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Repair of calcified left ventricular pseudoaneurysm of long duration

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Abstract

Cardiac pseudoaneurysm is a contained rupture of the myocardium limited by pericardial adhesions or the epicardial wall. Cardiac pseudoaneurysm may cause sudden death with a mortality of 30–45% in the first year, mostly resulting from rupture. Coronal and axial T2-weighted magnetic resonance images of a 65-year-old male patient admitted with dyspnoea, coughing and chest pain, present for the last 10 days, revealed a large pseudoaneurysm of the left ventricle. Coronary bypass and left ventricular restoration operation was performed. The patient was eventually discharged 8 days after operation. He is in NYHA Class I 21 months postoperatively. The interval between myocardial insult and establishment of diagnosis is unknown in our patient. This is a patient whose left ventricular rupture had been contained for a very long time, possibly years, because a heavily calcified thick pseudoaneurysm wall was encountered during operation, making this case rare in the literature.

Keywords: Pseudoaneurysm • Ventricle rupture • Myocardial infarction

INTRODUCTION

Cardiac rupture is a disastrous complication of myocardial infarction resulting in sudden death. Rarely in patients the rupture is contained by pseudoaneurysm formation making survival feasible.

CASE REPORT

A 65-year-old male patient was admitted with dyspnoea present for the last 10 days. He was categorized under NYHA Class III.

Thorax computed tomography revealed an exophytic left ventricular aneurysm with peripheral thrombus and calcification (Fig. 1A and B). Echocardiography showed depressed systolic function with an ejection fraction of 30%.

Cardiac cine magnetic resonance imaging of coronal and axial T2-weighted images revealed a 142 x 108 x 99 mm sized pseudoaneurysm of the left ventricle (Fig. 2A).

The angiogram revealed a left anterior descending artery stenosis (70%) after the first diagonal branch and distal occlusion. The right coronary artery had a 90% narrowing and the posterior descending branch was totally occluded in its middle section (Fig. 2B). Ventriculography revealed anterobasal and inferior akinesia with an anterolateral, apical aneurysm.

Coronary bypass and ventricular restoration were performed under single cross-clamp and antegrade cardioplegic arrest. Standard ascending aortic and bicaval atrial cannulations were performed. Hypothermia was not used and the entire cardiopulmonary bypass was conducted under mild hypothermia reaching

33°C. The pseudoaneurysm was large with approximate dimensions of 14 x 10 x 10 cm. The pseudoaneurysm sac was completely dissected and excised exposing the former calcified rupture orifice which was 1 x 1.5 cm (Fig. 2C). It was repaired using a dacron patch with Teflon-butressed polypropylene sutures. All remnants of calcified pseudoaneurysmal sac in the pericardial cavity were removed. Left internal thoracic artery to left anterior descending artery and saphenous vein to right coronary artery bypasses were performed. Cardiopulmonary bypass time was 168 min, cross-clamp time was 140 min and the total surgery and anaesthesia times were 5 h and 5 h 45 min, respectively. There was no need for a balloon pump or an assist device. The patient was transferred to the intensive care unit under inotropic support (dopamine 10 µg/kg/min).

Perioperative and postoperative periods were eventless. The patient stayed 30 h in the intensive care unit. He needed inotropes for 2 h postoperatively (dopamine 10 µg/kg/min for the first hour in the intensive care unit and 5 µg/kg/min for the latter hours). He was discharged on the 8th postoperative day. The early postoperative echocardiogram revealed the ejection fraction as 38%. There was an 8% increase in the ejection fraction showing an improvement of systolic function.

He is categorized under NYHA Class I 1 year and 9 months postoperatively.

DISCUSSION

Left ventricular pseudoaneurysm is a rare complication of myocardial infarction. It often occurs as a sequel to myocardial

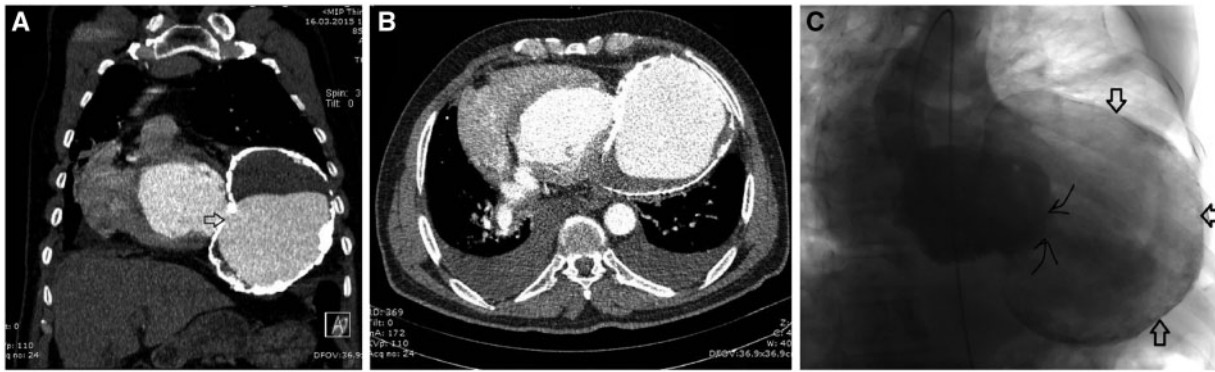


Figure 1: (A and B) Coronal and axial contrast-enhanced computed tomography images show increased size of left cardiac chambers and left ventricular aneurysm. An exophytic aneurysm originating from the left ventricle with peripheral marginal thrombus and calcification with dimensions of 125 x 100 x 139 mm is seen. The neck of the aneurysm (communicating aperture) is patent, shown by open white arrow. (C) Preoperative angiogram showing the aperture between the true left ventricle and the pseudoaneurysm (between thin arrows) and the heavily calcified pseudoaneurysm cavity (denoted by wide arrows).

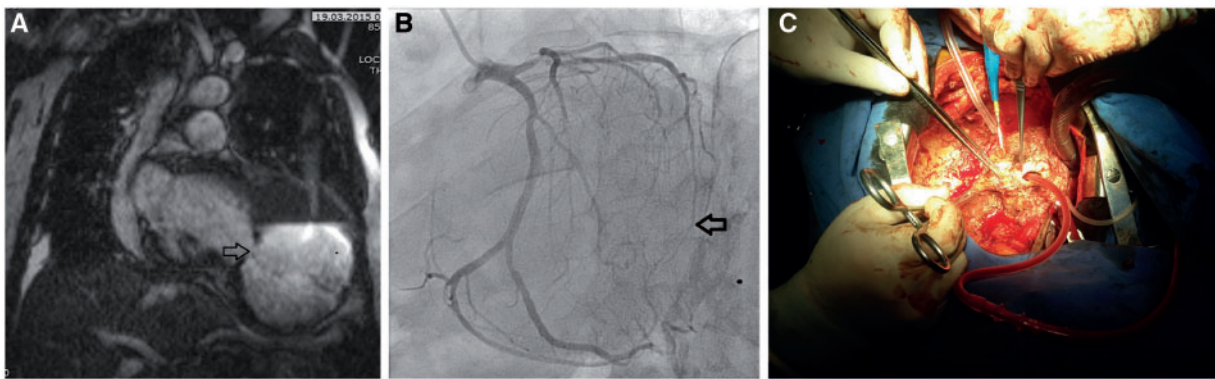


Figure 2: (A) Coronal and axial T2-weighted magnetic resonance images show a pseudoaneurysm of the left ventricle. (B) Angiogram showing occluded left anterior descending artery (wide arrow). (C) Intraoperative photograph showing the connecting aperture through which the real left ventricle is being vented.

infarction after the age of 50 years [1]. Acute left ventricular rupture is a disastrous condition leading to sudden death unless contained. If surgically treated the mortality rate is <15–20% [1].

Iatrogenic causes like previous heart surgery, transapical aortic valve replacement or placement of a ventricular venting catheter [2], penetrating or blunt trauma [3] or infection may also be causative factors.

Surgery should include extensive debridement of the pseudoaneurysmal sac, thrombectomy of the ventricle, closure of the remaining defect in the ventricular wall with or without the use of a prosthetic patch, preservation of ventricular geometry [4] and revascularization of the affected coronary arteries. The crucial step is to close the communicating aperture between the true ventricle and pseudoaneurysm cavity.

Although surgical repair is the gold standard, percutaneous closure is feasible in patients with previous cardiac operations, debilitating comorbidities rendering surgical therapy unacceptably dangerous [2]. We chose open restoration because our patient required revascularization. Seepage of blood into the pericardial space at the time of rupture with subsequent pericardial inflammation causes adherence of pericardial and epicardial layers leading to containment of the rupture [5].

The window of opportunity for intervention usually lasts only days rather than weeks after the myocardial infarction. Most ventricular free wall ruptures occur within a week of infarction [5]. Therefore, late survival after cardiac pseudoaneurysm is rare,

because few patients live beyond the first year after rupture. In our patient, the interval between initial myocardial insult and establishment of diagnosis is unknown. This may be because he belongs to a semi-nomadic tribe that earns its livelihood by sheep and goat breeding in a remote mountaneous area of the country. The access to medical care is limited and almost unavailable in long snowy winter months when roads may be blocked for months. Therefore, the patient has no recollection of the infarction.

Conflict of interest: none declared.

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