Ascending Aorta-Abdominal Aorta Bypass for Takayasu’s Arteritis

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ABSTRACT
Three patients with type III Takayasu’s arteritis were referred to us because of the upper extremity hypertension and vascular claudication of the lower extremities. They underwent extra-anatomic ascending aorta-abdominal aorta bypass with vascular graft under a median sternotomy and a splitted midline laparotomy incision without cardiopulmonary bypass. The postoperative course was uneventful. Upper extremity hypertension and vascular claudication were completely resolved.

INTRODUCTION
Takayasu’s arteritis is a nonspecific inflammatory disorder involving the aorta, its branches, and the pulmonary artery. Surgery is required for its steno-occlusive lesion.

CASE REPORTS
The first case involved a 57-year-old woman who was admitted with a diagnosis of Takayasu’s arteritis. Her blood pressure was 190/110 mm Hg in the right arm, 100/70 mm Hg in the left and 100/80 mm Hg in the lower extremities. Transthoracic echocardiography demonstrated left ventricular hypertrophy and calculated left ventricular mass index (LVMI) was 216.1 g · m⁻². Computed tomographic (CT) angiography revealed diffuse narrowing of the descending thoracic to abdominal aorta (Figure 1), the left common carotid artery and the left subclavian artery. The operative approach was through a median sternotomy and a splitted midline laparotomy incision. A 12 mm Vascutek vascular graft (Sulzer Vascutek Ltd., Scotland) was anastomosed end-to-side to the ascending aorta with a side-biting clamp. The graft was then tunneled through the right pleural cavity, the diaphragm, anterior to the liver, between the stomach and the pancreas, and brought into the retroperitoneal space. The graft was then anastomosed end-to-side to the infrarenal abdominal aorta under cross-clamps at proximal and distal part of the anastomosis site and covered with omentum and posterior parietal peritoneum. The pressure difference was completely resolved. Postoperative CT angiography demonstrated successful bypass graft (Figure 2). Blood pressure was 120/80 mm Hg in the right arm, 100/70 mm Hg in the left and 150/90 mm Hg in the lower extremities on the 10th postoperative day. The patient was discharged on the 11th postoperative day without complication.

A second case involved a 46-year-old woman who was admitted with a vascular claudication and headache. She was diagnosed as Takayasu’s arteritis. On physical examination, blood pressure was 200/80 mm Hg in the left arm, 150/80 mm Hg in the right and 120/80 mm Hg in both legs. The LVMI was 165.8 g · m⁻². The pressure difference due to diffuse narrowing of the descending thoracic aorta was relieved by the same manner with a 12 mm Hemashield vascular graft (Meadox Medicals, Inc., Oakland, USA) (Figure 3). Postoperative blood pressure was 160/90 mm Hg in the right arm, 140/100 mm Hg in the left and 150/90 mm Hg in both legs. She was discharged on the 10th postoperative day.

The third case involved a 23-year-old man who was diagnosed as Takayasu’s arteritis that involved the right coronary artery, as well as the subclavian artery and descending thoracic aorta. The peak pressure gradient between upper and lower extremities was 130 mm Hg. Ascending aorta-abdominal aorta bypass graft was done...
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Utilizing an 18 mm woven Dacron graft. He was discharged on the 13th postoperative day without complication.

**Discussion**

Type III Takayasu’s arteritis is characterized by a combination of occlusive lesions of the main branches of the aortic arch (type I) and narrowing of the thoraco-abdominal aorta and its branches (type II).\(^1\)\(^,\)\(^2\)

Standard aortic surgery usually comprises resection and anastomosis or replacement of a diseased segment. Even though very extensive aortic replacement is possible with the advancement of modern cardiovascular surgery, complex vascular problems may call for extra-anatomic bypass grafts.\(^3\) Blasidell and associates\(^4\) described the descending thoracic aorta-bilateral femoral arteries bypass for a patient with an infected abdominal aortic prosthesis in 1961. The concept of utilizing the ascending aorta for proximal anastomosis for such bypass grafts was described by Schumacker and associates\(^5\) in 1968 for a patient with mycotic aneurysm following repair of coarctation of the thoracic aorta.

In the cases reported here, surgery was required mainly due to upper extremity hypertension caused by the descending thoracic and abdominal aortic stenosis. Extra-anatomic bypass graft was the treatment of choice because the lesions were too extensive for the standard treatment. Operation with a shorter incision was possible through a median sternotomy and a splitted midline laparotomy. Great care was taken to ensure that the distal anastomotic site was retroperitoneal and well covered with posterior parietal peritoneum and to wrap the distal part of the graft with omentum. It may help to prevent fatal complications such as aorto-intestinal fistula and pseudoaneuryrsml change of the anastomosis site.\(^6\) In patients with type II and III Takayasu’s arteritis, extra-anatomic ascending aorta-abdominal aorta bypass can be a treatment of choice for relief of upper extremity hypertension and associated symptoms.

**References**