

Bandemia as a Harbinger of Stercoral Colitis and Impending Perforation

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The Case

A 56-year-old woman was brought to the emergency department (ED) by her husband for “shaking” at home and being weak “like a ragdoll,” which he attributed to her long history of high dose opioid therapy for chronic back pain. He reported that she had poor oral intake and lost 20 pounds in the previous month. The patient had no “chief complaint,” but admitted on “review of systems” to constipation for several days, subjective fevers at home, and mild pain in the chest, back and abdomen. On physical examination, she was alert and afebrile with abdominal distention and slight tenderness without rebound. An abdominal x-ray confirmed a large amount of stool in the colon with no free air. Urine drug screen was positive for hydrocodone and hydromorphone. Her blood leukocyte count was 11,500 cells/?L with 31% bands.

During observation in the ED, the patient’s condition improved considerably with intravenous fluids, but without any fecal output. Nevertheless, she wanted to go home, and her family concurred that she would be safe and that follow-up with her well-regarded primary care physician would be arranged within 1-4 days. She was diagnosed with "constipation," "failure to thrive," and "dehydration" and advised to take a laxative, drink fluids, and decrease her use of opioids.

Three days later, the patient was admitted to a second hospital with perforated bowel and sepsis. In the operating room, the surgeon found stercoral colitis and a large perforated “stercoral ulcer” of the proximal sigmoid colon with disseminated fecal and purulent material. Despite aggressive surgical and postoperative care, she expired from sepsis ten days later.

The Commentary

By Sean Flynn, MD and David K. Barnes, MD, FACEP

Background

Stercoral colitis, ulceration, and perforation represent a continuum of focal ischemic colitis resulting from fecal impaction. The impacted fecaloma leads to increased luminal pressure, decreased capillary filling, and eventually bowel wall ischemia, necrosis, and perforation. Perforations are most often located in the sigmoid colon, followed by the rectosigmoid junction.¹ Given the ischemic pathophysiology, perforations typically occur in the antimesenteric aspect of the bowel. These perforations can be quite large, with one study documenting an average perforation size of 3.6 cm.² Stercoral ulcerations are often multifocal, with one third of patients having more than one area of ulceration.²

Stercoral perforation is considered rare due to the relative paucity of case reports, since its first dramatic description in the US medical literature in 1896.³ However, it may be more common than the literature suggests. Given its propensity for perforation in the sigmoid colon, it can easily be misdiagnosed as perforated diverticulitis. Postmortem autopsy results have shown an incidence of stercoral ulceration of 0.04% to 2.3%.⁴ Stercoral perforation has been shown to be responsible for at least 3.2% of colonic perforations requiring surgical intervention.² The importance of identifying stercoral colitis and subsequent perforation lies in its high mortality, which ranges from 17-30%.^{1,5}

Diagnosis

The diagnosis of stercoral colitis and impending perforation can be challenging. The average age of presentation is between 58-76 years old. Patients typically present with vague abdominal complaints, such as in the case above. A recent review found that 70% of patients will have a history of constipation.⁴ Constipation is due to chronic opioid use in 20% of these patients, but can also be idiopathic in nature.⁵ All patients will have a heavy stool load at presentation.¹ Laboratory test values are nonspecific but may demonstrate leukocytosis (i.e., increased numbers of white blood cells) or left shift (i.e., increased numbers of immature cell types, particularly neutrophil-precursor band cells). The most sensitive test for diagnosis is computed tomography (CT). In stercoral colitis, CT imaging may demonstrate fecal impaction with colonic dilation (i.e., increased cross-sectional diameter >6cm), wall thickening (>3mm), mucosal discontinuity evidenced by lack of mucosal enhancement, and peri-colonic fat stranding.⁶ By comparison, in constipation or uncomplicated fecal impaction, the colon may be dilated, but its walls are usually thin and remain well perfused.⁷ When progressing to perforation, the most common findings include peri-colonic stranding (80%), colonic perfusion defects (70%), dense mucosa (62.5%), and colonic wall thickening (60%).⁸ Frank perforation has the usual signs of perforated hollow viscus, including free air, free fluid, and stool outside the bowel wall.

Management

The management of stercoral colitis depends on the clinical status of the patient. Stable patients should be admitted for observation with an aggressive bowel regimen including oral laxatives and enemas. Manual or endoscopic disimpaction may also be necessary. Surgical intervention is required when medical management fails to resolve the impaction, or if perforation occurs. Surgical management typically involves resection of the involved colon with end colostomy. Primary resection and anastomosis with or without upstream diversion can be considered based on the amount of intraperitoneal contamination and the patient's clinical status. Due to the size of stercoral perforations and the surrounding inflammation or stercoral colitis, primary repair or exteriorization of the perforation should almost never be attempted, as

these techniques are associated with increased mortality.⁹ Even with prompt surgical intervention, morbidity and mortality remains high for these patients, emphasizing the importance of early diagnosis and treatment before progression to perforation.

Quality Improvement Approach

The patient in this case had a challenging clinical presentation. She presented with vague complaints of weakness, anorexia, and weight loss. Only a subsequent review of systems revealed mild abdominal, back, and chest pain, along with constipation. She was taking high dose opiates at home, which likely contributed to her constipation and masked her abdominal symptoms. Her total white blood cell count was likely at the top of the normal range, if not mildly elevated. Once she had apparent improvement in her symptoms following intravenous hydration, she was discharged without further investigation or imaging. Although this decision was supported by the patient and her family, it involved significant risk for several reasons. First, the fact that the patient felt better with intravenous hydration, even without fecal evacuation, is not a meaningful finding in a high-risk clinical setting. Second, the combination of anorexia with substantial weight loss, severe constipation, and abdominal pain is a worrisome symptom complex. Constipation can cause abdominal discomfort and even pain on palpation; however, it is not a reasonable explanation for lethargy and feeling “weak like a ragdoll,” which prompted her ED presentation. Not all patients with constipation warrant further investigation with a CT scan or additional workup. But when the presenting symptoms are outside of a normal constipation symptom complex, there needs to be concern for another underlying diagnosis. For symptoms more severe than expected for constipation, concern must be raised for stercoral colitis as well as other intraabdominal infectious, inflammatory, or neoplastic conditions, such as urinary tract infections, diverticulitis, colorectal cancer, intraabdominal abscesses, inflammatory bowel disease, or colitis.

Other than her presenting symptoms, the patient's laboratory work demonstrated significant bandemia, with 31% bands. Bands are reported on manual differentiation of a complete blood count. They represent immature leukocytes and, while not specific for infection, are associated with an acute inflammatory response. Moderate bandemia is defined as 11%-19% bands and high bandemia as greater than 20%. Among 167 and 205 patients who presented to two community hospitals with normal total leukocyte counts and either high or moderate bandemia, respectively, bandemia was associated with positive blood cultures (adjusted OR, 3.8, 95% CI, 2.0-7.2 for moderate bands; adjusted OR, 6.2, 95% CI, 3.2-11.8 for high bands), including gram-negative bacteremia, and in-hospital death (adjusted OR, 3.2, 95% CI, 1.7-6.1; adjusted OR, 4.7, 95% CI, 2.4-9.0, respectively).⁹ Thus, this patient's 31% band count should have prompted further investigation for an underlying infectious source.

Given the history, physical examination, and laboratory findings described above, a prudent ED physician would have obtained CT imaging of the abdomen and pelvis. Had a CT scan been completed, it likely would have demonstrated significant fecaloma and stool burden within the colon. It is unclear when her perforation occurred but given that she presented with a perforation three days later, she likely would have had imaging findings to suggest stercoral colitis during her initial presentation. Inflammatory imaging findings, as described above, likely would have prompted admission, treatment, and close observation. If the patient refused CT, or if timely CT imaging was not available, then close telephone follow-up would have been indicated. In many EDs, a nurse or physician calls patients who are discharged with high-risk

findings but without a definitive diagnosis within 24-48 hours, to recommend immediate follow-up care if appropriate.

Bandemia in the setting of a normal white blood cell count can certainly be missed, as bands may not be part of the routine laboratory review of many clinicians and may require manual confirmation of automated results by an experienced technician, which adds delays in reporting. The reliability and utility of band counts among patients over 3 months of age has been extensively debated in both pathology and critical care literature.¹⁰⁻¹² A recent meta-analysis found that the Delta Neutrophil Index (DNI), the ratio of immature granulocytes over total neutrophils in the peripheral circulation, may be a more reliable predictor of infection, with pooled sensitivity of 0.67 (95% CI 0.62–0.71) and pooled specificity of 0.94 (95% CI 0.94–0.95).¹³ Given the high specificity and positive predictive value of severe bandemia or elevated DNI for bacterial infection among patients at risk, healthcare organizations should consider electronic health record alerts when these results are posted. In this way, clinicians could be alerted to the need for further investigation, although this benefit must be balanced against the risk of alert fatigue from “nuisance” alerts that lack clinical significance.

Take-Home Points

- Non-specific symptoms such as weakness, weight loss, and anorexia may be warning signs for severe underlying conditions. Any unexpected findings, such as absent fecal output or laboratory abnormalities in the ED, warrant further investigation in this setting.
- Stercoral colitis requires a high index of suspicion in patients with chronic constipation and abdominal complaints, especially when complaints are more severe or outside of expected constipation symptoms.
- Stercoral colitis is best diagnosed with a CT scan of the abdomen and pelvis, which may demonstrate local fecal impaction, colonic dilatation, decreased mucosal perfusion, and peri-colonic stranding.
- The sigmoid colon and rectosigmoid junction are the most common sites of stercoral ulceration and perforation. Segmental colectomy with end colostomy is the preferred intervention.
- Moderate and severe bandemia (>11% bands) should prompt further investigation for an underlying infection, even in the setting of a normal total white blood cell count.

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