

MINI-FOCUS ISSUE: IMAGING

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

Left Ventricular Pseudoaneurysm in a Patient With an Apical Aneurysm



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ABSTRACT

Left ventricular pseudoaneurysm is a potentially life-threatening complication of acute myocardial infarction. Timely diagnosis is crucial to improve the patient's prognosis. We describe a multimodality diagnostic approach with emphasis on cardiac magnetic resonance imaging for a left ventricular pseudoaneurysm found surreptitiously in 72-year-old man 2 weeks following an acute myocardial infarction. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2021;3:91-3) Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

A 72-year-old man with a history of an anterior ST-segment elevation myocardial infarction 16 days before presented to the emergency department with chest pain.

An electrocardiogram and serial troponins were unremarkable. A chest computed tomography angiogram excluded pulmonary embolism. However, it showed a focal aneurysm along the apical lateral wall of the left ventricle (LV) ([Supplemental Figure 1](#)) suggestive of pseudoaneurysm or a true aneurysm. An echocardiogram showed no apparent focal outpouching of the LV. Cardiac magnetic resonance imaging (CMR) was obtained to clarify the diagnosis. The CMR images demonstrated an aneurysmal apex with a relatively broad neck. However, there was an abrupt transition of myocardium from normal thickness to a thin layer, compatible with pseudoaneurysm ([Figure 1](#), [Videos 1, 2, 3, and 4](#)). Late gadolinium enhancement (LGE) imaging showed a myocardial infarction in the territory of the left anterior descending coronary artery and enhancement in the pericardium that continued to form a thin wall constraining the defect ([Figure 1](#)). The pseudoaneurysm also had 3 thrombi ([Figure 1](#), [Video 5](#)). There was a large circumferential pericardial effusion with fibrinous strands, likely hemorrhagic on the basis of the parametric T1 mapping ([Figure 1](#), [Supplemental Figure 1](#)).

The patient was urgently taken to surgical repair. Intraoperative findings were consistent with LV apical pseudoaneurysm with a contained free wall rupture ([Supplemental Figure 2](#), [Video 6](#)). To date, 8.5 months after the surgery, the patient is doing well without any subsequent myocardial infarction, heart failure, stroke, or fatal arrhythmia.

It is important to diagnose pseudoaneurysm early due to the risk of rupture. A echocardiogram is the first-line imaging modality to assess for pseudoaneurysm. It can usually differentiate pseudoaneurysm from a true aneurysm by demonstrating a narrow neck and an abrupt break in the myocardium. However, the

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**ABBREVIATIONS
AND ACRONYMS**

CMR = cardiac magnetic resonance

LGE = late gadolinium enhancement

LV = left ventricle

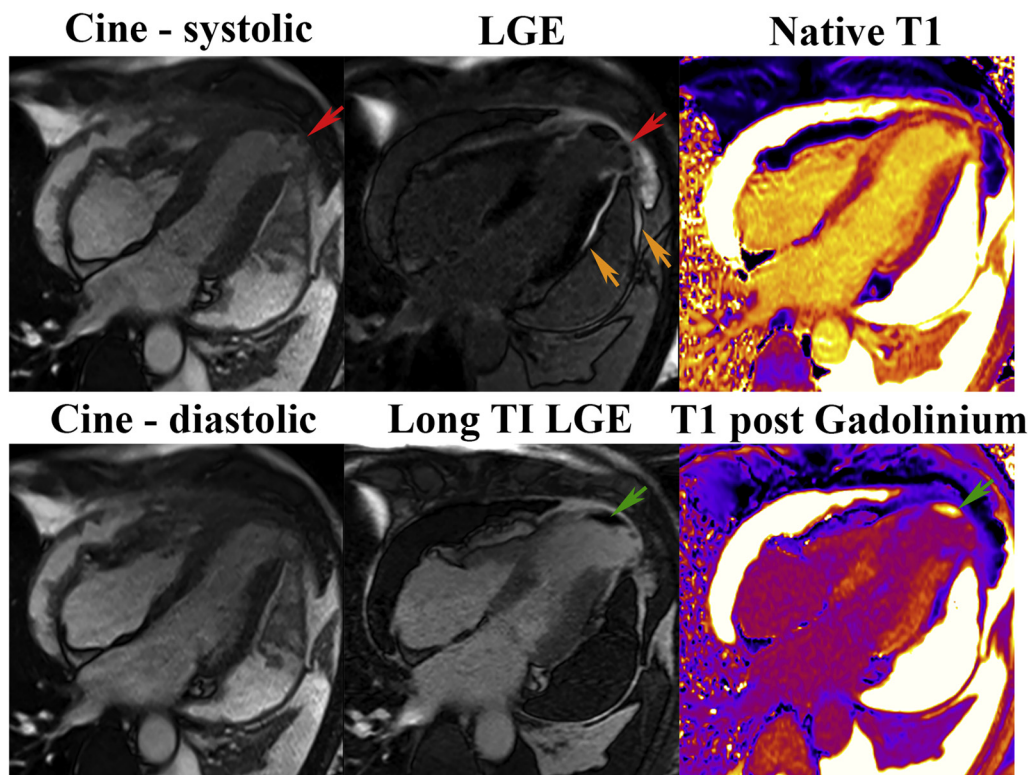
echocardiogram is limited by technical skill level during image acquisition, the patient's body habitus, and sometimes suboptimal echocardiographic windows. Computed tomography allows for a comprehensive assessment of a cardiac structure in any desired axes. CMR has further advantages due to lack of ionizing radiation or iodinated contrast and providing information on tissue characteristics such as presence and extent of myocardial infarction and pericardial inflammation.

By visualizing an aneurysmal area from any desirable angle, CMR allows for a complete delineation of the anatomy including seeing the abrupt break in the myocardium. A narrow neck can be assessed by calculating the ratio of diameters of the neck and the outpouching body (1). Furthermore, pericardial enhancement on LGE imaging is commonly seen in pseudoaneurysm because of pericardial inflammation (1). Hemorrhagic pericardial effusion can be assessed with parametric T1 mapping.

AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

FIGURE 1 Cardiac Magnetic Resonance Images of Left Ventricular Pseudoaneurysm




The pseudoaneurysm (**red arrows**) is seen on 4-chamber steady-state free precession (SSFP) cine and late gadolinium enhancement (LGE) images. On LGE imaging, viable myocardium appears dark, whereas infarcted myocardium is brighter than the blood. The pericardium (**orange arrows**) enhances along the lateral wall and constrains the pseudoaneurysm. Three thrombi are seen in the pseudoaneurysm on LGE, long inversion time (TI) LGE, and post-gadolinium T1 images (**green arrow**).

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KEY WORDS cardiac magnetic resonance imaging, computed tomography, echocardiogram, left ventricular pseudoaneurysm

 **APPENDIX** For supplemental figures and videos, please see the online version of this paper.