

# Left ventricle Subepicardial aneurysm following asymptomatic myocardial infarction

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## Abstract

An asymptomatic 75-year-old female with past medical history of percutaneous coronary intervention for angina pectoris was referred to our department for the management of left ventricular aneurysm which was pointed out on the follow-up echocardiography. Coronary angiography revealed no restenosis of the stent site, but 100% stenosis of a distal segment of the left circumflex artery that had not been detected previously. Transthoracic echocardiography indicated a defect of the myocardium 2cm in diameter in the posterior wall. Aneurysmectomy and patch closure was performed successfully before rupture and the lesion was diagnosed as subepicardial aneurysm.

## Introduction

Subepicardial aneurysm of the left ventricle is a rare but lethal complication of myocardial infarction. It is classified as subtype of incomplete myocardial rupture. Its features include abrupt interruption of the myocardium, a narrow neck, and propensity for progression to sudden trans-luminal rupture. This etiology has not been well reported because of its rarity and difficulty in diagnosis before rupture. Management has not defined but surgical repair is the only therapy to prevent rupture. We report a case of asymptomatic SEA incidentally pointed out on echocardiography and successfully treated by surgery. The etiology, clinical presentation, diagnosis, imaging findings and management are here discussed. We should keep in mind this condition as a life-threatening complication of myocardial infarction with the risk of trans-luminal rupture, even if asymptomatic.

## Case presentation

An asymptomatic 75-year-old female with past medical history of percutaneous coronary intervention for angina pectoris and chronic renal failure on hemodialysis was referred to our department for the management of left ventricular aneurysm which was pointed out on the follow-up echocardiography. Coronary angiography showed no restenosis of the stent site but 100% stenosis of distal segment of left circumflex artery which had not been detected previously. Echocardiography showed an abnormal cavity that communicated with the left ventricle through a small hole, 2cm in diameter in the lateral wall (Figure 1). Figure 2. Computed tomography scan showed an aneurysm in the lateral wall of left ventricle without pleural effusion (Figure 2). Magnetic resonance imaging showed an aneurysm with abrupt discontinuing of myocardium and narrow neck (Figure 3). Pseudoaneurysm, subepicardial aneurysm or pseudo-pseudoaneurysm was thought as differential diagnosis. Aneurysmectomy and patch closure was planned. Surgery was performed via medial sternotomy. Cardiopulmonary bypass (CPB) was carried out with cannulation of the aorta and the right atrium under cardiac arrest and mild hypothermia. Macroscopically, a subepicardial little red aneurysmal site with a

weakened wall was seen at the apical part of the left ventricle. Sign of rupture, adhesion to the surrounding structures or pericardial effusion was not seen. The aneurysmal sac was opened and a sclerotic wall was seen. There was a narrow neck at the base of the incised aneurysmal sac communicating with the left ventricular cavity. Myocardium was not contained in the aneurysm cavity (Figure 4). Following the resection of the aneurysm, the defect was patch closed with Gelweave graft. Two Teflon pledgets were used to reinforce the ventricle suture on the outside. The weaning from CPB and postoperative course were uneventful.

## Discussion

Cardiac rupture, whether complete or partial, is a potentially lethal mechanical complication of myocardial infarction. Subepicardial aneurysms, pseudoaneurysms and pseudo-pseudoaneurysms represent

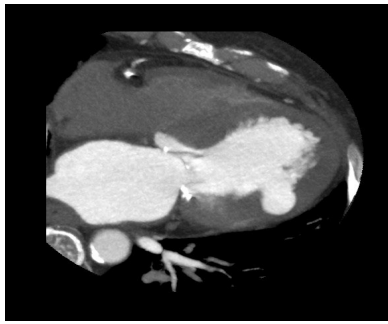


**Figure 1.** Transthoracic echocardiography showed abrupt myocardial interruption in the inferior wall. The aneurysm was 16 mm × 20 mm in size without external expansion.

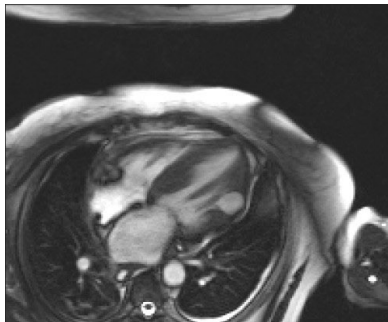
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**Key words:** aneurysm (left ventricle), myocardial infarction

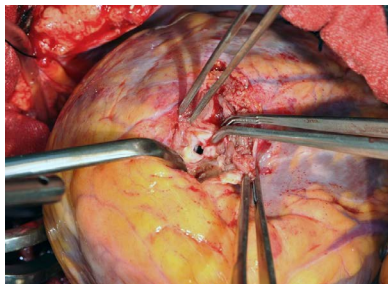
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**Figure 2.** Computed tomography scan showed an aneurysm lying below the inferior surface of left ventricle without pleural effusion.



**Figure 3.** Magnetic resonance imaging showed an aneurysm below the inferior surface of the left ventricle with abrupt discontinuing of myocardium and narrow neck.



**Figure 4.** Intraoperative picture showed that aneurysm had a narrow neck and myocardium was not contained in the aneurysm cavity.

three rare varieties of incomplete cardiac rupture [1-6]. In 1983, Epstein and Hutchins defined subepicardial aneurysm of the left ventricle as a rare complication of myocardial infarction [7]. Vossenberget al. reported that the overall incidence of subepicardial aneurysms ranges from 0.3% at consecutive autopsy series to 1% of myocardial infarction deaths [8]. Subepicardial aneurysms are characterized by an abrupt interruption of the myocardium opening to an aneurysmal pouch that is contained by epicardium and may also contain myocardial elements. Although rare, subepicardial aneurysms have several unique characteristics with important clinical implications. First, subepicardial aneurysms have been associated with a high risk of rupture [9-12]. The potential to rupture is high both in the early stages of development and in the chronic phase [13,14]. Second, they are also associated with other significant cardiac morbidity such as moderate-severe congestive heart failure, ventricular septal defects, true aneurysm formation, mitral regurgitation, ventricular arrhythmias, systemic emboli [7]. Finally, prompt recognition and surgical repair offers a favorable prognosis. Vossenberget al reported a literature review of 16 aneurysms, in which 31% had ruptured. Sixteen cases of subepicardial aneurysm (80%) were described as having occurred in the inferior or posterior walls, two

(10%) in the anterolateral wall, one (5%) in the anteroapical wall, and one (5%) involving the apex [8]. Six (30%) progressed to frank rupture. In six patients, the diagnosis was made only at autopsy. Ante-mortem diagnosis was made in 14 patients, 12 of whom underwent operative repair [11]. Although appropriate timing for surgical treatment remains unclear, an increase in size and external expansion of subepicardial aneurysm, which would be the anatomical indicator of rupture, require urgent surgery. Even if external expansion does not occur, surgical correction is necessary because of possible progression. To prevent to progression to rupture, serial echocardiography should be performed to detect the formation of aneurysm, increase in size and external expansion of a subepicardial aneurysm [15-17]. In conclusion, we should keep in mind this condition as a life-threatening complication with the risk of transmural rupture, even if asymptomatic. Serial echocardiography follow-up should be performed following myocardial infarction to detect the formation of aneurysm, increase in size and external expansion of a subepicardial aneurysm. Once it is diagnosed, prompt surgical intervention should be considered before rupture.

### Conflict of interest

All the authors have declared no competing interest.

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