

## Spontaneous closure of a large left ventricular pseudoaneurysm after mitral valve replacement

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**Abstract** Left ventricular pseudoaneurysm is a rare, but potentially fatal, condition that generally occurs as a complication of myocardial infarction, infective endocarditis, or cardiac surgery. Surgical repair is the treatment of first choice because of the marked risk of rupture, but deteriorated hemodynamics and complicated procedures to treat the pseudoaneurysm may lead to a high mortality rate. We report a 62-year-old woman with a large left ventricular pseudoaneurysm after mitral valve replacement for rheumatic mitral valve stenosis. Surgical repair was not performed due to the patient's refusal, but her pseudoaneurysm resolved spontaneously by 2 years after mitral valve replacement. Spontaneous obliteration of a large left ventricular pseudoaneurysm is very rare in a patient on warfarin therapy. This case suggests that a left ventricular pseudoaneurysm with a narrow neck may resolve spontaneously in rare settings.

**Keywords** Aneurysm · Left ventricle · Mitral valve replacement · Complication

### Introduction

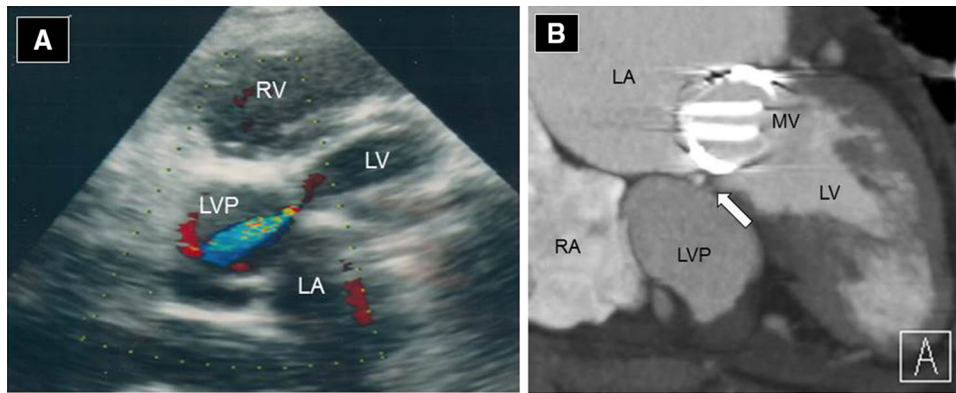
Although left ventricular (LV) pseudoaneurysm is associated with a considerable risk of rupture, we may hesitate to perform surgical repair because of the high mortality rate [1, 2]. We present a patient who developed a large LV pseudoaneurysm after mitral valve replacement (MVR).

Although surgical repair was not performed, the pseudoaneurysm showed spontaneous resolution by 2 years after MVR. Spontaneous obliteration of a large LV pseudoaneurysm in a patient receiving warfarin is very rare. Conservative management of LV pseudoaneurysm needs careful follow-up including urgent surgical repair, while spontaneous closure of LV pseudoaneurysm with a narrow neck may be uncommonly achieved.

### Case report

A 62-year-old woman with rheumatic mitral valve stenosis and secondary tricuspid valve regurgitation underwent MVR with a 29 mm St. Jude Medical mechanical prosthesis (St. Jude Medical, St. Paul, MN) and tricuspid annuloplasty with a 28 mm Edwards MC<sup>3</sup> ring (Edwards Lifesciences, Irvine, CA). Severe calcification and adhesions of the mitral leaflet and chordae in the P3 and posteromedial commissural areas were removed as completely as possible, allowing most of the posterior mitral leaflet to be preserved. The anterior mitral leaflet was totally removed. The mechanical prosthesis was sized to just fit the mitral annulus after removal of calcification. Her early postoperative course was uneventful. However, postoperative transthoracic echocardiography (TTE) showed an abnormal pouch on the posteromedial wall of the LV. Color Doppler imaging revealed blood flow into the pouch from the LV through a narrow neck (Fig. 1a). Accordingly, LV pseudoaneurysm was diagnosed. Contrast-enhanced computed tomography (CT) showed a pseudoaneurysm (30 × 42 mm) arising from the posteromedial wall of the LV just below the implanted mitral valve (Fig. 1b). The neck of the pseudoaneurysm was 4 mm in diameter. Although we recommended prompt surgical repair, the

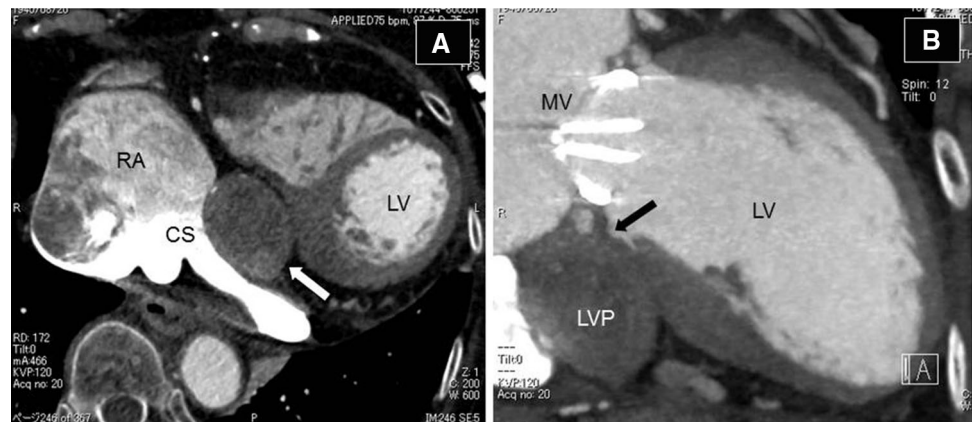
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**Fig. 1** **a** Transthoracic color Doppler echocardiography after mitral valve replacement shows an abnormal pouched lesion with blood flow from the left ventricle. **b** Contrast-enhanced computed tomography shows a 30 × 42 mm left ventricular pseudoaneurysm with

enhancement, arising from the posteromedial wall of the left ventricle. The neck of the pseudoaneurysm (*white arrow*) is narrow. *LA* left atrium, *LV* left ventricle, *LVP* left ventricular pseudoaneurysm, *MV* implanted mitral valve, *RA* right atrium, *RV* right ventricle

**Fig. 2** **a** Contrast-enhanced computed tomography at 2.2 years after mitral valve replacement shows the left ventricular pseudoaneurysm (*white arrow*) without enhancement. **b** The indentation (*black arrow*) in the wall of the left ventricle just beneath the implanted mitral valve represents the obliterated neck of the pseudoaneurysm



patient refused any further intervention and opted for conservative management of the pseudoaneurysm. She was started on warfarin to prolong the prothrombin time (international normalized ratio) to 2.0 and remained asymptomatic. Two years after MVR, repeat TTE showed that blood no longer flowed into the pseudoaneurysm through its narrow neck. Enhanced CT (2.2 years after MVR) revealed no enhancement of the pseudoaneurysm (Fig. 2a, b). At present, 5 years after confirming spontaneous closure of the aneurysmal neck, there is neither blood flow into the pseudoaneurysm on echocardiography nor enhancement on contrast CT.

## Discussion

LV pseudoaneurysm is an uncommon complication of transmural myocardial infarction, trauma, infective endocarditis or cardiac surgery. About half of LV pseudoaneurysms associated with cardiac surgery occur after mitral valve replacement [1], and female patients with rheumatic

mitral valve disease predispose LV rupture or pseudoaneurysm after surgery [3, 4]. In this patient, type I rupture preceded the occurrence of the pseudoaneurysm, presumably due to overzealous resection of the calcified posterior mitral leaflet and insertion of an oversized prosthesis [4, 5]. LV pseudoaneurysm develops only when LV rupture is barely contained by adherent pericardium or scar tissue, hence 30–45 % of untreated pseudoaneurysms rupture in the first year [1]. Although most authors have recommended prompt surgical repair as the method of first choice to prevent rupture, surgical repair may be hesitant because of the high mortality rate [1, 2]. We hardly ever encounter LV pseudoaneurysm, and we should adequately know the mechanism and the future course of it.

Sakai et al. reported that 7 out of 8 patients with a LV pseudoaneurysm after mitral valve repair were managed conservatively, and indicated that conservative management may be possible if the pseudoaneurysm is small and its neck is very narrow [6]. Pretre et al. [2] reported that a chronic and asymptomatic LV pseudoaneurysm is not an indication for surgery if it is less than 3 cm in diameter or

not expanding. Yeo et al. [7] concluded that conservative management in selected patients with increased surgical risk seems reasonable and surgical treatment should only be performed in patients with ventricular tachycardia or recurrent embolism related to the pseudoaneurysm. In 1989, Tai et al. [8] reported the first case of long-term survival of a patient who developed a LV pseudoaneurysm after MVR with subsequent spontaneous resolution. The natural history of LV pseudoaneurysm is still little known and the optimal treatment of chronic asymptomatic LV pseudoaneurysm remains controversial. In the present case, serial echocardiography revealed no change in size during follow-up, the aneurysm had a typical narrow neck (less than 5 mm in diameter), and contrast-enhanced CT confirmed spontaneous closure of the neck. A narrow neck may shrink by contraction of the surrounding myocardium during systole, and LV pseudoaneurysm is likely to be thrombosed. Careful follow-up including urgent surgical repair is mandatory for LV pseudoaneurysm, while LV pseudoaneurysm with a narrow neck may close spontaneously in rare settings.

## Conclusion

We presented a case of spontaneous closure of a large LV pseudoaneurysm after mitral valve replacement. Although spontaneous closure of a large LV pseudoaneurysm under

the administration of warfarin is very rare, LV pseudoaneurysm with a narrow neck may resolve spontaneously.

**Conflict of interest** All the authors have declared no conflict of interest associated with this manuscript.

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