

➤ **Case Report** ◀

Successful Endovascular Repair of Mycotic Aortic Pseudoaneurysm Followed by Aorto-esophageal Fistula

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Mycotic aneurysm of the aorta is a rare, but life-threatening pathology. In recent years, endovascular stent graft placement has been introduced as an effective alternative for treating infected aortic aneurysms. A 64-year-old woman with a history of paraplegia due to spinal cord injury was referred to our institute with fever and blood-tinged sputum. Computed tomography (CT) scan showed an 11-cm pseudoaneurysm arising from the proximal descending aorta, which was normal 1 month ago at the previous CT scan. The patient underwent thoracic endovascular aortic repair for the pseudoaneurysm, deployed with a transiliac access approach, and received antibacterial medical therapy. On postoperative day 11, she developed signs of infection, caused by an aorto-esophageal fistula. The infection was treated conservatively with parenteral nutrition and antibiotic administration. The patient had an uneventful recovery and was discharged on postoperative day 113. At 2-year follow-up, she had a normal physical examination and CT angiography showed a marked reduction of the pseudoaneurysm sac. We report a successful endovascular stent grafting and subsequent medical treatment in a patient with a mycotic thoracic aortic pseudoaneurysm followed by a postoperative aorto-esophageal fistula.

Keywords: endovascular repair, pseudoaneurysm, aorto-esophageal fistula, mycotic aneurysm

Introduction

Mycotic aneurysm of the aorta is a rare, but critical pathology. The main surgical treatment procedures are wide debridement, resection of the infected aorta and surrounding tissues, and grafting of the aneurysm, followed

by long-term antibiotics. In recent decades, endovascular stent graft repair has been introduced as a less invasive alternative for treating aortic aneurysms; this strategy has been extended to include infected aortic aneurysms.^{1,2)} Here we report a successful thoracic endovascular aortic repair (TEVAR) of an acute mycotic descending aortic pseudoaneurysm, despite a subsequent aorto-esophageal fistula.

Case Report

A 64-year-old woman was transferred to our institute with high fever (>39°C) and blood-tinged sputum. One month previously, she was in another hospital due to fever of unknown origin with negative urine cultures; she was treated with sulbactam/cefoperazone and levofloxacin. Chest computed tomography (CT) scan showed a large pseudoaneurysm, measuring 11×6 cm in size and displacing the esophagus to the right (Fig. 1). The pseudoaneurysm originated from the proximal descending aorta, which was normal at her previous CT scan a month ago. Her laboratory data on admission indicated severe infection or sepsis, i.e., a white blood cell (WBC) count of 12,900 cells/μL and C-reactive protein (CRP) level of 17.1 mg/dL. She had a history of spinal cord injury due to a traffic accident, resulting in paraplegia at age 20. Because sepsis was strongly suspected, despite repeated negative blood culture, antibiotic therapy was initiated with meropenem hydrate and vancomycin.

TEVAR was performed under general anesthesia to prevent aortic rupture 2 days after admission. A 30/26 mm×155 mm Relay Plus tapered stent graft (Bolton Medical, Sunrise, FL, USA) was deployed, covering the left subclavian artery via an open right common iliac artery approach. The on-table angiography after deployment showed good positioning of the stent graft, no signs of endoleak, and intentional coverage of the left subclavian artery orifice.

CT angiography on postoperative day (POD) 4 ruled out endoleak. A subsequent CT on POD 11, which was performed due to the recurrence of high fever, showed a

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Fig. 1 Sagittal section of the computed tomography scan demonstrating the pseudoaneurysm originating from the proximal descending aorta and measuring 11×6cm in size.

thrombus and air bubbles in the aortic pseudoaneurysm (Fig. 2). Although this suggested the development of an aorto-esophageal fistula, blood analysis revealed a WBC count of 8,700 cells/ μ L and CRP level of 5.70 mg/dL, which did not indicate severe infection. Although we considered a radical open surgery for the aorto-esophageal fistula, consisting of an in situ aortic replacement in association with esophagectomy, she was deemed unlikely to survive this procedure and she refused to undergo surgical treatment. We therefore decided to pursue a conservative treatment as an alternative strategy. Oral food intake was ceased, and the patient was treated conservatively with pernasality tube-feeding for 5 weeks until spontaneous closure of the fistula. Three months postoperatively, the patient was discharged from our hospital but continued to receive antibiotics orally; her CRP values were within the normal range. Because temporary withdrawal of antibiotics showed left-sided pleural effusion and an elevated CRP level at the 20-month follow-up, antibiotics were resumed. She remained on prolonged antibiotic therapy with levofloxacin and minocycline and showed complete elimination of the pseudoaneurysm 2 years after the endovascular intervention (Fig. 3).

Discussion

Mycotic aortic aneurysms represent one of the most challenging pathologies for vascular surgeons; traditional treatment consists of an open surgical removal and debridement of the infected segment, use of omentum or muscle flaps to cover the infected field, and either an in situ replacement using a prosthetic graft or extra-anatomic bypass followed by long-time antibiotic therapy. Due to the high morbidity and mortality associated with standard surgical procedures in this disease, several reports have suggested that endovascular management for mycotic aneurysms is a viable, less invasive alternative with favor-

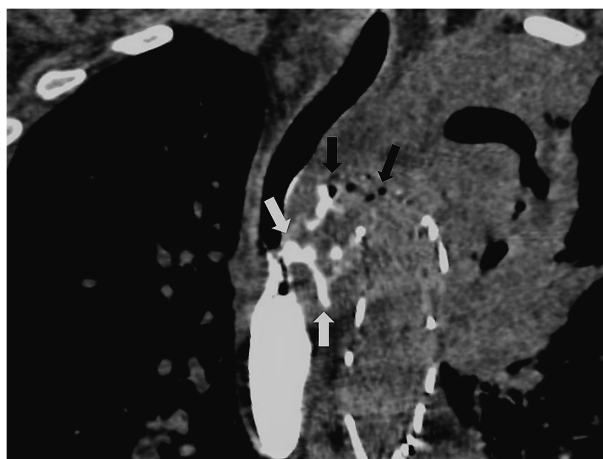


Fig. 2 Computed tomography scan performed on postoperative day (POD) 11 revealed extravasation of the contrast medium (Gastrografin, white arrows) from the esophagus into the pseudoaneurysm, in which ectopic gas was generated (black arrows).



Fig. 3 Follow-up computed tomography scan 2 years after endovascular repair.

able results.¹⁻³) In contrast, the use of an endoluminal stent graft does not preclude later open repair, and in the case of an impending rupture, it could serve as a “bridge to delayed open surgery.”^{1,4,5})

In our patient, endovascular stent graft repair was used to treat a rapidly expanding, life-threatening, acute, mycotic pseudoaneurysm, thus avoiding a high-risk open procedure. Kan et al. recommended the preoperative use of antibiotics for longer than 1 week to provide significant protective factors for persistent infection.⁶) Although the patient was in the active phase of the infection with a high fever, we first performed TEVAR to prevent the rupture of the aortic pseudoaneurysm and administered vancomycin and meropenem for only 2 days preoperatively. After the patient’s general condition improved, we planned to perform open surgery, if necessary.

This patient subsequently developed an aorto-esopha-

geal fistula, which could cause further contamination, secondary to the mycotic thoracic aortic pseudoaneurysm repaired by endovascular stent grafting. In situ prosthetic reconstruction is often unavoidable, even with open repair. Surgery for the esophageal perforation is not performed if patients seek treatment late, have minimal symptoms, or do not have sepsis.⁷⁾ The risk of a persistent infection may be high in a state where contamination through the esophageal fistula is ongoing. Owing to persistent esophageal contamination, a poor outcome may be expected without further definitive surgery.^{3,5,8)} Endovascular stent graft treatment may itself cause an esophageal fistula by aortic erosion, particularly in the tortuous segments. There is no special treatment for aorto-esophageal fistula that occurs after TEVAR. High-risk patients have been reported to survive with conservative treatment consisting of antibiotic therapy and percutaneous drainage.⁹⁾

There has always been a concern regarding the risk of persistent infection when deploying a stent graft in an infected field.^{1-3,6,8)} However, as shown in our patient, long-term survival is possible if the fistula heals. Rapid shrinkage of the aneurysm sac may have contributed to the healing. It cannot be denied that there is a possibility that the aorto-esophageal fistula worked as drainage for a perigraft abscess. Had it not been a pseudoaneurysm, but a true aneurysm, we are uncertain as to whether the same result would have been obtained.

Life-long antibiotic therapy does not achieve better outcomes in the prevention of sepsis. However, in patients who are unsuitable for conventional open surgery, it may be possible to manage a local aortic wall infection with antibiotics and endovascular treatment.^{1,4,8)} In our patient, antibiotics were effective; therefore, it was possible that she may have been infected with weaker pathogens. The introduction of a foreign material into the infectious field will not necessarily worsen the infection.⁶⁾ Prolonged antibiotic treatment ranging from months to years could lead to a significant decrease in the high mortality rate normally associated with this diagnosis.

Conclusion

Endovascular treatment combined with long-term antibiotic treatment may be a reasonable alternative to open surgery in appropriately selected patients with mycotic aortic pseudoaneurysm.

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Statement of Patient Consent

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Disclosure Statement

None declared.

Author Contributions

Study conception: SY

Data collection: SY

Leadership for endovascular treatment: HU

Writing: SY

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Final approval of the article: all authors

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