

Left Ventricular Free-Floating Ball Thrombus Complicating Aortic Valve Stenosis

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A 67-year-old man was referred for evaluation of near-syncopal attacks and left hemiparesis. Echocardiography revealed moderate to severe calcific aortic valve stenosis and a free-floating thrombus. Left ventricular (LV) systolic function was normal. No regional wall motion abnormality was detected in the left ventricle. On serial echocardiography, the thrombus began to fragment. Urgent surgery was commenced, during which the mass was seen to be a free-floating ball thrombus in the LV cavity, in addition to apical fibrin bands mimicking abnormal trabeculation. The thrombus was removed and aortic

Left ventricular (LV) free-floating thrombus can embolize at any moment and require emergency treatment, notably because of a high mortality rate of systemic embolic events or acute hemodynamic decompensation caused by LV outflow tract obstruction. To the authors' knowledge, this is the first report of LV free-floating thrombus concomitant with isolated calcific aortic valve stenosis.

Case report

A 67-year-old man with no previous cardiac history was referred for evaluation of near-syncopal attacks and left hemiparesis. The initial physical examination was notable for a 3/6 systolic ejection murmur in the aortic region. The lungs were clear to auscultation, and the patient had left hemiparesis. Electrocardiography revealed the presence of sinus tachycardia and left bundle branch block, but chest radiography was unremarkable. Routine hematological and biochemical parameters were normal. Transthoracic echocardiography (TTE) performed at the bed-side revealed moder-

ate to severe calcific aortic valve stenosis (the aortic valve area, assessed by the continuity equation, was estimated at 1.1 cm²), and a 2×1.5 cm free-floating thrombus without pedicle was identified in the left ventricular (LV) apex with a LV structure which mimicked abnormal trabeculations (Fig. 1). The LV systolic function was normal, and no regional wall motion abnormality was detected in the left ventricle. During early serial TTE, the thrombus began to fragment (Fig. 2). In view of this high embolic risk, the patient was treated immediately with heparin, and urgent surgery was carried out. During surgery, the mass was found to be a free-floating ball thrombus in the LV cavity, in addition to apical fibrin bands mimicking abnormal trabeculation. The thrombus was removed and aortic prosthetic valve replacement performed. No coagulation abnormalities were detected, and the patient made a full recovery.

The Journal of Heart Valve Disease 2004;13:197-199

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Discussion

Left ventricular thrombi with a protruding appearance are at increased risk for systemic embolization (1,2), and occur typically in the ventricular apex. Reports of LV free-floating thrombus are rare (3,4). In the first of these reports the condition was fatal, with free-floating ball thrombi in both the left atrium and ventricle being detected in a patient with severe mitral

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stenosis and aortic stenosis (3); in this case the mitral stenosis may have been the source of both thrombi. The second report was a recurrence of the pedunculated free LV thrombus that occurred after myocarditis and in the absence of LV dyskinesia and dilatation (4). This occurrence of thrombus may be explained as a residual endocardial damage of the left ventricle after myocarditis. Unlike these two cases, LV free-floating thrombus concomitant with isolated calcific aortic valve stenosis has not been reported previously. As a consequence of the mechanical obstruction of blood flow, acquired von Willebrand syndrome may occur in aortic valve stenosis, and the hemostatic abnormalities and bleeding may be symptoms of severe stenosis (5). In contrast to these reported hemostatic abnormalities, the present patient demonstrated different hemostatic abnormalities related to aortic stenosis, namely LV thrombus in the absence of systolic dysfunction and dilatation of the left ventricle without any coagulation abnormalities. The presence of LV thrombus may have diagnostic and therapeutic implications in systemic thromboembolism. A diagnosis of left heart thrombi with TTE may permit immediate treatment to be commenced, without any need for additional investigations, as these thrombi present with a distinctive appearance on TTE. However, free-floating thrombus can embolize at any moment and lead to a need for emergency treatment. This is especially likely in view of the high mortality rate due to high risks of systemic embolic events, or to acute hemodynamic decompensation as a result of obstruction of the LV outflow tract. Thus, LV free-floating thrombus represents an extreme therapeutic emergency, and any delay in beginning

treatment may prove fatal.

The present report relates to an older patient in whom TTE demonstrated LV free-floating thrombus with fibrin bands complicating calcific aortic valve stenosis, and which resulted in near-syncopal episodes and hemiparesis. The characterization of thrombi may be used to predict the risk of embolism, which is higher for subacute and mobile, fragmented clots than for organized and immobile thrombi. Thrombus formation in the left ventricle is primarily due to stasis of blood which causes activation of the coagulation system. In acute myocardial infarction, the formation of LV thrombus triggered by diastolic dysfunction has been reported (6). Aortic stenosis almost always associated with diastolic dysfunction, and this may explain the evolution of thrombus in aortic valve stenosis in the present patient, in the absence of blood stasis. Another explanation for the presence of LV free-floating thrombus concomitant with aortic stenosis may be as follows. Because of myocardial fibrosis, an abnormal myocardial collagen content is common in pathological cardiac hypertrophy, including that mediated by pressure overload such as aortic valve stenosis, and predisposes the patient to left ventricular thrombus formation (7).

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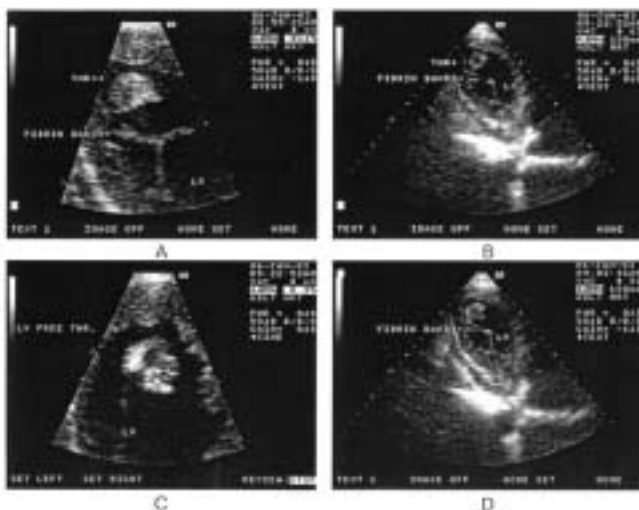


Figure 1: Left ventricular free-floating thrombus with fibrin bands from modified apical two-chamber views (A and C are magnified images). THR: Thrombus; LV: Left ventricle.

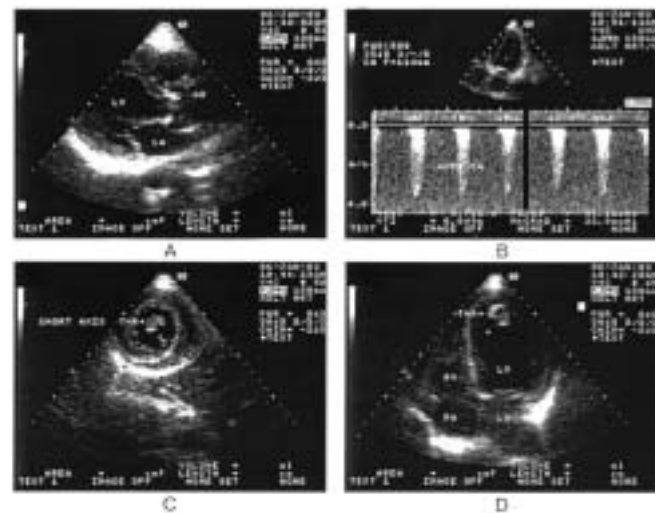


Figure 2: A) Calcific aortic valve stenosis shown from parasternal long-axis view. B) Aortic valve stenosis by continuous Doppler, from apical five-chamber view. C) Parasternal short-axis view. Note the free floating ball thrombus. D) Free floating ball thrombus shown from apical four-chamber view. Cleavage of the thrombus was observed during the echocardiographic examination. AO: Aorta; THR: Thrombus; LV: Left ventricle; LA: Left atrium; RA: Right atrium; RV: Right ventricle.

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