Ascending Aorta-Supraceliac
Abdominal Aorta Bypass*
Successful Removal of an Infected Graft in the Descending Thoracic Aorta
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An infected graft and a mycotic pseudoaneurysm were successfully resected by employing an ascending aorta-supraceliac abdominal aorta bypass graft in a 19-year-old man. He had formerly undergone graft replacement surgery for traumatic aneurysm of the descending thoracic aorta, with the aid of a temporary external bypass graft. After this first operation, the patient had suffered from septicemia due to *Pseudomonas aeruginosa*, which resulted in formation of mycotic pseudoaneurysms at the distal anastomotic site of the prosthetic graft and at both stumps of the formerly employed external bypass graft.

Infection of a prosthetic graft is the most serious complication after vascular surgery. Removal of the infected graft is the only method to treat such sepsis. This report describes the successful resection of an infected graft and a pseudoaneurysm which developed after surgery for an aneurysm of the descending thoracic aorta. An ascending aorta-supraceliac abdominal aorta bypass graft was used to remove the infected graft.

**Case Report**

A 19-year-old man underwent surgery for traumatic aneurysm of the descending thoracic aorta on June 6, 1977. The aneurysm was resected using a temporary external bypass graft†‡ from the left subclavian artery to the left femoral artery and was replaced with a 16-mm woven Teflon graft.

On the 17th day after surgery, while the patient had a fever of 41°C (105.8°F), *Pseudomonas aeruginosa* was isolated in a culture of arterial blood. Therefore, powerful antibiotic therapy was started immediately; however, when this therapy was discontinued, the patient became febrile again, with positive cultures of blood. After about four months of antibiotic treatment, the chest roentgenogram revealed an unusual shadow at the site where the graft was replaced. The aortogram demonstrated pseudoaneurysms on both the distal anastomotic site in the descending aorta and the stump of the external bypass graft on the left subclavian artery.

On Nov 30, 1977, repeat surgery was performed under a median sternotomy and upper midline abdominal incision. The pericardium was opened longitudinally. The triangular ligament was divided from the left lobe of the liver, and the diaphragm was also divided from the median anterior edge to the aortic hiatus. A 16-mm Cooley double velour graft inserted by bypass from the ascending aorta to the supraceliac abdominal aorta along the right border of the right atrium. Both ends of the graft were anastomosed end to side. After the procedure for bypass, a left thoracotomy was performed through the bed of the fifth and sixth ribs. The left subclavian artery was resected 5 cm in length, including the stump of the formerly used external bypass graft. The descending aorta was subtotally resected, including the infected graft and pseudoaneurysm, and debridement of surrounding tissues was carefully performed. Both ends of the aorta were closed and reinforced with pericardium (Fig 1 and 2). The resected graft revealed a dehiscence at the distal anastomotic site, and the culture of the specimen of the graft showed an invasion of *P aeruginosa*.

The postoperative course was uneventful, and the patient was afebrile. No more bacteria were isolated from cultures of the blood; however, a postoperative iliac angiogram showed a tiny pseudoaneurysm of the left femoral artery. On the 17th day after surgery, resection of the pseudoaneurysm and patch angioplasty with a saphenous vein were performed. The postoperative angiograms are shown in Figures 3 and 4.

**Discussion**

Septicemia involving a prosthetic graft is the uniformly lethal complication of arterial reconstructive surgery.

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In our case, sporadic high fever and positive cultures of blood were repeated during four months of the postoperative period, in spite of the vigorous antibiotic treatment. An angiogram showed formation of pseudoaneurysms at the distal anastomotic site of the replaced graft and at the stump of the formerly used external bypass graft on the left subclavian artery. Therefore, we considered that complete suppression of the septic infection would be extremely difficult without removal of the infected graft.

The basic concepts in the treatment of infection of a replaced graft are as follows: (1) complete removal of the infected graft; (2) débridement of the lesions; and (3) revascularization bypassing the lesions. In 1963, Blaisdell and Hall reported successful repair of an infected vascular prosthesis at the abdominal aortic bifurcation, with removal of the infected graft using a left axillofemoral bypass. Recently, apico-aortic anastomosis with valved conduit was reported as a method of surgery for an infected aortic valvular prosthesis or severe obstruction of left ventricular outflow. Therefore, this method with aortocoronary bypass might be a technique to be employed for an infected vascular prosthesis of the aortic root.

Figure 2. Completion of second operation. Graft was inserted from ascending aorta to supraceliac abdominal aorta. Infected graft and pseudoaneurysms were resected, and aortic stumps were secured with pericardium.

Figure 3. Anteroposterior view of postoperative aortogram. On the other hand, with regard to bypass from the ascending aorta to the abdominal aorta, Shumacker et al attempted a bypass from the ascending aorta to the infrarenal abdominal aorta for a mycotic aneurysm following repair of coarctation of the aorta in 1968, but these investigators never succeeded. Thereafter, in 1977,
Liotta et al. successfully bypassed from the ascending aorta to the infrarenal abdominal aorta and resected the infected pseudoaneurysm following surgery for coarctation of the aorta. In 1975, Cooley and Norman described a technique of bypass from the ascending aorta to the supraceliac abdominal aorta as a method of aortic reconstruction for recurrent coarctation. In 1977, Wukasch and Cooley reported the practical use of this technique in nine patients; however, these cases mostly consisted of recurrent coarctation and coarctation with associated anomalies.

We have chosen ascending aorta-supraceliac abdominal aorta bypass as a method for revascularization. The advantages of this procedure are as follows: (1) the procedure for bypass through the heterotopic root is free from infection; (2) proximal anastomosis can be done easily; (3) the supraceliac abdominal aorta offers an adequate length for distal anastomosis; and (4) this procedure requires a shorter graft.

REFERENCES


Sudden withdrawal of oral therapy with hydralazine for reduction of afterload in a patient precipitated severe congestive heart failure. Signs of metabolic encephalopathy evolved due to low cardiac output. Reinstitution of therapy with hydralazine resulted in prompt improvement in cardiac and neurologic status. This case underscores the need for careful follow-up of such patients and argues against sudden withdrawal of vasodilator therapy.

In recent years, vasodilator drugs have been shown to be beneficial in treating patients with heart failure. The orally administered vasodilator agent, hydralazine, which relaxes peripheral arterioles, relieves the signs and symptoms of circulatory congestion and low cardiac output in certain patients. The results of long-term therapy with hydralazine in patients with heart failure are not yet available. The status of patients from whom therapy with hydralazine is withdrawn after initial evidence of improvement is not known. We report the findings in a patient in whom sudden withdrawal of therapy with hydralazine resulted in acute, severe heart failure with attendant neurologic dysfunction.

CASE REPORT

A 71-year-old man was diagnosed as having severe aortic insufficiency and congestive heart failure. The patient was placed on therapy with digoxin and furosemide. Over the next 35 years, he had several hospitalizations for shortness of breath, orthopnea, paroxysmal nocturnal dyspnea, and peripheral edema, which responded to increasingly higher dosages of digoxin and diuretic drugs.

The patient was referred for further cardiac evaluation. Examination revealed a dyspeptic elderly man with heart rate of 76 beats per minute and blood pressure of 110/70 mm Hg. A 10 cm jugular venous distension was present above the sternal angle. Bibasilar pulmonary rales were audible. Cardiac examination revealed cardiomegaly, a loud pulmonic closure sound, S1 in the second interspace, and S2 gallop rhythms, a grade 2/6 systolic ejection murmur, and a diastolic murmur along the left sternal border. The span of the liver was 12 cm. Peripheral edema was also present. A chest x-ray film displayed massive cardiomegaly and interstitial pulmonary congestion. An electrocardiogram demonstrated left ventricular hypertrophy.

Cardiac catheterization revealed high right ventricular (55/12 mm Hg), pulmonary arterial (55/30 mm Hg) and pulmonary capillary wedge (27 mm Hg) pressures. The aortic pressure was 112/70 mm Hg. Left ventriculographic studies showed a markedly enlarged and diffusely hypokinetic left ventricle. The ejection fraction was 10 percent. Moderately severe aortic insufficiency was observed on aortographic studies of the ascending aorta.

The patient was considered a high-risk candidate for surgical correction because of poor left ventricular function. Vasodilator therapy with intravenously administered sodium nitroprusside produced an improvement in left ventricular function. The patient was then given a trial with oral therapy with hydralazine. He had a marked increase in cardiac output, a decrease in pulmonary capillary wedge pressure, and a fall in resistances in the systemic and pulmonary vascular beds without major changes in heart rate and blood pressure (Table I). After 72 hours of oral therapy with hydralazine, the patient reported a marked diminution in complaints of fatigue and orthopnea. The intensity of the S1 and S2 gallop rhythm and the murmur of aortic insufficiency decreased.

Precipitation of Heart Failure following Sudden Withdrawal of Hydralazine*

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