

CLINICAL VIGNETTE

Incidental Finding of a Left Ventricular Pseudoaneurysm

Celso Diaz, MD and Lua Jafari, MD

Introduction

Left ventricular pseudoaneurysms are a rare, potential complication following myocardial infarction, surgery, or trauma. Pseudoaneurysms form following rupture of the ventricular free wall that is contained by adherent pericardium.¹ “True” left ventricular aneurysms are defined as thinned myocardium that are dyskinetic and involve the full thickness of the myocardial wall.² Pseudoaneurysms are associated with a high risk of sudden cardiac death from rupture. However, due to the rare overall occurrence of pseudoaneurysms, there are limited data on management.

Case Presentation

A 70-year-old male with past medical history of dementia, schizophrenia, Parkinson’s disease, hyperlipidemia, hypertension, and prior tobacco use presented to cardiology for evaluation of a possible left ventricular aneurysm. History was obtained primarily from the patient’s sister. He was recently evaluated at an outside hospital for abdominal pain. CT abdomen and pelvis incidentally revealed a possible calcified, saccular left ventricular aneurysm (Figure 1). He denied any cardiac symptoms including chest pain, dyspnea, or orthopnea. He also denied any prior myocardial infarction or coronary artery disease. He resides in a skilled nursing facility with limited functional capacity. Echocardiogram revealed left ventricular ejection fraction of 35-40% with regional wall motion abnormalities and an echolucent structure posterior to the left ventricle (Figure 2). The patient was started on guideline directed medical therapy for his cardiomyopathy. Subsequent cardiac MRI showed a large left ventricular pseudoaneurysm in the mid anterolateral wall measuring up to 11 cm (Figures 3, 4). Additional MRI findings were concerning for thrombus within the pseudoaneurysm with internal heterogeneous hyperintensities.

The findings were discussed with his sister. His pseudoaneurysm was felt to be a chronic incidental finding with calcification and absence of symptoms. Given concern for underlying coronary artery disease, coronary angiogram was discussed as well as cardiothoracic surgery referral for treatment of his large pseudoaneurysm. After discussion, invasive procedures were not consistent with the patient’s goals of care and his sister opted for medical therapy. Anticoagulation was discussed given concern for thrombus. Risks/benefits were discussed including the risk of rupture, tamponade, and stroke. After discussion with both the sister and his primary care pro-

vider, he was started on anticoagulation, given suspicion that his pseudoaneurysm was chronic. A direct oral anticoagulant (apixaban) was chosen over warfarin given difficulty obtaining routine INR checks.

Discussion

Data are limited with regards to the treatment and management of patients with left ventricular pseudoaneurysms. When suspected, echocardiography is first obtained given wide availability. Differentiation between a pseudoaneurysm and aneurysm can be difficult but important as pseudoaneurysms carry a higher risk of rupture compared to true aneurysms. On imaging, pseudoaneurysms have a narrow neck and are often located in the posterior and lateral wall segments.² Left ventricular aneurysms have a wide neck with no interruption in the myocardial wall. If the diagnosis remains uncertain, cardiac CT or MRI can confirm the diagnosis, with superior spatial and tissue resolution.³

Untreated pseudoaneurysms are associated with heart failure, arrhythmias, and thromboembolism.^{3,4} They also have a high risk of rupture, estimated as high as 30 to 45%.^{1,3} Given these potential complications and the high risk of rupture, surgical repair is the treatment of choice. Surgery involves resection of the pseudoaneurysm and repair of the ventricular wall defect by primary closure or patch.⁵ For patients who cannot undergo surgery, percutaneous closure is a possible option. Retrospective review of 7 patients who underwent percutaneous closure reported success in all 7 patients with no complications. The type and size of device was determined by CT imaging. The procedures involved either a retrograde approach into the left ventricle or transapical approach.⁶

Optimal medical therapy for patients who opt against surgery or who are not surgical candidates is not known. Medical treatment consists of blood pressure control and guideline directed medical therapy in patients with heart failure. For patients at risk for thromboembolism, such as in this case, the decision to start anticoagulation is difficult, given risk of rupture in those not surgically treated. There are limited data on anticoagulation and no guidelines, and the decision is based on “clinical judgement.” In addition, there are no data comparing DOAC vs warfarin for prevention of thromboembolism, although antiplatelets agents may be less effective. A case series of 52 patients with pseudoaneurysms reported 10 patients managed

non-surgically did not rupture during the follow up period.⁷ The absence of trials raises the question of whether selective conservative therapy is reasonable.

Conclusions

Left ventricular pseudoaneurysms are associated with a high risk of sudden cardiac death from rupture. Given their rare nature, management data are limited. The general consensus is surgical repair is the treatment of choice to reduce the risk of rupture. In this patient, surgery was not consistent with goals of care and medical management was chosen. There are no guidelines for the medical management of left ventricular pseudoaneurysms and future studies are needed.

Figures

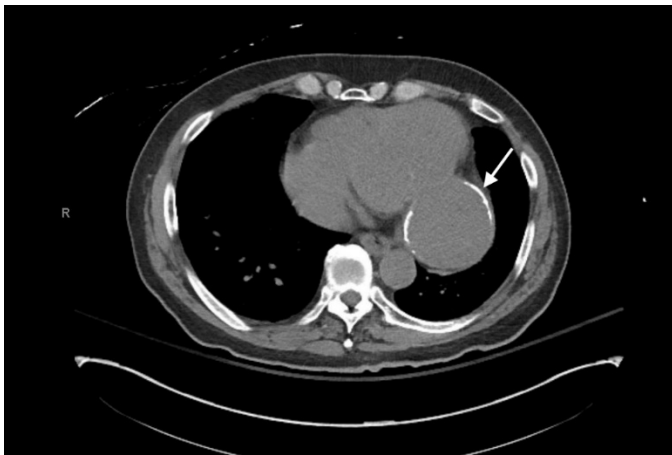


Figure 1.

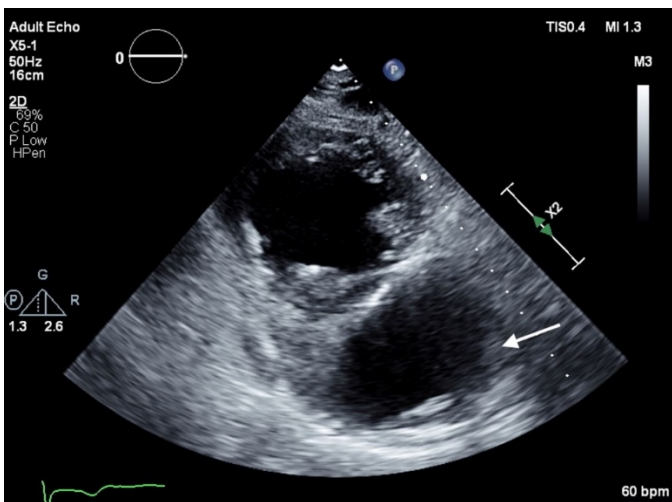


Figure 2.

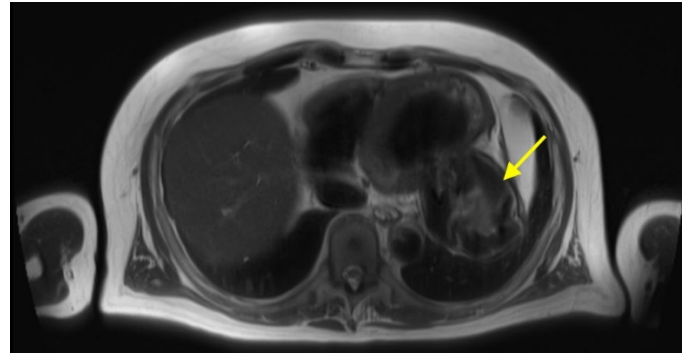


Figure 3.

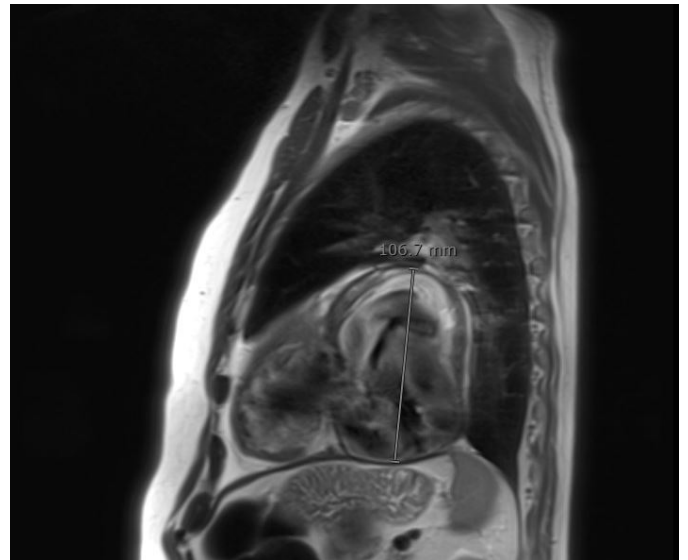


Figure 4.

REFERENCES

1. **Frances C, Romero A, Grady D.** Left ventricular pseudoaneurysm. *J Am Coll Cardiol.* 1998 Sep;32(3):557-61. doi: 10.1016/s0735-1097(98)00290-3. PMID: 9741493.
2. **Caldeira A, Albuquerque D, Coelho M, Côrte-Real H.** Left Ventricular Pseudoaneurysm: Imagiologic and Intraoperative Images. *Circ Cardiovasc Imaging.* 2019 Dec;12(12):e009500. doi: 10.1161/CIRCIMAGING.119.009500. Epub 2019 Nov 26. PMID: 31766861.
3. **Hulten EA, Blankstein R.** Pseudoaneurysms of the heart. *Circulation.* 2012 Apr 17;125(15):1920-5. doi: 10.1161/CIRCULATIONAHA.111.043984. PMID: 22508841.
4. **El Ouazzani J, Jandou I.** Aneurysm and pseudoaneurysm of the left ventricle. *Ann Med Surg (Lond).* 2022 Feb 24;75:103405. doi: 10.1016/j.amsu.2022.103405. PMID: 35386778; PMCID: PMC8977915.
5. **Atik FA, Navia JL, Vega PR, Gonzalez-Stawinski GV, Alster JM, Gillinov AM, Svensson LG, Pettersson BG, Lytle BW, Blackstone EH.** Surgical treatment of postinfarction left ventricular pseudoaneurysm. *Ann Thorac Surg.* 2007 Feb;83(2):526-31. doi: 10.1016/j.athoracsur.2006.06.080. PMID: 17257982.

6. **Dudiy Y, Jelnin V, Einhorn BN, Kronzon I, Cohen HA, Ruiz CE.** Percutaneous closure of left ventricular pseudoaneurysm. *Circ Cardiovasc Interv.* 2011 Aug;4(4):322-6. doi: 10.1161/CIRCINTERVENTIONS.111.962464. Epub 2011 Jul 26. PMID: 21791672.
7. **Yeo TC, Malouf JF, Oh JK, Seward JB.** Clinical profile and outcome in 52 patients with cardiac pseudoaneurysm. *Ann Intern Med.* 1998 Feb 15;128(4):299-305. doi: 10.7326/0003-4819-128-4-199802150-00010. PMID: 9471934.