Successful Repair of Graft Failure and Abdominal Aortic Aneurysm Following Thoraco-abdominal Bypass for Atypical Aortic Coarctation

A 54-year-old woman, who underwent descendo-abdominal aortic bypass grafting for atypical aortic coarctation complicated with Takayasu’s arteritis 37 years previously, was referred to our hospital for treatment of a pseudoaneurysm due to rupture of the graft. Preoperative computed tomography scan also demonstrated an abdominal aortic aneurysm. First, an endovascular stent-graft repair of the pseudoaneurysm was performed, then the abdominal aortic aneurysm was repaired with the aid of cardiopulmonary bypass. Proper surgical planning was important to treat this rare development accompanied by aberrant circulation. (Jpn J Thorac Cardiovasc Surg 2004; 52: 91-94)

Key words: Takayasu’s arteritis, atypical aortic coarctation, abdominal aortic aneurysm, graft failure

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A typical aortic coarctation is a rare pathology caused by Takayasu’s arteritis, and aorto-aortic bypass grafting has mainly been performed for this lesion. We report a patient who developed a graft rupture and abdominal aortic aneurysm 37 years after bypass surgery, who was successfully treated.

Case

A 54-year-old woman was transferred by ambulance to our hospital following rupture of a previously implanted vascular graft and abdominal aortic aneurysm were incidentally found at another hospital. According to her, she had sometimes experienced slight dull aching pain in her left flank for a year, but otherwise was free from any symptoms. She was diagnosed with Takayasu’s arteritis in 1965 when she was 17, with severe renovascular hypertension being the symptom at onset, and underwent bypass grafting between the descending and the abdominal aorta with a 16-mm woven Teflon graft at our institution. Active inflammation had already subsided at that time. According to the old medical record, her systolic blood pressure decreased to 170 mmHg after the operation with no pressure gradient between the upper and lower extremities, though preoperatively they had been 220 and 110 mmHg respectively. The reason why hypertension did not resolve completely was unclear, as the angiography did not delineate stenosis of the renal arteries.

Computed tomography (CT) scan revealed that the graft was anastomosed to the descending aorta, then passed through the left thoracic cavity and the retroperitoneal space, and was anastomosed to the infra-renal abdominal aorta. The native descending aorta was occluded just distal to the proximal anastomosis (Fig. 1A) and had regained patency at the level of the celiac artery (Fig. 1B), thus blood flow of the abdominal branches was supplied entirely retrogradely by the bypass. The graft rupture was observed at 2 points just above the diaphragm and pseudoaneurysms had also formed. The maximum diameter of the infra-renal abdominal aortic aneurysm was 48 mm (Fig. 1C). Preoperative conditions are summarized in Figure 2A. As her vital signs were stable and she did not have any symptoms, elective surgery was planned.

First, we conducted an endovascular stent-graft repair of the pseudoaneurysm (Fig. 3A, B) in order to avoid pseudoaneurysm-related complications during the ab-
dominal aortic aneurysm (AAA) operation. A 17.5 cm custom made stent-graft was inserted into the graft in such a way that the entire length of the old graft would be reinforced in order to avoid rupture at other sites. Intra- and postoperative angiography did not reveal any endoleak. Two weeks after stenting, graft replacement of the infrarenal abdominal aorta was performed. To avoid abdominal organ ischemia during aortic clamping, extracorporeal circulation was instituted between the right femoral vein and the abdominal aorta just distal to renal arteries. A 16-mm tube graft was implanted between the distal edge of the old graft and the terminal aorta, and then a 14-mm graft was interposed between the aorta just below the renal arteries and the new graft (Fig. 2B). The postoperative course was uneventful and CT scans depicted a prompt reduction of the pseudoaneurysm. The patient was discharged 16 days after the second operation and has been doing well since.

**Discussion**

In general, the principal remote complications seen after vascular surgery that call for utilization of prostheses are anastomotic aneurysm and graft occlusion. Failure of arterial prostheses now seems improbable and in fact, we could not find any reports of a failed graft implanted after the mid-1980s. However, Berger et al. reported in 1981 that the incidence of late defects in Dacron grafts was 3% in patients followed for a period of 3 to 15.3 years. In the present case, the graft was more primitive than those in Berger’s series, thus failure of the prosthesis may well be attributed entirely to the nature of the graft. However, it is also possible that long-term excessive stress accelerated deterioration of the graft, which was used as a substitute for the thoracic aorta in this patient, whose renovascular hypertension did not completely resolve following bypass surgery.

Indeed, radical operations such as replacement of the graft with a new one could have eliminated risk of rupture at another site. However, we considered that the patient had a good indication for stent-graft implantation, as there were good landing zones available, there was no concern regarding paraplegia accompany-