

Post-infarction revelation of the inflammatory bicuspid aortic cusp perforation to the intraventricular septum pseudoaneurysm cavity

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A patient with a diagnosed bicuspid aortic valve, mild aortic regurgitation was hospitalized in 2014 with symptoms of chronic heart failure (CHF; New York Heart Association [NYHA] class II), multiple unexplained ventricular and supraventricular arrhythmias, episodes of supraventricular tachycardia, paroxysmal atrial fibrillation, and preserved ejection fraction (EF; 55%). Coronary angiography showed nonsignificant atherosclerosis. In 2015, he was admitted with CHF symptoms (NYHA III) and multiple supraventricular arrhythmias. Echocardiography (ECHO) showed global left ventricular (LV) hypokinesis, reduced EF (40%), and no signs of aortic valve and interventricular septum (IVS) distortion. Until then, the cardiac inflammatory process had not been established.

Six years later (2021), he was admitted to the hospital with a non-ST-segment elevation myocardial infarction (NSTEMI). Admission ECHO revealed LV enlargement (63 mm), segmental contractility abnormalities (EF, 45%), bicuspid aortic valve with mild systolic gradient, and moderate regurgitation. Additionally, ECHO showed a cavity (28 × 18 mm) with diastole filling and systole emptying in the basal part of the IVS (Figure 1A). Coronary angiography was postponed until urgent cardiac magnetic resonance (CMR) was performed. CMR confirmed segmental akinesia in the basal segment of the lateral wall and inferoseptal segment in the location of the described cavity in the LV outflow tract (Figure 1B, C). The IVS cavity communicated with the lumen of the LV, filled during diastole, and emptied partially in systole. Addition-

ally, a perforation in the non-coronary cusp communicating with this cavity was revealed. Performed coronary angiography showed critical left main coronary artery (LM) stenosis on bifurcation with the left anterior descending artery (LAD) and left circumflex coronary artery ostium along with subtotal stenosis of the LAD on bifurcation with a large diagonal branch (Figure 1D). Due to advanced coronary artery disease and the bicuspid aortic cusp perforation to the cavity in the IVS, the patient was qualified for cardiac surgery (Figure 1E, F). Successful aortic valve replacement with mechanical AVR 21 ONX prosthesis, IVS cavity closure, and coronary artery bypass grafts with left internal mammary artery to left anterior descending artery (LIMA-LAD), Saphenous vein bypass graft to the diagonal artery (SVBG-Diag) were performed. Histopathology of the aortic leaflet revealed a chronic atypical inflammatory process, without bacterial vegetations.

In this myocardial infarction (MI) patient without an active inflammatory process, ECHO raised suspicion of an IVS rupture within the ischemic zone with the formation of a pseudoaneurysm. Cardiac pseudoaneurysms are a rare complication of MI or bacterial endocarditis [1] [2]. Further ECHO examinations and CMR raised suspicion of the inflammatory damage to the aortic leaflet with a reverse jet towards the injured IVS. The atypical inflammatory process without bacterial vegetation was confirmed in cardiac surgery and histopathology.

Nevertheless, the patient had not been previously diagnosed with cardiac inflammatory disease, and numerous recurrent

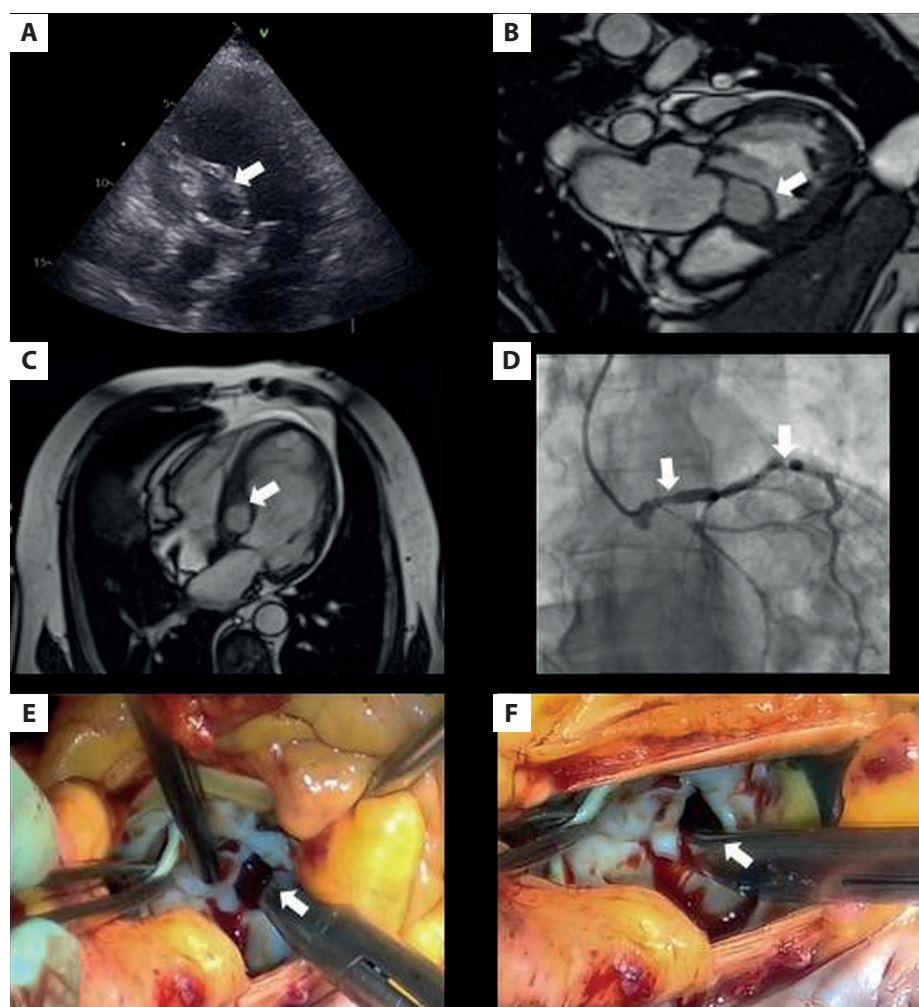


Figure 1. **A.** Transthoracic echocardiography — a cavity in the basal part of the interventricular septum (arrow). **B.** Cardiac magnetic resonance (CMR) — a cavity in the basal part of the interventricular septum (arrow). **C.** CMR — a cavity in the basal part of the interventricular septum (arrow). **D.** Coronary angiography — a caudal view of left main coronary artery stenosis on bifurcation with the left anterior descending artery and left circumflex coronary artery ostium (Medina 1-1-1) (arrow); subtotal stenosis of the left anterior descending artery on bifurcation with a large diagonal branch (Medina 1-1-1) (arrow). **E.** Intraoperative view of the intraventricular septum pseudoaneurysm cavity (arrow). **F.** Intraoperative view of the intraventricular septum pseudoaneurysm cavity (arrow)

arrhythmias could reflect the subclinical inflammatory process. Because coronary angiography demonstrated critical LM bifurcation stenosis with deep ischemia causing NSTEMI, even after surgery, it could not be ruled out whether the IVS post-inflammatory cavity contacted the LV outflow tract before MI or whether this cavity perforated to the LV lumen in the course of post-infarction tissue necrosis.

Imaging is crucial for establishing a diagnosis and guiding appropriate treatment, CMR and tomography are the basis of anatomical characterization and differentiation from other diseases, such as a true LV aneurysm [3–5]. This case presents a situation where pre-coronary angiography ECHO in acute MI influenced the decision process.

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