Pseudoaneurysm of the ascending aorta after cardiac surgery is a rare but life threatening complication, which can result in rupture. Pseudoaneurysms are usually related to the aortic cannulation, the proximal site of graft anastomosis, or the suture line of aortotomy, and often occur after mediastinal infection. We report a case of pseudoaneurysm of the ascending aorta associated with aortic cannulation and the proximal anastomosis of a saphenous vein graft without an obvious history of mediastinal infection.

Key words: pseudoaneurysm, ascending aorta, aortic cannulation, cardiac surgery

Introduction

Pseudoaneurysm of the ascending aorta is a rare but known complication after cardiac surgical procedures. Surgical management of this condition may be complicated because of adhesions and the possibility of exsanguination during resternotomy. It has been reported recently1, 2) that endovascular treatment of the aneurysm is a feasible and less invasive technique. We experienced a case of ascending aortic pseudoaneurysms located at both the previous aortic cannulation site and the saphenous vein graft anastomosis site. We successfully dissected out the adhesion between the sternum and ascending aorta and incised the aneurysm.

Case Report

A 65-year-old man with a history of cardiac surgery was admitted to our hospital for surgery on an aneurysm of the ascending aorta. Sixteen years ago, he underwent coronary artery bypass grafting for severe stenosis of a left main trunk lesion by grafting of the left internal mammary artery to the left anterior descending artery and of the saphenous vein to the diagonal branch and posterolateral branch, sequentially. The initial operation was carried out under extracorporeal circulation with ascending aortic cannulation, and the proximal anastomosis of the saphenous vein graft was attached to the ascending aorta. His postoperative course was uneventful and without mediastinal infection. Recent computed tomography revealed pseudoaneurysm of the ascending aorta, although he was asymptomatic. There were two aneurysms located at the previous aortic cannulation site and proximal anastomosis site of the saphenous vein (Fig. 1). Coronary angiography demonstrated the occlusion of both previous grafts, but fortunately the stenosis of the native coronary artery disappeared and myocardial scintigram showed no obvious cardiac ischemia.

Therefore, surgical treatment was indicated for the aneurysms, since the distal aneurysm was close to the neck vessels and considered unsuitable for endovascular treatment. Under general anesthesia, the femoral artery, femoral vein, and right axillary artery were exposed and taped for the cardiopulmonary bypass. The chest was reopened without the patient experiencing significant bleeding, and extracorporeal circulation was initiated with femoral and right axillary arterial cannulation and...
venous drainage from the femoral vein and superior vena cava. The aneurysm of the saphenous vein was capsulated with an expanded polytetrafluoroethylene patch used to close the pericardium. The adhesion between the sternum and ascending aorta was carefully dissected out and the aneurysm was incised after cooling of the patient to 25 degrees centigrade. Under systemic circulatory arrest and antegrade selective cerebral perfusion with selective cannulation to the neck vessels, the ascending aorta was replaced with a 24-mm artificial graft. The next day, the patient was extubated, and he did not experience any neurological deficits. He was discharged 23 days after the operation.

Discussion

Pseudoaneurysm of the ascending aorta is a potentially fatal complication after thoracic surgical procedures, usually related to aortic cannulation, the needle vent site, the proximal site of venous or arterial graft anastomosis, the suture line of aortotomy, or the aortic clamp site. Predisposing factors associated with pseudoaneurysms of the ascending aorta include dissection of the native aorta, infection, connective tissue disorders, preoperative hypertension, aortic cannulation, and blowout of the aortotomy. Mycotic aneurysm of the ascending aorta secondary to the mediastinal infection has been reported; however, in the absence of infection, pseudoaneurysms of this site are extremely rare. The patient had no obvious history of mediastinal infection, and no history of connective tissue disorder, though he presented with aneurysms in the aortic cannulation site and venous graft anastomosis site, which are quite rare. The pathological examination revealed pseudoaneurysms; however, a clear etiology of the aneurysmal formation was not found.

Massive hemorrhage at the time of re-exploration of the chest cavity resulted from entry into the aneurysmal sac potentially resulting in cardiac shock and required emergency cannulation for cardiopulmonary bypass. Hypothermic circulatory arrest before femoro-femoral

Fig. 1 Computed tomography demonstrated double pseudoaneurysm of the ascending aorta at the previous aortic cannulation site (21 mm, arrow) and at the proximal anastomosis site of the saphenous vein graft which was protruding to the sternum (39 mm).
bypass via resternotomy is a well known strategy that prevents fatal rupture of the pseudoaneurysm.\textsuperscript{3-5) In the present case, the aneurysm was protruding anteriorly but did not reach the sternum, so we approached the aneurysm without extracorporeal circulation. Although endovascular treatment of the aneurysm is a useful method,\textsuperscript{1,2) we treated the aneurysm by median sternotomy since the distal portion of the aneurysm was close to the neck vessels and unsuitable for endovascular treatment without branching to the neck vessels. Aortic pseudoaneurysm is usually the result of disruption of at least one layer of the aortic wall and is contained by the remaining vascular layers and surrounding structures of the mediastinum.\textsuperscript{5) In a previous operation, the expanded polytetrafluoroethylene patch was used to close the pericardium and prevent adhesion between the ascending aorta and sternum, and fortunately, the patch capsulated the aneurysm wall and prevented a fatal rupture.}

Pseudoaneurysms of the ascending aorta sometimes present non-typical symptoms such as a pulsatile mass around the sternum, chest oppression, discomfort, dysphagia, or stridor although this case presented no infectious history or chest symptoms.\textsuperscript{3) Careful management of this condition by periodic radiological examination is mandatory, and prompt surgical repair is indicated before catastrophic complications occur.

\textbf{Conclusion}

We experienced a case of pseudoaneurysm of the ascending aorta associated with aortic cannulation and the proximal anastomosis of a saphenous vein graft of a patient without an obvious history of mediastinal infection. Careful management of this condition and prompt surgical repair is indicated, since rupture of the aneurysm could result in death.

\textbf{References}