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Transmitral endocavitary repair of inferior left ventricular pseudoaneurysm: A simplified approach in patients requiring concomitant mitral valve surgery

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Left ventricular pseudoaneurysms (LVPAs) arise from contained myocardial rupture after acute myocardial infarction. Their propensity to rapid enlargement and rupture mandates expeditious surgical management.¹ We report a case of LVPA repair through an endocavitary transmitral approach in a patient undergoing concomitant mitral valve surgery.

Clinical Summary

An 82-year-old man with a history of two myocardial infarctions and ischemic cardiomyopathy was seen with congestive heart failure and angina. Transthoracic echocardiography demonstrated dilated left ventricle, left ventricular ejection fraction of 30%, a large inferior LVPA (Figure 1, A), and severe ischemic mitral regurgitation. Cardiac magnetic resonance imaging confirmed the presence of a 63 × 58 × 41-mm inferior LVPA adjacent to the mitral valve (Figure 1, B). Coronary angiography showed severe three-vessel disease.

The operation was performed through a median sternotomy incision with cardiopulmonary bypass. Four-vessel coronary artery bypass grafting was performed initially.

There were dense adhesions along the diaphragmatic surface of the heart. The pseudoaneurysm sac was densely calcified and adhered to the inferior vena cava. Because we needed to address the severe mitral regurgitation, and to avoid a ventriculotomy, an endocavitary approach to the LVPA was selected. The mitral valve could not be repaired because of the extensive pathology of the subvalvular

apparatus. The posterior mitral valve leaflet was detached, affording excellent exposure of the neck of the LVPA. The LVPA was excluded from the left ventricle by closing the neck with a patch of glutaraldehyde-fixed bovine pericardium (Peri-Guard; Synovis Life Technologies, Inc, St Paul, Minn) sutured in place with interrupted, pledgeted sutures. The mitral valve was replaced with a bioprosthesis, preserving the anterior chordae.

The patient recovered uneventfully. PredischARGE transthoracic echocardiography and magnetic resonance imaging showed a satisfactory repair with an intact pericardial patch, partially thrombosed aneurysmal sac, markedly improved left ventricular function, and no mitral regurgitation (Figure 2). At 6-month follow-up, the patient was doing well and in New York Heart Association functional class I.

Discussion

LVPAs are formed as a result of contained myocardial rupture after acute myocardial infarction. In contrast with true ventricular aneurysms, LVPAs have a high propensity to rapid enlargement and rupture, mandating expeditious surgical management.¹

Repair of LVPA is commonly performed with a patch sutured through a ventriculotomy made in the LVPA wall.² This approach can be technically challenging because of dense pericardial adhesions, adhesion of the sac to adjacent structures (such as the inferior vena cava in our case), calcification of the sac, and a friable ventriculotomy suture line.

The transmitral endocavitary approach for repair of LVPA has been previously reported in isolated cases.^{3,4} This approach is particularly useful for patients with concomitant mitral valve disease that necessitates repair or replacement of the valve. With this approach, we gained a wide exposure of the aneurysm neck and were able to achieve an excellent repair with restoration of left ventricular geometry while avoiding a ventriculotomy.

In our case, the mitral valve had to be replaced. If the mitral valve is competent or suitable for repair, however, transmitral repair of the LVPA can be accomplished with preservation of the mitral valve by reattaching the posterior leaflet to the annulus after suturing the patch.

In summary, the endocavitary transmitral approach is a safe and effective technique. It should be considered for repair of inferior LVPA in patients who require concomitant mitral valve surgery.

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Received for publication Oct 16, 2007; accepted for publication Dec 12, 2007.

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J Thorac Cardiovasc Surg 2008;135:1382-3

0022-5223/\$34.00

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doi:10.1016/j.jtcvs.2007.12.006

Figure 1. A, Preoperative transthoracic echocardiogram shows inferior pseudoaneurysm adjacent to mitral valve. B, Preoperative magnetic resonance imaging shows $63 \times 58 \times 41$ -mm inferior left ventricular pseudoaneurysm adjacent to mitral valve. Asterisk indicates left ventricular pseudoaneurysm; arrows indicate mitral valve annulus.

Figure 2. A, Postrepair transthoracic echocardiogram. Left ventricular geometry is restored by exclusion of pseudoaneurysm by pericardial patch. B, Postrepair magnetic resonance imaging shows pericardial patch excluding thrombosed pseudoaneurysm. Asterisk indicates thrombosed pseudoaneurysm; arrow indicates pericardial patch.

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