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CASE REPORT

Tenecteplase in prosthetic mitral valve thrombosis

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Abstract In the few reported cases of prosthetic mitral valve thrombosis, where surgical intervention was considered as high risk, fibrinolytic therapy had proved life saving. The authors present clinical, laboratory, and imaging data from such a patient, with prosthetic mitral valve thrombosis and its successful management with tenecteplase. The use of tenecteplase as a viable fibrinolytic agent for the first time was justified, due to the lack of immunogenicity concerns compared to streptokinase.

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1. Introduction

Prosthetic valve thrombosis (PVT) is considered a serious complication following a native cardiac valve replacement. More common with metallic prosthesis, it may result in disabling peripheral thromboembolism and life-threatening deterioration in a patient's clinical status unless dealt with appropriately and promptly. We report our first experience with tenecteplase

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used to treat a critically ill patient, diagnosed with mitral PVT with cardiac decompensation.

2. Case report

A 72-year-old woman presented to our emergency room with complaint of progressively worsening shortness of breath (NYHA functional class III–IV) for one day. A prosthetic valve had been inserted in the mitral position four years ago. The patient was on a maintenance dose of warfarin, except for the past week. On physical examination, she exhibited frank pulmonary edema and muffled first heart sounds. The international normalized ratio (INR) was sub-therapeutic at 1.1 (target range is 2.5–3.5). Transthoracic echocardiogram showed a mass attached to the prosthetic mitral valve and a trans-valvular peak and mean gradient of 58 and 35 mm Hg, respectively (Fig. 1). Fluoroscopic examination confirmed that one of the leaflets was stuck in the closed position and the other had restricted movement. The patient being high risk for surgery, a bolus of 40 mg of tenecteplase was given intravenously. A few hours later, the patient had marked alleviation

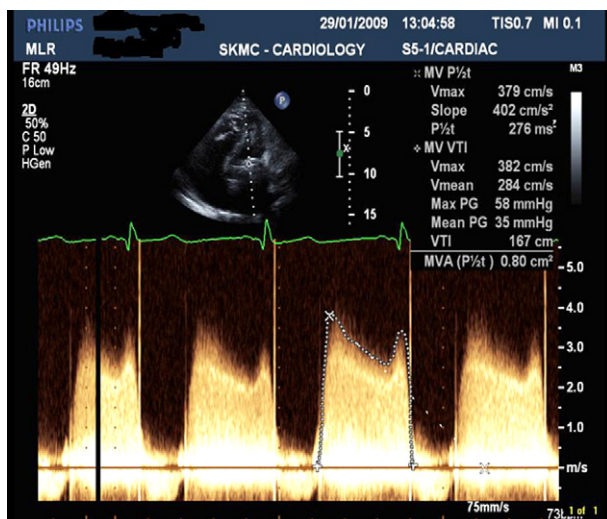


Figure 1 Continuous wave Doppler study showing a markedly elevated gradient across the prosthetic mitral valve before tenecteplase.

of her dyspnea and examination revealed the return of a metallic first heart sound. The trans-prosthetic peak and mean gradients improved significantly to 10 and 4 mm Hg, respectively (Fig. 2). Fluoroscopic examination confirmed normal movement of the prosthesis. There was no evidence of embolic complications or bleeding. The patient was discharged after attaining the recommended level of anticoagulation.

3. Discussion

A number of factors can contribute to thrombotic dysfunction of a prosthetic heart valve and inadequate anticoagulation can play a major role in this. In the current case, the INR was 1.1. Flow and pressure dynamics of different cardiac chambers and hemodynamic profile of a prosthetic valve are the other considerable factors. Pannus in-growth, restricting the prosthetic valve movement, should also be considered, because fibrino-

lytic therapy will be ineffective. Duration of symptoms, anticoagulation status, and qualitative and quantitative ultrasound intensity of the mass obstructing the valve may help differentiate pannus from thrombus (Barbeteas and Nagueh, 1998). Our patient's symptoms were of recent onset and the INR was not within the desired range.

Patients with a stuck artificial valve present with different signs and symptoms, depending on location and degree of obstruction. When this condition involves mitral prosthesis, such as in this case, patients usually complain of shortness of breath and have signs of heart failure. In some cases, the first presentation may be a systemic thromboembolic event.

Transthoracic echocardiography and fluoroscopy are two important diagnostic tools for patients with suspicion of PVT. Their concomitant use makes a correct diagnosis of PVT in 85% of patients with suspected valve obstruction. Sensitivity, specificity, and positive predictive value are 87%, 78%, 80%, and 75%, 64%, 57% for fluoroscopy and transthoracic echocardiography, respectively (Montorsi et al., 2000). In this case, we used the two techniques to make the diagnosis and to assess the response to the treatment.

Since no randomized controlled trial has been conducted comparing medical to surgical therapy for PVT, optimal treatment remains controversial. According to the American College of Cardiology/American Heart Association guidelines (ACC/AHA) (Smith, 2008), emergency surgery is reasonable for a thrombosed left-sided prosthetic valve and NYHA functional class III–IV symptoms (Class IIa, Level of Evidence: C) while fibrinolytic therapy may be considered as a first-line therapy for patients with a thrombosed left-sided prosthetic valve, NYHA functional class III–IV symptoms, and a small or a large clot burden (Class IIb, Level of Evidence: B and C, respectively), if surgery is high risk or not available. Furthermore, thrombolysis therapy as first choice in prosthetic heart valve thrombolysis has been supported in the current literature (Cáceres-Lóriga et al., 2006).

Considering our patient's high risk for emergency surgery (elderly, fragile lady with severe respiratory distress, marked tachycardia and NYHA Class IV heart failure), we opted for fibrinolytic strategy using tenecteplase. This agent has been used in patients with aortic PVT (Maegdefessel et al., 2008) and can act as a viable alternative to streptokinase (Bozugañ et al., 2001), for which immunogenicity issues can arise. The patient made an excellent recovery from her symptoms. Follow-up cardiac ultrasound and fluoroscopic examination confirmed the resolution of the thrombus, restoration of the prosthetic leaflets mobility and a significant improvement of trans-prosthetic Doppler parameters. There was no thromboembolic or hemorrhagic complication and the patient was discharged on warfarin, after achieving the desired INR.

This case affirms the use of fibrinolytic agent as a first-line therapy in high risk patients with mitral PVT and severe heart failure, matching ACC/AHA guidelines. Because of its remarkable response in this case, tenecteplase may be considered as a useful fibrinolytic agent in cases of mitral PVT.

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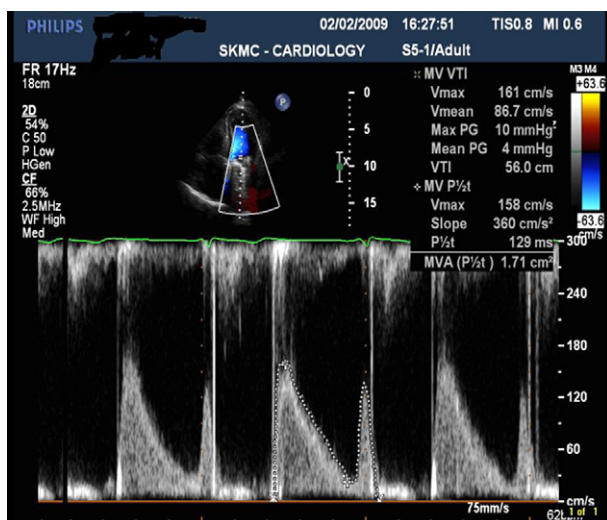


Figure 2 Continuous wave Doppler study showing a significant drop in the pressure gradient across the prosthetic mitral valve after tenecteplase.

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