Case Report

Two-stage Surgery for Double Infected Aneurysms in the Infrarenal Abdominal and Descending Thoracic Aorta

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A 61-year-old man complaining of lumbago and high-grade fever was admitted to our institution. Computed tomography (CT) revealed a saccular aneurysm in the infrarenal abdominal aorta and blood culture results were positive for *Streptococcus pneumoniae*. He was diagnosed with infected abdominal aortic aneurysm, and antibiotic therapy was initiated. Follow-up CT demonstrated a rapidly-enlarging abdominal aortic aneurysm and a newly-developed descending thoracic aortic aneurysm. For this case, two-stage surgery consisting of extra-anatomical bypass and in-situ reconstruction using rifampicin-soaked Dacron graft was performed after an interval of 37 days. The patient was discharged 14 days after the second surgery without any complications.

Key words: infected aortic aneurysm, multiple aneurysms, rifampicin-soaked graft

INTRODUCTION

Infected aortic aneurysm is a relatively rare but fatal vascular disease; therefore, surgical intervention is indispensable for most cases. The optimal timing of surgery and the choice of procedures are controversial, especially in cases with multiple infected aortic aneurysms, which are extremely rare. Herein, we describe a successful surgical case of double infected aneurysms in the infrarenal abdominal and descending thoracic aorta treated by two-stage surgery consisting of extra-anatomical bypass with the radical aneurysmectomy of the abdominal aorta and replacement of the descending aorta using a rifampicin-soaked gelatin-sealed Dacron graft.
A Case of Double Infected Aortic Aneurysms

using the rifampicin-soaked gelatin-sealed knitted Dacron graft (Gelsoft plus: Vascutek, Renfrewshire, Scotland) prior to the midline laparotomy. Then the retroperitoneum was opened to expose the aneurysm. The infrarenal abdominal aorta and bilateral common iliac artery were clamped, and the aneurysm was opened to identify an abscess formation. Subsequently, the aneurysmal wall was completely resected with contiguous tissue; then, the aortic and bilateral iliac stumps were suture-closed using autologous fascial pledget. Both stumps were covered with the omental flap after pulsative irrigation of the retroperitoneal space.

Although the patient required thrombectomy for the thrombotic occlusion of the prosthetic graft on the operative day, his postoperative recovery was uneventful. The CRP level gradually decreased to 1.6 mg/dl. However, CT re-examination performed on 18th postoperative day demonstrated that the aneurysm in the descending aorta had progressed to the diameter of 48 mm (Fig. 2B). We performed the second surgery for the aneurysm 37 days after the initial operation.

With the patient in a right semilateral position, his chest cavity was entered through a left thoracotomy over the 5th intercostal space. Since his abdominal aorta was

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**Fig. 1** A: Enhanced computed tomography (CT) scan at the time of admission revealed a saccular aneurysm in the infrarenal abdominal aorta, measuring 46 mm in diameter with surrounding inflammation (arrowhead).

B: Follow-up CT performed 6 days after admission demonstrated a rapidly-enlarging lobulated aneurysm measuring a maximum diameter of 56 mm (arrowhead).

**Fig. 2** A: Enhanced computed tomography (CT) scan performed 6 days after admission demonstrated a newly-developed lobulated aneurysm in the descending aorta (arrow).

B: Follow-up CT performed 18 days after the initial surgery showing an aneurysm in the descending aorta enlarged to the diameter of 48 mm (arrow).
completely resected at the initial surgery, extracorporeal circulation with the femoro-femoral bypass could not be established. Therefore, the distal aortic arch and descending aortic arch just above the diaphragm were chosen for drainage and return of the oxygenated blood, respectively. Thus, aorto-aortic temporary bypass was established. The aneurysm and the adjacent inflamed tissue were radically resected, and the descending aorta was replaced with the rifampicin-soaked gelatin-sealed woven Dacron graft (Gelweave: Vascutek). There were no signs of active infection, including the abscess formation. The prosthetic graft was then placed to detour around the infected field.

There were no postoperative complications. The postoperative CT scan demonstrated no signs of persistent or recurrent infection and the patent axillo-bifemoral bypass graft (Fig. 3). The patient was discharged from our institution 14 days after the second surgery.

**Discussion**

Despite the progression of medical and surgical management for patients with vascular disease, infected aneurysms still remain as challenging disorder for vascular surgeons to treat with high incidence of arterial rupture and recurrent infection. Specifically, infected aortic aneurysms are life-threatening disease, and the reported hospital mortality ranges from 16%–44%. Although radical debridement of all the infected tissues, including the arterial wall, as well as the administration of appropriate antibiotics, is essential for the treatment of infected aneurysm, the optimal timing and appropriate procedure to treat are controversial. In the present case, antibiotic therapies for infected infrarenal abdominal aortic aneurysm were not effective, and the infected aneurysm in the descending aorta had newly developed refractory to these treatments. We planned a two-stage surgery to treat the uncontrolled infectious state due to active infected abdominal aortic aneurysm prior to the surgery for thoracic aorta. Simultaneous surgery is considered to be too invasive and contain a potential risk of paraplegia.

Two surgical options are available for the treatment of infected abdominal aortic aneurysm: extra-anatomical bypass and in-situ reconstruction. We usually perform extra-anatomical bypass for cases with high fever, leukocytosis, elevated CRP level, or septic state refractory to antibiotic treatment, like the present case. While this procedure has the advantage of grafting via an aseptic route, the disadvantages are risk of aortic stump blowout and...
axillo-bifemoral bypass graft infection. For the prevention of such fatal complications, we performed suture-close of the aortic stump with reinforcement using the autologous fascial pledget and omental coverage of the stump after pulsative irrigation of the retroperitoneal space in this case. In addition, we used the rifampicin-soaked gelatin-sealed Dacron graft for axillo-bifemoral bypass. Recent studies show the satisfactory outcomes of in-situ reconstruction, and this procedure also can be an effective surgical alternative for the treatment of primary infected abdominal aortic aneurysm. Rifampicin-soaked graft or polytetrafluoroethylene graft is an available conduit for the prevention of postoperative graft infection.

On the other hand, when the infected aneurysm is located in the thoracic aorta, it is anatomically difficult to perform an extra-anatomical bypass. For this reason, elective surgery in the controlled infectious phase is ideal for patients with infected thoracic aortic aneurysm. In the present case, we performed in-situ reconstruction during the subclinical infectious phase following the initial operation. We routinely perform in-situ reconstruction using a rifampicin-soaked Dacron graft with the omental coverage for the prevention of graft infection. However, we could not perform the omental coverage in this case since the omentum had already been used in the initial operation. Therefore, we placed the prosthetic graft to detour around the infected field after sufficient irrigation of the left thoracic cavity. Although the homograft is known to be better with regard to prevention of bacterial colonization than the prosthetic graft, a homograft is not easily obtainable under the present medical system in Japan; in addition, this biological conduit is not available in our institution.

**Conclusion**

We have presented a rare case of double infected aneurysms in the infrarenal abdominal and descending thoracic aorta successfully treated by two-stage surgery consisting of extra-anatomical bypass and in-situ reconstruction using the rifampicin-soaked Dacron graft. Performing the appropriate procedure for the infectious phase in cases with multiple infected aortic aneurysms is of the utmost importance.

**References**