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JCIMCR OPEN ACCESS Journal of Clinical Images and Medical Case Reports

ISSN 2766-7820

Short Report

Open Access, Volume 3

Left ventricular pseudoaneurysm and the utility of non-contrast coronary artery calcium scan in differentiating acute versus chronic bleed

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Received: Sep 27, 2022
Accepted: Oct 25, 2022
Published: Nov 01, 2022
Archived: www.jcimcr.org

DOI: www.doi.org/10.52768/2766-7820/2132

Introduction

A Left Ventricular Pseudoaneurysm (LVP) forms when cardiac rupture is contained by pericardium or scar tissue [1]. Ventricular pseudoaneurysms differ from true aneurysms since they do not contain the endocardium or myocardium. LVPs can result from myocardial infarction, cardiac surgery, infection, or trauma [1]. The clinical presentation for ventricular pseudoaneurysms varies. Most notable presentations are chest pain, dyspnea, sudden cardiac arrest, congestive cardiac failure, tamponade, embolism, and syncope.

LVP could be a potentially fatal structural condition due to its significant risk of rupture. The estimated risk of rupture for ventricular pseudoaneurysm is approximately 30-45% [2]. Due to this increased risk, the need for urgent management is crucial.

The standard imaging test used to confirm LVP when echocardiography is not diagnostic is cardiac computed tomography angiography (CCTA). This particular case highlights the importance of using non-contrast CT, such as coronary artery calcium (CAC) in conjunction with CCTA, where it would be extremely helpful in differentiating an acute versus chronic bleed in an LVP, which can be challenging with contrast CT alone.

Case report

A 59-year-old male with past medical history of type 2 diabetes mellitus and coronary artery disease, on carvedilol, rosuvastatin, warfarin, and metformin, underwent CCTA for evaluation of chest pain. CCTA showed a left ventricular pseudoaneurysm spanning 68.5 mm by 36.0 mm with several areas of high attenuation (HU) within the aneurysm. This finding on CCTA posed a clinical challenge: Are these high attenuation areas within the aneurysm contrast or old calcified lesions? The presence of contrast would suggest active leakage of blood into the aneurysm from the left ventricle, which may need urgent intervention in a symptomatic patient.

Figures 1A, 1B, 2A, 2B, illustrates the pseudoaneurysm in sagittal and axial views with and without contrast.

Discussion

CCTA is one of the most effective imaging modalities for identifying ventricular pseudoaneurysms and to defining their morphology. However, in cases when contrast CT detects ventricular aneurysms with high attenuation areas, it is imperative for clinicians to determine if these lesions correspond to iodinated CT contrast, which indicates blood leakage into the aneurysm,

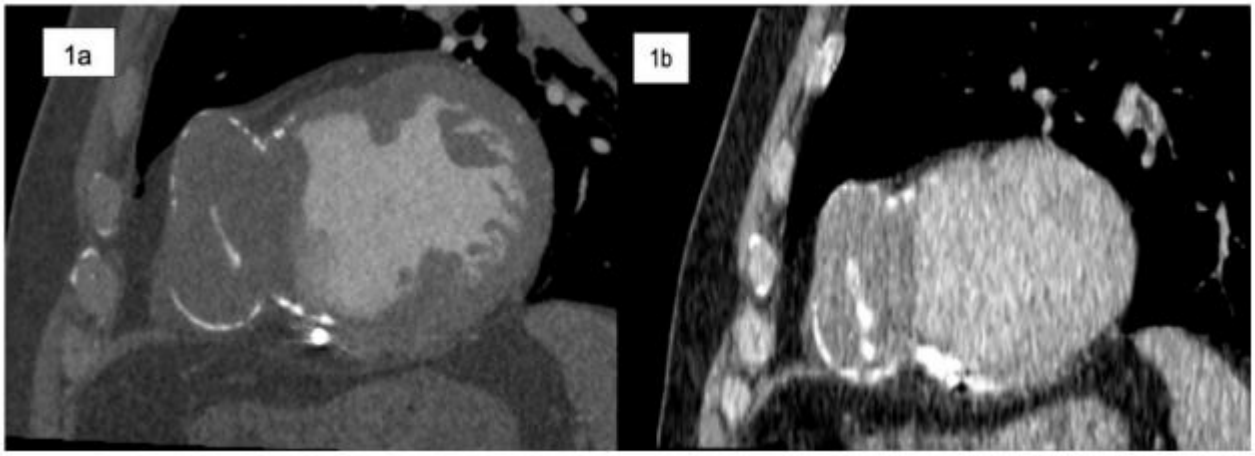

Figure 1: (a) Sagittal view of a CCTA, showing an enhanced area inside the pseudoaneurysm suggesting a communication between the left ventricle and pseudoaneurysm. (b) Sagittal view of a non-contrast cardiac CT scan showing calcifications in the same area within the pseudoaneurysm, suggesting these hyperattenuated lesions are chronic calcifications and not contrast. Hence ruling out active communication between left ventricle and pseudoaneurysm.

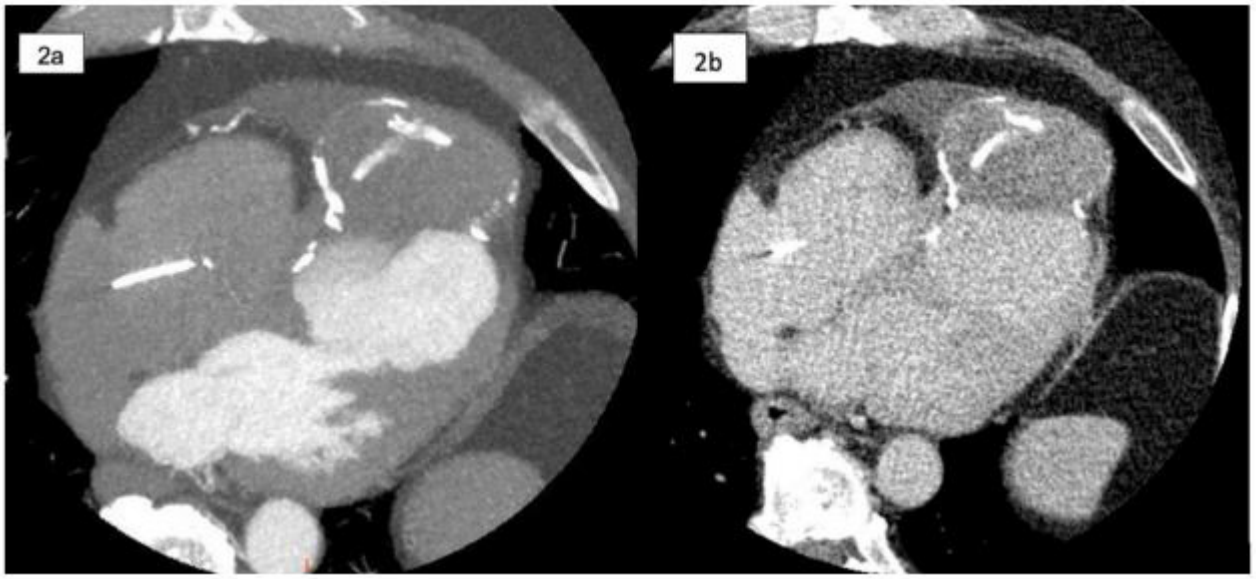

Figure 2: (a) Axial view of a CCTA, showing enhanced area inside the pseudoaneurysm. (b) Axial view of non-contrast cardiac CT, showing hyperattenuated lesions in the same area with calcium density (high HU), again suggesting chronic calcifications instead of contrast leak from the left ventricle into the pseudoaneurysm.

or chronic bleed with calcified lesions. As calcifications and iodinated contrast HU overlap on a CCTA, it can be difficult to distinguish between these lesions. Utilizing non-contrast CT along with CCTA guides clinicians to differentiate such lesions and aids in the decision-making process for any necessary immediate intervention. In this case, a non-contrast study (coronary artery calcium scan) was obtained in conjunction with CCTA as part of the imaging protocol. Upon review of the CAC scan, several calcified lesions were identified in the LVP that corresponded to the high attenuated lesions that were detected on CCTA. These findings indicated an old, calcified hematoma in the LVP, making the likelihood of active leakage of blood from left ventricle into LVP less likely. Non-contrast CAC scans are of high clinical significance in patients undergoing CCTA, not only do they provide the CAC score, but they can also be crucial in distinguishing equivocal lesions (contrast vs calcium) that are seen on CCTA, as seen in this case. In this particular case the information obtained from CAC scan helped in differentiating between acute bleed versus old calcified lesions with a hematoma. This particular case exemplifies the significance of non-contrast calcium imaging in conjunction with coronary CTA in the evaluation of patients with chest pain, hence facilitating the definitive diagnosis, which influences the treatment plans and has clinical implications for the patient.

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