

Mechanical Aortic Valve Thrombosis Successfully Treated with Intravenous Thrombolytic Therapy

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Introduction

A prosthetic heart valve has been used for humans since 1952. Prosthetic valve thrombosis (PVT) is one of the rare but serious complication with high morbidity and mortality. It has an incidence of 0.1% to almost 6% per patient-year of left-sided valves and up to 20% of tricuspid valves. The most common cause of thrombus formation is inadequate anticoagulation. In the past, patients were treated with valve surgery but recently treatment with thrombolytic therapy is found to have promising outcomes with minimal complications.

Case Report

A 42-year old female with a history of aortic valve replacement with a #21 St. Jude mechanical valve three years ago, on chronic anticoagulation with warfarin, came for follow up visits with cardiology one year ago. She was feeling well. International Normalized Ratio (INR) was found to be supratherapeutic as she has missed few doses of warfarin. Transthoracic echocardiogram (TTE) showed ejection fraction (EF) 60-65% with adequately functioning mechanical aortic valve with transaortic gradient of 22 mm of hg.

Recently, on follow up, she had mild substernal chest pain associated with shortness of breath for the last 2 months. Her vitals were stable, the physical exam was normal except 3/6 early peaking systolic ejection murmur at the right upper sternal border. Lab work showed INR of 2.8.

EKG showed normal sinus rhythm with borderline septal Q waves. TTE showed EF of 70% with severe prosthetic aortic stenosis likely pannus vs thrombus with transaortic gradients 47 and estimated PASP 42 mmHg which was confirmed by transesophageal echocardiogram.

She was admitted to the cardiology floor. Coronary computed tomography showed filling defects surrounding the mechanical aortic valve with limited visualization of the mobility of mechanical valves. Cardiac catheterization with fluoroscopy showed immobile anterior aortic leaflet. The patient was evaluated by a cardiothoracic surgeon for possible aortic valve repair or replacement and decision was made to treat with Alteplase (tPA).

Patient was transferred to the intensive care unit and was treated with intravenous Alteplase at the rate of 104.3ml/hr for 6 hours followed by intravenous unfractionated heparin drip for the next 18 hours. Repeat TTE showed a mean transaortic gradient of 36 mmHg[Figure.1]. She was treated with the second cycle of tPA with a repeat TTE showing improvement in valve movement and leaflet excursion with no change gradient[Figure.2].

Cardiac catheterization with fluoroscopy showed opening angle 48 degrees and closing angle 117 degrees, a marked improvement in the aortic valve opening compared to previous one. She was discharged home on subcutaneous lovenox for 10 days bridged with warfarin. One month later, she underwent TTE with findings as mentioned in the table.

Echocardiogram findings	Transaortic mean gradient (mmHg)	Estimated Peak aortic gradient (mmHg)
One year ago	22	29
Initial follow up visit	47	42
After 1 st cycle of tPA	36	66
After 2 nd cycle of tPA	36.52	69.56
1 month after discharge	33	69

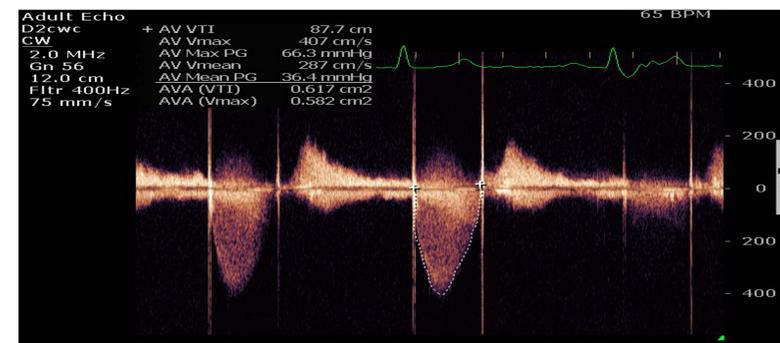


Figure.1: TEE finding after 1st cycle of tPA

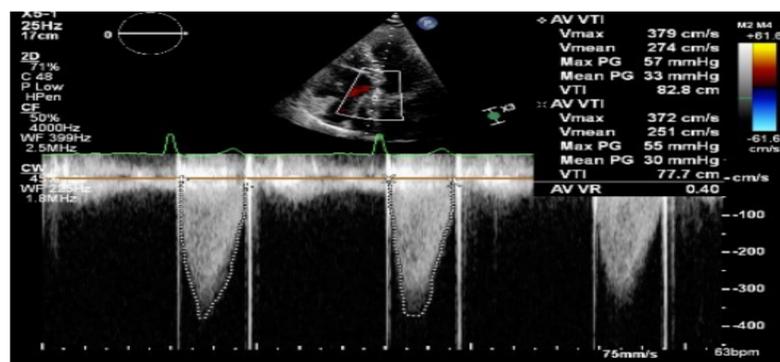


Figure. 2: TEE after second cycle of tPA



Figure.3: TEE comparing aortic valve before and after tPA treatment

Discussion

Patient with suspected mechanical aortic valve prosthesis should be evaluated by TTE and/or TEE. Cardiac CT can be considered to differentiate between pannus or thrombus[1]. Management of PVT remains controversial. PVT can be treated surgically or medically. Medically it can be treated with thrombolytic therapy but can be associated with cerebral embolization, bleeding and recurrent thrombosis of the prosthetic valve. Surgical treatment is associated with high risk of mortality[2,3].

Conclusions

Patients with prosthetic mechanical valve thrombosis can be treated with intravenous slow infusion thrombolysis therapy with tPA with serial monitoring of valve thrombosis, flow gradient via the serial transthoracic or transesophageal echocardiography. It is proven to have a high success rate and a low risk of complications with thrombolytic therapy.

Reference

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