

periodontitis. Significant correlation has been reported between tobacco smoking and the severity of periodontal diseases measured by the average pocket depth, the number and percentage of pockets above 4 mm, and the average clinical attachment loss, as well as the overall state of oral hygiene.^{2,3} In contrast, even though tobacco chewing is associated with increased cardiovascular risk, the link is much weaker than that of smoking. The deleterious impact of tobacco chewing on oral periodontal health manifests mainly in the form of poor periodontal health and oral submucous fibrosis (OSMF). OSMF is a premalignant condition of oral cavity.^{4,5} Tobacco is often chewed in the form of kharra, which is a mixture of areca nut and tobacco. Arecoline, an areca nut extract, disrupts the harmony of the periodontal cells and thus leads to destruction of the periodontium.⁵

Nonetheless, we acknowledge the need for further studies evaluating the relationship between various forms of tobacco consumption, periodontal health, and cardiovascular disease.

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therapy in patients with mitral prosthetic valve thrombosis.” The authors conducted a study in which they compared two modalities of thrombolytic therapy (TT) (streptokinase vs tenecteplase) in patients with mechanical prosthetic valve thrombosis (PVT) in mitral position.

They reported a favorable outcome with tenecteplase as compared with streptokinase and a complete therapeutic success rate of more than 75% in these patients.

Despite the limitations of the study, mainly because of the low number of patients included, it recognizes TT as the first-choice therapeutic option in PVT in developing countries such as India.

I would like to emphasize the importance of TT as an initial therapeutic option and highlight that this treatment is not just for developing countries; rather, the emerging evidence supports it to be a universal intervention in patients with PVT.

For several years, we have recommended TT as the first therapeutic indication in PVT.²

Our meta-analysis provides evidence that suggests a primary role for thrombolysis in patients with PVT, and we have concluded that surgery has not been proved superior to thrombolysis.³

In the Ultra-slow PROMETEE trial,⁴ the authors reported 90% of therapeutic success rate. The overall complication rate was 6.7% (3.3% nonfatal major, 2.5% minor, and 0.8% death). The authors concluded that the TT was efficient with low mortality rates and low risk of nonfatal complications.

Regarding the therapeutic intervention in PVT, there has been a remarkable change in the latest update of the American Heart Association/American College of Cardiology guidelines for the management of valvular heart diseases.⁵ It matches the indication level and emphasizes the need for urgent initial treatment with either slow-infusion low-dose fibrinolytic therapy or emergency surgery in patients with a left-sided mechanical PVT presenting with symptoms of valve obstruction (recommendation class I–B). In addition, this last update adds a group of clinical factors to be considered when taking therapeutic decisions, including the choice of the patient and the institutional capacity.

Conflicts of interest

The authors have no conflicts of interest to disclose.

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Thrombolysis may be a universal therapeutic option in left-sided prosthetic valve thrombosis



To the Editor:

I have read with great interest the article published by Kathirvel et al¹ “Tenecteplase versus streptokinase thrombolytic

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Two and real-time three dimensional transesophageal echocardiography guided thrombolytic therapy for prosthetic valve thrombosis is crucial



To the Editor,

We have read with great interest the article by Kathirvel et al which was recently published in the Indian Heart Journal.¹ We commend the authors for this important report describing clinical outcomes with tenecteplase (TNK) versus streptokinase thrombolytic therapy (TT) in patients with mitral prosthetic valve thrombosis (PVT). However, at the same time, we would like to highlight some important issues that need to be addressed.

First, TNK, a tissue-type plasminogen activator modified by 3 amino acids from alteplase, has the potential to deliver this kind of performance. It has greater fibrin specificity resulting in no evidence of systemic fibrinogen depletion and resistance to plasminogen activator inhibitor resulting in an initial serum half-life of 20 min and a mean terminal half-life of 100 min, such that it can be conveniently given as a bolus dose (over 5 s) on a weight-adjusted basis. At a dose of 0.5 mg/kg, it has been a standard of care for treating acute ST-segment elevation myocardial infarction for 15 years.² In this study, 12 of the 52 patients with PVT were treated with a 24-h infusion of TNK. According to the manufacturer's guidelines, the reconstituted solution should be diluted with sterile water for injection up to a maximal concentration of 5 mg TNK per ml, and it should be administered as an intravenous single bolus dose over 5 s. The remaining TNK solution, if needed, may be kept in the vial for up to 8 h, but at 2–8 °C temperature.³ How were the biological stability and efficiency of reconstituted solution ensured during the 24-h infusion?

Second, transthoracic echocardiography (TTE) usually offers inadequate images in making differential diagnosis of thrombus, pannus, and vegetation due to acoustic shadowing and low resolution caused by prosthetic material. On the other hand, transesophageal echocardiography (TEE) with its high resolution may differentiate thrombus from pannus formation and vegetation in patients with PVT. Furthermore, TEE is also of great value with regard to the assessment of mobility, location, and thrombus size; this may assist in the decision regarding surgery, anticoagulation, or TT. In addition, a large residual nonobstructive PVT may be present in some patients who have experienced successful TT, but it may be missed during TTE study. The detection of nonobstructive PVT can be challenging, particularly when Doppler parameters are within normal limits and clinical findings are subtle. Hence, nonobstructive PVT can even be missed with conventional 2D imaging. In comparison, real-time three-dimensional (RT-3D) TEE, over the last decade, has emerged as an important clinical tool in the assessment of PVT. RT-3D TEE has higher spatial resolution, resulting in images with unparalleled anatomic detail when compared with 2D imaging. The diagnostic accuracy for detecting PVT has improved after the introduction of RT-3D TEE, especially for those in mitral position^{4–6}. It is understood that cine fluoroscopy is effective at detecting abnormality of leaflet mobility, and TTE may provide data regarding changes in valve area and transvalvular

gradients. Nevertheless, these imaging tools are complementary to TEE, which offers a fundamental roadmap for TT in patients with PVT.

Third, patients with thrombus with size >1 cm² were included in the trial. It is surprising why these patients were not given TT and were excluded from the trial. It is noteworthy that the recent 2017 American Heart Association (AHA)/American College Cardiology (ACC) focused update of the 2014 AHA/ACC guideline for the management of patients with valvular heart disease now recommends urgent initial treatment with either slow-infusion low-dose fibrinolytic therapy or emergency surgery for obstructive PVT as first-line treatment strategies with class 1-B indication.⁷

In conclusion, during TT in patients with PVT, continuous TEE guidance is crucial. Moreover, RT-3D TEE is a complementary imaging tool to 2D TEE in the diagnosis and evaluation of PVT. Finally, if TEE had been performed on all the patients in the study both before and after TT, the unexpected results would not have been the same.

Conflict of interest

The authors declare that they have no conflict of interest.

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Authors' response to "Letter to Editor"

We thank the authors of the letter for their interest in our work and for making valid observations. Please find below our responses.