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Case Report

Prosthetic heart valve thrombosis treated with low-dose slow-infusion fibrinolytic therapy

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ABSTRACT

Thromboembolic complications following heart valve replacements are rare but a severe situation. Cerebral infarcts, transient neurologic deficits, and cardiac arrest due to stuck prostheses are among possible critical outcomes. Diagnosis and appropriate treatment should be initiated rapidly. Echocardiography plays a significant role in diagnosis. Fibrinolysis, anticoagulation with heparin, and surgical intervention are considered among the treatment modalities. Medical treatment is conducted according to the valvular condition and the clinical status of the patient. In order to prevent probable complications and enhance the efficiency of fibrinolysis, different approaches have been established regarding the dose and rate of the medication. In the present case, we report a prosthetic heart valve thrombosis successfully treated with an administration of low-dose, slow-infusion fibrinolytic agent.
<**Learning objective:** Valvular thrombotic complications after heart valve replacement operations are associated with high morbidity and mortality. Efficient and urgent treatment is necessary. Considering the medical treatment, popular conviction about fibrinolytic therapy has depended on the principal of 'the more, the better' to date. However, complications of the fibrinolysis may aggravate hemorrhagic complications with high doses. In this case report, we aimed to state that low-dose slow-infusion thrombolysis is as efficient as higher doses with fewer complications.>

Introduction

Prosthetic valve thrombosis (PVT) is a rare and severe complication seen after heart valve replacement and is associated with high mortality and morbidity. It is seen in 0.3–1.3% of prosthetic valves in developed countries [1]. Early diagnosis and appropriate treatment should be promptly established [2]. Surgical approach, fibrinolysis, and heparin treatment are considered as treatments of choice according to the clinical status of the patient. The optimal treatment modality is widely affected by the valvular condition [1]. The presence of valvular obstruction or the location of the thrombotic valve (left or right sided) alter the treatment approach. Because, a left-sided obstructive valve thrombosis reveals different symptoms than a right-sided non-obstructive valve thrombosis, the treatment modality should be adjusted in accordance with the situation.

Fibrinolytic agents are among the treatment options for this complication [3]. However, studies on large series revealed high risk of emboli, major and minor bleeding, and high mortality rates [4–6]. The incidence of complications decreases with low dose and slow infusion of fibrinolytic therapy [7]. Here we report a case of PVT with mobile and obstructive thrombus diagnosed on a bioprosthetic mitral valve and the treatment with low-dose slow infusion of recombinant tissue-type plasminogen activator (rt-PA) without complications.

Case report

A 66-year-old female patient was admitted to our clinic with dyspnea and palpitations for one week. There were no signs of hemorrhage. Her history included bioprosthetic mitral valve replacement surgery five years previously due to rheumatic heart disease. She had not attended scheduled follow-up visits for two years. She has used acetylsalicylic acid irregularly and gave up for the past month. Warfarin was not prescribed by the surgeons probably because the implanted valve was a bioprosthesis. Physical examination revealed tachycardia and an attenuated first heart sound. Heart rate was 112/min, arterial blood pressure was 98/60 mmHg, body temperature was 36.2 °C, and the respiratory rate was 14/min. Pulmonary auscultation was normal.

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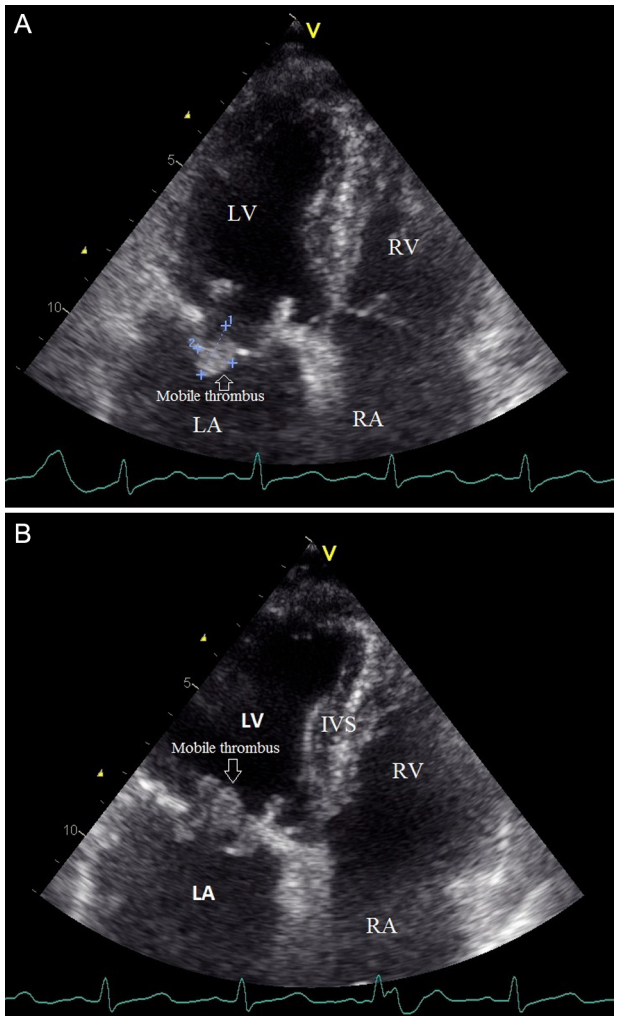

Fig. 1. On admission. Transthoracic echocardiography images showing the mobile thrombus. (A) Thrombus in atrium during systole. (B) Thrombus between prosthetic valvular leaflets during diastole. IVS, interventricular septum; LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

Electrocardiography revealed a sinus rhythm with a biphasic P wave in V_1 derivation. Its duration and amplitude were normal. Pulmonary conus was prominent and pulmonary vascular congestion was determined in posteroanterior chest X-ray. The white blood cell count was 7.91 c/μL (normal: 3.5–10.5 c/μL), and lymphocyte was 1.37 c/μL (normal: 0.99–5.17 c/μL). C-reactive protein was 2.98 mg/dl (normal: 0–0.5 mg/dl) and the erythrocyte sedimentation rate was measured as 27 mg/L. The hemoglobin, hematocrit, and platelet count was 9.9 g/dl, 28%, and 138,000 c/L respectively. International normalized ratio (INR) was 1.07 IU, prothrombin time was 13.7 s (normal: 10–15 s), and activated partial thromboplastin time (aPTT) was 13.2 s (normal: 24–37 s). Blood oxygen saturation was 94%. Other biochemical tests were entirely normal.

Transthoracic echocardiography (TTE) revealed a mobile thrombus attached to the left atrial face of the bioprosthetic mitral valve leaflet (Fig. 1A). The thrombus was moving from the left atrium through the bioprosthetic mitral valve leaflets during diastole (Fig. 1B). The longest diameter of the thrombus was 14.76 mm, the shortest diameter was 7.76 mm, and its area was 0.6 cm^2. Trans-bioprosthetic valvular diastolic maximum peak gradient was 12.5 mmHg. The maximum mean gradient was 8.5 mmHg while the thrombus was passing through the leaflets. In parasternal long-axis two-dimensional (2-D) TTE, the right ventricle diameter was 2.9 cm, and left ventricular diastolic diameter was 4.5 cm. Diastolic diameter of the interventricular septum was 0.8 cm, and the left ventricular posterior wall diastolic diameter was 0.8 cm. In apical four chamber 2-D TTE, the left atrial diameter was measured as 5.2 cm × 4.7 cm × 5.5 cm and the right atrial diameter was measured as 4.2 cm × 3.9 cm. Ascendant aorta and pulmonary artery diameter were calculated as 3.5 cm and 1.9 cm, respectively. Left ventricular ejection fraction was calculated as 62% with modified Simpson technique. There were no valvular, supravalvular, or infravalvular stenosis in the aortic and pulmonary artery. First-degree tricuspid insufficiency with a peak gradient of 35 mmHg was encountered. Pulmonary arterial pressure was 45 mmHg. Vital signs were stable.

Transesophageal echocardiography (TEE) was also performed to determine the strategy of treatment. TEE revealed a mobile thrombus attached to the atrial side of the bioprosthetic mitral valve (Fig. 2). There was no thrombus in left atrial appendage. With the diagnosis of mobile, obstructive bioprosthetic valve thrombosis, the patient was admitted to the coronary care unit. Acetylsalicylic acid (300 mg/day) and standard heparin

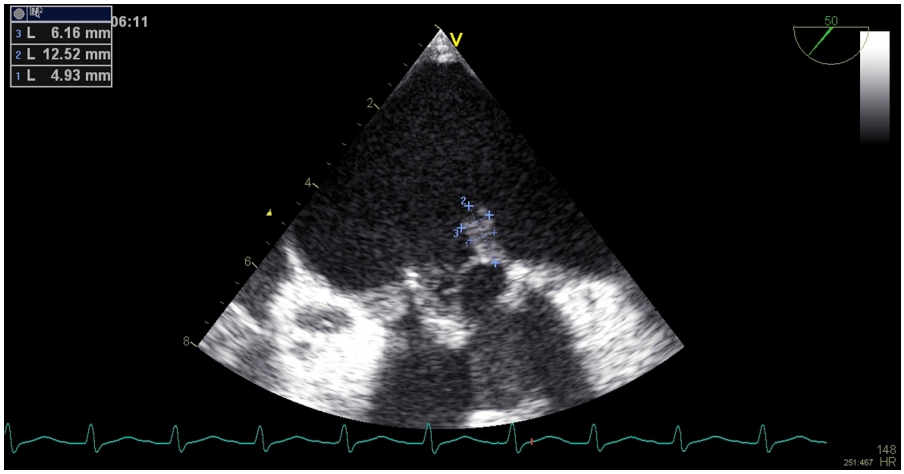

Fig. 2. On admission. Transesophageal echocardiography image showing the mobile thrombus attached to the atrial side of the bioprosthetic mitral valve, before the fibrinolytic treatment was administered.