



Aortoenteric Fistula after Endovascular Aortic Repair of Infected Abdominal Aortic Aneurysm

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Secondary aortoenteric fistula is a rare yet fatal condition that may occur as a complication after abdominal aortic aneurysm repair. Here, we report a case of a 66-year-old male with abdominal discomfort and intermittent fever at 5 years after endovascular aortic repair of an infected abdominal mycotic aneurysm. Surgical treatment with extra-anatomic bypass for lower body revascularization, followed by exploratory laparotomy with explantation of the infected graft and aortic tissue and repair of the duodenum were performed. The patient was rescued from the septic condition and discharged uneventfully 2 months postoperatively.

Key words: Aortoenteric fistula, endovascular aortic repair, infected aortic aneurysm

INTRODUCTION

An aortoenteric fistula (AEF) is a communication between the aorta and adjacent gastrointestinal tract. AEF formation is a devastating condition regardless of whether it is primary or secondary (i.e., after previous aneurysm repair). Secondary AEF develops after the aortic intervention and typically involves the suture line and/or prosthetic graft material, with a reported incidence between 0.36% and 4% of patients who underwent open aortic surgery.^{1,2} Endovascular aortic repair (EVAR) has become the preferred approach for aortic aneurysm repair with lower perioperative morbidity, mortality, and shorter length of hospital stay, with outcomes comparable to those of the open approach.^{3,4} However, EVAR is not immune to infection. Based on case reports and small case series, the incidence of infected endografts, which may present with fever, weight loss, malaise, abdominal pain, AEF, and aneurysm rupture, varies from 0.2% to 5%.⁵ Endograft infection is rare but is a devastating complication associated with high mortality. Here, we report a 66-year-old male patient who developed secondary AEF at 5 years after EVAR and its treatment course.

CASE REPORT

A 66-year-old male patient was admitted to our ward due to intermittent fever and abdominal discomfort with diarrhea and passage of tarry stools for several weeks. He had a history of infected abdominal aortic aneurysm (AAA) and underwent abdominal aortic stenting grafting approximately 5 years prior [Figure 1]. Although a long-term oral antibiotic with augmentin 1000 mg each tablet (amoxicillin 875 mg + clavulanate potassium 125 mg) twice a day was prescribed in the outpatient department, he was poorly compliant with his medication intake.

On physical examination, his temperature, heart rate, respiratory rate, and blood pressure were 38.9°C, 101 bpm, 25 cpm, and 96/58 mmHg, respectively. Abdominal auscultation revealed decreased bowel sounds, with tenderness over the midabdominal region.

Blood examination results showed marked leukocytosis (white blood cell count: 29,020/ml) with left shift, and the patient's PCT was 174.6 ng/ml, indicating an acute infection status. The hemoglobin level and platelet count were 8.6 g/dl

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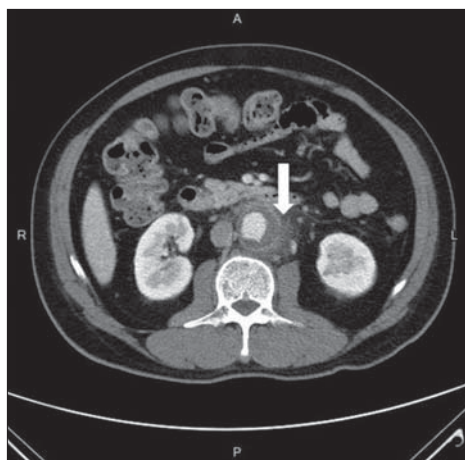


Figure 1: Initial computed tomography revealed abdominal aortic aneurysm (3.2 cm × 3.4 cm × 6.6 cm) with mural thrombus and surrounding fatty strands (white arrow)

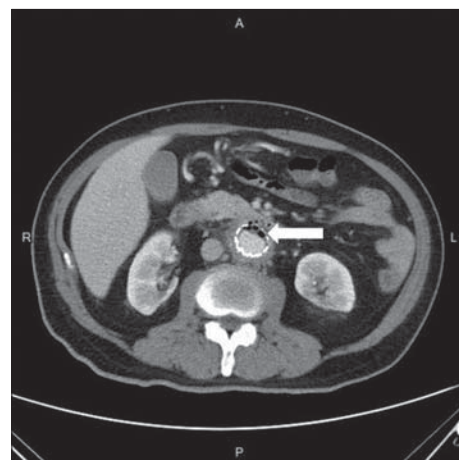


Figure 2: Follow-up computed tomography 5 years after endovascular aortic repair demonstrated stent grafting over abdominal aortic aneurysm with intraluminal thrombus and air formation within the aortic wall (white arrow)

and 180,000/ml, respectively. Blood culture results revealed *Veillonella parvula*, and intermittent fever persisted under intravenous antibiotic treatment with vancomycin. Abdominal computed tomography scan revealed air formation within the aortic stent and surrounding fatty strands with some enlarged nodes around the aneurysm [Figure 2]. AEF was suspected from the clinical presentation and laboratory/imaging findings.

Surgery was performed under the impression of secondary AEF. Extra-anatomic bypass with an 8-mm Gore-Tex vascular graft between the axillary and femoral arteries over both sides was performed. Subsequently, an exploratory laparotomy was performed to lyse the severe adhesion of the aortic wall and the third portion of the duodenum. Under adequate aortic clamping, the infected aortic wall and previously implanted stent graft were excised. The proximal and distal ends of the aorta were sewn, and the perforated duodenum was repaired. The abdominal wound was closed after the placement of multiple drainage tubes.

The patient developed sepsis postoperatively. The culture of the excised aortic tissue and graft showed mixed flora (Gram-positive cocci, Gram-negative bacilli, and yeast), and the pathology section revealed fungal infection with acute inflammation. The postoperative blood culture results revealed *Staphylococcus epidermidis*. The patient was administered with prolonged intravenous antibiotic treatment in the intensive care unit under the expertise of an infection disease specialist. He was weaned off the ventilator after 1 month and discharged 2 months postoperatively, with alert consciousness and stable hemodynamic condition. He is currently doing well and has resumed his previous job at 6 months postoperatively.

DISCUSSION

Infected aortic aneurysms are rare and account for approximately 0.65%–2.0% of all aortic aneurysms in Western countries.⁶ However, the incidence is higher in East Asia.^{7,8} The therapeutic management of infected aortic aneurysm is challenging, and the prognosis is generally poor because of the high risk for rupture of rapidly growing aneurysm; further, affected patients often have severe comorbidities, particularly immunodeficiency and coexisting sepsis.⁹ The treatment of infected aortic aneurysm consists of antibiotics and surgery. The administration of antibiotics should be tailored after the culture and sensitivity results. Intravenous antibiotics should be continued for at least 4–6 weeks, followed by long-term oral antibiotics, such as amoxicillin-clavulanate, levofloxacin, or trimethoprim-sulfamethoxazole.^{5,10} Empirical antibiotic treatment effective against *Staphylococcus aureus* and Gram-negative rods, such as *Salmonella*, should be initiated in cases that are culture negative.¹¹ Surgical options may include open surgical repair (OSR), that is, aneurysm resection with tissue debridement and revascularization or EVAR. The first EVAR for infected aortic aneurysm was reported in 1998.¹² EVAR has been considered potentially more prone to infection-related complications because the stent graft is deployed in an infected field without resection of the infected nidus. However, from a recent systemic review of the management of infected aortic aneurysm, no high-quality evidence supports either OSR or EVAR as the primary repair strategy.¹³ Compared with OSR, EVAR seems to be associated with superior short-term survival, without late disadvantages, suggesting that EVAR can be an acceptable alternative to OSR, particularly in patients with high surgical risk.^{11,13}

Because EVAR has been considered potentially more prone to infection-related complications, the duration and choice of antibiotic therapy is an important issue for successful treatment. Some authors recommend parenteral or oral antibiotics for at least 6 weeks.¹⁴ A significant proportion of patients developed late fatal infection-related complications after discontinuing antibiotic therapy. Most recurrent infections occurred within the 1st year, predominantly within the first 6 months.¹¹ Late severe infection-related complication similar to the presented case is extremely rare, which also reflects that long-term antibiotic therapy, for at least 6–12 months and possibly for life, is a prerequisite for successful endovascular treatment of infected aortic aneurysm.

AEF formation is a fatal condition if left untreated, and secondary AEF after EVAR for previous infected aortic aneurysm is rarely reported. Patients present with signs and symptoms of gastrointestinal bleeding and systemic infection. Due to the fact that the hemodynamic status of the presented case was relatively stable, he was managed with conventional treatment consisting of extensive open surgery (extra-anatomical bypass and aortic ligation), closure of fistula tract, and complete removal of any prosthetic material. This treatment is associated with high morbidity and mortality; therefore, more minimally invasive options with endovascular repair have been attempted. However, EVAR is often successful in achieving short-term favorable immediate outcome, but it is followed by repeat infection and bleeding in the presence of systemic infection.¹⁰ In our opinion and other's perspectives,^{11,13} EVAR may be utilized for acute bleeding to stabilize the patient with AEF and earn time for aggressive infection control. EVAR does not eliminate the infecting bacteria, but it can be used as a bridging procedure for definitive surgical repair, particularly in the setting of active systemic infection.

CONCLUSION

The endovascular approach in selected cases may ameliorate complications associated with open surgery for the treatment of infected aortic aneurysm. AEF is a rare but highly fatal complication if left untreated, and it may occur after both endovascular repair and open surgery for infected aortic aneurysm. Secondary AEF should be ruled out in a patient presenting with gastrointestinal symptoms with a history of AAA repair. Early recognition of symptoms may prevent the development of untoward hemodynamic instability. Explantation of the infected stent graft and creation of an extra-anatomic bypass are effective surgical options.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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