

Acute Thrombosis of Mechanical Mitral Valve Prosthesis Successfully Treated with Thrombolysis

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A 61-year-old female patient using a mechanical prosthesis for 11 years was admitted to the hospital with sudden dyspnea, pallor and atrial fibrillation. The diagnostic evaluation included transesophageal echocardiogram, which showed a significantly reduced motion of one of the leaflets of the mitral prosthesis and immobility of the other, in addition to a thickened structure compatible with a thrombus adherent to the valve. The patient was diagnosed with thrombosis of mechanical mitral valve prosthesis. Thrombolytic therapy (rtPA) was started successfully. The patient has been followed up for more than one year with a favorable outcome.

Introduction

Thanks to medical advances, the population has achieved a higher life expectancy. As regards heart valve diseases, repeat surgical interventions have become feasible, with increasingly frequent indications for mechanical valve prosthesis. Thrombosis is one of its most feared complications, with an incidence of up to 0.2-6% in left heart chambers, and up to 20% in tricuspid valve prosthesis¹. The main factor predisposing to thrombosis is an inadequate anticoagulation, which is observed in 82% of the cases¹⁻³. Surgical intervention has been the conventional treatment; however, morbidity and mortality may be as high as 69% in patients with NYHA functional class III and IV heart failure¹. The successful use of fibrinolytic agents in the treatment of thrombosis of Starr-Edwards prosthesis in the tricuspid position was first described by Luluaga et al⁴ in 1971. Currently, thrombolytic therapy has been documented as an effective alternative treatment, and is the first choice for right chambers³⁻⁶. However, thrombolysis remains a debatable treatment for aortic and mitral valve diseases due to the risk of embolic and hemorrhagic events and recurrences⁵. We report a case of thrombosis in mechanical mitral valve prosthesis successfully treated with thrombolysis.

Case Report

A 61-year-old female patient was admitted to the hospital with sudden dyspnea on minimum exertion, orthopnea,

Key words

Thrombosis/complications; fibrinolysis; heart valve prosthesis; thrombolytic therapy.

paroxysmal nocturnal dyspnea, asthenia, skin and mucous membrane pallor and diaphoresis.

Her past medical history included rheumatic mitral valve disease and two valve replacements: the first, with a biological prosthesis, and the second with a Carbomedics 27 metal prosthesis 11 years ago. The patient was diagnosed with large B-cell non-Hodgkin lymphoma 5 months ago, and started chemotherapy with the CHOP regimen (Cyclophosphamide, Adriamycin, Vincristine, and Prednisone). She was taking warfarin 5mg/day, which was replaced by enoxaparin 40mg/day three months prior to hospital admission due to a possible drug interaction with the chemotherapy drugs. She had been examined a few days prior to hospitalization and was totally asymptomatic.

At admission, her physical examination revealed a respiratory rate (RR) of 20 breaths per minute (bpm), irregular pulse with normal amplitude; heart rate of 100 beats per minute, blood pressure of 110/70 mmHg, mucous membrane pallor (2+/4+), and axillary temperature of 37°C. She was oriented to person, place, time, and situation and had no neurological deficits. Vesicular breath sounds were decreased at lung bases, with crackles in the lower two-thirds bilaterally. Irregular heart rhythm, accentuated P2, with no heart murmurs. She presented lower-extremity edema 1+/4+.

Chest radiograph (Figure 1) showed significant pulmonary congestion and bilateral pleural effusion. Electrocardiogram showed atrial fibrillation and absence of myocardial ischemia. Blood analysis revealed hemoglobin of 10.4 g/dL, potassium of 3.0 mEq/L, partial thromboplastin time of 30.0s (equal to control), prothrombin activity of 81.4% and INR of 1.22.

Transthoracic echocardiogram showed a severely enlarged left atrium (LA), ejection fraction of 61%, metal mitral valve prosthesis with an opening calculated at 1.7 cm², high transprosthetic diastolic gradient compatible with severe stenosis of the prosthetic mitral valve and moderate pulmonary hypertension.

In light of the echocardiographic evidence of probable thrombosis of the mitral valve prosthesis, full heparinization was started and a transesophageal echocardiogram was requested.

Transesophageal echocardiogram (Figure 2) showed a significantly reduced motion of one of the leaflets of the mitral valve prosthesis and immobility of the other, in addition to a thickened structure compatible with a thrombus adhered to the valve, increased LA/LV gradient (maximum: 31mmHg and mean: 17mmHg), with a valve area estimated at 0.55 cm², and systolic pulmonary artery pressure (SPAP) of 61mmHg.

The patient presented a significant deterioration of the respiratory function, with RR of 32bpm, ventilatory effort and arterial hypotension.

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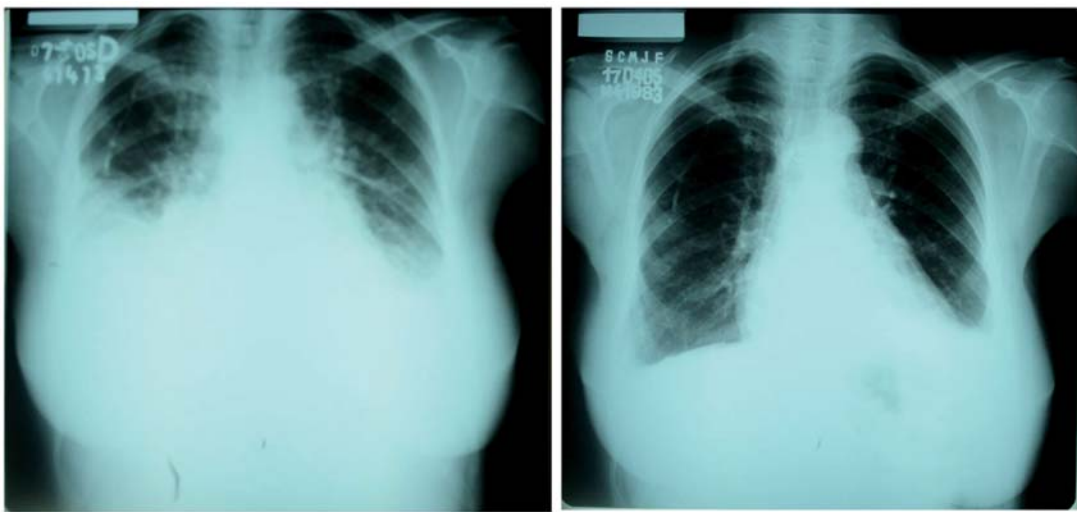


Fig. 1 - Postero-anterior view of chest radiograph. Left, prior to thrombolytic therapy, and right, after treatment.

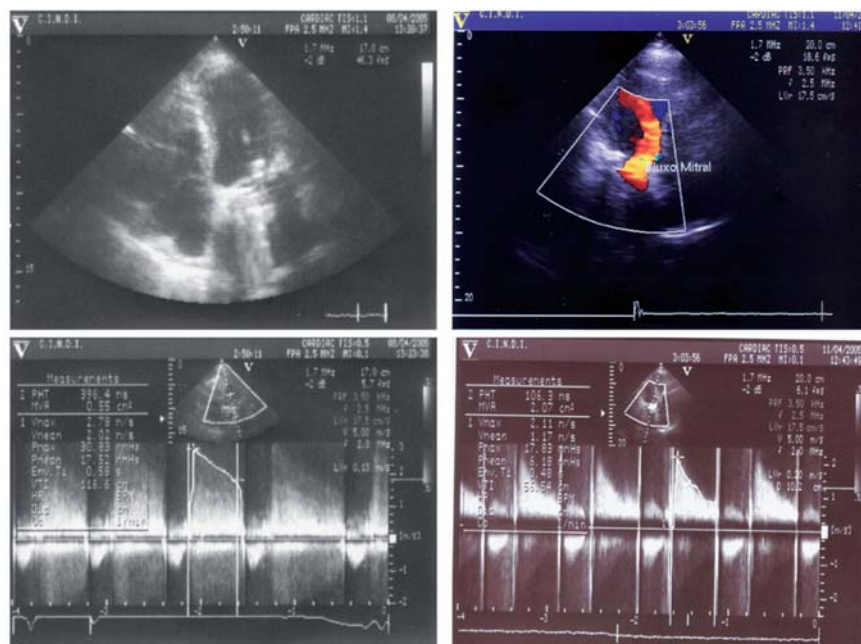


Fig. 2 - Transesophageal echocardiogram. Left, prior to thrombolytic therapy, and right, three days after treatment.

Thrombolytic therapy with rtPA 100mg IV in continuous infusion was started for two hours, after which full heparinization was resumed. Immediately after the end of the infusion, transthoracic echocardiogram already showed a decrease in the LA/LV gradient and SPAP. The patient progressed with a gradual improvement of her clinical status.

Transesophageal echocardiogram (Figure 2) performed three days after thrombolysis showed LA of 55mm, ejection fraction

of 76%, significantly reduced motion of one of the prosthesis leaflets with good motion of the other, maximum and mean LA/LV gradient of 17mmHg and 6mmHg, respectively; valve area estimated at 2.0 cm², SPAP estimated at 42mmHg, mild to moderate regurgitation in the mitral valve prosthesis, and moderate tricuspid regurgitation.

The patient has been followed up by a cardiologist and remains asymptomatic. She is taking a continuous

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oral anticoagulant agent and has not presented other thromboembolic events.

Echocardiogram performed in July, 2005 revealed a valve area of 3.7 cm², normal transvalvular gradient, SPAP of 39mmHg, and presence of spontaneous echo contrast in LA. Repeat echocardiogram was performed in March, 2006 and showed LA of 47mm, valve area of 2.94 cm², and SPAP of 34mmHg. Prosthesis with no signs of malfunction.

The non-Hodgkin lymphoma is in remission.

Discussion

Transesophageal echocardiogram is the best diagnostic tool to determine alterations in the mechanism of valve occlusion or the existence of thrombotic valve mass, mainly in the mitral position. It characterizes the type, size and location of the thrombus, thus helping to choose the most appropriate treatment⁵.

Thrombolytic therapy for prosthetic valve thrombosis (PVT) in left chambers is acceptable in critically ill patients, as in the case reported, who are at a high risk for a surgical intervention, or for those to whom surgery is contraindicated. The argument in favor of surgery in NYHA functional class I

or II patients is based on the low mortality in this group, as opposed to the high risk of embolism (12-17%) resulting from thrombolysis⁷. In a review of 200 articles on thrombolysis in PVT of left chambers, Lengyel et al found an initial success rate of 82%, with a thromboembolism rate of 12% and mortality rate of 10%⁸.

History of stroke and size of the thrombus as observed in the echocardiogram are independent predictors of complications related to thrombolysis. For each 1-cm² increase in the thrombus area, a 2.4-fold increase in the complication rate is observed. Patients presenting a thrombus with an area <0.8 cm² are successfully treated with thrombolysis without any significant adverse effects. The presence of a thrombus with an area > 0.8 cm² was predictive of complications with a 79% sensitivity and 68% specificity⁶.

Finally, Reddy et al⁹ suggested that thrombolysis may represent an important alternative in developing countries where cardiac surgery is not available, mainly in cases of extreme clinical severity.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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