Acute Myocardial Infarction in a Young Female: Ball Valve Thrombus and Coronary Embolism in Rheumatic Heart Disease

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ABSTRACT

Acute coronary syndrome in a young patient should prompt a search for non-atherosclerotic causes too. This case demonstrates the classical finding of ball valve thrombus in a young female with rheumatic mitral valve stenosis and atrial fibrillation who presented with an acute inferior wall myocardial infarction due to coronary embolism.

Keywords: Ball valve thrombus, Coronary embolism

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CASE SCENARIO

A 44-year-old lady presented with a history of breathlessness and chest pain of one-day duration. Based on clinical examination and electrocardiogram (ECG), a diagnosis of atrial fibrillation (AF) with fast ventricular rate and pulmonary edema was made by the emergency medicine physician and the patient was admitted immediately to the cardiac intensive care unit (ICU) after a bolus dose of intravenous loop diuretic **(Figure 1).**

A bedside echocardiogram done in the ICU showed rheumatic valvular heart disease, with significant mitral stenosis (MS) along with the striking finding of a large, mobile ball valve thrombus floating inside a grossly dilated left atrium **(Figure 2,3).**

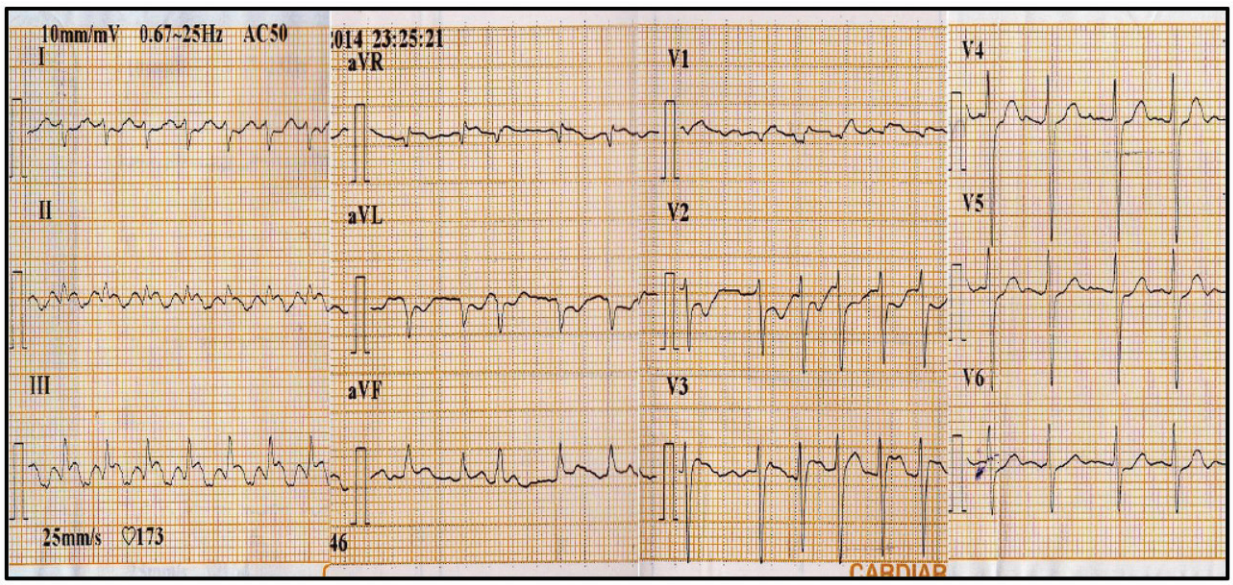

Figure 1. **ECG – showing atrial fibrillation (AF) and subtle ST segment elevation in inferior leads II, III, aVF with mild reciprocal ST depression in leads I and aVL**

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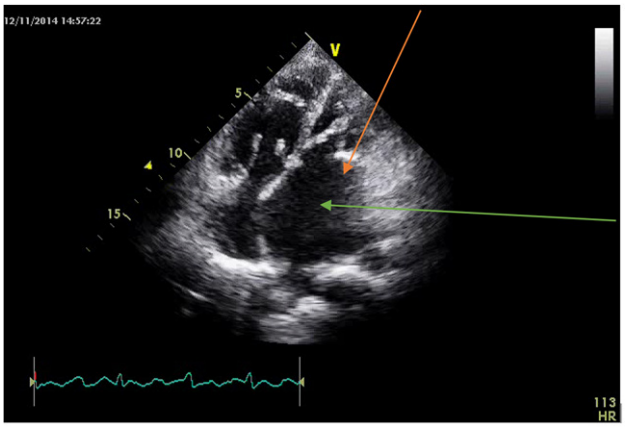

Figure 2. **Echocardiogram image 1 - showing thickened mitral valve leaflets (orange arrow) suggestive of rheumatic heart disease, grossly dilated left atrium(green arrow)**

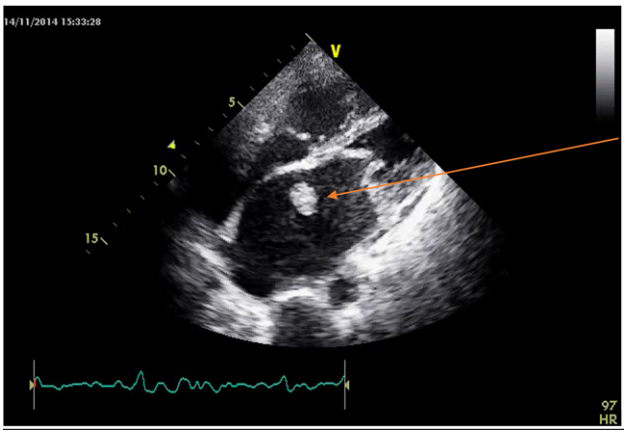

Figure 2. **Echocardiogram image 2 – showing a large spherical ball of thrombus (orange arrow) floating freely inside the grossly dilated left atrium**

The presence of chest pain in addition to dyspnea prompted a closer review of the ECG which revealed subtle ST segment elevation in leads II, III and aVF, along with minor reciprocal ST depression in leads I and aVL **(Figure 1).** In the setting of the chest pain, rheumatic mitral stenosis, ball valve thrombus on echo, atrial fibrillation along with ischemic changes on the ECG, an additional diagnosis of acute coronary syndrome (ACS) - acute inferior wall myocardial infarction due to coronary embolism was made.

After clinical stabilization, the patient was taken up for an emergency coronary angiogram on the same day which confirmed the diagnosis. A thrombotic occlusion of the right coronary artery (RCA) was identified and the patient underwent successful coronary angioplasty and reperfusion through thrombus aspiration without stenting. After the Heart Team discussion, the patient was subsequently planned for elective mitral valve replacement surgery along with surgical removal of the left atrial thrombus.

DISCUSSION

Rheumatic valvular heart disease continues to be prevalent in India even though new cases of acute rheumatic fever have significantly come down. Rheumatic mitral stenosis (MS) is a classical manifestation and happens to be more frequent among the female sex. Ball valve thrombus is a well-described but rare and special accompaniment of severe MS, especially in the setting of atrial fibrillation (AF). It is a spherically shaped free-floating thrombus or clot inside the left atrium.[1] Both the severity of MS and the AF contributes to the gross LA dilatation seen in these patients. Even though left atrial ball valve thrombus is classically seen only in the setting of mitral valve disease (native or prosthetic valve disease), rarely it can occur in the setting of restrictive cardiomyopathy and AF.[2]

The clinical presentation of ball valve thrombus can vary from asymptomatic cases incidentally detected on echocardiography to more dramatic presentations like acute pulmonary edema, hemodynamic compromise with cardiac arrest, syncope, systemic embolism (stroke or peripheral arterial) or less commonly as acute myocardial infarction related to coronary embolism.[3]

Apart from ball valve thrombus in the setting of MS, coronary embolism may also be seen in the setting of AF, infective endocarditis, left atrial myxoma, mitral/aortic prosthetic valve thrombosis, atrial/ventricular mural thrombus, pulmonary vein thrombosis or patent foramen ovale (PFO) with a paradoxical embolism.[4]

Lessons from the case

1. Acute myocardial infarction in a young patient (especially a female) should prompt a diligent search for non-atherosclerotic causes.
2. As always, a meticulous symptom analysis is crucial in making the right and complete diagnosis.
3. Coronary embolism should be suspected if a patient with rheumatic heart disease presents with an ACS (due to a ball valve thrombus, atrial fibrillation, or both).
4. Echocardiography must be performed if possible before interventional management of ACS.

END NOTE

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