Large left ventricular apical pseudoaneurysm: a multimodal imaging approach guiding successful diagnosis and surgical management

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Case presentation

A 59-year-old female with a history of non-anticoagulated paroxysmal atrial fibrillation, dyslipidemia, and tobacco use was admitted with anterior ST-elevation myocardial infarction. Her chest pain started 2 days before she sought medical advice. ECG showed sinus rhythm with ST-elevation in the anterolateral leads with established deep Q waves in leads V1–V4. She was taken directly to the catheterization laboratory where diagnostic coronary angiogram revealed occluded mid left anterior descending artery (LAD) with otherwise unobstructed vessels. Revascularization of LAD was attempted with balloon angioplasty several times but with no restoration of flow. Due to resolution of symptoms and a relatively small-calibre vessel, the procedure was abandoned. Routine post-acute myocardial infarction (AMI) transthoracic echocardiography showed akinesia of the apex and apical walls with moderately impaired left ventricular systolic function. Following stabilization, she was discharged with optimal medical therapy. After 2 months, cardiac magnetic resonance imaging (MRI) was performed to assess for myocardial viability to guide the need for further revascularization attempts and this showed transmural myocardial infarction in the mid to apical LAD territory. There was a large left ventricular apical septum pseudoaneurysm measuring $95 \times 64$ mm with significant increase in the size of thrombus occupying more than half of the cavity (Figure 3). The patient underwent urgent surgical repair at which time a huge friable clot was found within the pseudoaneurysm (Figure 4). She had an uneventful postoperative recovery and continued to do well at 6-month follow-up. Histology of the resected aneurysm showed organizing fibrin and blood clot on a base of thick collagenous fibrous tissue, consistent with a contained rupture of the left ventricle. Repeat cardiac MRI showed good surgical result with normalization of left ventricle volume for age and body surface area and left ventricular ejection fraction of 47%.

Discussion

Left ventricular pseudoaneurysm is usually a rare serious complication that occurs following AMI and may lead to sudden death, ventricular arrhythmias, pump failure, infection, or thromboembolism.1 Risk factors for the development of this complication include female sex, first occurrence of myocardial infarction, and age >60 years.2 Initial evaluation with transthoracic echocardiography may be unrevealing, especially in cases with small defects, but in suspected cases, contrast echocardiography, cardiac CT, and cardiac MRI will have a high diagnostic yield.

Left ventricular pseudoaneurysm is formed by ruptured ventricular free wall that is contained by localized pericardial adhesions. The apex and anterior walls are much more affected than the inferoposterior walls. The contained cavity is characterized by a narrow neck...
Figure 1  Cardiac magnetic resonance imaging showing large left ventricular apical septum pseudoaneurysm (red arrows) with a filling defect representing laminar thrombus (blue arrow).

Figure 2  Transthoracic contrast echocardiography demonstrated a large apical myocardial rupture and apical pseudoaneurysm (black arrows). Left panel shows parasternal short-axis view and right panel shows apical view.

Figure 3  Cardiac computed tomography confirmed a large apical pseudoaneurysm with a thrombus occupying more than half of the cavity (blue arrows).
communicating freely to the left ventricle with a tendency to expand and rupture, hence early intervention is recommended. With recent advancements in cardiac surgery and interventional percutaneous techniques, perioperative mortality is reported to be around 10%. Due to improvements in the management of patients with AMI with successful timely coronary revascularization, the incidence of this complication is decreasing.

**Consent:** The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

**Conflict of interest:** none declared.

**References**

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**Figure 4** Resection of pseudoaneurysm with patch repair of defect. (A) After median sternotomy, the pericardium was opened and adhesions were taken down the atria and great vessels sparing the aneurysm and ventricles, (B) cardiopulmonary bypass was established, and cardioplegia was administered in an antegrade fashion, (C) the aneurysm margins were dissected out, the aneurysm was resected, and the cavity was evacuated of large clot, (D) the ventricle was copiously irrigated with saline, and (E) a Dacron patch closure of the defect was performed.