managing diverticulitis depends on if its uncomplicated or complicated.

Complicated diverticulitis is diverticulitis plus one of these: bowel obstruction, abscess, fistula, or frank perforation. We discussed those above. If you see them, that patient is not going home.¹⁴

Microperforations are NOT a reason to call a surgeon unless the patient has a peritoneal abdomen, or they have other clinical signs of sepsis and/or are immunocompromised. These are expected due to the inflammation in the diverticula, and they are managed medically. Expect a few air bubbles outside the colonic wall but no contrast extravasation.¹⁵

Other reasons to admit diverticulitis: sepsis, microperforations, immunosuppression, peritonitis, significant comorbidities, intolerance of oral intake, failed outpatient treatment.

If you are admitting these patients, you'll want to start IV antibiotics in the ED¹³:

- Piperacillin-tazobactam (3.375g IV every 6 hours) or
- Metronidazole plus one of these (cefazolin, cefuroxime, ceftriaxone, ciprofloxacin, or levofloxacin) (Please use fluoroquinolones sparingly due to their side effect profile, more commonly associated with the development of *C. Diff*, and their worsening sensitivity to *E. coli*.)
- If allergic or resistance is an issue, ertapenem or meropenem is an option.

Outpatient treatment^{16,17}

Here comes the most controversial part of our review. Outpatient antibiotics in diverticulitis have really come under fire lately, and with good reason. The evidence for antibiotics improving the care of diverticular patients is weak. However, there is no strong evidence that antibiotics shorten episode length or prevent recurrence, but we still do it anyways.

They are typically prescribed for 7-10 days, based on retrospective studies and clinical experience. Traditionally, ciprofloxacin and metronidazole were given, now amoxicillin-clavulanate or trimethoprim-sulfamethoxazole have been preferred due to easier dosing of a more reliable single agent. After the episode, a high-fiber diet (> 30 g/day), exercise, avoidance of risk factors, and weight loss in patients with a BMI greater than or equal to 30 kg/m^2 is recommended.¹³

Prognosis

It's important to remember that $\sim 80\%$ of patients with diverticulosis never have any problems. This is important to reassure patients when diverticulosis is incidentally found on CT scan. Sadly, 20-50% of patients have recurrent diverticulitis cases.¹⁸

Most cases of diverticulitis resolve within 2-3 days, but extended courses prompt further imaging in search of a large abscess.

Diverticulitis is the third leading cause of GI-related hospitalizations and the most common indication for elective colonic resection.¹ Evidence shows that laparoscopic resections result in shorter episode length, fewer complications, and less in-hospital deaths than an open colectomy.¹³ Patients that have two acute diverticulitis events are recommended to undergo surgery for resection of the affected tissue to prevent future episodes.

References: for a complete list of references, please visit our website under this topic heading (we are trying to reduce paper waste)!