Rare Silent Ischemic Ventricular Septal Aneurysm and Rupture: A Multimodality Diagnostic Approach

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Abstract

Mechanical complications of myocardial infarction are rare but have elevated short- and long-term mortality rates. The authors present a rare case of an inferobasal left ventricular aneurysm and rupture after a silent inferior infarction. A multimodality approach is important in the diagnosis and management.

Key Clinical Message:

Silent inferior infarction causing both inferobasal VSR and LVA formation is rare, requiring high level of clinical suspicion and thorough physical examination.

Question:

A 68-year-old man, whose medical history is significant for hypertension and diabetes mellitus type II, was admitted for constant substernal chest pressure and exertional dyspnea associated with orthopnea and bilateral lower extremity edema for one week. His exam was remarkable for elevated jugular venous pressure, a holosystolic murmur at the left lower sternal border radiating toward the apex, and 2+ pitting edema in bilateral lower extremities. Electrocardiogram (EKG) showed Right bundle branch block with T wave inversions in inferior and anterolateral leads without a prior EKG for comparison. Serial troponin levels were negative and the brain-natriuretic peptide level was elevated (535 pg/mL). Chest radiograph showed cardiomegaly and interstitial edema.

What is the diagnosis?

Answer: new-onset heart failure with rare concomitant occurrence of VSR and LVA secondary to silent inferior infarction

An echocardiogram (TTE) revealed a 4.5 cm left ventricular aneurysm (LVA) extending from the base to mid-section of the inferoseptum (Figure 1A) and a ventricular septal defect (VSD) of 1.5 cm in mid-ventricular septum (Figure 1B) with an estimated Qp:Qs of 1.6. Heparin was discontinued, and patient continued treatment for heart failure. Cardiac magnetic resonance imaging (CMR) was obtained to further characterize the mechanical complications from suspected old inferior infarction, which showed a 6 cm inferior wall LVA (Figure 2A) and a 0.8 cm inferobasal VSD (Figure 2B). Coronary angiography showed 90% stenosis of the proximal right coronary artery (RCA) with severe diffuse distal disease (Figure 3A) and a 50% focal napkin ring lesion of the proximal left main coronary artery (Figure 3B). Coronary artery bypass graft (CABG) and left ventriculoplasty were subsequently performed with left internal mammary artery to left anterior descending artery and saphenous vein graft to obtuse marginal artery. The LVA was

resected and the VSR was repaired using a Dacron Patch. Post-surgery TTE showed successful LVA repair (Figure 4A) and resolution of previous VSR without residual interventricular shunt (Figure 4B). Our case demonstrated a rare concomitant occurrence of VSR and LVA secondary to silent inferior infarction. Given the high mortality, clinicians should be vigilant in their evaluation for post-MI mechanical complications (1). A multimodality approach can facilitate the diagnosis and management of these complications. Although surgical repair remains the definitive treatment for VSR and selectively indicated in certain LVA cases, the optimal timing should be considered in an individualized fashion (1).

Author contributions:

Author 1:

1. Have made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; and

2. Been involved in drafting the manuscript or revising it critically for important intellectual content; and

3. Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; and

4. Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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3. Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; and

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4. Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References:

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Figure 1: Transthoracic echocardiogram demonstrating Ventricular Septal Aneurysm and Defect

(A) Left ventricle short axis view showing an inferobasal septal left ventricular aneurysm (circled in black).

(B) Modified apical view showing a ventricular septal defect from the base to mid inferoseptum with left to right shunt (black arrow).

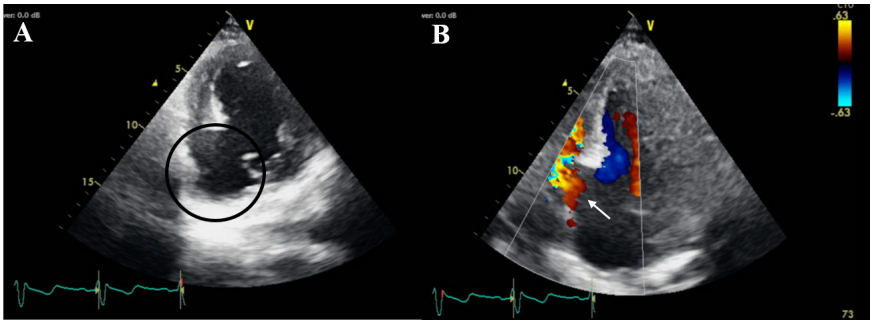

Figure 2: Cardiac Magnetic Resonance Imaging showing Left Ventricular Septal Defect and Aneurysm.

(A) Cardiac magnetic resonance imaging (MRI) coronal view showing the left ventricular (LV) inferobasal septal aneurysm (outlined by the white circle).

(B) Cardiac MRI sagittal view showing the inferobasal septal defect (black arrow) with the interventricular connection between the left ventricle (LV) and the right ventricle (RV).

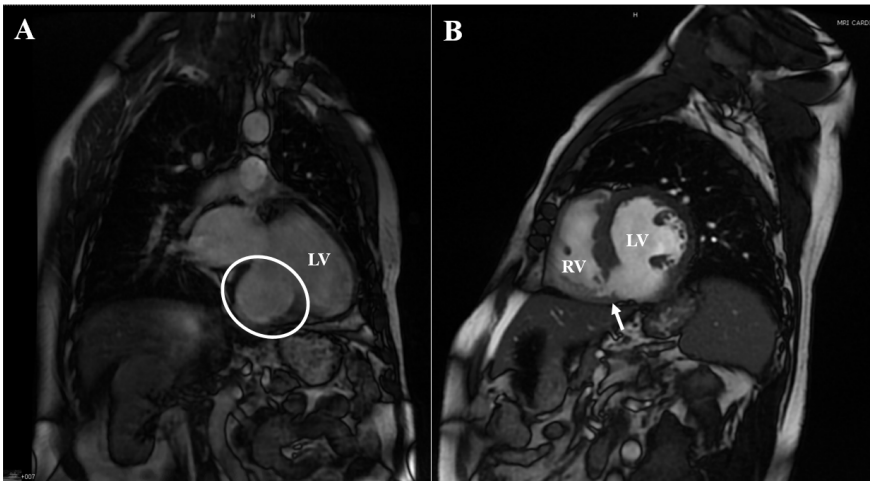

Figure 3: Coronary angiogram

(A) The proximal right coronary artery is 90% occluded (arrow).

(B). Proximal left main coronary artery has a 50% focal napkin ring lesion (arrow)

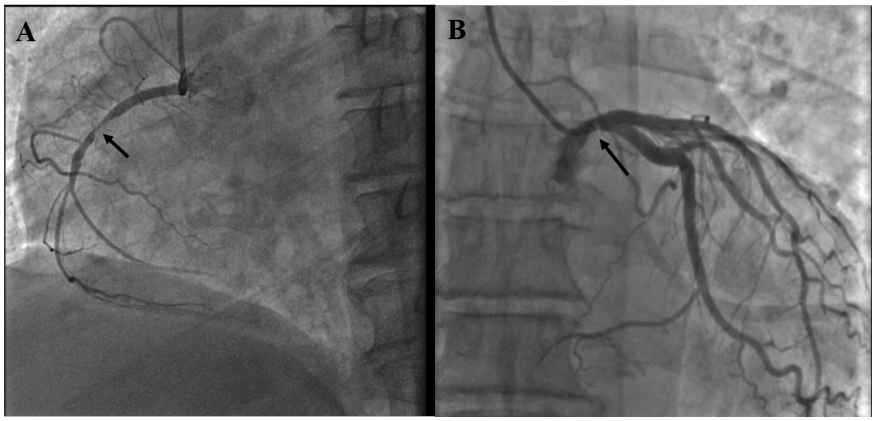

Figure 4: Post-VSR and LVA repair TTE

(A) Previously found inferobasal LVA is no longer visualized.

(B) No interventricular connection or residual shunt between LV and RV is visualized with color Doppler.