

A giant left ventricular pseudoaneurysm with severe mitral regurgitation after silent inferior myocardial infarction resulting in cardiogenic shock

Sessiz inferior miyokard infarkütüsü sonrası gelişen ve kardiyojenik şokla sonuçlanan dev psödoanevrizma ve ciddi mitral yetersizliği

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A 60-year-old man presented with a two-week history of dyspnea and tachycardia at rest. Severe heart failure and findings of pulmonary edema without evidence of acute coronary syndrome were observed. Transthoracic echocardiography showed dilatation of the left ventricle (LV), severe mitral regurgitation, and a giant extra chamber, 11x14 cm in size, next to the posterior region of the LV, containing a massive thrombus. Coronary angiography performed on the same day showed total occlusion of the right coronary artery and a critical stenosis of the circumflex artery. An emergency operation was performed due to the sudden development of pulmonary edema and cardiogenic shock. The pseudoaneurysm was resected together with the thrombus, the defect in the LV myocardial wall was repaired, and mitral ring implantation and annuloplasty were performed. He was hospitalized for 22 days postoperatively due to heart failure and decreased oxygenation and was followed-up for three months.

Key words: Aneurysm, false/surgery; myocardial infarction/complications; mitral valve insufficiency.

Pseudoaneurysm is defined as sealing of ruptured myocardium by the pericardium, resulting in a discrete aneurysmal outpouching with a narrow neck.^[1,2] Pseudoaneurysms of the left ventricle (LV) may occur as a result of several reasons, including transmural myocardial infarction, chest trauma, cardiac surgery, or endocarditis. Pseudoaneurysms sometimes remain clinically silent and may be discovered incidentally during routine investigations. However, patients with a pseudoaneurysm may have recurrent tachyarrhythmia, thromboembolism, or heart failure. Surgical resection is usually recommended because

Altmış yaşındaki erkek hasta, iki haftadır istirahatte ortaya çıkan nefes darlığı ve nabız hızlanması yakınmalarıyla başvurdu. Hastada akut koroner sendrom bulguları olmaksızın ciddi kalp yetersizliği ve akciğer ödemi bulguları vardı. Transtorasik ekokardiyografide sol ventrikülde genişleme, ciddi mitral yetersizliği ve sol ventrikül arka duvarının karşısında, içinde yoğun pıhtı olan, 11x14 cm boyutlarında ikinci bir kalp boşluğu izlendi. Aynı gün yapılan koroner anjiyografide sağ koroner arterin tam tıkalı ve sirkümfleks arterde ciddi daralma olduğu görüldü. Ani gelişen akciğer ödemi ve kardiyojenik şok tablosu nedeniyle hasta acil ameliyata alındı. Psödoanevrizma, içindeki pıhtıyla birlikte çıkarıldı, sol ventrikül miyokard duvarındaki defekt onarıldı ve mitral halka implantasyonu ve annuloplasti uygulandı. Kalp yetersizliği ve azalmış oksijenasyon bulgularının tedavisi için hasta ameliyat sonrasında 22 gün hastanede yatırıldı ve üç ay izlendi.

Anahtar sözcükler: Psödoanevrizma/cerrahi; miyokard infarktüsü/komplikasyon; mitral yetersizliği.

of the risk for spontaneous and fatal rupture of pseudoaneurysms.^[3,4]

We presented surgical treatment of a giant pseudoaneurysm of the posterior wall of the LV con-founded by simultaneous severe mitral regurgitation, that progressed insidiously into heart failure, pulmonary edema, and cardiogenic shock.

CASE REPORT

A 60-year-old male patient presented with a complaint of progressively worsening dyspnea of a two-week history. Physical examination was notable for

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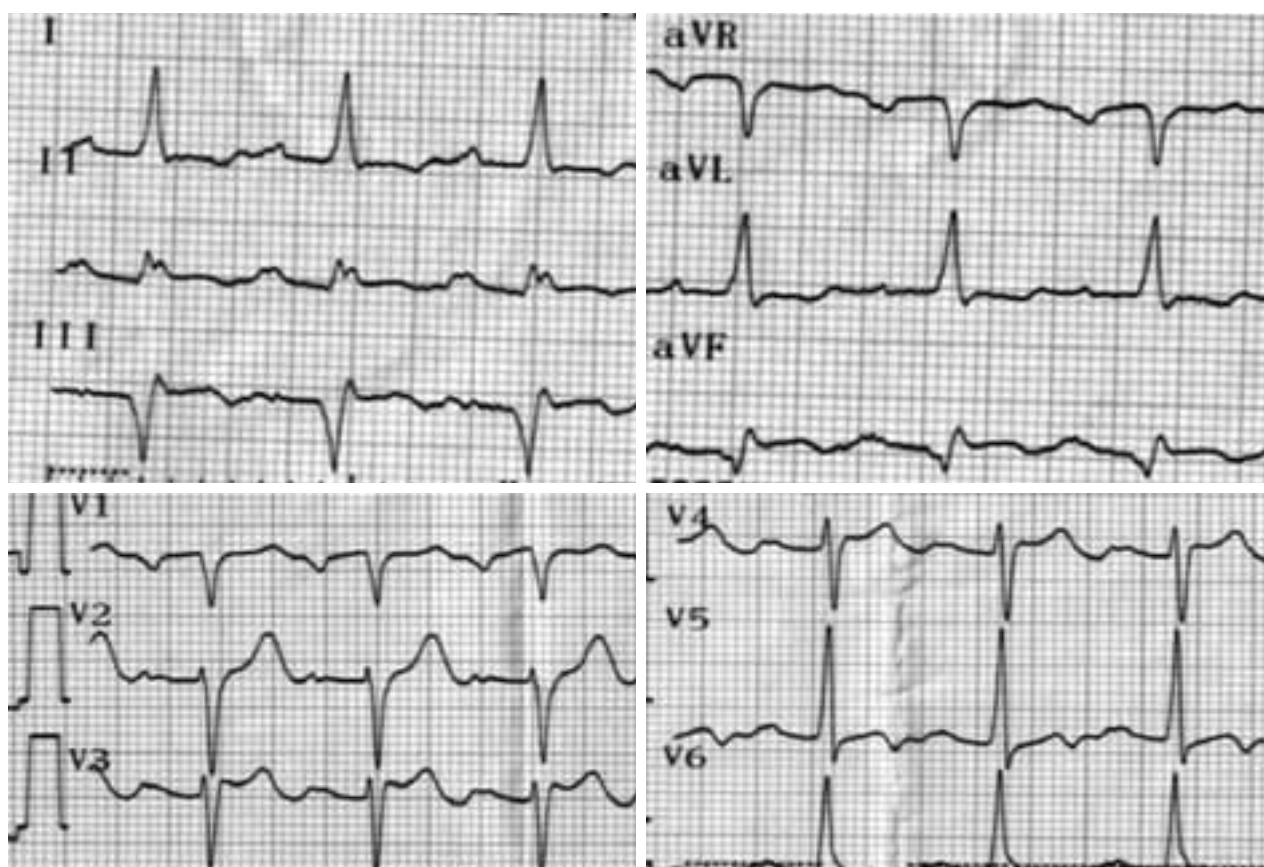


Figure 1. Electrocardiograms showing (A,B,C) P mitrale, (A,B,C,D) first degree atrioventricular block, and (A,C) pathological Q waves in D3 and aVF leads.

low cardiac output and findings of pulmonary edema such as venous distension, sinus tachycardia, S_3 gallop, and crepitations up to the upper zones of the lung. Blood pressure was 105/70 mmHg and the pulse rate was 100 beats per minute. There was also a pansystolic murmur that was heard loudest at the mesocardiac area. Electrocardiography showed P mitrale, first degree atrioventricular block, and pathological Q waves in D3 and aVF leads (Fig. 1). Transthoracic echocardiography showed dilatation of the LV (diastolic diameter 7.0 cm, systolic diameter 5.2 cm), normal systolic function (ejection fraction 55%), severe mitral regurgitation, and a giant extra chamber, 11x14 cm in size, next to the posterior region of the LV, containing a massive thrombus (Fig. 2). A bidirectional flow was noted in the neck of the pseudoaneurysm by pulse-wave Doppler, being toward the pseudoaneurysm during systole and reverse during diastole. It was thought that dilatation of the LV was due to volume overload associated with a large pseudoaneurysm and simultaneous mitral regurgitation. Serial analyses of serum creatine kinase and troponin I levels were within normal

ranges. The patient was initially treated with diuretics and low dose nitroglycerin infusion. Coronary angiography showed total occlusion of the right coronary artery and a critical stenosis in the middle of the circumflex artery with antegrade TIMI-1 flow. The left anterior descending coronary artery was normal. Surgical resection of the pseudoaneurysm, repair or replacement of the mitral valve, and coronary artery bypass grafting were recommended. Upon development of cardiogenic shock and pulmonary edema at the end of the same day, the patient was immediately taken to the operation room. Aortic and bicaval venous cannulation were performed. After cross-clamping, antegrade cardiac arrest was induced. The pseudoaneurysm was incised and massive thrombus was observed. The pseudoaneurysm was resected together with the thrombus. The defect in the LV myocardial wall was repaired with patch plasty. Aortocoronary distal anastomosis was performed between the right coronary artery and the circumflex artery. After a left atriotomy, the mitral valve was explored. Mitral ring implantation and annuloplasty were preferred because of literature data reporting a

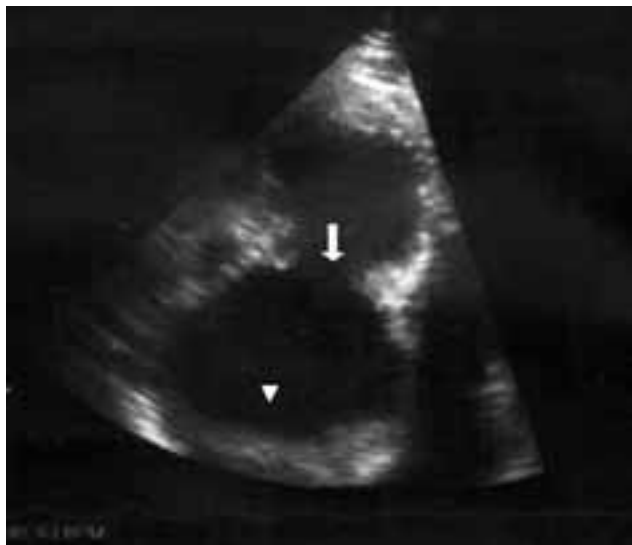


Figure 2. Parasternal short axis view showing the left ventricle opening to a large pseudoaneurysm through a narrow neck (arrow). Thrombus formation is seen at the base of the pseudoaneurysm (arrow head).

high mortality rate associated with mitral valve replacement.^[5] After cross-clamping, the severity of mitral regurgitation decreased. The patient stayed in the intensive care unit for 12 days postoperatively due to heart failure and decreased oxygenation and was eventually discharged on the 22nd postoperative day. On postoperative echocardiography, ejection fraction was 50% and LV diameters (diastolic 6.3 cm, systolic 4.8 cm) were improved. He was followed-up for three months after the operation.

DISCUSSION

In the presented non-diabetic case, the giant LV pseudoaneurysm possibly developed after a silent inferior myocardial infarction. He was admitted with symptoms of heart failure and the pseudoaneurysm was diagnosed during routine echocardiography. Davutoğlu et al.^[6] presented a similar case of silent myocardial infarction and a giant LV pseudoaneurysm in a 36-year-old diabetic man presenting with dyspnea on exertion, in whom the pseudoaneurysm was detected during the differential diagnosis of congestive heart failure.

In another study, Komeda et al.^[5] reported the results of surgical repair in 12 patients with a LV pseudoaneurysm. The pseudoaneurysm was located in the posterior wall in 10 patients, three of whom also had severe mitral regurgitation for which mitral valve replacement was performed together with aneurysmectomy. Unfortunately, all the patients died after mitral valve replacement. De Paulis et al.^[7] reported a

case with a posterolateral LV pseudoaneurysm and severe mitral regurgitation, in which mitral valve insufficiency was almost completely cured by simple closure of the left ventricular defect by edge-to-edge apposition along the long axis of the heart. On the other hand, Clift et al.^[8] performed percutaneous device closure for the treatment of a LV wall pseudoaneurysm in a 60-year-old man who had previously undergone coronary artery bypass grafting.

Pulmonary edema and cardiogenic shock were observed in our case in the course of the treatment, which mandated urgent surgical intervention. Considering high operative mortality associated with mitral valve replacement,^[5] mitral ring implantation and mitral annuloplasty were preferred as an alternative approach. Simple edge-to-edge apposition and closure of the LV defect were not possible due to the large size of the neck of the pseudoaneurysm (2.4x1.8 cm).^[8] Closure of the myocardial defect was not sufficient for treating severe mitral regurgitation which was associated with dilated LV and mitral annulus in our case. In our opinion, this operative approach may prove promising for the treatment of giant pseudoaneurysms associated with severe mitral regurgitation causing severe heart failure and cardiogenic shock.

In conclusion, co-existence of a giant LV pseudoaneurysm and severe mitral regurgitation as an insidious complication of inferior myocardial infarction may be a rare cause of severe heart failure and should be treated immediately. Mitral ring implantation and mitral annuloplasty may be recommended due to the high mortality risk of mitral valve replacement.

REFERENCES

1. Dachman AH, Spindola-Franco H, Solomon N. Left ventricular pseudoaneurysm. Its recognition and significance. *JAMA* 1981;246:1951-3.
2. Gatewood RP Jr, Nanda NC. Differentiation of left ventricular pseudoaneurysm from true aneurysm with two dimensional echocardiography. *Am J Cardiol* 1980;46:869-78.
3. Frances C, Romero A, Grady D. Left ventricular pseudoaneurysm. *J Am Coll Cardiol* 1998;32:557-61.
4. Hung MJ, Wang CH, Cherng WJ. Unruptured left ventricular pseudoaneurysm following myocardial infarction. *Heart* 1998;80:94-7.
5. Komeda M, David TE. Surgical treatment of postinfarction false aneurysm of the left ventricle. *J Thorac Cardiovasc Surg* 1993;106:1189-91.
6. Davutoglu V, Soydisc S, Sezen Y, Aksoy M.

Unruptured giant left ventricular pseudoaneurysm complicating silent myocardial infarction in a diabetic young adult: left ventricular giant pseudoaneurysm after silent myocardial infarction. *Int J Cardiovasc Imaging* 2005;21:231-4.

7. De Paulis R, Zeitani J, Bognolo G, Fratini S, Penta de

Peppo A, Chiariello L. Left ventricular pseudoaneurysm and mitral valve regurgitation. Conservative surgical therapy. *J Cardiovasc Surg* 1999;40:679-81.

8. Clift P, Thorne S, de Giovanni J. Percutaneous device closure of a pseudoaneurysm of the left ventricular wall. *Heart* 2004;90:e62.