

## A Case of *Clostridium septicum* Aortitis With Concomitant Adenocarcinoma of the Cecum

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### Abstract

*Clostridium septicum* aortitis is a rare infection that is strongly associated with underlying adenocarcinoma of the colon. We report a case of a 73-year-old woman with peripheral vascular disease who presented after 4 weeks of severe abdominal pain. Abdominal computed tomography showed thickening of the cecal wall and gas in the aortic wall. Colonoscopy revealed a large ulcerated moderately differentiated adenocarcinoma in the cecum. Blood cultures grew *Clostridium septicum*. The patient was offered surgical intervention but refused; she was treated with antibiotics and discharged home where she died 1 week later.

### Introduction

Certain microbial pathogens have been found concurrently with human malignancies such as *Streptococcus bovis* with colorectal carcinoma and *Helicobacter pylori* with gastric mucosa-associated lymphoid tissue (MALT) lymphoma.<sup>1,2</sup> The role in early detection of these infectious agents in the setting of suspecting malignancy remains unclear. *Clostridium septicum* is an anaerobic, gram-positive bacillus that can form endospores and withstand a variety of environments.<sup>3</sup> It accounts for 1.3% of all clostridial infections, but its impact lies in its association with occult gastrointestinal and hematological malignancies.<sup>4</sup>

### Case Report

A 73-year-old woman with atherosclerotic cardiovascular disease treated with 4-vessel coronary artery bypass graft, peripheral vascular disease treated with aortobifemoral bypass, hypertension, chronic obstructive pulmonary disease, and major depressive disorder presented with a 4-week history of crampy abdominal pain with nausea and intermittent postprandial emesis. Her abdominal pain radiated to her cervical, thoracic, and lumbar back. The patient noted a decrease in her stool caliber, anorexia, and a 18-kg weight loss over the prior 8 months. She denied fevers, melena, hematochezia, recent travel, or infections. She was afebrile but mildly hypertensive and tachycardic, with a heart rate >100 bpm and 94% oxygen saturation on ambient room air. She appeared uncomfortable with a mildly distended abdomen that was nontender to palpation. A digital rectal exam was notable for hemoccult-positive brown stool. Laboratory studies showed hemoglobin 6.1 g/dL, mean corpuscular volume of 70 fL, and leukocyte count 32,000 cells/ $\mu$ L with 91% polymorphonuclear neutrophils. She was transfused 3 units of packed red blood cells, and started on intravenous metronidazole, piperacillin-tazobactam, and vancomycin. Abdominal and pelvic computed tomography (CT) revealed gas in the aortic wall at the level of the celiac artery and superior mesenteric artery suspicious for infectious aortitis.

CT angiography demonstrated gas in the aortic wall proximal to the aortobifemoral bypass graft, with 2 focal outpouchings in the descending abdominal aorta, suspicious for an aortitis with a pseudoaneurysm (Figure 1). Additionally, there was a large area of cecal wall thickening with surrounding mesenteric fat stranding. Colonos-

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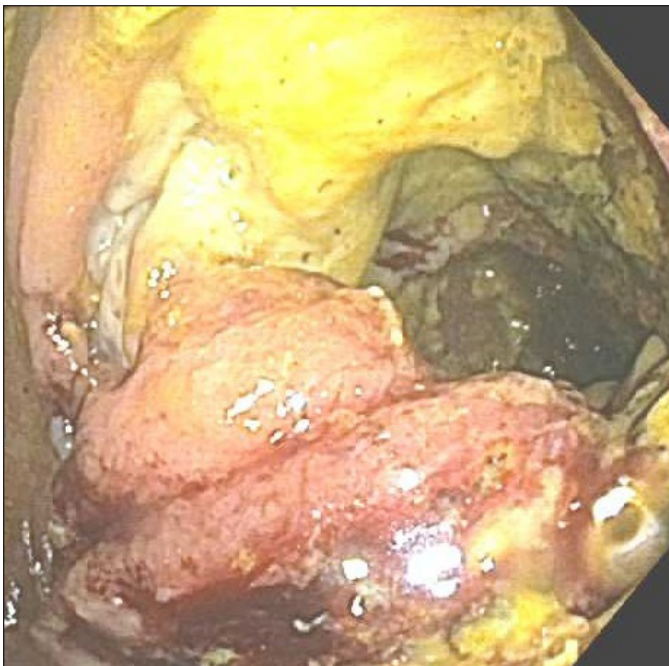


**Figure 1.** Abdominal and pelvic (A) sagittal and (B) transverse computed tomography angiography showing gas in the descending and thoracic abdominal aorta, approximately above the level of the celiac axis.

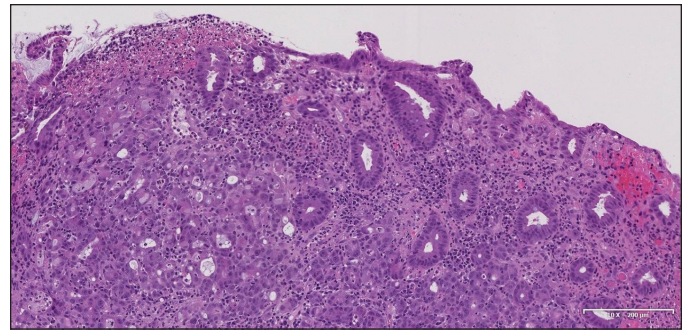
copy revealed a large, ulcerated circumferential mass in the cecum that, under microscopy, was found to be moderately differentiated adenocarcinoma (Figures 2 and 3). Blood cultures grew *C. septicum*. Definitive therapy (in consultation with infectious disease and vascular surgery consultants) required surgical intervention, but the patient's family opted for no surgical intervention or further antibiotic therapy. The patient was discharged home with hospice on hospital day 6, and died 1 week later.

## Discussion

*C. septicum* is a gram-positive bacillus that, while known to cause gas gangrene and fulminant sepsis like other *Clostridium* species, can serve as the source for vascular infections. It is clinically significant because of its strong association with occult neoplasms, as first described in 1969 by Alpern and Dowell.<sup>3</sup> Up to 85% of *C. septicum* infections



**Figure 2.** Colonoscopy revealing a large circumferential, ulcerated cecal mass.



**Figure 3.** Moderately differentiated cecal adenocarcinoma with infiltration of adenocarcinoma cells into the submucosa and normal adjacent glands.

have been accompanied by concurrent malignancies, with hematological and gastrointestinal neoplasms occurring most frequently.<sup>3</sup> A review of 162 cases of *C. septicum* infections showed 47% of patients had a concomitant cecal carcinoma, and another 40% had a concomitant hematologic malignancy.<sup>5</sup> The authors hypothesized that the association between hematological malignancies and *C. septicum* was likely a result of the often coexisting enterocolitis because of underlying granulocytopenia.<sup>5</sup> A review of 23 cases of *C. septicum* aortitis showed that 91% of infected individuals had a synchronous colonic adenocarcinoma or polyp, with 71% of the neoplasms localizing to either the ascending colon or cecum.<sup>6</sup> The acidic environment and lowered oxidation-reduction potential in the cecum may enable clostridia to thrive and proliferate.<sup>7</sup> The mucosal ulceration that results from the expanding gastrointestinal neoplasm facilitates *C. septicum* to systemically disseminate and seed with a preference for atheromatous lesions, such as in the aorta. Vascular infections caused by *C. septicum* carry a mortality rate of 50-100%.<sup>3,5-8</sup>

High-dose intravenous penicillin G is the antibiotic of choice for *C. septicum* infections; for patients with penicillin allergies, options include third- or fourth-generation cephalosporins, metronidazole, imipenem, clindamycin, and vancomycin.<sup>6</sup> Aortic resection with reconstruction should be considered in all patients with *C. septicum* aortitis, given the risk of rapid aneurysmal change and ensuing rupture.<sup>9</sup> The overall prognosis of *C. septicum* aortitis is poor, with a 6-month mortality rate of 64%, and a mortality rate of 100% for those who failed to receive surgical debridement and revascularization.<sup>6</sup> Moreover, in the few cases of *C. septicum* aortitis described, the majority have been associated with a concurrent mycotic aneurysm or dissection, making vascular reconstruction crucial.<sup>6,10</sup>

Our case supports the strong association of *C. septicum* aortitis and gastrointestinal malignancy. *C. septicum* in the setting of a gastrointestinal malignancy carries an high mortality rate and can be considered a prognostic marker. Most

importantly, for patients with blood cultures that grow *C. septicum*, a comprehensive search for occult malignancy is imperative, especially for adenocarcinomas in the cecum or ascending colon.

## Disclosures

Author contributions: S. Shah performed the literature review, wrote the manuscript, and is the article guarantor. D. Whitehead, K. Sampath, and A. Toor reviewed and edited the manuscript.

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Informed consent was obtained for this case report.

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