

FREE-FLOATING LEFT ATRIAL BALL THROMBUS

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A case of large ball thrombus in a patient with rheumatic mixed mitral valve disease is described. Mitral valve replacement and thrombectomy was successfully performed.

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Free floating ball thrombus of the heart is a rare disorder with potentially catastrophic consequences that usually involve the left atrium, particularly in association with mitral stenosis and atrial fibrillation (1). The term of "ball thrombus" was first applied by Wood in 1814, who has described autopsy findings in a 15-year-old girl with rheumatic mitral stenosis and syncope. Left atrial ball thrombus has a risk for lethal complications, and a high incidence of systemic embolism or circulatory collapse due to mitral valve obstruction even during anticoagulation therapy. The results of anticoagulation and thrombolysis are unpredictable and potentially as harmful as no treatment at all. Thus, early diagnosis and prompt surgical removal of free thrombus, often in conjunction with mitral valve repair or replacement, are mandatory. This report is about a large ball thrombus floating in the left atrium in a case with rheumatic mitral valve disease.

CASE REPORT

A 47-year-old woman was admitted to the hospital because of complaints of dyspnea and palpitation that were present since 4 years. She has experienced neither embolism nor syncope. Physical examination disclosed rheumatic mixed mitral valve disease. Her clinical signs did not indicate a left atrial ball thrombus. The ECG revealed atrial fibrillation with an average ventricular rate of 90 beats/min. She had never received an anticoagulation regimen before her administration to the hospital.

A transthoracic echocardiographic examination revealed the presence of mitral stenosis and regurgitation with left atrial enlargement (62 mm) and pulmonary hypertension. Mitral valve area was measured to be 1,1 cm² and mitral regurgitation was found to be moderate. The echo characteristics of a ball thrombus in the left atrium was not examined in M-mode in this patient suffering from mixed mitral disease (mitral steno-insufficiency). This finding was probably due to the absence of a pedunculus; thus the mass was relatively free to move in the left atrium. Transesophageal echocardiogram disclosed the existence of a free-floating thrombus in the left atrium that has not been detected on transthoracic echocardiogram. Coronary angiogram was normal.

The surgical procedure including the removal of the thrombus, mitral valve replacement (# 27 Medtronic-Hall) and ligation of the left atrial appendage was performed under cardiopulmonary bypass with moderate hypothermia. An ovoid, smooth-surfaced (42x32x20 mm) free-floating thrombus was removed (Figure 1). Its cut surface showed a laminated structure.

In the early postoperative period, enoxaparine was given subcutaneously and converted to

warfarin (international normalized ratio [INR] 2.5 to 3.5) and aspirin 300 mg/day was given on the 3rd postoperative day. Postoperative course was uneventful. Transthoracic echocardiography (TTE) confirmed normal prosthetic valve (PV) before discharge.

Follow-up echocardiography no longer showed significant thrombosis either at the mitral mechanical prosthesis or in the left atrium after replacement. The patient, with warfarin and aspirin therapy, has been well at follow-up two years after discharge.

DISCUSSION

The formation of a free-floating ball thrombus in the left atrium is uncommon. The estimated autopsy incidence of free-floating ball thrombus is about 1 in 2000 to 3000 (1). Occasionally a wall-adherent thrombus can detach from the atrial wall, float freely and result in a ball thrombus. Left atrial ball thrombi are surgically demonstrated to be spherical or ovoid in configuration. To receive the designation, a free ball thrombus must be larger than the orifice of the valve, and must have a smooth surface with no signs of attachment to the atrial wall (1).

The clinical diagnosis is difficult because of



Figure 1. The mitral valve and ball thrombus after being removed from the left atrium.

the rarity of this phenomenon, but one should think of the emboli from the left atrium, when atrial fibrillation and mitral disease are diagnosed. It is usually a complication of long-standing rheumatic mitral stenosis. The diagnosis of ball thrombus is suspected clinically when there are auscultatory changes in the intensity of the murmur of mitral stenosis. Symptomatic presentation is variable: fragmentation of the thrombus followed by peripheral embolism will produce ischemia or infarction of the myocardium, brain, viscera, or extremities; random, intermittent, partial, or total occlusion of the mitral valve orifice may cause syncope, pulmonary congestion, and occasionally sudden death in patients (2). One should also consider the possibility of a myxoma with these symptoms. The sudden death was reported in some cases due to the incarceration of ball thrombus in the mitral orifice (hole-in-one thrombus) (3, 4). Embolic and obstructive phenomena may also occur concomitantly (5). In contrast, ball thrombus can also be asymptomatic. Vitale and associates (6) described a case with a large free-floating left atrial ball thrombus secondary to severe mitral stenosis, in whom the peculiar symptoms and complications of a ball thrombus were absent. The patient's only reported symptom before the episode was mild dyspnea, which was attributed to mitral stenosis.

Two-dimensional echocardiography is the gold standard for identifying ball thrombus. Transthoracic study sometimes fails to demonstrate the ball nature of the thrombus in the left atrium. Multiple views of the left atrium are required, because there may be no single plane in which the thrombus is constantly imaged. It is important to examine left atrial ball thrombus by transesophageal echocardiography. Transesophageal echocardiogram is also useful for intraoperative management. Miyamoto and associates (7) described the effect of body position on a free ball thrombus as observed by transesophageal echocardiography. Embolism of a left atrial ball thrombus during transesophageal echocardiography was reported (8). Cardiac catheterization provides assessment of coronary artery status when needed.

Given the unpredictability of other modalities for treating left atrial ball thrombus and the

obvious inevitability of eventual catastrophic complications, prompt surgical removal is the therapy of choice. During the operation, head down position is recommended to prevent ball thrombus from being compressed into the mitral valve orifice; and immediate cardiopulmonary bypass was performed by ascending aortic, superior and inferior venous cannulation placed through midsternal splitting incision.

Numerous reports have appeared using diagnostic methods such as echocardiography and cardiac catheterization. Mukai reported a case (9) with two left atrial ball thrombi with mitral stenosis and severe tricuspid regurgitation. Salim presented a left atrial ball thrombus (10) in a 20-year-old woman with complex congenital heart disease including congenital mitral valve stenosis with an intact atrial septum.

Free ball thrombi of the left atrium are usually observed with mitral valve disease. Left atrial ball thrombus without mitral stenosis is a rare condition. In the literature, the unusual cases of left atrial ball thrombus without mitral valve disease were reported (11-13). A left atrial free-ball thrombus in the absence of mitral pathology was reported in a patient with dilated cardiomyopathy (14). Shimada reported a left atrial ball thrombus in a SLE patient without an organic mitral lesion (15).

Left atrial ball thrombus may occur even during anticoagulation therapy (16-18). Chow (5) presented a free-floating ball thrombus in the left atrium after mitral valve replacement with mechanical prosthesis complicated with embolism on the 5th postoperative day. Iida reported a case of left atrial ball thrombus in a 16 years old patient after mitral valve replacement (19).

Our case is of particular interest for the rarity of occurrence with mitral regurgitation and asymptomatic progression in spite of its large size.

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