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PINBALL PARTY IN WOMEN HEART: ABOUT LEFT ATRIAL THROMBUS BALL

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ABSTRACT

Free floating thrombus ball in the left atrium is rare. It is a clinical problem with potentially catastrophic consequences. We report 2 original observations of well documented left atrial free floating thrombus ball: A case of 24 year-old woman with mitral stenosis in sinusal rhythm and a second case of 101year-old hypertensive woman with chronic atrial fibrillation.

KEYWORDS free floating ball thrombus, mitral stenosis, atrial fibrillation.

INTRODUCTION

Free floating left atrial ball thrombus is an extremely rare and serious disorder, which occurs in the setting of large left atrium with low flow velocities. It is commonly the result of severe rheumatic mitral stenosis with atrial fibrillation.[1] Free floating thrombus ball is a recognized cause of stroke and left ventricular inflow obstruction.[2] Whilst oral anticoagulation therapy is used routinely in mitral stenosis with left atrial thrombosis, free floating ball require its prompt surgical removal.

Case 1

24 year old woman is referred to our hospital on an emergency basis with sever dyspnea. She had a history of rheumatic fever during childhood and a recent progressive shortness of breath.

Cardiac examination notes essentially a loud first heart sound, a diastolic rumble and systolic murmur of tricuspid regurgitation.

Electrocardiogram shows regular sinus rhythm, left atrial hypertrophy and right bundle branch block.

Transthoracic echocardiography revealed a severe mitral valve stenosis (mitral area= 0.6cm^2), moderate tricuspid regurgitation, severe pulmonary hypertension, and mild pericardic effusion.

Both atria were dilated (right atrium surface= 24cm^2; left atrium surface= 39cm^2).
Left atrium contains spontaneous echo contrast and a huge arronded mass measuring 39mmx 30mm. This mass floats freely with no attach in the left atrium **(Figure 1)**.

The mass reaches up to the mitral orifice, without prolapsing through (because of mitral stenosis). Then, it is repulsed by the mitral leaflets movement **(figure 2)**. The mass corresponds to a free floating thrombus ball.

Mitral valvular replacement with tricuspid plasty was performed and the left atrial mass removed. It is a rounded mass of 30 mm, with a smooth surface and a soft consistency **(Figure 3)**. Histological examination confirms the thrombotic nature of the mass.

Case 2

101 years old woman is treated for a stage 2 hypertension complicated by atrial fibrillation since several years, and compensated cirrhosis. Despite a high chads2-vasc score, and given the considerable hemorrhagic risk, anticoagulation was refused by the patient. Therefore an alternative treatment by combination "aspirine + clopidogrel" was performed.

She is admitted for subacute ischemia of the lower limb.

Transthoracic echocardiography revealed biatrial enlargement (right atrium area = 27cm^2; left atrium area = 44cm^2), moderate left ventricular hypertrophy and normal ejection fraction.
Left atrium contains a large, heart shaped mass, measuring 35mm x 27mm. This mass floats freely with no attach in the left atrium **(Figure 4)**.

The mass reaches up to the mitral orifice with intermittent prolapse through: "hole in one" . Then, it is repulsed by the mitral leaflets movement and the mitral regurgitation flow **(figure 4)**.

The mass clearly corresponds to a free floating thrombus ball. (no mass was detected in a transthoracic echocardiography realised 7 months before).

Because the high surgical risk, we decide to perform an intravenous heparin anticoagulation. An extensive stroke occurs 5days after thrombus diagnosis, and the patient died 3 weeks after.

DISCUSSION

Left atrial (LA) thrombus is very infrequently detected in the presence of sinus rhythm (SR). In this case, it is usually associated with additional cardiac pathology. In previous study, LA thrombus and SR was detected in ≈ 0.1% of >20.000 transthoracic echocardiography examinations performed over an 11-year period.[3] Enlarged LA endocardial damage with blood stasis are a common source of thrombus formation.

Enlargement of LA has been closely related to rheumatic mitral valve causing severe pressure and volume overload. Previous studies showed that chronic pressure in the LA is not the only cause of enlargement, but weakening of the LA wall by rheumatic pancarditis causing chronic inflammation and fibrosis is also implicated.

In the case 1, our patient had a severe mitral stenosis and enlarged LA in sinus rhythm, associated with a huge free floating thrombus. 17% of atrial thrombi are located in the LA appendage and only 2% of all extend to LA cavity.[4] and fill the lateral and superior wall. However, our patient had a free floating thrombus ball in the LA with no attaches.

It is important to mention that the mechanism of thrombus formation in our patient is infrequent. Patient with mitral stenosis have a significantly high level of fibrinopeptide A, thrombin-antithrombi III complex and Von Willebrand factor antigen in the LA. These biomechanical markers are responsible for the thrombosis regardless of the severity of mitral stenosis or size of left atrium.[5] This could be the major factor of thrombus formation in our patient. Or, probably thrombus was initially fixed, grows gradually and subsequently gets detached to be free floating inside left atrium.

LA thrombus ball is a rare condition that was first described by Wood on autopsy in 1814, in a 15 year old girl with mitral stenosis.[6]

In a non exhaustive review of literature on pubmed (research with the keyword "left atrial thrombus ball"), we find 112 papers, published between 1976 and 2014, reporting about 120 cases of left atrial free floating thrombus ball. In this review, we particularly note a clear female predominance: 98 female cases (81.7%) versus only 18 male cases (18.3%).

LA free floating thrombus is predominantly associated with mitral valve disease. LA free floating thrombus has also been reported in the presence of normal mitral valve.[7] but it is extremely rare. In this condition, it was associated with atrial fibrillation, hypertrophic cardiomyopathy or restrictive cardiomyopathy.

It's the case of the second observation patient. High chads2-vasc score was clearly predictive of thromboembolic event, contrasting with the anticoagulation difficulty in the elderly person. The "aspirine –clopidogrel" combination, as an alternative, doesn't protect our centenary patient.

The most common presentation of left atrial thrombus ball is peripheral embolization. Pulmonary vein and left ventricular inflow tract obstruction have also been reported.[2] Completely asymptomatic patient and fortuitous discovery of a thrombus ball is not impossible.[8]

Urgent surgery to remove the thrombus is generally required to avoid fatal risk of systemic embolization and/or left ventricular inflow obstruction.

In absence of mitral valve disease and only for high-risk patient, we can consider aggressive anticoagulation as treatment option for LA free floating thrombus ball.[9]

In the 1st case, we can paradoxically think that the severe mitral stenosis is a relative protective factor against fatal outcome of the free floating thrombus ball.[10] But emergency surgery has really saved our patient against catastrophic complications.
Unfortunately, in the 2nd case, without surgery evolution was fatal.

Figures

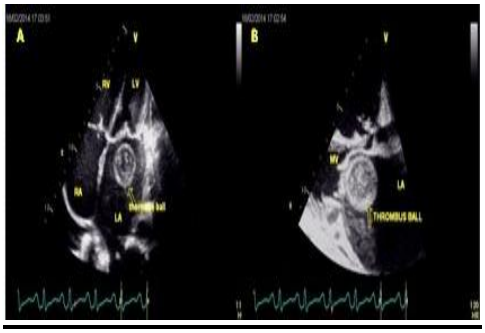

Figure 1: echocardiography, 4-chamber apical view (A) and long axe parasternal (B). left atrial free floating thrombus-ball.

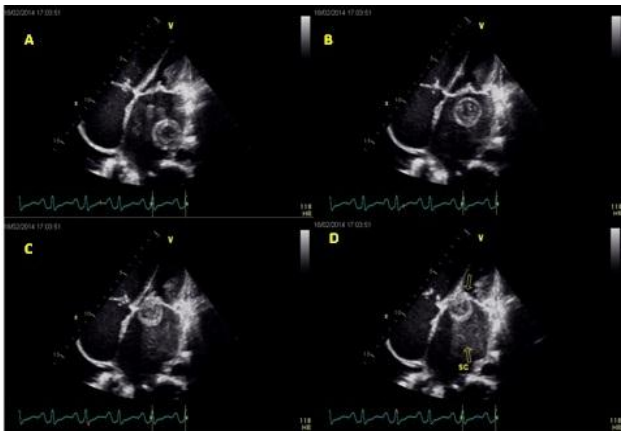

Figure 2: (A,B,C,D): aleotary movement of the thrombus in the left atrium.

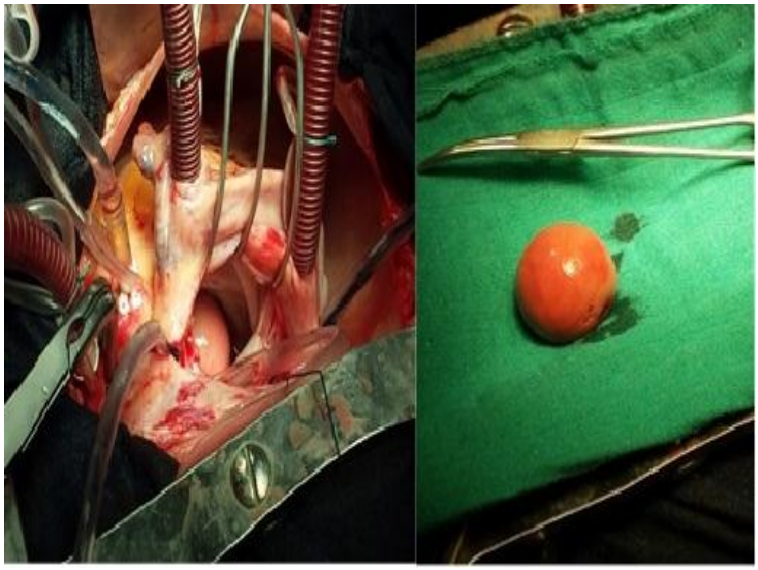

Figure 3: intraoperative view and extirpated thrombus ball.

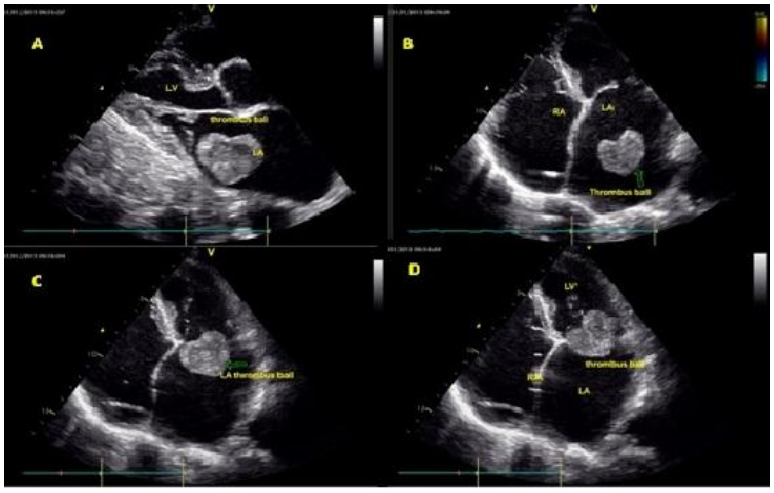

Figure 4: (A, B): Long axe parasternal (A) and 4-chamber apical view (B) showing "heart shaped" left atrial free floating thrombus-ball.
(C, D) Thrombus engaged in the mitral orifice: "Hole in one".

CONCLUSION

Left atrial free floating thrombus ball remains very rare. It's often associated with mitral stenosis even in sinus rhythm but all other atrial fibrillation conditions may lead to such complication. Female patient appear to be more exposed to thrombus ball formation. Prompt surgery remove of the thrombus is vital.

Conflict of interest: none

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