

MULTIPLE RECURRENCE OF INFECTED PSEUDOANEURYSM AS A RARE COMPLICATION OF VENTRICULOTOMY: A CASE REPORT

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Contribution

MA, SHAT conceived idea, did literature review and final drafting. FF, EF reviewed case report. ANG, MS helped in acquiring photographs and related material. All authors contributed significantly to the submitted manuscript.

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ABSTRACT

Pseudoaneurysm of the left ventricular is a very rare but lethal condition which could complicate patients after myocardial infarction, cardiac surgery, trauma or infection. Few patients may experience recurrent pseudoaneurysm due to the technical failure or infection. We presented a 57-year old man who developed recurrent infected pseudoaneurysm following a ventriculotomy because of left ventricular aneurysm. His cardiac defect was first repaired using Teflon felt. Then, he returned 3 times with infected pseudoaneurysm for the treatment of which he underwent aneurysmorrhaphy 3 times. Eventually, he died after the last operation due to low cardiac output caused by multiple debridement of the left ventricle. This case implies the necessity of prevention of factors which increase the chance of pseudoaneurysm recurrence including infection and technical failure.

Key Words: Pseudoaneurysm, Ventriculotomy, Multiple Recurrence, Infection

INTRODUCTION

Acquired pseudoaneurysm of the left ventricle is an extremely rare but lethal complication of transmural myocardial infarction, cardiac surgery, trauma or infection.¹ Formation of a pseudoaneurysm starts with a small rupture in the myocardium through which blood leaks into a cavity whose wall has no myocardial element, but is composed of the pericardium, fibrin or synthetic surgical materials.² The size of the pseudoaneurysm increases gradually and therefore, it may compress the nearby structures. Moreover, the combination of the absence of myocardial tissue in the wall of the pseudoaneurysm and progressive increase in the size of the cavity leads to a significant risk of rupture. Another catastrophic consequence of pseudoaneurysm is an infection which could be life-threatening.² We reported a case of recurrent infected left ventricular pseudoaneurysm following surgical repair of a left ventricular aneurysm.

CASE REPORT

A 57-year-old man with the diagnosis of unstable angina was admitted to the hospital. In addition to the standard treatments, he underwent angiography which demonstrated three-vessel coronary artery disease, and a transthoracic echocardiography which revealed an ejection fraction of 40% and a left

ventricular apical aneurysm with thrombus. Therefore, left ventriculotomy and coronary artery bypass grafting simultaneously were performed for the patient.

Both aneurysm and the thrombus were removed and left ventricle was reconstructed with linear closure using a Teflon felt. The operation was uneventful and postoperative transthoracic echocardiography confirmed successful surgical repair. Finally, 10 days after the operation the patient was discharged with the good general condition.

However, two months later the patient referred to the hospital and re-admitted due to difficulty breathing and dyspnea on exertion and fatigue.

On physical examination, the patient was ill and mildly feverish. The only abnormal finding on lab data was leukocytosis with a leftward shift ($12000/\text{mm}^3$). Transthoracic echocardiography showed a pulmonary artery pressure of 40 mmHg, moderate mitral regurgitation and massive pericardial effusion. No intracardiac vegetation was seen on the echocardiography.

In addition, a large apical pseudoaneurysm ($53 \times 39\text{mm}$) with a narrow neck was observed which was suggestive of postoperative pseudoaneurysm of the left ventricle. Based on both clinical and radiological findings, diagnosis of infected pseudoaneurysm was confirmed, therefore patient was reoperated by the lateral thoracotomy. The adhesionolysis was performed and Teflon felt was removed and aneurysmorrhaphy was completed using a GORE-TEX® patch.

Teflon felt culture demonstrated staphylococcus aureus infection for the treatment of which patient was commenced on a 10-day course of cefazolin. Seven days after surgery, the patient was discharged from the hospital.

After about 1 month, the patient came back with the complaint of fluid leaking through the thoracotomy incision site. In Transthoracic echocardiography evaluation, a narrow-neck left ventricular pseudoaneurysm following dehiscence of the previous stitches was seen. A sample of fluid from the thoracotomy incision site was cultured and indicated staphylococcus aureus infection. At first, we tried to close the defect with an Amplatzer occluder device; however, patient's condition became worse over the next 48 hours. Therefore, a transthoracic echocardiography and a CT-scan with contrast were performed, and a floating Amplatzer in the left ventricle following the enlargement of the pseudoaneurysm was detected (Figure-1).

Therefore, anterior thoracotomy as the third operation was performed for the patient. Initially, the pseudoaneurysm was uncovered and the Amplatzer was removed, then the necrotic tissue and debris were resected and the opening of the pseudoaneurysm, endoaneurysmorrhaphy was

Figure1: Amplatzer Device (black arrow) is Seen at the Neck of Pseudoaneurysm. The Red Arrow Points to the Pseudoaneurysm Sac which is Contrast-Filled Due to Failure of Amplatzer to Occlude the Defect.



Figure-2: White Arrow Shows Omental Flap Covering the Resected Pseudoaneurysm Neck. Small Air Bubbles (red arrow) are Suggestive of Re-infection.



trimmed and the defect was covered with an omental flap (Figure-2). Finally, one week after the operation, the patient was discharged in fair condition.

About 14 days later the patient was brought to cardio surgery department because of high-grade fever ($39.5\text{ }^{\circ}\text{C}$ oral) and severe respiratory distress. In transthoracic echocardiography, a giant left ventricular pseudoaneurysm was detected. To surgical repair of the lesion, the fourth operation was performed via midsternotomy using cardiopulmonary bypass. An autologous pericardial patch was used to reconstruct the defect (Figure-3), but unfortunately, the patient died soon after the operation. His death was mainly due to low cardiac output caused by multiple debridement of the left ventricle.

Figure-3 An Autologous Pericardial Patch was Applied to Cover the Defect.



DISCUSSION

Left ventricular pseudoaneurysm forms when a free-wall rupture is sealed by the overlying pericardium, thrombus or scar tissue. It communicates with the cavity of the left ventricle by a narrow neck.³ Previous cardiac surgery has been considered as the second most common cause of left ventricular pseudoaneurysm. Postsurgical pseudoaneurysm rarely occurs after cardiac procedures including mitral valve replacement or after ventriculotomy⁴. Although, the exact foundation of a pseudoaneurysm is not clear due to rarity, it should be considered in patients with inexplicable postinfarction heart failure.⁵ Catastrophic consequences such as rupture, thromboembolism, syncope, mediastinal compression and infection may occur following the formation of a pseudoaneurysm.⁶ Although infection could be a complication of pseudoaneurysm, it can cause pseudoaneurysm as well. In the current case, both previous ventriculotomy and infection were contributing factors for recurrent pseudoaneurysm. The recurrent left ventricular pseudoaneurysm is so rare and there are a few reports presenting this condition. However, to our knowledge, our case was different, regarding to the rate and number of relapses and its rapid development. As opposed to our case whose pseudoaneurysm recurred just 1 month after the first pseudoaneurysm repairing, in a case reported by Rao the patient had been free of symptoms for 2 years after the initial repair.⁷ However in line with our findings Almeida et al. presented a 66-year-old woman, with a pseudoaneurysm of the ascending aorta 12 days after valvuloplasty. The patient was infected and surgical repair was considered followed by six weeks of antibiotic therapy. She was readmitted six months later for an abscess and recurrence of a large pseudoaneurysm and a third operation was performed for the patient.⁸

In the cases of post-surgical left ventricular pseudoaneurysm, the infection-induced breakdown of primary closure and suture dehiscence can be considered as major

causes of pseudoaneurysm formation.⁹

Based on a literature review of ventricular suture line infection following cardiac surgery, Teflon felts have been reported to be the source of infection in all reported cases.¹⁰ In addition to infection of foreign material such as Teflon felts, technical failure and tearing off a suture can also lead to the formation of a new pseudoaneurysm from the closure line of the previous ventriculotomy.¹¹ In the current case, the combination of these two main contributing factors, including infection of the foreign material and repeated surgical interventions, seems to be responsible for multiple recurrences.

CONCLUSION

Although pseudoaneurysm of the left ventricle needs urgent surgical intervention to eliminate the potential risk of rupture, it is vital to apply prophylactic measures to reduce the need for multiple surgical repairs which lead to ventricular volume reduction. Pseudoaneurysm of the left ventricle has a spectrum of complications, and we have to prevent or manage all of them concomitantly. Because foreign materials such as Teflon felts which increases the risk of infection significantly are very commonly used in cardiac surgery, it is vital to follow principles of sterility tightly and prescribe reasonable prophylactic and therapeutic antibiotics to prevent fatal consequences of infection and relapse. Use of biological patches may also reduce the risk of infection and recurrence.

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