

Transcatheter prosthetic valve endocarditis of an aortic valve-in-valve bioprosthesis in an elderly male

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ABSTRACT

Transcatheter aortic valve replacement (TAVR) is the percutaneous alternative to traditional surgery. Infective endocarditis is a fatal complication of TAVR, especially in the elderly. A 65-year-old male with a history of valve-in-valve TAVR presented to our emergency room with altered mentation. On examination, he was febrile. Laboratory investigations and echocardiography suggested infective endocarditis. Explantation and surgical aortic valve replacement were planned. The biopsy of the prostheses showed acute inflammation. Transcatheter prosthetic valve endocarditis warrants early diagnosis, particularly in the elderly. Our case emphasizes the importance of the prompt inclusion of endocarditis in the differential and surgical referral.

KEYWORDS: TAVR; infective endocarditis; elderly; valve-in-valve

INTRODUCTION

Transcatheter aortic valve replacement (TAVR) is a percutaneous technique that involves threading a catheter through the femoral artery under fluoroscopic guidance and deploying a bioprosthetic valve at the site of the native valve.

Initially employed as a viable alternative to surgical aortic valve replacement (SAVR) in only high-risk individuals, current recommendations suggest that TAVR can be suitably used even in certain low-risk patients. However, one must be aware of potential complications, both early and long-term after a trans-catheter implant [1]. Transcatheter prosthetic valve endocarditis (TPVE) is one such complication that can occur in the immediate postprocedural and long-term follow-up period. Data on the natural history of TPVE is limited, particularly among the elderly.

We present a report of a transcatheter prosthetic valve endocarditis in an elderly male who underwent TAVR twice.

CASE PRESENTATION

A 65-year-old hypertensive male with a past medical history of heart failure and hyperlipidemia presented to our center with sudden onset altered mentation as per the family. He reported drinking four to five glasses of whiskey daily for the past year and denied similar episodes in the past. No history of shortness of breath or chest pain. He had been experiencing intermittent fevers for the past few weeks.

His past medical history was significant for cardiogenic shock due to heart failure and severe aortic stenosis two years ago and had been advised TAVR due to hemodynamic instability and a high Society of Thoracic Surgery (STS) risk score and underwent TAVR with a 34 mm Medtronic Evolut pro (Medtronic plc, Dublin, Ireland) bioprosthetic valve. Due to persistent paravalvular leak post-deployment, a valve-in-valve (ViV) TAVR was performed with 34 mm Medtronic Evolut pro. Following the second deployment, the echocardiogram was deemed satisfactory, with no paravalvular leak and a mean gradient of 3 mm Hg across the valve.

On examination, he was alert and oriented, carried out tangible conversation, and was febrile. Physical examination was otherwise unremarkable.

Laboratory investigation revealed normal white cell count, elevated lactate, blood urea nitrogen/ serum creatinine, and hypokalemia. The chest X-ray (CXR) reported an increased cardiothoracic ratio with pulmonary vascular congestion (Figure 1). The computed tomography of the brain showed no abnormalities. The blood culture grew methicillin-sensitive *Staphylococcus aureus* (MSSA), and empirical intravenous antibiotics (Cefepime and Vancomycin) were started. The transthoracic echocardiogram (ECHO) revealed a well-seated ViV prosthesis with no perivalvular leak and a left ventricular ejection fraction (LVEF) of 27%. However, due to a lack of improvement in clinical condition after 7 days, we performed a transesophageal ECHO (TEE) which showed a perivalvular leak around the ViV prosthesis occupying 30% of the circumference and no evidence of perivalvular abscess along with moderate mitral regurgitation and made the diagnosis of TPVE using the modified Duke's criteria (2 major criteria in our case) and counseled

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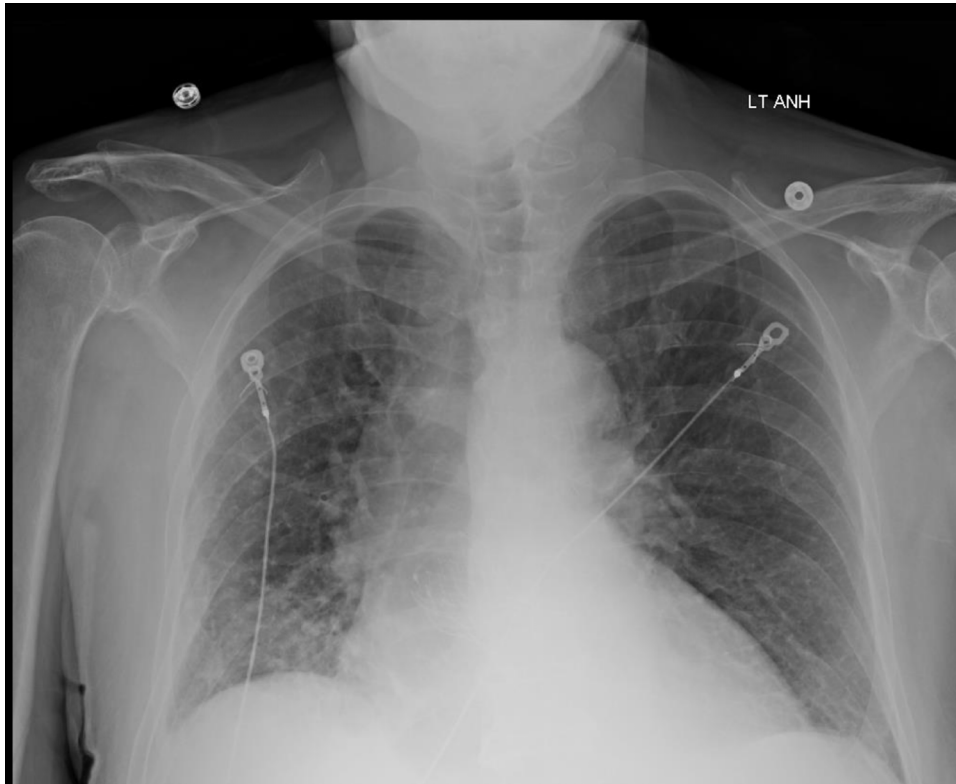


Fig. 1. Pre-operative Chest-X Ray shows cephalization of upper lobe vessels and Kerley A and B lines suggesting fluid overload.

for TAVR explant and surgical aortic valve replacement (SAVR) with possible root replacement. Pre-operatively, we performed a left heart catheterization revealing non-obstructive coronary artery disease, and the calculated STS risk score for mortality was 8%. Surgery was performed after 9 days of antibiotic therapy.

Intra-operatively, we performed a midline sternotomy, exposed the great vessels, and cannulated the aorta, superior, and inferior vena cava in the usual fashion. Once the activated coagulation time reached 480 seconds, we initiated cardiopulmonary bypass, cross-clamped the aorta, and administered retrograde cardioplegia with modified Del-Nido cardioplegia solution. We covered the heart with cold saline as an ice slush for augmented myocardial protection. We transected the ascending aorta at the level of the pulmonary artery bifurcation to visualize the ViV prosthesis and found the two prostheses densely adherent to the aortic intima (Figure 2). Using a combination of sharp and blunt dissection, removed both valves without damaging the native aorta. We folded the valves, removed the explant, and native leaflets and decalcified the annulus, and sent the explant and the native valve for culture and biopsy (Figure 3). We inspected the aorta for injuries, performed an aortic valve replacement with a 25 mm Inspiris Resilia (Edwards Lifesciences, Irvine, California, United States of America) aortic bioprosthetic valve in standard fashion, and closed the aorta using a 4-0 polypropylene suture in a running fashion. After appropriate de-airing, the cross-clamp was released, and we placed dual chamber pacing wires. Post-operative TEE revealed a well-seated prosthetic aortic valve, with no intra- or para-valvar leak, and a mean gradient of 5 mm Hg. The patient was then weaned off bypass and protamine was administered. The chest was then

closed in standard fashion and the patient was transferred to the CVICU on minimal vasopressors. The cardiopulmonary bypass time and cross-clamp time were 91 minutes and 72 minutes respectively.

The biopsy of the explant showed acute inflammation with no evidence of organisms, and the culture revealed no growth. He had an uneventful postoperative period, and we discharged him on postoperative day seven. Post-operative CXR reported normal with no evidence of pulmonary edema, pericardial and pleural effusion (Figure 4). Post-operatively, the antibiotics were continued for 6 weeks.

On 3 monthly follow-ups, he felt well, and his ECHO showed a well-seated bioprosthetic valve with no aortic insufficiency.

■ DISCUSSION

Transcatheter aortic valve replacement (TAVR) is the percutaneous alternative to the traditional surgical approach introduced in 2006 and provides the unique opportunity of placing another TAVR-compatible valve inside the first valve in case of incorrect placement or degeneration [2]. Our patient underwent a second implantation due to a persistent paravalvular leak in a setting of hemodynamic instability.

A fatal complication of TAVR is infective endocarditis (IE), especially in the elderly. Transcatheter prosthetic valve infective endocarditis (TPVE) occurs in 0.5%- 3% [3], but the data on the incidence is limited due to the number of studies. To the best of our knowledge, we describe the first case of TPVE in a valve-in-valve prosthesis in an elderly patient who underwent TAVR twice.

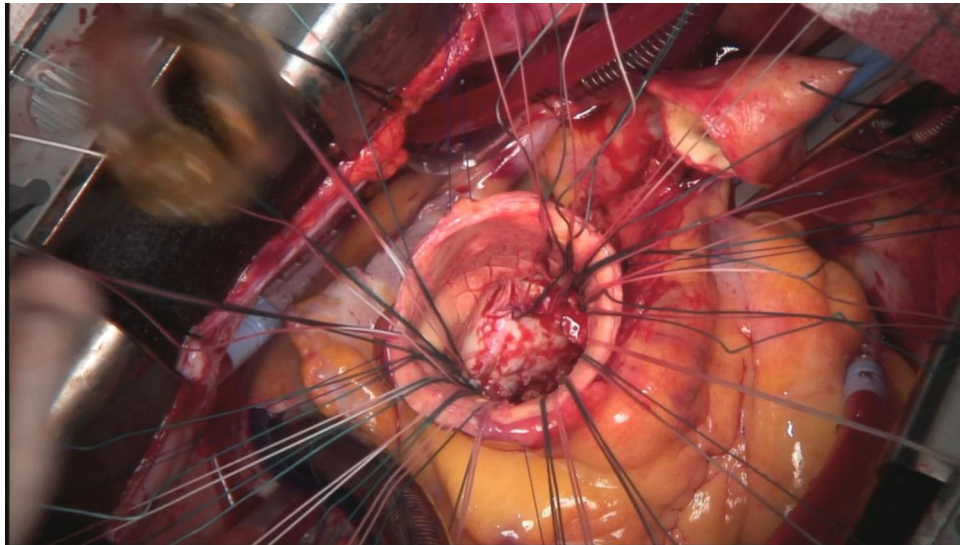


Fig. 2. Aortic root after excision of the valves.

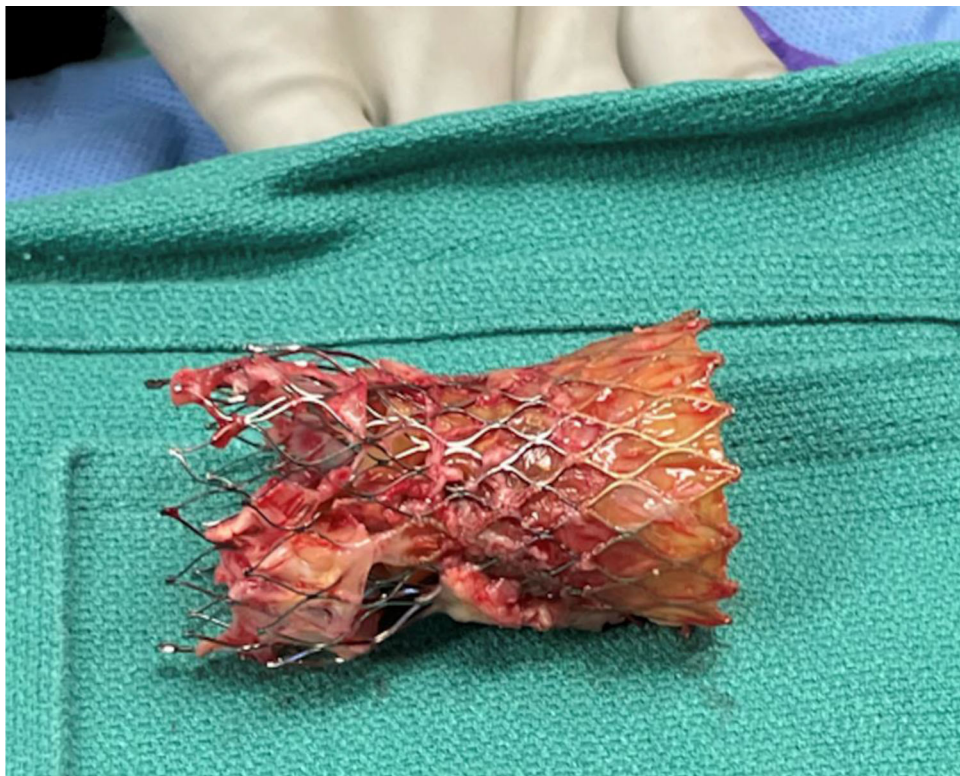


Fig. 3. Explanted TAVR valves.

Symptoms present on a progressive spectrum ranging from intermittent fever to overt heart failure if left untreated. In the elderly, the onset of symptoms is often masked by prolonged intermittent fever or positive blood cultures with no evidence of valvular vegetation [4]. This unfortunately results in delayed diagnosis leading to increased mortality. Our patient presented with altered mentation and intermittent fever with no audible murmur on examination adding a layer to the dilemma. We suggest TEE in the elderly who present similarly after a valve replacement for a more

accurate depiction of the valve status in addition to the routine evaluation of fever. Our patient showed a paravalvular leak around the ViV prosthesis in the TEE that the transthoracic ECHO missed. Reguerio et. al showed that TEE demonstrated vegetation in 68% and paravalvular leak in 18% of cases [5]. Blood cultures in this setting reveal the culprit organism. After 12 months of replacement, encountered organisms are the streptococci and *S. aureus* followed by coagulase-negative staphylococci and enterococci [6].

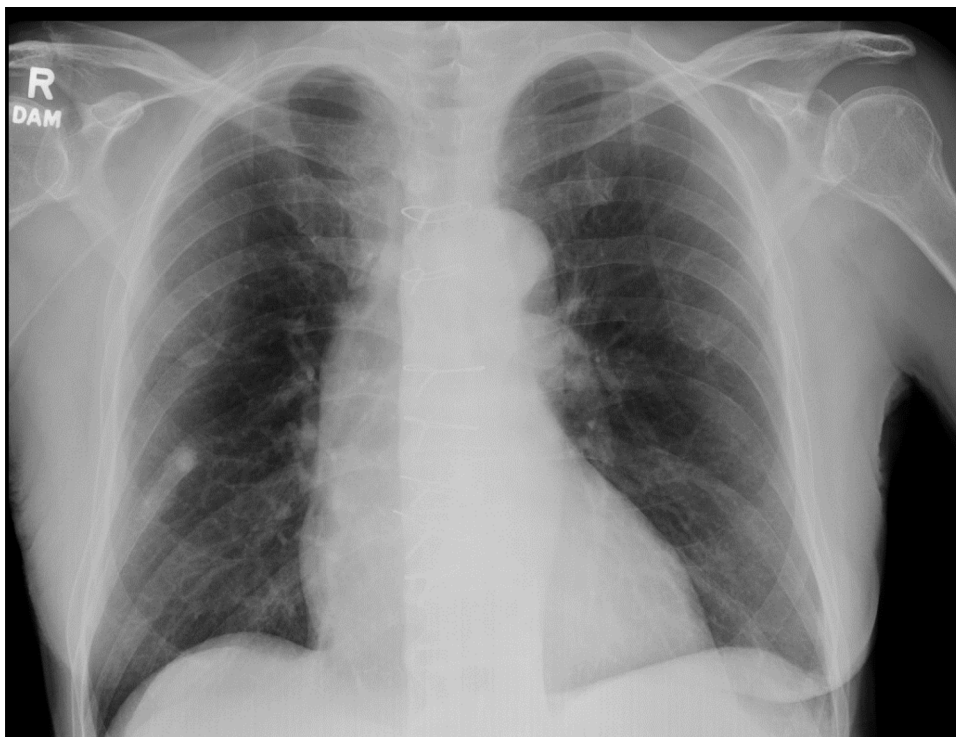


Fig. 4. Post-operative Chest X-Ray shows improvement in aeration and absence of pulmonary vascular congestion.

Explantation and replacement of the aortic valve under the blanket of intravenous antibiotics are currently recommended [7]. We suggest early initiation of antibiotics in the elderly with a similar profile especially on receiving a preliminary report of positive blood culture. The possibility of root replacement should be considered as the decision is to be made intraoperatively. Aortic root replacements were performed in 13.4% of the patients undergoing explantation in one study [8].

Stringent follow-up visits are the mainstay as the incidence of mortality, and strokes are considerable [8] with serial ECHOs to determine the valve status.

CONCLUSION

Transcatheter prosthetic aortic valve endocarditis in the elderly is an often-fatal condition that presents atypically. Diagnosis should be prompt and suspected in the elderly with a similar profile. Surgical explantation with an intravenous antibiotic cover is recommended.

Conflict of Interest and Disclosure

The authors have no conflict of interest.

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NIL

Informed Consent

Written informed consent has been taken from the patient for publication of this case report.

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