Subepicardial aneurysm after apicoaortic bypass

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In conventional aortic valve replacement for acquired aortic stenosis after previous coronary artery bypass grafting (CABG), damage to patent grafts remains one of the main intraoperative problems. In such cases apicoaortic bypass is an alternate method,^{1,2} but it has some characteristic complications that require special attention. There have been reports of postoperative pseudoaneurysm,^{3,4} but we experienced a case of postoperative subepicardial aneurysm near the site of the proximal anastomosis.

Clinical Summary

A 78-year-old woman, who underwent CABG with left internal thoracic artery–left anterior descending artery and saphenous vein graft (SVG)–right coronary artery grafts 5 years ago, had an aortic valve stenosis pointed out during her follow-up studies. The patient began to experience dyspnea on exertion, and a transthoracic echocardiograph revealed aortic stenosis caused by a calcified valve. The peak aortic pressure gradient of the patient was 52.4 mm Hg, and aortic regurgitation was only trivial. Preoperative investigations revealed that not only was the SVG just beneath the sternum, but the graft laid right on the surface of the intended aortotomy site. Concerning the risk of damage to the SVG, apicoaortic bypass was chosen.

Through a left thoracotomy, cardiopulmonary bypass was initiated with left femoral and left axillary artery cannulation and left femoral vein and pulmonary artery drainage. The valved conduit was constructed by using a 24-mm Hemashield vascular graft (Boston Scientific, Boston, Mass) and a 19-mm Carpentier–Edwards Perimount pericardial bioprosthesis (Edwards Lifesciences, Irvine, Calif). The valve was sewn inside the graft about 2 cm from the proximal edge. The pericardium was opened to expose the apex of the left ventricle. On the beating heart, a circular segment of the left ventricular muscle was removed by using a coring device. Thirteen pledgeted mattress sutures were placed surrounding the border of the apical hole, and the conduit was sutured directly to the apex. After tying down the conduit, continuous sutures were added in a circumferential fashion. The distal end of the conduit was attached to the descending aorta with a partial occluding clamp.

Although no major trouble was seen during the perioperative period, postoperative computed tomography (Figure 1) and trans-

thoracic echocardiography revealed a ventricular aneurysm near the site of the anastomosis. The aneurysm was 30 mm in diameter, with a neck of 7 mm obtaining flow from the left ventricle. The patient underwent another operation, and the connection between the aneurysm and the ventricular wall was repaired with several pledgeted sutures. Operative and pathologic findings revealed the aneurysm was a subepicardial aneurysm and not a pseudoaneurysm. The aneurysmal wall was composed of epicardium without a layer of myocardium.

Discussion

Left ventricular aneurysm is a complication that usually follows myocardial infarction. It is categorized as either a true aneurysm or a pseudoaneurysm, but there are some aneurysms that cannot be categorized as either, and they are called subepicardial aneurysms. Some of the features of a subepicardial aneurysm are an abrupt interruption of the myocardium at the neck of the aneurysm, an intact epicardium, a narrow neck, and a predisposition to rupture spontaneously regardless of its wall's component.⁵ In the present case the aneurysm was connected to the left ventricle with a narrow neck, and the wall of the aneurysm consisted mainly of epicardial tissue without a layer of myocardium.

Bleeding and the formation of a pseudoaneurysm are some of the common and characteristic morbidities of apicoaortic bypass.²⁻⁴ There have been reports of pseudoaneurysm after apicoaortic bypass, but little has been said about its cause. In the present case the coring site was probably too close to the septum, making some of the stitches on the septal margin unable to reach the endocardium, damaging the septal muscles, and resulting in a subepicardial aneurysm. The use of an epicardial echocardiograph before ventricular coring might have prevented such complications.

Figure 1. Multislice computed tomographic reconstruction demonstrating a subepicardial aneurysm near the site of the proximal anastomosis.

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Suturing the conduit directly to the apex without using an apical connector seemed very effective, especially in terms of the control of bleeding from the friable apex. It enabled us to take deep bites through the epicardium and the endocardium, allowing excellent integrity between the left ventricle and the graft. In the present case bleeding from the proximal anastomosis was not a problem at all.

This technique has additional merits. Crossclamping of the aorta is never required. It does not compromise major coronary arteries, other valves, or the conduction system.^{1,3} Paravalvular leak and patient-prosthesis mismatch are completely avoided.

Apicoaortic conduit for patients after CABG with acquired aortic stenosis is feasible but requires special attention, especially when coring the ventricle. With more modifications, this method has the possibility for a more common use.

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Arterial coronary–coronary conduit over single, distal left anterior descending coronary artery lesion: 3.5 years afterward

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Coronary–coronary bypass grafting (CCBG) is occasionally performed in cases of heavily calcified ascending aorta and inadequate length of available grafts,¹ and, sometimes, to bypass lesions on large coronary arteries.² Although early patency rates are reported to be excellent,¹ very few data are available on the midterm or long-term angiographic patency rates of these grafts. We present the midterm follow-up of a coronary–coronary arterial bypass performed 3.5 years earlier over a single, distal stenosis on the patient's left anterior descending (LAD) coronary artery.

Clinical Summary

In July 2003, a 41-year-old man was admitted at our hospital with progressive angina. Coronary angiography performed on that occasion had demonstrated an occluded right coronary artery, a 75% stenosis of the ramus intermedius, and long (3 cm

in length)—up to 95% stenosis on the border zone between the mid and distal thirds of the large LAD. Bypass surgery with a pedicled left internal thoracic artery (LITA) and vein graft was planned and accomplished. The vein graft was used to bypass the right coronary system. Because there was no proximal stenosis on the LAD, we decided to use only a short, free segment of the pedicled LITA to perform a coronary–coronary bypass (proximal and distal connections were done as a termino–lateral anastomosis) over that single, distal stenosis. We also grafted the in situ LITA remnant onto the ramus intermedius. The patient's postoperative course and convalescence progressed without any difficulty. A predischARGE angiogram showed a patent, free LITA coronary–coronary conduit (CCC)² (Figure 1).

The patient has been recently readmitted for evaluation of chest discomfort. Although results of the stress test were negative, he voluntarily underwent coronary angiography. According to visual assessment by the Core Angiography Committee (two cardiologists and a cardiac surgeon, to whom the angiogram was presented in masked fashion concerning the existence of the CCC on the LAD), vein and LITA conduits were declared to be perfectly patent. The LAD coronary artery was described as having no lesions. Indeed, the caliber of the LITA free segment incorporated into the LAD coronary bed in coronary–coronary fashion can be seen to match (Figure 2) that of native coronary artery very well, so much so that it is difficult

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