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Coronary Sparing Aneurysmectomy

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Abstract

Repairing left ventricular aneurysms that form after myocardial infarction may be challenging, especially if located close to the important native coronary arteries. Here, we describe a rare case of anterolateral aneurysm of the basal LV wall and a safe, efficient approach for a patch plasty sparing the native left anterior descending.

Keywords

- aneurysm
- coronary artery bypass grafts surgery
- myocardial infarction

Introduction

Left ventricle aneurysms (LVA) are formed by bulging of the weakened ventricular free wall as a result of myocardial malperfusion, most commonly after untreated myocardial infarction. LVAs can be covered by mural thrombi or fibrous tissue.[1] Thromboembolisms, heart failure with reduced ejection fraction (EF), and perforation are the common complications of LVAs. They can also be potentially arrhythmogenic and, even though aneurysm repair can restore function and symptoms, recurrent malignant arrhythmias are common and pose a high risk of sudden cardiac death. Patients usually present with angina and ventricular arrhythmias, which indicate the need for a timely surgery. The most common (85%) localization of LVAs is apical, presumably because there are only three muscular layers apically in comparison to four layers at the base of the heart.[2]

The two most frequently used surgical techniques are the linear repair and the Dor procedure (circular patch plasty), with the latter having shown higher increase in EF and improved recovery in previous studies.[3]

We present an unusual case of a coronary-sparing aneurysmectomy with an endoventricular patch plasty of the anterolateral ventricular wall sparing the native left anterior descending (LAD). Oral patient consent was obtained.

Patient and Methods

A 50-year-old man presented to an outside hospital with unstable angina after suffering from a non-ST elevation myocardial infarction 1 year prior in Hong Kong. Echocardiography showed decreased EF (45%) with apical hypokinesia but no aortic or mitral valve abnormalities. Further workup included a coronary angiography, which showed a, most likely, ruptured, nonstenosing LAD plaque and cardiac magnetic resonance imaging, which revealed an aneurysm of the base of the anterior ventricular wall (see ►**Fig. 1**).

Surgical Technique

The patient was cannulated in standard bicaval fashion, cardiopulmonary bypass (CPB) was commenced and the heart arrested with cold Bretschneider cardioplegia. The area of the aneurysm, a protrusion in the left ventricular wall between LAD and first diagonal branch with scarred margins, was easily identified by palpation (see ►**Fig. 2A**, black arrow). An incision was made and the affected area was resected (see ►**Fig. 2B**), with care taken to avoid injury to the LAD. The atrium and ventricle were not dilated (38 and 50 mm, respectively, on echocardiography) and therefore the ventriculotomy was closed with a 5 × 2cm (visual judgement) bovine pericardial

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Fig. 1 Imaging of the (**A**) left ventricle aneurysm (white arrow: left anterior descending, red arrow: aneurysm). (**C**) Coronary angiograph, (**B**) three-dimensional computed tomography scan, (**D**) magnetic resonance imaging scan.

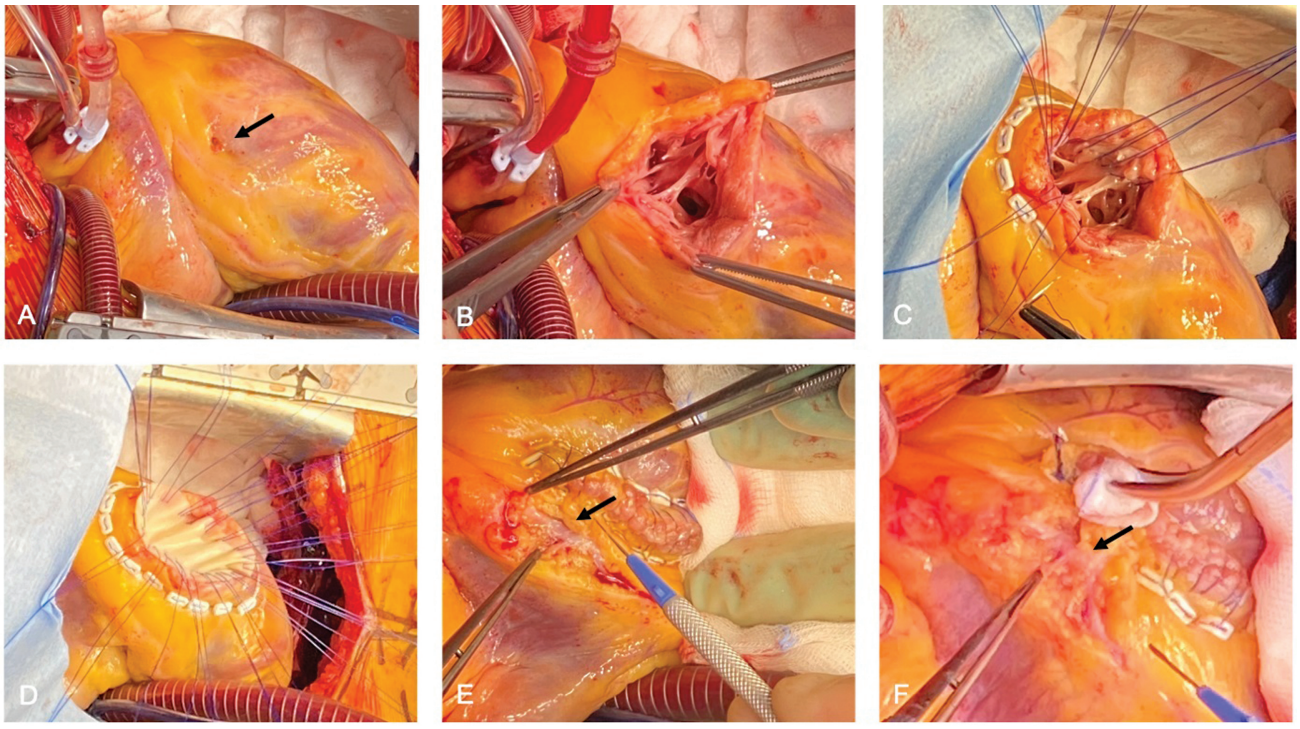

Fig. 2 (A–F) Surgical setup.

patch with single 3–0 Prolene sutures reinforced by felt strips (see ►**Fig. 2C, D**) without using any glue. We used pericardial patch material based on the general institutional policy preferring bovine material due to anticipated low thrombogenesis and excellent surgical handling qualities. The course of the LAD was carefully dissected to avoid putting stress on the myocardium and causing stenosis (see ►**Fig. 2E**, **F**, black arrow). After weaning from CPB and adequate deairing, transesophageal echocardiography showed unchanged EF but no new wall contraction irregularities and again no aortic or mitral valve insufficiency.

The postoperative course proceeded without any complications; the patient stayed on the intensive care unit for 2 and 12 days on the normal ward. A final echo showed only minor reduction in EF; the patient was discharged without any symptoms of angina and was advised to take phenprocoumon for 3 months due to the newly inserted foreign patch material. On 2-month follow-up, the patient presented in good general condition with a normal EF on echocardiography.

Discussion

The goal of the surgical LVA repair is the reduction in ventricular diastolic volume and its geometry restoration with the final intention to improve the left ventricular function.[4] However, the repair is challenging without injuring coronary vessels. Although the surgical treatment shows a significantly higher 5-year survival rate (75–90%) when compared to conservative medical treatment (8–12%), the outcomes vary depending on the extent of myocardium affected and accompanying coronary artery disease. Thus, the need for myocardial revascularization has been

reported to be as high as 94% in some study populations, extending the duration and complexity of the surgery.[3,5] In selected cases with suitable anatomy, careful isolation of intact coronary vessels may prevent coronary injuries and the need for myocardial revascularization, as shown in our case.

Authors' Contributions

A.D. and G.J., was involved in conceptualization. A.D. and C.R. contributed to data curation. C.R. helped in writing the manuscript. A.D., G.J., and C.H. helped in supervision. All authors have agreed to the published version.

Conflict of Interest

None declared.

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