

Repeat Reteplase Therapy in a Patient with Recurrent Prosthetic Tricuspid Valve Thrombosis after Trido Multiple Valve Replacement

Abstract

Prosthetic valve thrombosis (PVT) is a rare but life-threatening complication. It has an incidence of 6.1% in developing countries and 0.3%–1.3% in developed countries. The first-line treatment for the right-sided PVT is fibrinolytic therapy with streptokinase or recombinant tissue plasminogen activators, but there are limited cases that were treated with recombinant plasminogen activators. A 57-year-old female with a history of Trido valve surgery and persistent atrial fibrillation rhythm was hospitalized for recurrent tricuspid mechanical valve thrombosis multiple times. The patient was treated with fibrinolytics successfully three times. We report a rare case of recurrent tricuspid mechanical valve thrombosis that is treated with IV reteplase twice.

Keywords: Fibrinolysis, prosthetic valve thrombosis, reteplase, tricuspid prosthetic valve

Introduction

One of the most serious complications in mechanical heart valves is thrombus formation. There are two treatment choices for obstructive prosthetic valve thrombosis (PVT); surgery, and fibrinolytic therapy. The first choice of treatment for left-sided PVT is surgery. According to the new guidelines for the management of valvular heart disease, fibrinolytic therapy is considered the best choice of treatment in the right-sided PVT.^[1,2] The first-line medication for obstructive right-sided PVT is recombinant tissue plasminogen activators (rt-PA) or streptokinase, but recombinant plasminogen activators (r-PA), such as reteplase, can be an alternative in patients with PVT who cannot use streptokinase or r-TPA with any reasons.

Case History

A 57-year-old female, with underlying rheumatic heart disease and history of open mitral valve commissurotomy 22 years earlier, redo mitral valve replacement (27-mm Carbomedics), tricuspid valve repair (Kay technique) 1½-year earlier and persistent atrial fibrillation rhythm, presented with NYHA class III dyspnea. Her admission INR level was 2. Transthoracic

echocardiography (TTE) and transesophageal echocardiography revealed mechanical bileaflet MV prosthesis with large-sized (15 × 11 mm) fresh semi-mobile clot resulted in stuck one disc in closing position and severely increased transvalvular gradient (MPG: 11 mmHg, PHT: 158 ms), at least moderate aortic insufficiency and severe tricuspid regurgitation (TR). Fluoroscopy showed mechanical bileaflet MV prosthesis with fixed medial disc in closing position and acceptable lateral disc motion. The patient was a candidate for Mitral valve replacement or MV prosthesis thrombectomy due to obstructive MV prosthesis malfunction. The patient underwent Trido open heart surgery, including MV prosthesis thrombectomy, aortic valve replacement with 19-mm Carbomedics, and tricuspid valve replacement with 31 mm Carbomedics. After successful surgery, the patient was discharged on warfarin (target INR 3.5–4).

Two months after surgical intervention, a follow-up TTE showed well-functioning MV and AV prosthesis, but an increased transvalvular gradient (MPG: 7.2 mmHg, PHT: 140 ms) was detected on mechanical bileaflet TV prosthesis. She was asymptomatic and had an INR of 3.5. Fluoroscopy revealed mechanical bileaflet TV prosthesis with fixed lateral disc and mild decreased another disc motion. Regarding

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right-sided obstructive PVT and no contraindication for fibrinolytic therapy, the patient was given IV streptokinase 250,000 IU in 20 min that was followed by 100,000 IU/h IV streptokinase. After 12 h of treatment, transvalvular gradient was reduced (MPG: 4.1 mmHg, PHT: 100 ms) and the valve function normalized. The patient was discharged under optimized oral anticoagulation therapy with warfarin (target INR 4–4.5).

She stayed asymptomatic for the next 6 months until she came back to the clinic with complaint of dyspnea (NYHA class II). She had an INR of 4.8. TTE showed an increased transvalvular gradient (MPG: 11 mmHg, PHT: 190 ms) over TV prosthesis with fixed both disc in semi-open position that was confirmed with fluoroscopy [e.g., Figure 1]. The patient started on streptokinase again, but it was stopped due to allergic reaction. Therefore, the patient was given unfractionated heparin with close monitoring of activated partial thromboplastin time (aPTT). After 2 days of intensive anticoagulation therapy, no clinical improvement and no change in hemodynamic study was observed at three times the normal aPTT levels. She was a candidate for surgery, but due to high-risk surgery, the patient underwent fibrinolytic therapy. She was given a single dose of IV reteplase 18 mg. TTE showed mechanical bileaflet TV prosthesis with acceptable bileaflet motion and hemodynamic study (MPG: 4.5 mmHg, PHT: 130 ms). The patient was discharged on warfarin (target INR 4.5–5) in stable condition.

After 6 months, despite of the close observation and therapeutic INR (at least 4), she was admitted for NYHA class III dyspnea. TTE revealed mechanical bileaflet TV prosthesis with fixed medial disc and high transvalvular gradient (MPG: 5.8 mmHg, PHT: 155 ms) that was confirmed with fluoroscopy [e.g., Figure 2]. The patient was given a single dose of IV reteplase 18 mg, but the following TTE showed no change in medial disc motion and hemodynamic study. Therefore, another dose of reteplase 18 mg was given to the patient, within

30 min of first. After second-dose administration, TTE showed normal both disc motion and hemodynamic study (MPG: 4 mmHg, PHT: 55 ms). The patient was discharged on warfarin (target INR 4.5–5) in a stable condition.

Discussion

PVT has an incidence of 0.3%–1.3% in developed countries and 6.1% in developing countries.^[1] The most common cause of PVT is insufficient anticoagulant therapy. Long-term follow-up of 4,924 patients with Carbomedics mechanical valve showed insufficient anticoagulation therapy (INR <2.5) is the cause of the PVT in 54% of the cases, with inadequate anticoagulation management in 26% and poor compliance in 26%.^[3] Patients with tricuspid mechanical valves have higher mortality and PVT rate in comparison with patients who have aortic and mitral mechanical valve.^[4]

There are two types of PVT: obstructive and nonobstructive. These types have different treatment choices and prognosis. In this paper, we discuss treatment choices and prognosis in right-sided obstructive PVT. According to the European Society of Cardiology Guidelines for the management of valvular heart disease, the best choice of treatment for right-sided obstructive PVT is thrombolytic therapy.^[2] The studies showed that both rt-PA and streptokinase can be used as first-line medication in PVT.^[5,6]

Fibrinolytics are divided into two categories: fibrin specific and non-fibrin specific. Streptokinase is a non-fibrin-specific fibrinolytic but reteplase or r-PA and alteplase or rt-PA are both included in fibrin-specific group.^[7]

Cardiologists usually prefer to use streptokinase as first-line medication because it is older and there is more experience with it, but streptokinase is highly antigenic and it can cause allergic reaction after first administration (specially within 6 month of exposure).^[7] So, in cases of recurrence of PVT, it is possible that we cannot use streptokinase because of previous administration.

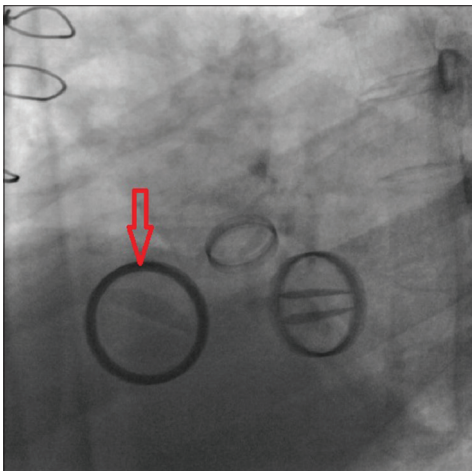


Figure 1: Fluoroscopy showed mechanical bileaflet TV prosthesis with immobile both disc in semi-open position during systole (red arrow)

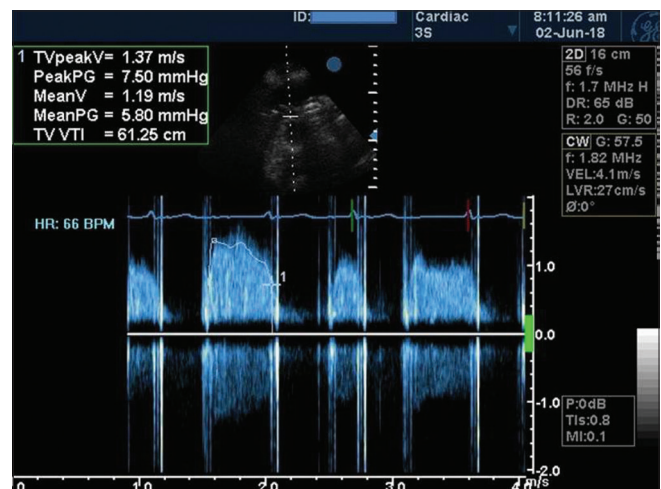


Figure 2: Continuous wave Doppler assessment of TV prosthesis showed increased transvalvular gradient (MPG: 5.8 mmHg)

We have presented a patient with multiple episodes of tricuspid obstructive PVT. In the first episode, the patient treated with streptokinase successfully. After that, the patient experienced two other episodes, which there were not any other options except fibrin-specific fibrinolytic therapy because of an allergic reaction to streptokinase and high-risk surgery.

In our experience with this patient, the outcome of both r-PA and streptokinase therapy was good and based on monitoring the patient for intracranial and nonintracranial bleeding no complications was observed.

Both r-PA and rt-PA have shown similar effects and complication rate in treating acute myocardial infarction but in theory r-PA is more efficient than rt-PA because its ability to penetrate blood clots.^[8,9] Due to r-PA ability to penetrate clots and larger global burden of clots in PVT compared with acute myocardial infarction, it is possible that r-PA is even a better choice than rt-PA.

We have concluded, based upon our experience on this case, that it is possible that r-PA would be at least as efficient as rt-PA in treating obstructive PVT with fibrin-specific thrombolytics. More studies on this issue can determine reteplase role in treating right-sided PVT.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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