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A rare case of *Clostridium septicum* aortitis with colon adenocarcinoma

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ABSTRACT

Clostridium septicum aortitis is a rare, highly morbid condition typically accompanied by malignant disease, such as hematologic cancer or colon adenocarcinoma. Presenting symptoms commonly described include acute onset of abdominal pain, nausea, and fevers. Prompt diagnosis of infectious aortitis is critical to prevent deadly complications, such as sepsis and vascular catastrophe. The described management largely involves surgical resection of the infected aorta, débridement, and arterial revascularization through extra-anatomic bypass or aortic graft placement. (J Vasc Surg Cases and Innovative Techniques 2018;4:87-90.)

We present the first reported case of *Clostridium septicum* aortitis with associated colon adenocarcinoma successfully treated with excision and aortoiliac reconstruction using an arterial homograft in addition to a literature review. The patient's consent was obtained for publication.

CASE REPORT

A 66-year-old man without prior medical care presented with a 3-day history of sharp right lower quadrant abdominal pain, fevers, chills, and bloody bowel movements. He had originally presented to an outside hospital, where computed tomography (CT) of the abdomen and pelvis showed marked thickening of the cecum and ascending colon wall and gas in the walls of the infrarenal abdominal aorta and inferior mesenteric artery.

On examination, the patient was nontoxic and hemodynamically stable with a temperature of 102.3°F; the abdomen was distended and tender in the right lower quadrant without peritoneal signs and no pulsatile mass, and femoral and pedal pulses were 2+ bilaterally. Laboratory studies were notable for leukocytosis to 19.5 cells per microliter of blood. Preliminary

blood cultures were positive for gram-positive rods, and he was started on intravenous cefepime, vancomycin, and metronidazole (Flagyl). Additional workup included esophagogastroduodenoscopy (given gastrointestinal bleed), the findings of which were normal (specifically no aortoenteric fistula), and colonoscopy demonstrated cecal and rectal masses.

CT angiography of the abdomen and pelvis, performed for surgical planning, demonstrated circumferential wall thickening and air within the wall of the infrarenal aorta and a fluid collection from the aortic bifurcation to the common iliac arteries, concerning for infected infrarenal aorta (Fig 1). The patient underwent urgent transabdominal removal of the infected aortobi-iliac segment and in-line reconstruction with an aortobi-iliac homograft and left renal artery reimplantation into the homograft (Fig 2). Given the urgency of the procedure and availability of homograft at our institution, homograft was selected as the conduit of choice over alternatives such as a neo-aortobi-iliac system (NAIS) procedure. The left renal artery required reimplantation because of proximal inflammation extending to the orifice of this vessel, with a total renal ischemic time of 70 minutes and reimplantation time of 15 minutes. Concurrently, open right hemicolectomy was performed with the bowel left discontinuous because of the patient's septic state, lack of bowel preparation, and presence of cecal and rectal masses. The retroperitoneum was approximated over the graft using 2-0 Vicryl in a standard running fashion, and the abdominal wall was left open with an ABThera wound vacuum (Acelity, San Antonio, Tex). As planned, 2 days later, the patient underwent end-ileostomy creation and abdominal wall closure. Intraoperative aortic cultures grew *C. septicum*, and antibiotics were narrowed to ampicillin-sulbactam (Unasyn). The rectal mass was to be addressed at a later time.

His postoperative course was marked by acute renal failure; serum creatinine concentration peaked at 6.2 mg/dL with glomerular filtration rate of 9.0 mL/min/1.73 m² on postoperative day 6, without need for hemodialysis. At 1 week postoperatively, serum creatinine concentration was 2.2 mg/dL; it was nearly normalized to 1.5 mg/dL with a glomerular filtration rate of

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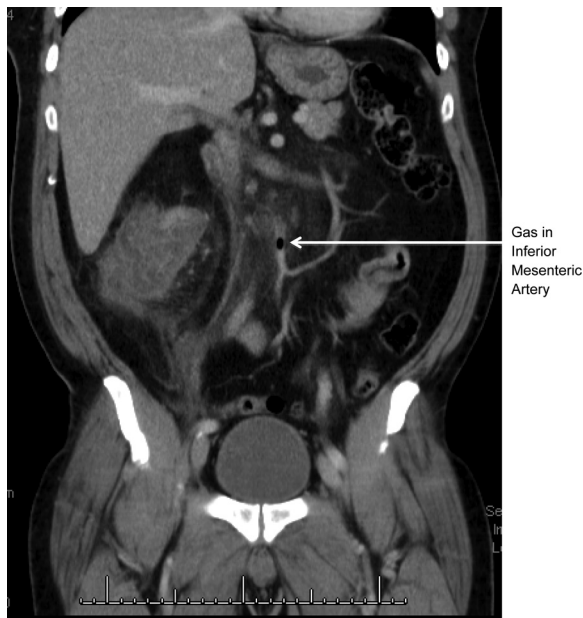


Fig 1. Preoperative computed tomography (CT) scan of *Clostridium septicum* aortitis showing free air in inferior mesenteric artery on coronal section.



Fig 2. In situ aortobi-iliac homograft after débridement and excision of infected aorta.

47.0 mL/min/1.73 m² by discharge. Postoperatively, he remained afebrile, and the white blood cell count normalized. He was released on postoperative day 28 to a rehabilitation facility in stable condition with no systemic symptoms and planned 6-week course of Unasyn from time of resection of the infectious nidus.

DISCUSSION

A PubMed search using the key words “aortitis,” “mycotic,” “aneurysm,” “clostridium,” “colon,” and “aorta” was conducted in September 2015 to find a composite of cases for our analysis. The search yielded 55 studies published between 1976 and 2015 that were narrowed by the following exclusion criteria: absence of both aortitis and colon adenocarcinoma, aortitis due to organisms

other than *C. septicum*, patient outcomes not addressed, presenting with aortic rupture, and paper not available in English.¹⁻¹⁹

C. septicum aortitis has a poor prognosis with a 50% to 100% mortality rate.^{3,20} Early surgical intervention for patients with *C. septicum* aortitis is necessary to prevent progression to sepsis. The hypothesized relationship between colon cancer and *C. septicum* aortitis stems from the anaerobic environment fostered by the tumor cells optimal for *C. septicum* spores, which can hematogenously spread from the tumor site to the aorta.¹¹ All deaths in our review occurred in patients treated medically. For patients treated with antibiotics alone, high surgical risk due to advanced age, acute clinical decline, comorbidities, and preference of the patient contributed to the decision to forgo surgery.

The options for surgical management of *C. septicum* aortitis include axillobifemoral bypass (with excision of the aorta), excision of the infected aorta and insertion of an aortic graft, and NAIS procedure. In most cases, nonsurgical treatment resulted in high morbidity that outweighed the risks of surgery.¹⁹ A combination of early surgical intervention and long-term antibiotics has proved to be more effective than medical therapy alone.¹⁹ The average length of parenteral antibiotic treatment was 6 to 8 weeks postoperatively, and only 5 of 22 (22.7%) patients were treated with lifelong antibiotics. Because of the higher rates of homograft resistance to bacteria compared with other conduits, our patient was prescribed a 6-week regimen of antibiotics instead of lifelong antibiotic suppression.²¹ Our plan for follow-up after completion of the course of antibiotics included close clinical follow-up and postoperative CT angiography at 6 months.

In a series by Lau et al,²² following 6 weeks of intravenous antibiotics after open repair of mycotic aortic aneurysms, lifelong suppression with narrow-spectrum oral antibiotics (typically trimethoprim-sulfamethoxazole, cephalexin, doxycycline, or metronidazole) was prescribed. With the combined presence of colon cancer, the addition of anaerobe coverage is recommended. The duration of antibiotic use for *C. septicum* aortitis may depend on persistence of the patient's infectious symptoms, intraoperative findings and surgical cultures, mode of antibiotic administration, and specific antibiotic regimens.

In our case review, in those treated surgically for aortitis, 31.8% (7/22) received axillobifemoral bypass, and 31.8% (7/22) received an aortic graft. For critically ill patients, an axillobifemoral bypass can serve as a bridge until the patient is medically stabilized. In comparison to surgical excision of the infected aorta and aortic graft reconstruction, axillobifemoral bypass requires a shorter operative time, and it has less hemorrhage and shorter aortic cross-clamp time with the excision of the infected aorta.²³ Although axillobifemoral bypasses confer certain

advantages over in situ aortic graft placement, stump rupture and graft occlusion are the major postoperative complications.

Unlike synthetic grafts, homografts appear to be more mechanically stable and more resistant to infections because of their immunologically inert property with cryopreservation.^{23,24} Given the lower rate of postoperative infections, cryopreserved homografts have become more commonly used in the treatment of aortic graft infections, aortoenteric fistulas, and mycotic aneurysms.²³ In an operative field with an existing infection, homografts are probably preferred to synthetic grafts. However, the major impediments to the widespread use of homografts are availability and high cost. Because of the relatively short history of homograft use in treatment of mycotic aneurysms, there are limited data on the long-term outcomes and complications of these grafts.

In centers with limited access to homografts, antibiotic-soaked prosthetic grafts are an alternative option for aortic repair, specifically rifampicin-soaked Dacron grafts. Both in situ repair options, homografts and antibiotic-soaked grafts, avoid the risk of stump blowout feared in extra-anatomic bypasses. Although Dacron antibiotic-soaked grafts are less expensive than homografts, they may be less effective at treating methicillin-resistant *Staphylococcus aureus* and certain strains of *Staphylococcus epidermidis*.²⁵

The NAIS procedure, first described by Clagett et al²⁶ in 1993 and constructed with femoropopliteal vein conduit, is another emerging option for repair, especially in cases of aortic infection. The advantages of the NAIS approach include low rates of recurrent infections (<2%) and decreased rates of aortic stump rupture that are associated with axillofemoral grafts.²⁷ The NAIS procedure may not be ideal in patients with a known virulent pathogen because of a higher risk for persistent graft infection and sepsis.²⁸ Another drawback is the length of time associated with NAIS reconstruction, on average 554 minutes.²⁷

Overall, one of the most common complications of surgery in our analysis was acute kidney injury, probably secondary to preoperative exposure to contrast material and intraoperative suprarenal clamping. Higher rates of renal injury would be expected in patients with suprarenal aortic clamping; however, because of the small number of patients in this study, we found equal rates (28.6%) of renal injury in patients with aortic grafts (2/7) and axillobifemoral bypass grafts (2/7).

CONCLUSIONS

Excision and repair with homograft should be considered for definitive repair of *C. septicum* aortitis. Although the literature is limited on this treatment, given the rarity of *C. septicum* aortitis, this surgical option may be a safe

alternative to the NAIS procedure and axillobifemoral bypass, especially in an emergent setting.

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