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Late Obstructive Transcatheter Heart Valve Thrombosis Resolved by Rivaroxaban

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Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
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Conflict of interest: None declared

Patient: Male, 68
Final Diagnosis: Transcatheter heart valve thrombosis
Symptoms: None
Medication: —
Clinical Procedure: —
Specialty: Cardiology

Objective: Unusual clinical course

Background: Although transcatheter aortic valve replacement (TAVR) has become a worldwide and generally accepted treatment of patients with aortic stenosis at high surgical risk, there is a rising concern and debate about the occurrence of transcatheter heart valve (THV) thrombosis and its impact on TAVR outcome. It seems that the incidence of THV thrombosis is higher than first anticipated, but uncertainty remains regarding how to prevent and how to treat it. Hence, there is an urgent need for understanding THV thrombosis and to communicate experiences within the field.

Case Report: We present a unique case of late occurrence of THV thrombosis that was resolved by switching from clopidogrel to rivaroxaban treatment.

Conclusions: As a novel observation, our case demonstrates that THV thrombosis may develop even late after TAVR, and even in such cases may be completely reversed. It also underscores that THV dysfunction should evoke prompt investigation for possible thrombus formation, preferable by multidetector computed tomography. Finally, this case report suggests NOAC as an alternative to warfarin treatment in patients with THV thrombosis.

MeSH Keywords: Anticoagulants • Aortic Valve Stenosis • Heart Valve Prosthesis • Multidetector Computed Tomography

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Background

Transcatheter aortic valve replacement (TAVR) has become a routine option in patients at high surgical risk. In a recent large consecutive cohort of 405 patients having TAVR performed with the Edwards balloon-expandable transcatheter heart valve (THV), thrombus was diagnosed 1–3 months after the procedure by multidetector computed tomography (MDCT) in 7% of the patients [1]. The occurrence of THV thrombosis was associated with large THV size and no treatment with warfarin [1]. Hence, THV thrombosis is more common than previously anticipated, and there is uncertainty on how to prevent and treat this complication. THV thrombosis is expected to occur early after TAVR and has not previously been reported later than 7 months post-TAVR [1,2]. While sparse evidence suggests warfarin is superior to antiplatelet therapy in targeting TAVR thrombosis [1], the role of non-vitamin K antagonist oral anticoagulants (NOAC) is being investigated in ongoing trials [3].

Case Report

We present the case of a 68-year-old man suffering from paroxysmal atrial fibrillation and severe symptomatic aortic stenosis. Preprocedural transthoracic echocardiography (TTE) showed a mean transvalvular gradient of 67 mmHg and preserved left ventricular function. An Edwards Sapien 3, 29 mm THV was successfully deployed without postdilatation. The postprocedural mean trans-THV gradient was 9 mmHg, and no paravalvular regurgitation was observed by TTE. Due to alcohol abuse and a history of previous minor intracranial hemorrhage, treatment of atrial fibrillation with warfarin was considered to be contraindicated. At discharge, the patient received clopidogrel 75 mg daily as mono-antithrombotic therapy. At 3 months post-TAVR, the patient was asymptomatic, and the mean trans-THV gradient remained low, at 10 mmHg. As part of our institutional TAVR practice, MDCT was performed, showing mild, but insignificant thickening of the THV cusps (Figure 1). Repeated MDCT at 5 months did not show any progression in cusp thickening, and no further increase in trans-THV gradient was observed. At 17 months post-TAVR, the TTE mean trans-THV gradient had increased to 27 mmHg, and a subsequent MDCT demonstrated low-to-moderate THV thrombosis (Figure 2). Due to concerns about bleeding complications following intensified antithrombotic treatment, a strategy of watchful waiting was chosen. Although still asymptomatic at 20 months post-TAVR, the mean trans-THV gradient had now increased to 73 mmHg, and a repeated MDCT revealed severe THV thrombosis involving all 3 THV cusps (Figure 3). A thorough evaluation did not reveal any drug compliance issue, and it was decided to replace clopidogrel with rivaroxaban 20 mg daily. NOAC was preferred since warfarin was considered less safe with respect to the risk of intracranial hemorrhage [4].

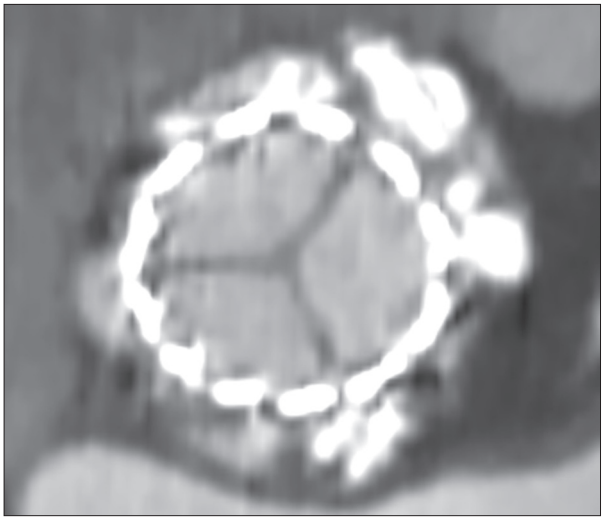

Figure 1. MDCT at 3 months post-TAVR shows slight thickening of THV cusps. Mean trans-THV gradient (TTE) was 10 mmHg.

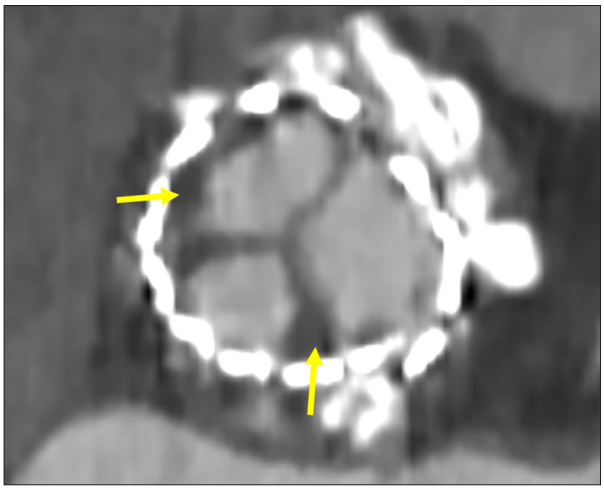

Figure 2. MDCT at 17 months post-TAVR shows low-to-moderate thrombus formation (yellow arrows). Mean trans-THV gradient (TTE) was 25 mmHg.

After 4 months of NOAC treatment (at 24 months post-TAVR), the mean trans-THV gradient had declined to the immediate postprocedural level of 10 mmHg, and MDCT showed complete resolution of thrombus formation (Figure 4). The patient had no complications related to the medical treatment and was recommended lifelong therapy with rivaroxaban.

Discussion

Predisposing factors to THV thrombosis in this case may have been the use of a large 29 mm THV, the presence of paroxysmal atrial fibrillation, and the use of mono-antiplatelet therapy [1]. Dual-antiplatelet therapy, combining low-dose

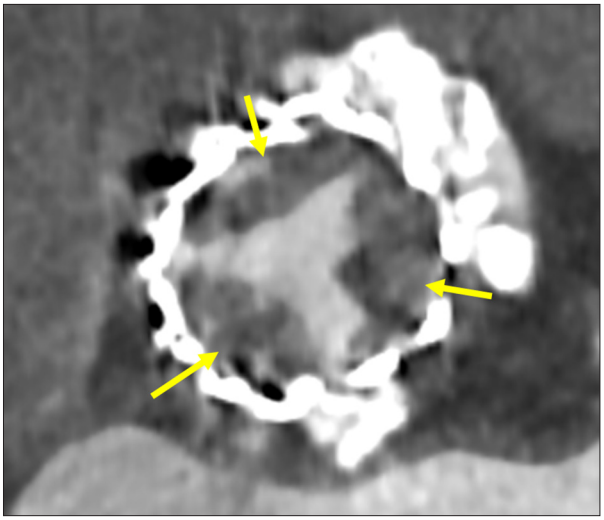

Figure 3. MDCT at 20 months post-TAVR shows severe thrombus formation (yellow arrows). Mean trans-THV gradient (TTE) was 73 mmHg.

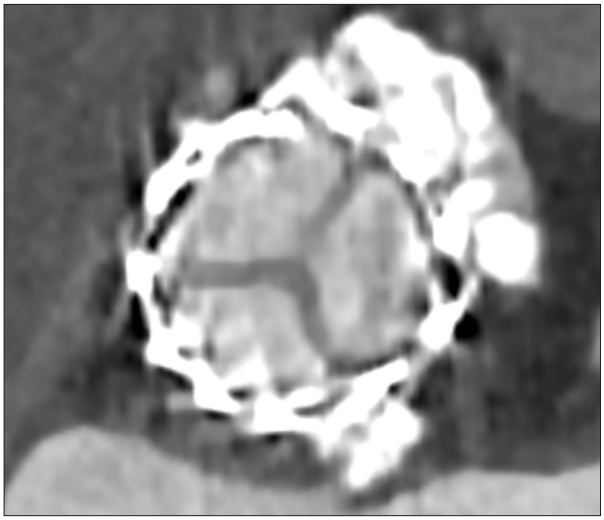

Figure 4. MDCT at 24 months shows slight thickening of THV cusps but no thrombus formation. Mean trans-THV gradient (TTE) was 10 mmHg.

aspirin and clopidogrel, is commonly recommended following TAVR [5]. The present case, in line with previous data, underscores that antiplatelet therapy seems inadequate for preventing THV thrombosis and is likely inferior to oral anticoagulant drugs [1]. Moreover, it demonstrates that THV thrombosis may develop even late after TAVR, thus challenging the routine recommendation of 12 months of post-TAVR antiplatelet therapy [5]. This case also shows that THV dysfunction should evoke prompt investigation for possible thrombus formation, preferable by MDCT [1], since it may be completely reversed even in late cases. Finally, this report suggests NOAC as a novel alternative to warfarin treatment in patients with THV thrombosis. Although spontaneous major bleeding is reported less frequently in patients treated with NOAC than with warfarin, it should be acknowledged that NOAC treatment *per se* is associated with an increased risk of bleeding [6].

Conclusions

THV thrombosis may develop late after TAVR and can be reversed by switching from antiplatelet to NOAC therapy.

Conflicts of interests

Authors have no conflicts of interests to declare.

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