

Left Ventricular Pseudoaneurysm after Sutureless Repair of Subacute Left Ventricular Free Wall Rupture: A Case Report

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A 65-year-old woman presenting with a left ventricular pseudoaneurysm 27 months after sutureless repair of a subacute left ventricular free wall rupture complicating acute myocardial infarction is described. An autologous pericardial patch and gelatin resorcin formaldehyde (GRF) glue were used in the repair. A small pseudoaneurysm bulged out over the true aneurysm of the left ventricle. We performed a Dor operation and concomitant bypass grafting to the right coronary artery. Although sutureless repair is an effective procedure for subacute left ventricular free wall rupture, left ventricular pseudoaneurysm in the late postoperative period may be a rare problem after this repair. (Ann Thorac Cardiovasc Surg 2001; 7: 311–4)

Key words: left ventricular pseudoaneurysm, left ventricular true aneurysm, sutureless repair, left ventricular free wall rupture, acute myocardial infarction

Introduction

Left ventricular pseudoaneurysm (LVPA) forms when a cardiac rupture is contained by adherent pericardium or scar tissue.¹⁾ Most LVPAs occur following myocardial infarction, cardiac surgery, trauma, infection, or inflammation.¹⁾ We report a patient who developed LVPA after sutureless repair²⁾ of a subacute left ventricular free wall rupture (LVFWR) complicating acute myocardial infarction (AMI).

Case

A 63-year-old woman came to our hospital in June 1998 with chest and back pain that had persisted for 24 hours. She had a cerebral hemorrhage 6 years prior. Electrocar-

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diogram revealed ST segment elevation in leads aV_L, and V1 to V6. She was treated medically without coronary angiography (CAG) or coronary intervention for over 24 hours after the onset of AMI. She lost consciousness suddenly due to electromechanical dissociation on the second hospital day, and echocardiogram revealed pericardial effusion. After cardiopulmonary resuscitation and pericardiocentesis, her blood pressure and level of consciousness improved, and we performed emergency surgery for subacute LVFWR.

First surgery

After median sternotomy, the pericardium was opened and 140 ml of fresh blood and clot was removed. A 5×5 cm infarcted area was observed in the anterior free wall of the left ventricle (LV). A 10-mm myocardial tear parallel to the diagonal branch was found in the infarcted area, and oozing from the tear was seen. After the bleeding was stopped by finger compression over the tear, a sutureless repair²⁾ was performed without cardiopulmonary bypass. A large patch of autologous pericardium (8×12 cm) for covering the entire infarcted area was fixed to the surface of the heart with GRF glue.

The patient's postoperative recovery was uneventful. Postoperative CAG revealed total occlusion of the di-

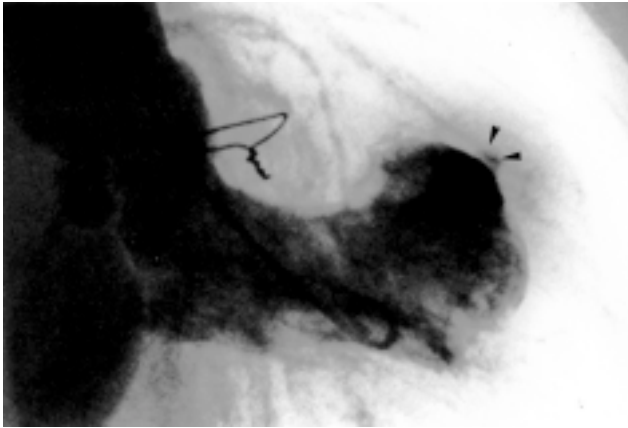


Fig. 1. Left ventriculogram in 30° right anterior oblique projection 24 months after the first operation demonstrating anterior wall pseudoaneurysm (7.5 mm×7.5 mm diameter) (arrows) from the true aneurysm.

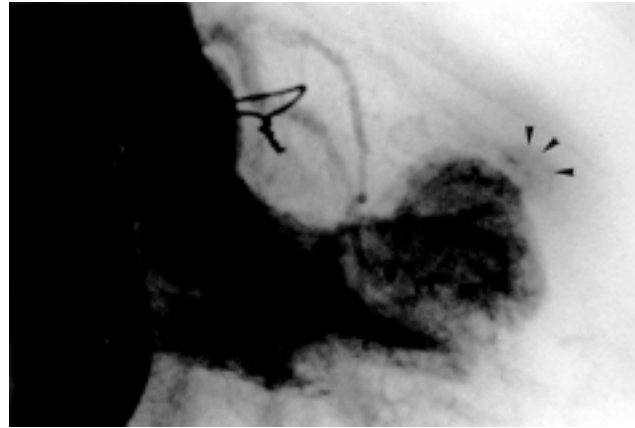


Fig. 2. Left ventriculogram in 30° right anterior oblique projection 27 months after first operation revealed that the anterior wall pseudoaneurysm diameter had grown from 7.5 to 15.0 mm (arrows).

agonal branch. The other coronary arteries were nearly normal. Left ventriculogram (LVG) revealed an anterior wall true aneurysm with a broad base.

The patient had regular 6-month follow-up transthoracic echocardiography examinations. The echocardiogram 18 months after surgery was normal. However, a subepicardial aneurysm was noted on the 24-month echocardiogram. LVG demonstrated a LVPA originating from the true aneurysm (Fig. 1). CAG revealed 90% stenosis of the distal right coronary artery (seg. 3). The patient refused surgical treatment, but 3 months later, she was readmitted and LVG demonstrated that the pseudoaneurysm had grown in diameter from 7.5 to 15.0 mm (Fig. 2). The patient underwent a second surgery 27 months after the sutureless repair.

Second surgery

After a usual median sternotomy, moderate adhesion was observed surrounding the heart. There was some loose adhesion between the autologous pericardial patch and the myocardium. The pseudoaneurysm was 18×20 mm. After removal of the thrombus, the orifice of the pseudoaneurysm (8×10 mm) was confirmed. A Dor operation³⁾ was performed with the aid of cardiopulmonary bypass because the pseudoaneurysm was formed on the true aneurysm of the left ventricle. Fibrous scar tissue around the orifice was partially resected. An endoventricular circular suture of 2-0 polypropylene was passed through the fibrous tissue above the transitional zone between the normal and scarred muscle. The artificial neck was closed with a Dacron patch. After closure, the

excluded external tissue was folded to reinforce the suture line. Coronary artery bypass grafting to the posterior descending artery was performed with a saphenous vein graft.

The patient's postoperative course was uneventful. Postoperative LVG showed a satisfactory result and an ejection fraction that had improved from 62% to 69% (Fig. 3). The bypass graft to the posterior descending artery was patent. The patient was discharged on day 21 after this second surgery.

Pathology

Pathological examination showed no myocardial element in the pseudoaneurysmal wall and a mixed thrombus inside the pseudoaneurysm.

Discussion

LVPA is a rare complication of myocardial infarction, cardiac surgery, trauma, infection, or inflammation.¹⁾ Post surgical pseudoaneurysms can occur after replacement of the mitral valve or can arise on a previous ventriculotomy.⁵⁾ LVPA requires early diagnosis and subsequent surgical correction, because it tends to rupture even in the chronic phase and regardless of size.⁴⁾ However, patients are often asymptomatic and the LVPA is found incidentally upon imaging study.^{1,6)} A high clinical index of suspicion is needed to avoid missing the diagnosis.¹⁾ What distinguishes the pseudoaneurysm from the LV true aneurysm is discontinuity of the myocardium around the aneurysmal cavity.^{1,6)} The presence of a neck smaller than

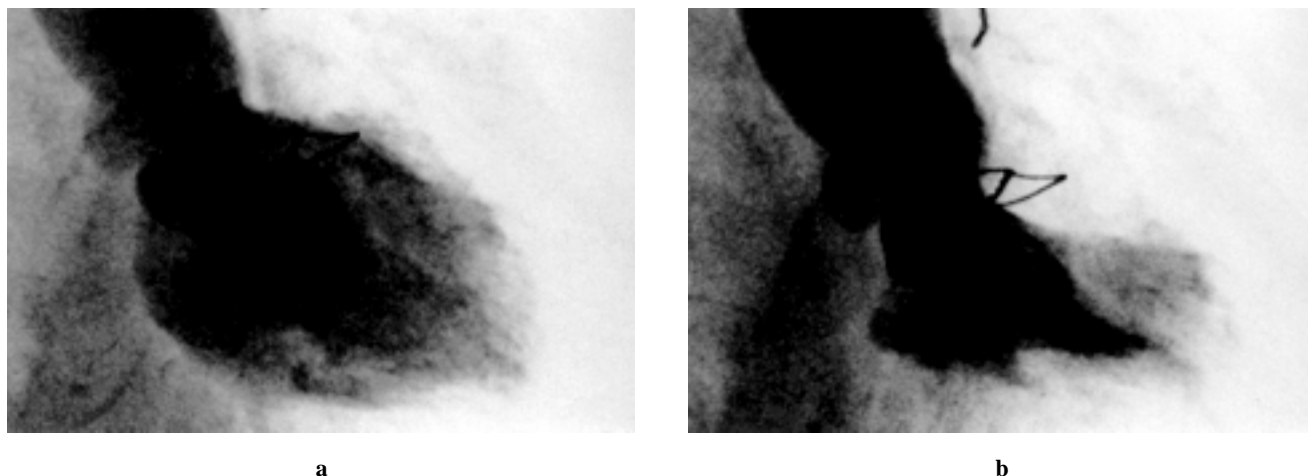


Fig. 3. Postoperative left ventriculogram in 30° right anterior oblique projection following Dor operation demonstrating an improvement in ejection fraction from 62 to 69%.
a: Diastolic phase. b: Systolic phase.

the cavity is strongly suggestive of pseudoaneurysm, and LVG is the best tool for establishing a diagnosis.¹⁾ CAG is usually necessary before surgery to evaluate the need for concomitant bypass grafting.¹⁾ Transthoracic echocardiography is a reasonable first diagnostic tool,¹⁾ and regular follow-up by this means was useful in our case.

There are a few reports of coincident pseudoaneurysm and true aneurysm.^{1,7-9)} Most investigators have supported surgery as the appropriate treatment for LVPA because untreated pseudoaneurysms have an approximately 30% to 45% risk of rupture.^{1,4,10)} However, regardless of treatment, patients with LVPA have a high mortality rate, i.e., 23% in those treated surgically and 48% in those treated medically.¹⁾ The mortality rate is significantly high during the acute phase of MI and during redo operations.⁴⁾ Pretre et al.⁴⁾ reported that because asymptomatic small pseudoaneurysms (<3 cm diameter) have a relatively stable course, regular echocardiography or magnetic resonance imaging could be a reasonable approach in patients who do not require myocardial revascularization or mitral valve surgery. Any increase in size should point toward surgical treatment. The pseudoaneurysm in our patient grew from 7.5 mm to 15.0 mm in only 3 months. Usually, emergency repair of the postsurgical pseudoaneurysm is technically difficult because of tight adhesion. We recommend prompt surgical correction even for the asymptomatic small pseudoaneurysm.

LVFWR is a catastrophic complication after AMI. Sutureless repair is a relatively new procedure for sub-

acute LVFWR, reported by Pado in 1993.²⁾ This procedure facilitates hemostasis, and reduces the operation time, and is associated with a decreased incidence of low output syndrome.²⁾ There have been many recent reports of sutureless repair of subacute LVFWR.

Noda and associates¹¹⁾ reported that GRF glue ensures tight adhesion between the patch and the myocardium and that neither abnormal inflammatory cells nor giant cells were found histologically in their case. In our case, however, there was insufficient adhesion between the autologous pericardial patch and the myocardium, even in the late period. There has been a report of LVPA after sutureless repair with fibrin glue.¹²⁾

With the sutureless repair there is the risk of re-rupture or formation of a LV true aneurysm in the postoperative period.¹³⁾ Close follow-up should be carried out after sutureless repair of subacute LVFWR due also to the possibility of pseudoaneurysm.

Conclusion

A 65-year-old woman presenting with left ventricular pseudoaneurysm 27 months after sutureless repair of subacute left ventricular free wall rupture complicating acute myocardial infarction is described. Although sutureless repair is an effective procedure for subacute left ventricular free wall rupture, left ventricular pseudoaneurysm in the late postoperative period may be a rare problem after this repair.

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