

## Left Ventricular Pseudo-pseudoaneurysm with Hemopericardium

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We report a case of pseudo-pseudoaneurysm, which is a very rare complication of myocardial infarction. A 69-year-old man was admitted to our clinic with chest tightness and dyspnea. He had undergone aortic valve replacement with a pericardial bioprosthetic valve, ring mitral annuloplasty, and reconstruction of an aortic annular defect due to infective endocarditis with bovine pericardium 4 years prior. Echocardiography and computed tomography showed pericardial effusion and a 16-mm cavity at the anterolateral wall of the left ventricle. Magnetic resonance imaging suggested either pseudo-pseudoaneurysm or myocardial abscess. We successfully repaired the myocardial defect using a patch made from a vascular graft with pledgeted horizontal mattress sutures under cardiopulmonary bypass.

Key words: 1. Pseudoaneurysm  
2. Ventricular aneurysm  
3. Myocardial infarction

### CASE REPORT

A 69-year-old male visited the emergency room due to chest tightness and dyspnea that had occurred 3 days prior. Four years before this visit, the patient had undergone aortic valve replacement, ring mitral annuloplasty, and reconstruction of an aortic annular defect due to infective endocarditis using bovine pericardium.

He showed the symptoms of cardiac tamponade. Echocardiography and computed tomography revealed a large amount of pericardial effusion and a 16-mm cavity at the anterolateral wall of the left ventricle. The cavity had no communication with the nearby pericardial space and had the continuity of parietal pericardium. The myocardial wall motion around the cavity was normal. To stabilize vital signs, we performed pericardial centesis. The old bloody pericardial

effusion was drained and there was no progressive bleeding.

Coronary angiography showed 30% tubular stenosis in the left anterior descending artery and 40% focal stenosis in the proximal left circumflex artery. Magnetic resonance imaging (MRI) showed an aneurysmal change of the left ventricle from the base to the middle and anterior wall. Considering the surrounding myocardium of pseudoaneurysm was normal, pseudo-pseudoaneurysm or intramyocardial abscess was suspected (Fig. 1).

Surgery was performed under cardiopulmonary bypass and cardiac arrest. In gross, we couldn't identify the site of the pseudo-pseudoaneurysm, so we palpated the ventricular base between the left anterior descending artery and the ramus intermedius to identify the thinnest ventricle wall and incised it. After removing the inner thrombus, we identified a defect 1 cm in diameter in the endocardium and a 3×2-cm defect in

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†This journal article was presented at the 248th monthly meeting in Seoul and Gyeonggi province.

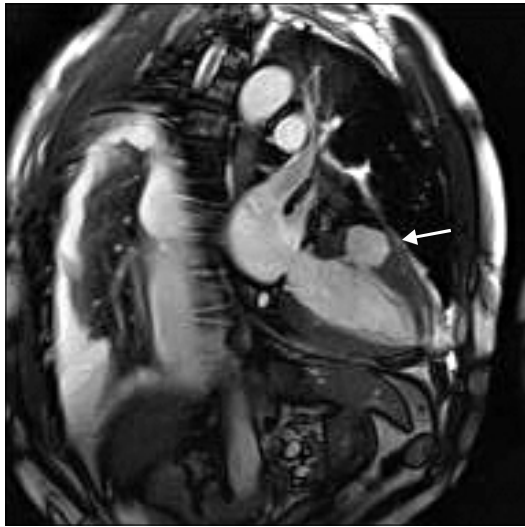
Received: September 29, 2010, Revised: November 12, 2010, Accepted: May 10, 2011

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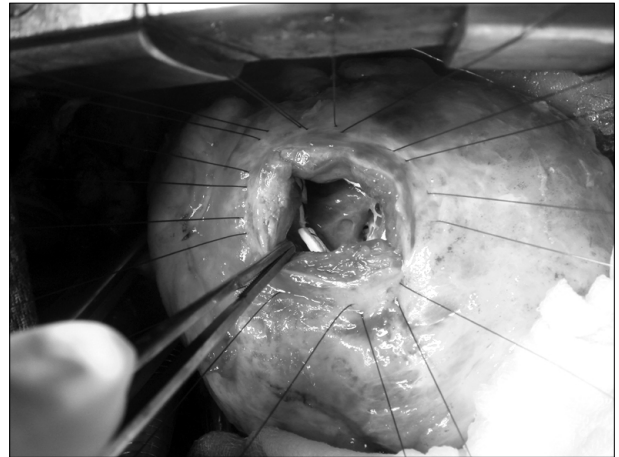
**Fig. 1.** Preoperative cardiac magnetic resonance image demonstrating a cavity within the anterolateral myocardial wall (white arrow).

the epicardium. There was no evidence of infection, so it was diagnosed as a pseudo-pseudoaneurysm. We performed patch closure of the defect using a prosthetic bypass graft in horizontal mattress sutures with pledgets (Fig. 2). The patient's postoperative vital signs were stable, and postoperative echocardiography showed no abnormal cardiac wall motion. With the exception of temporary pleural effusion in the left thoracic cavity, no complications occurred, and the patient was discharged on the thirteenth postoperative day. There was no evidence of abnormal cardiac wall motion or recurrence of the cardiac aneurysm in the follow-up echocardiography one month post-operation.

## DISCUSSION

The rupture of myocardium is a rare but fatal complication of myocardial infarction. There are complete and incomplete myocardial ruptures. Incomplete myocardial rupture can be divided into pseudoaneurysm, subepicardial aneurysm, and pseudo-pseudoaneurysm [1,2].

Mostly pseudoaneurysm is a complication of transmural myocardial infarction and ruptured myocardium is covered with pericardium and spilled blood. Epicardial ventricular aneurysms occur due to the abrupt interruption of the my-



**Fig. 2.** Repair of the pseudo-pseudoaneurysm with pledgetted horizontal mattress sutures.

ocardium covered with epicardium, so that there is a communication between the ventricle and the cavity of ventricular aneurysm. There is a possibility of rupture, so surgical correction is indicated, as in the case of pseudoaneurysm [2]. The pseudo-pseudoaneurysm is a subtype of epicardial ventricular aneurysms. Like the epicardial ventricular aneurysm, pseudo-pseudoaneurysm has a communication with the ventricular cavity through a thin neck and shows only an intramyocardial dissecting hematoma without strong adhesion between the epicardium and the pericardium. It is very rare, so there have been few reports of it [1,3-5].

MRI is helpful in distinguishing a pseudoaneurysm from a true ventricular aneurysm and in identifying the exact site and size of the ventricular aneurysm [3]. Coronary angiography and transesophageal echocardiography can be utilized to distinguish pseudo-pseudoaneurysm from pseudoaneurysm by the differences in the epicardial direction of coronary arteries [6]. Regardless of the diagnostic method used, myocardium covering the cavity indicates either a true ventricular aneurysm or pseudo-pseudoaneurysm, and lack of myocardial continuity indicates a diagnosis of pseudoaneurysm. True ventricular aneurysm and pseudo-pseudoaneurysm can be distinguished from each other by the ventricular enlargement corresponding with the enlargement of the outer wall [3]. The myocardial continuity, the range of the ventricle, the ratio of the opening to the maximal diameter of the cavity, the flow in the ventricle, the location of the ventricle, the cavity, and

their relationship with coronary arteries are useful for the identification of lesions [3,7].

The pseudo-pseudoaneurysm is very rare, so there is little known about its natural course. Surgical correction is controversial in cases without symptoms. And there has been a case of success with only non-surgical treatment [8]. However, recurrent chest pains occur due to myocardial dissection by leaking blood, signaling the impending rupture of the myocardium, and requiring surgical correction [3]. In this case, the patient visited the hospital due to chest discomfort a few days prior without a history of angina pectoris or myocardial infarction.

Echocardiography and MRI confirmed the patient's diagnosis as a pseudo-pseudoaneurysm and coronary angiography showed no significant stenosis. Therefore, we considered the possibility of a left ventricular injury by the vent used in the cardiac surgery 4 years prior. However, the site of the ventricular aneurysm was in the cardiac base of the diagonal branch area, which was different from the site of the vent. The previous operation was due to infective endocarditis, so we considered the possibility of intramyocardial abscess and a pseudo-pseudoaneurysm due to myocardial infarction localized to the area of the diagonal branch. We considered intracoronary lesions and thromboembolic myocardial infarction from the previous infective endocarditis as the cause of myocardial infarction. In the operative field, there was no evidence of infection or inflammation, and the rupture site that had resulted in hemopericardium was not clear. The epicardium was continuous, so we identified the site of the cavity by palpation, which was consistent with a pseudo-pseudo-

neurysm localized to the myocardium. The internal defect was too large for us to perform a primary closure, so we closed the defect using a prosthetic bypass graft patch. Postoperative follow-up echocardiography and MRI showed no leakage from the patch closure site and the patient has been doing well without any problems.

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