

## Prosthetic valve endocarditis after transcatheter aortic valve implantation

*Transkateter aort kapak implantasyonu sonrası protez kapak endokarditi*

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### ABSTRACT

Transcatheter aortic valve implantation (TAVI) is being performed in increasing numbers in recent years, leading to an increase in the variety of complications related to the procedure. In this article, we report a 75-year-old female patient who developed infective endocarditis eight months after TAVI. Timing of surgery and treatment approach may be controversial in patients who underwent TAVI previously since they were already accepted as high risk of cardiac surgery. Therefore, we believe that individual experiences may be beneficial to determine the optimal treatment approach for such complex cases.

**Keywords:** Bioprosthetic heart valve; infective endocarditis; transcatheter aortic valve implantation.

Transcatheter aortic valve implantation (TAVI) has become an accepted alternative treatment for severe aortic stenosis in elderly high-risk patients since it was first introduced in 2002.<sup>[1]</sup> In addition, the number of TAVI cases has increased along with many technical and procedural advancements, leading to more complications with greater diversity. There have only been a few published reports in the English literature that involve TAVI valve infective endocarditis.<sup>[2-7]</sup> Although it is known that prosthetic valve endocarditis after surgical aortic valve implantation is associated with high morbidity and mortality, the prognosis for patients with TAVI valve endocarditis is more complicated since they are at high risk for open cardiac surgery due to their comorbidities and because of the TAVI procedure itself. Hence, surgical management in these cases involves not only the preexistent risks but also the newer infective event. Managing these

### ÖZ

Transkateter aort kapak implantasyonu (TAVİ) son yıllarda giderek artan sayılarda yapılmaktadır ve dolayısıyla, işlemle ilişkili komplikasyonlardaki çeşitlilik de artmaktadır. Bu yazıda, TAVİ'den sekiz ay sonra enfektif endokardit gelişen 75 yaşında bir kadın hasta sunuldu. Kardiyak cerrahi için zaten yüksek riskli kabul edilerek TAVİ uygulanmış hastalarda, cerrahi zamanlaması ve tedavi yaklaşımı tartışılmalı olabilir. Bu nedenle, bireysel deneyimlerin bu kompleks olgularda optimal tedavi yaklaşımını belirlemek için faydalı olacağına inanıyoruz.

**Anahtar sözcükler:** Biyoprostetik kalp kapağı; enfektif endokardit; transkateter aort kapak implantasyonu.

patients is challenging, but individual experiences can help in the assessment process when deciding on the best treatment option. Herein, we present our own experience with TAVI valve infective endocarditis.

### CASE REPORT

Eight months prior to being admitted to our facility, a 75-year-old woman with severe aortic stenosis and coronary artery disease (CAD) underwent percutaneous coronary intervention (PCI) for proximal and distal lesions of the right coronary artery (RCA), and subsequently transfemoral aortic valve implantation (26 mm Edwards SAPIEN XT, Edwards Lifesciences Corp., Irvine, CA, USA), was performed at conventional catheterization laboratory (cath lab) which does not meet the qualifications of a hybrid operating room or modified cath lab. Although



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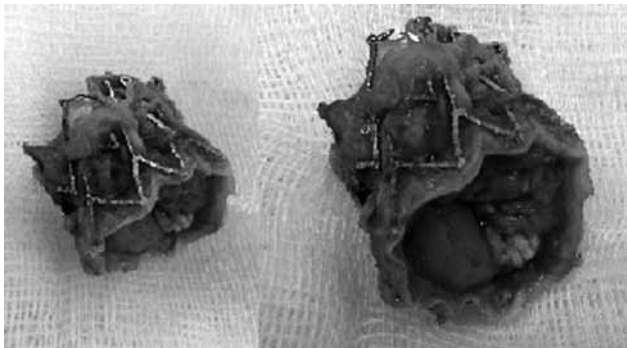
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the patient was referred for aortic valve replacement, she refused to have open cardiac surgery because of comorbidities such as advanced age, atrial fibrillation (AF), hypertension (HT), CAD, and pulmonary HT [pulmonary artery pressure (PAP) 37 mmHg]. Her initial transthoracic echocardiography (TTE) revealed severe aortic stenosis with a mean gradient of 49 mmHg, an aortic valve area (AVA) index of 0.9 cm<sup>2</sup>, and an ejection fraction (EF) of 50%.

Eight months after the TAVI procedure, she was readmitted to our hospital with palpitation, dyspnea and angina which are indicative of congestive heart failure and fever. Transthoracic echocardiography revealed dysfunction of the aortic device with a mean gradient of 38 mmHg. The patient's prophylactic antimicrobial medication was then adjusted (ampicillin/sulbactam, gentamycin, rifampin) because of a positive blood culture for *Enterococcus faecium*. In addition, transesophageal echocardiography (TEE) showed a 1.2x1.1 cm vegetation on the right coronary cusp of the aortic valve with pericardial effusion measuring approximately 1.5 cm at the posterior region with an EF of 40% and moderate tricuspid regurgitation. On follow-up in the intensive care unit (ICU), the patient was intubated due to acute lung edema and acidosis. Furthermore, dialysis was required for a short period for supervening acute renal failure. After being followed up for approximately one month in the cardiology ICU, the blood cultures were negative. However, the patient's general condition did not recover, and control TEE did not reveal any reduction in the vegetation size or a decrease in the aortic valve gradient, so she was scheduled for an operation to remove and replace the infected and malfunctioning TAVI valve.

During the surgery, cardiopulmonary bypass (CPB) was first established in a standard fashion, and myocardial protection was obtained via antegrade and retrograde cold blood cardioplegia. The vegetations were



**Figure 1.** The resected transcatheter aortic valve implantation valve with metal stents and vegetations on the prosthetic valve.

present on all of the TAVI valve leaflets, and the valve along with the metal stent and the native aortic valve were meticulously resected (Figure 1). Decalcification was needed for the remaining tissue. Next, a 21 mm Carpentier-Edwards PERIMOUNT Magna aortic heart valve (Edwards Lifesciences, Irvine, CA, USA) was reimplanted (Figure 2). The CPB was then terminated uneventfully with a moderate dose of inotropic support; however, it became necessary to insert an intraaortic balloon pump (IABP) in the ICU because of hemodynamic instability and rhythm disturbances. Afterwards, we detected refractory hypotension and ventricular fibrillation in the patient that led to the need for an emergency reoperation. Resternotomy revealed weak right ventricular contractions and a saphenous vein graft (SVG) anastomosis was performed to the RCA assuming RCA stent failure. The CPB was then terminated with inotropic and IABP support. However, the hemodynamic instability continued, and the patient was lost at the 10<sup>th</sup> postoperative hour in spite of all our supportive efforts.

## DISCUSSION

Since only a few cases of TAVI valve infective endocarditis have been reported to date,<sup>[2-7]</sup> a major concern exists regarding the optimal management of these patients. The incidence of post-TAVI prosthetic valve endocarditis was reported as 3.4% at one year by Puls et al.<sup>[2]</sup> Handling such complex patients is challenging because they are already at high risk for aortic valve replacement surgery and have additional risks because of aortic device endocarditis and its related systemic complications. Successful surgical aortic valve replacement has been reported<sup>[3]</sup> as well as successful medical management.<sup>[4]</sup> Nonetheless, failure



**Figure 2.** The implanted 21 mm aortic heart valve.

of medical therapy in a patient who refused surgical correction has also been reported.<sup>[5]</sup>

The timing of the surgery also should be discussed with different outcomes in the literature. Wilbring et al.<sup>[6]</sup> reported that immediate cardiac surgery for a patient with a large root abscess caused causing a covered rupture of the aortic base leading to had a poor clinical course. As in our patient, a high risk surgery as a salvage procedure because of the unhealed medical status of the patient despite maximal medical management also exhibited a poor outcome. Furthermore, a recent report by Eisen et al.<sup>[8]</sup> concluded that infective endocarditis after the TAVI procedure deserves prompt diagnosis and treatment.

Another crucial point is that most TAVI procedures are performed in cath labs. Because the sterilization guides are not as strict as they are in the operating theaters, further studies are needed to evaluate whether cath labs are safe enough to perform the TAVI procedure. In fact, one report exists which showed that cath labs were not associated with increased infective complications in a single-center experience.<sup>[9]</sup> Nevertheless, we believe that the optimal setting for TAVI procedures should be a hybrid operating room because a high-efficiency, particulate air-filtered laminar flow is absent in most cath labs and the criteria for air control, room facilities, and specific staff education are not as stringent.<sup>[9]</sup> Thus, hybrid operating rooms should be constituted being the best option to minimize procedure-related infections in these high-risk patients unless the cath labs are modified to improve their standard of quality.

Even though infective endocarditis after TAVI has a very low incidence rate, the optimal patient management associated with this procedure still needs to be evaluated, and we believe that individual patient experiences will help establish the most appropriate treatment plan. To the best of our knowledge, this is the first reported case of TAVI valve infective endocarditis in Turkey; hence further reports would help to identify the incidence rate in our country and the optimal management strategy for these highly vulnerable patients as well as the most advantageous surgical setting. Finally, forming a data pool in Turkey

for TAVI patients should be of the utmost importance in order to clarify the exact results of TAVI procedures.

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