Multimodality imaging and thrombolytic therapy for prosthetic valve thrombosis

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We read with great interest the article by Szatan et al. entitled "Ultraslow thrombolysis for subacute mitral prosthetic valve thrombosis" [1] We congratulate the authors for their successful treatment of mitral prosthetic valve thrombosis using low-dose and ultraslow infusion of tissue plasminogen activator (t-PA). However, we believe that there are several major drawbacks that should be addressed.

First of all, differentiating between prosthetic valve thrombosis (PVT) and pannus is essential for the management of prosthetic heart valve dysfunction [2]. In addition, cardiac computed tomography (CT) has a complementary role to play in transesophageal echocardiography and is emerging as a valuable non-invasive imaging tool in the assessement of mechanical heart valves. Based on the histopathological differences between the pannus and the thrombus, X-ray attenuation of the pannus must be markedly higher than that of the thrombus. Previously, Gündüz et al. [2] reported in a large series of patients with prosthetic heart valve dysfunction that periprosthetic masses with HU values of more than 145 are associated with the pannus, whereas lower values indicate the thrombus. Additionally, they found that peri-prosthetic thrombi with a HU <90 are amenable to thrombolytic therapy [2]. Furthermore, a combination of real time three-dimensional transesophageal echocardiography and cardiac CT efficiently provide reliable and quantitative data for the diagnosis and differentiation of pannus and thrombus in patients with prosthetic valve dysfunction [3]. Differential diagnosis based on clinical presentation may be challenging, and multimodality imaging, including echocardiography, cine fluoroscopy, and cardiac CT, is usually required to distinguish between PVT and other prosthesis-related pathologies such as pannus [2–4]. In this case, the readers may wonder why thrombolytic therapy was administered without quantitatively distinguishing between pannus and PVT with multimodality imaging, including cardiac CT.

Secondly, thrombolytic therapy is one of the two leading treatment options for obstructive PVT [3, 4]. Nevertheless, in the absence of randomized controlled trials, the optimal treatment of PVT remains a topic of debate. A recent prospective observational study demonstrated that low-dose and slow/ultraslow infusion of t-PA were associated with fewer complications and lower mortality rates, with high success [4]. This strategy should be considered as a beneficial treatment in patients with obstructive PVT. However, some key points should be kept in mind when planning this strategy for PVT patients. If the patient's clinical and hemodynamic status is not stable, such as NYHA >2 (as in this case), the application of the TRIOA protocol (25 mg/6 h) instead of low-dose/ultra-slow infusion of t-PA (25 mg/25 h) might provide a faster response to the treatment [3]. In the Multicenter HATTUSA study, the treatment algorithm of PVT patients highlights essential points in detail [4].

Thirdly, the authors concluded with the following statement regarding the management of these complex patients: "Ultraslow thrombolytic therapy may be an alternative treatment option for patients with prosthetic valve thrombosis and high perioperative risk". However, the 2020 American College of Cardiology/American Heart Association guidelines state that low dose slow infusion of t-PA is as equally effective as urgent surgery [5]. So it is interesting to note that the latest update of the European Society of Cardiology (ESC)/

/European Association for Cardio-Thoracic Surgery (EACTS) guidelines still considers surgery to be the first-line therapy. The inconsistencies between these American and European guidelines regarding the recommendations for the management of PVT may be multifactorial. One might argue that the ESC/EACTS taskforce may be concerned about the safety of thrombolysis because no randomized data is yet available on this topic. However, it should be recognized that not all of the recommendations set out by guidelines are based on randomized trials.

Article information

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