

Palliative Stent-Graft Insertion Followed by an Allograft Replacement for an Infected and Ruptured Aortic Aneurysm

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We report a surgical case of infected thoracic aortic aneurysm. Before arrival of the cryopreserved aortic allograft, the patient had hemoptysis resulting from aneurysm rupture. Therefore endovascular stent grafting was urgently performed three days prior to in situ allograft implantation. Palliative stent grafting prevented circulatory collapse and stabilized the patient until successful allograft implantation. (Ann Thorac Cardiovasc Surg 2009; 15: 261–264)

Key words: infected thoracic aortic aneurysm, stent grafting, bridge to allograft implantation

Introduction

Most infected aneurysms are accompanied by serious conditions, such as sepsis, coagulopathy, and rupture resulting in high mortality. Thus an infected aneurysm is still a challenging disease for cardiovascular surgeons and appropriate and prompt countermeasures are necessary.

Case

A 65-year-old man had been given antibiotics for three weeks for the treatment of pyogenic spondylitis. However, his fever spiked to 39°C, and a computed tomography of his chest demonstrated a new thoracic aortic aneurysm (TAA) adjacent to the diaphragm. The TAA was positive on positron emission tomography, indicating presence of the infection. Furthermore, it grew from 4 cm to 7 cm

(Fig. 1) in only one month, and the patient was admitted to our hospital on July 7, 2007. His serum C-reactive protein (CRP) was 3.77 mg/ml, and his WBC count was normal. A culture of his blood revealed salmonella, thus salmonella-sensitive antibiotics were initiated preoperatively.

In situ thoracic aortic replacement with a cryopreserved allograft (CPA) was planned. This time, the CPA was due to arrive on July 23 from the University of Tokyo Tissue Bank. However, hemoptysis occurred on July 18, indicating aneurysm rupture and penetration into the lung. Because more blood was coughed up over time, emergency endovascular stent grafting (self-expandable Gianturco Z stent: diameter 40 mm, Cook, Bloomington, IN, USA; and thin Dacron graft: diameter 30 mm and length 8 cm, UBE Medical Inc., Tokyo, Japan) was performed on July 20 (Fig. 2). After stent grafting, the amount of hemoptysis considerably decreased and the patient's condition improved.

As previously scheduled, in situ reconstruction was performed with the CPA on July 23. Using Stoney's spinal approach and the femoro-femoral bypass, the thoracic aorta was cross clamped and opened. After removal of the stent graft, the thoracic aorta was replaced with the CPA from the 6th rib to just above the celiac artery (Fig. 3). Simultaneously, the left lower lobe of the lung was removed with as much hematoma as possible because of

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Received February 14, 2008; accepted for publication July 17, 2008
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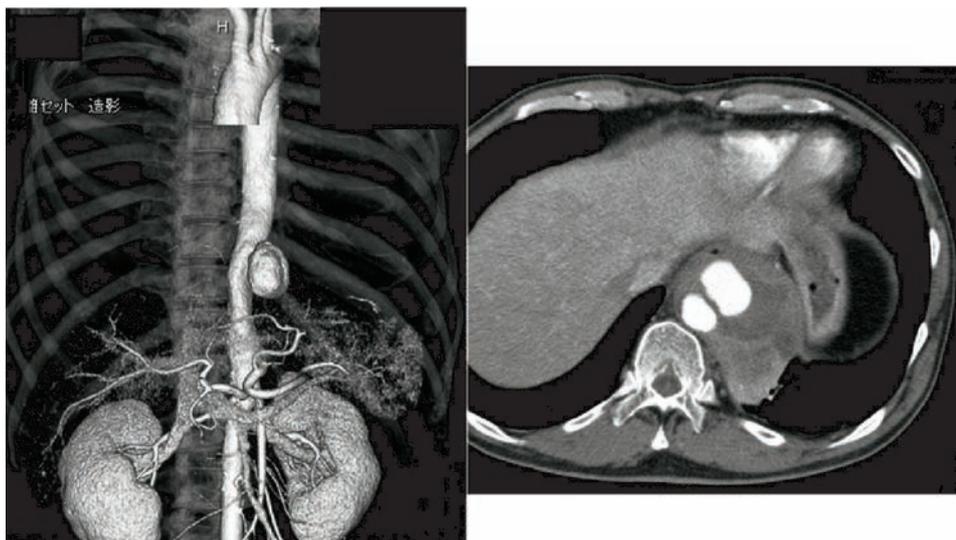


Fig. 1. Preoperative computed tomograms (CTs) demonstrate the saccular aneurysm of the descending thoracic aorta with irregular mural hematoma (maximal diameter 7 cm).

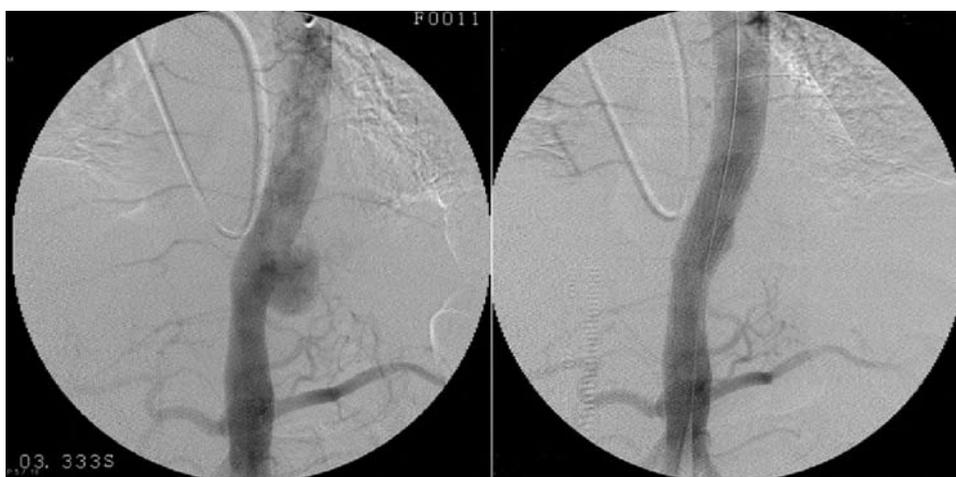
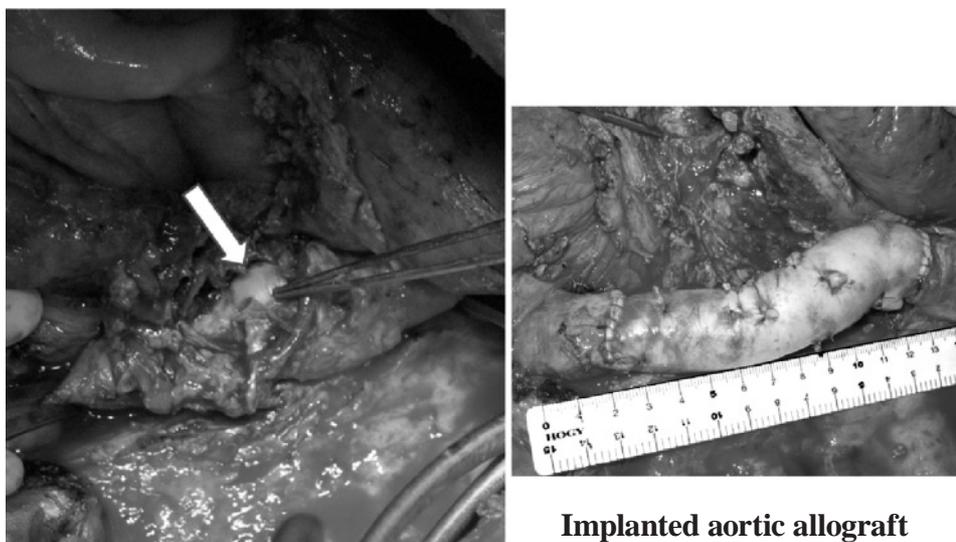


Fig. 2. Digital subtraction angiograms show the saccular aneurysm (left) and the successfully implanted stent graft (right).

Before

Post stent-grafting



Implanted aortic allograft

Fig. 3. Intraoperative photographs showing the previously inserted stent graft (left: arrow) and the newly implanted cryopreserved aortic allograft (right).



Fig. 4. Postoperative computed tomogram (CT) shows the implanted aortic allograft (arrow).

tight adhesion to the aneurysm and in consideration of local infection control. The patient recovered with no neurological deficits. No purulent discharge was seen postoperatively, and the drains were removed without complications. Salmonella-sensitive antibiotics (cefazopran hydrochloride, meropenem trihydrate, and ampicillin) were administered intravenously for one month until the serum level of CRP and the white blood cell (WBC) count normalized. He was discharged on August 30 on an oral antibiotic and is doing well 6 months postoperatively (Fig. 4).

Discussion

The prognosis of surgical treatment for infected aneurysms largely depends on the control of sepsis and persistent local infection.¹⁾ Therefore the standard surgical treatment has been an aneurysm excision using an extra-anatomic bypass. However, this operation is often associated with serious complications, such as graft-occlusion/infection, thromboembolism, and stump blowout.^{1,2)} Unfortunately, the extra-anatomic bypass for infected aneurysms has resulted in early postoperative mortality rates as high as 24%.²⁾ Furthermore, there is a reluctance to institute it for TAA repair because of inadequate visceral perfusion.

Under these circumstances, in situ implantation of CPAs has received renewed interest. In Japan, two tissue banks are established, one at the University of Tokyo and another at the National Cardiovascular Center in Osaka. These institutions have currently become the main source

of allografts. Although the late deterioration of allografts or disruption of anastomoses^{3,4)} are occasionally reported, the in situ implantation of a CPA is a sufficiently attractive option for the treatment of an infective aortic aneurysm.

Given that an infected aneurysm is characterized by rapid expansion leading to rupture,^{4,5)} prompt and careful treatment is necessary. For emergency cases such as rupture or for patients with high surgical risk, less-invasive endovascular stent grafting is now in wide use. Out of necessity, endovascular stent grafting is occasionally employed for infected aneurysms, and a few successful cases have been reported.⁶⁾ However, as is obvious, the presence of prosthetic grafts often leads to persistent and recurrent infection and causes deterioration of the patient's condition.^{7,8)} Accordingly, as suggested by Curti et al.,⁹⁾ a subsequent implantation of an allograft should be considered at an early stage after stent grafting.

Recent studies have demonstrated that CPAs are resistant to infection, and in situ implantations of CPAs are clinically acceptable for the treatment of infected aneurysms.^{1,10)} However, strict postoperative management is important for a successful outcome. In our hospital, antibiotics are administered intravenously until the CRP level and WBC count normalize. At that point they are switched to oral antibiotics. Thus far we have experienced three other allograft-implanted cases (rupture of the ascending aorta induced by postoperative mediastinitis, stent-graft infection in the thoracic aorta, and infected TAA). All recovered well without additional surgical procedures, such as re-drainage, omentopexy, or graft reimplantation.

Conclusions

In this case, stent grafting was performed as a bridge to allograft implantation for an infected and ruptured aortic aneurysm. Palliative stent grafting greatly contributed to stabilizing the patient's condition until successful allograft implantation.

Acknowledgments

We thank Professor Shinichi Takamoto and Dr. Noboru Motomura (University of Tokyo Tissue Bank) for providing the CPA.

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