

Axillofemoral Bypass to Treat Severe Heart Failure Caused by Takayasu's Arteritis

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Takayasu's arteritis is an inflammatory vasculitis that primarily affects the aorta and its major branches. Involvement of the thoracic and abdominal aortas, although rare, causes marked hypertension and may lead to severe heart failure. We report the improvement of cardiac function after axillofemoral bypass grafting in a 59-year-old woman who had this condition.

Key words: 1. Takayasu's arteritis
2. Arterial bypass

CASE REPORT

A 59-year-old woman who had pre-existing hypertension presented with chest pain and dyspnea. She reported claudication and coldness of the lower extremities that had been becoming more severe. Her medical history included a diagnosis of hypertension.

On physical examination, she was found to be hypertensive in the right arm (170/100 mmHg), normotensive in the left arm (100/60 mmHg), and hypotensive in the thighs (76/45 mmHg). Both femoral pulses were weak and the ankle-brachial index (ABI) was 0.56. There were no remarkable findings in the laboratory tests including the C-reactive protein level and erythrocyte sedimentation rate. A 12-lead electrocardiogram revealed a normal sinus rhythm and left ventricular hypertrophy. The chest X-ray revealed cardiomegaly (cardiothoracic ratio 57.4%) and left ventricular enlargement. The computed tomography findings, such as diffuse concentric wall thickening, and luminal narrowing of the aorta from

the thoracoabdominal junction to the infrarenal level along with diffuse stenosis of the left renal artery, were compatible with the presumed diagnosis of Takayasu's arteritis. The left ventricular ejection fraction assessed by echocardiography was 25%.

For treatment, bypass grafting was performed between the right axillary artery and the right femoral artery using an 8 mm ringed Gore-Tex graft (Fig. 1). Warfarin (2 mg/day) was administered postoperatively. At the time of discharge, the patient showed marked improvement of the dyspnea and chest pain. The ABI became normal (1.0) (Fig. 2). Echocardiography showed early improvement of the left ventricular ejection fraction (range, 23% to 41%) and dimensions (range, 61/69 mm to 52/62 mm) compared with the preoperative values. At 11 months, these indices had improved further according to the echocardiogram; the left ventricular ejection fraction was 57% and the dimensions were 37/52 mm.

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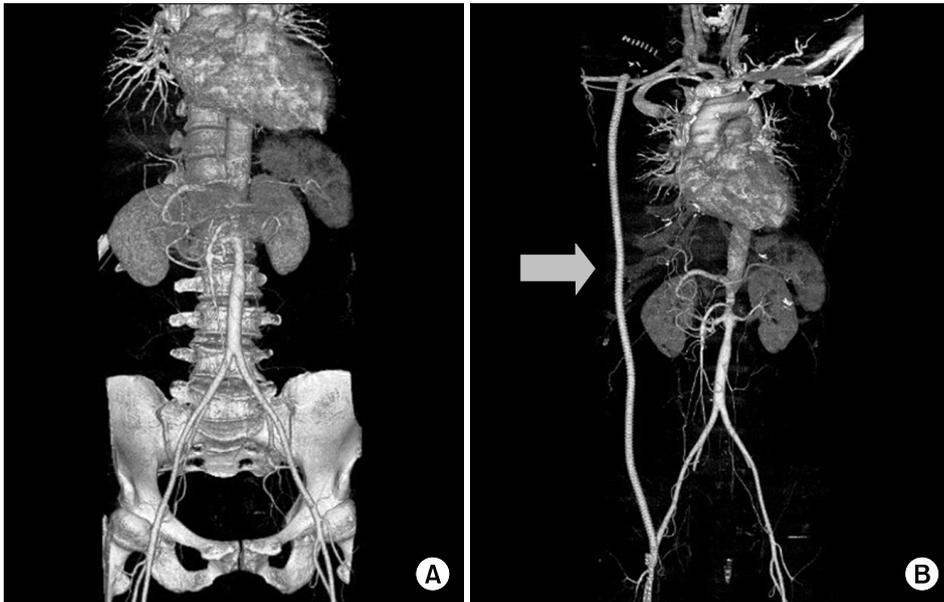


Fig. 1. (A) Preoperative computed tomography (CT) showing marked irregular narrowing of the descending thoracic and abdominal aortas. Diffuse concentric wall thickening and luminal narrowing were also found in the left common and internal carotid, and the left subclavian arteries. (B) Postoperative CT showing a patent axillofemoral bypass graft.

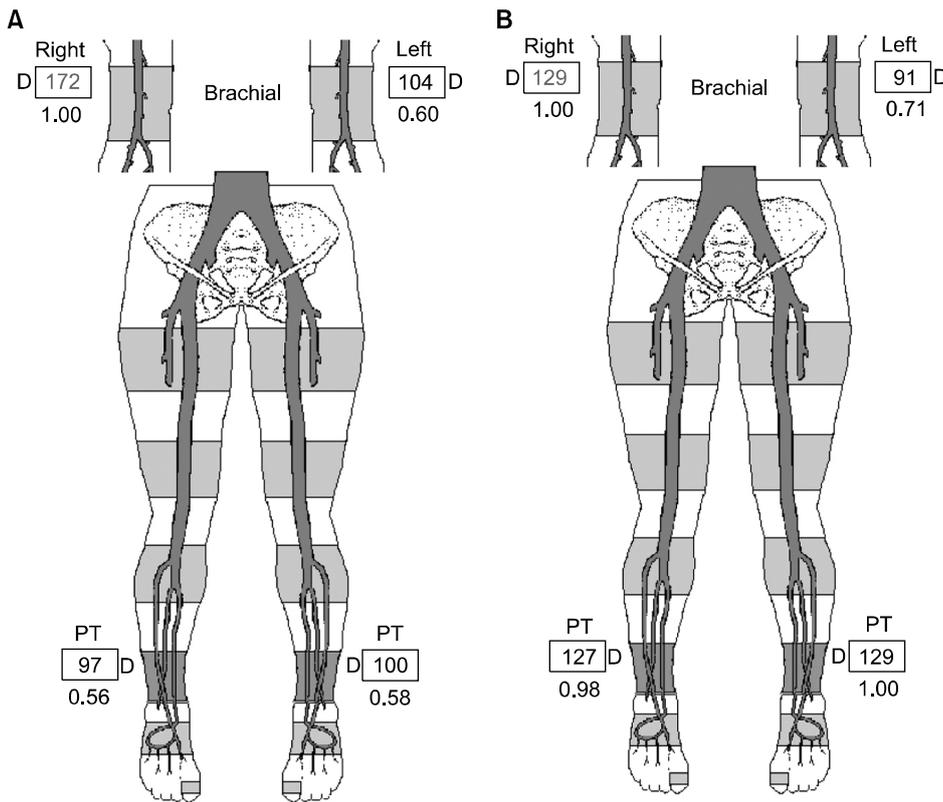


Fig. 2. (A) Preoperative ankle-brachial index (ABI) test showing marked decreases in both ABIs, with a pressure difference between the arms. (B) Postoperative ABI test showing normal results. D=doppler; PT=posterior tibial.

DISCUSSION

Takayasu's arteritis is a chronic inflammatory disease af-

fecting the aorta and its main branches. Stenosis involving both the thoracic and abdominal portions is extremely rare. Hypertension can increase systemic resistance, causing in-

creased after-load and resulting in heart failure. Surgery is generally warranted because the prognosis is poor if left untreated. The first successful resection and end-to-end anastomosis of stenosis of the aorta was performed by Crafoord and Nylin [1] in October 1944. There are problems associated with resection and anastomosis. First of all, aortic restenosis can occur with the reported incidence between 1.5% and 43% [2]. In addition, the intercostal arteries can be injured due to anatomical distortion caused by the surrounding scar tissue, and spinal cord ischemia can also occur as the result of aortic cross-clamping. In 1973, Weldon et al. [3] reported bypass grafting as an alternative to resection and anastomosis because it avoids dissection of the scar tissue and aortic cross-clamping. Since then, tube bypass grafting has been performed in various ways with the proximal anastomosis on the axillary artery or the ascending aorta, and the distal anastomosis on the descending aorta or the femoral artery [2,4].

Axillofemoral bypass has been a widely accepted management approach that carries a low risk of mortality and morbidity. Martin and Katz [5] reported a 30-day mortality rate of 4.9% and Schneider et al. [6] described a 30-day mortality rate of 9%. This procedure reduces the hemodynamic disturbances that accompany aortic resection and end-to-end anastomosis. This benefit appears to be the result of the reduction of cardiac after-load, reduction of spinal cord ischemia by avoiding cephalic hypertension and caudal hypotension, and preservation of renal and mesenteric perfusion, thus avoiding the need for heparin in many patients.

However, the procedure's long-term patency is controversial. The patency of a bypass graft can be affected by multiple factors including the surgeon's experience, surgical method, and the material and size of the prosthetic grafts. Martin and Katz [5] reported patency rates of 88% at 1 year, 79% at 3 years, and 69% at 5 years.

It is unlikely that aorto-aortic and axillofemoral bypass will be subjected to the rigors of a prospective and randomized

study to compare their relative merits, and the current studies describing the results of these bypass operations have had dissimilar patient cohorts. In the majority of series, patients undergoing axillofemoral grafting were older, had more medical comorbidities, and had a higher number of operations for limb salvage than patients undergoing an aorto-aortic bypass.

As the age of the population increases and the healthcare system suffers greater economic restraints, these factors will become increasingly important when determining treatment options. We believe that axillofemoral bypass grafting is a viable alternative to direct aortic reconstruction in the treatment of patients with severe cardiac and pulmonary disease, with highly reproducible 3-year and 5-year patency rates [7]. Although aortofemoral bypass remains the procedure of choice in good-risk patients, axillofemoral grafting remains an excellent therapeutic option for surgeons encountering elderly or debilitated patients with diffuse aortic disease.

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