



CASE REPORT

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Endocarditis post-TAVR treated by surgical aortic valve replacement. Case report

Endocarditis post-TAVR tratada mediante reemplazo protésico aórtico. Reporte de caso

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ABSTRACT

The current ever-increasing use of TAVR to treat aortic stenosis through all ranges of surgical risk, as well as in younger patients, has begun to pay the price of the challenge, with the complications inherent to such a procedure. Infective endocarditis has been identified as one of the causes for TAVR failure. Even when the overall incidence of infective endocarditis is around 2%, surgical aortic valve replacement to treat such complication is underused in real-world practice. We describe here the case of a 76-year-old male patient diagnosed with post-TAVR endocarditis, who underwent surgical aortic valve replacement for TAVR removal.

Keywords: aortic valve disease, aortic stenosis, infective endocarditis, surgical aortic valve replacement, TAVR, TAVR failure.

Aortic stenosis (AS) is the most frequent valvular disease in developed countries. As a matter of fact, aortic valve diseases are responsible for 61% of all valvular heart disease deaths.¹ The prevalence of AS increases with increasing age of the population. It ranges around 0.2% at 50 to 59 years,

RESUMEN

El uso actual cada vez mayor de TAVR para tratar la estenosis aórtica en todos los rangos de riesgo quirúrgico, así como en pacientes más jóvenes, ha comenzado a pagar el precio del desafío, con las complicaciones inherentes a dicho procedimiento. La endocarditis infecciosa ha sido identificada como una de las causas del fracaso del TAVR. Incluso cuando la incidencia global de endocarditis infecciosa es de alrededor de 2%, el reemplazo quirúrgico de la válvula aórtica para tratar dicha complicación está infrutilizado en la práctica del mundo real. Describimos aquí el caso de un paciente masculino de 76 años con diagnóstico de endocarditis post-TAVR, sometido a reemplazo valvular aórtico quirúrgico para remoción de TAVR.

Palabras clave: enfermedad valvular aórtica, estenosis aórtica, endocarditis infecciosa, reemplazo valvular aórtico quirúrgico, TAVR, TAVR fallido.

1.3% at 60 to 69 years, 3.9% at 70 to 79 years, and 9.8% at 80 to 89 years of age.² The current American clinical guidelines for the treatment of valvular heart disease establish a series of recommendations to treat AS. Transcatheter aortic valve replacement (TAVR) or surgical aortic valve replacement

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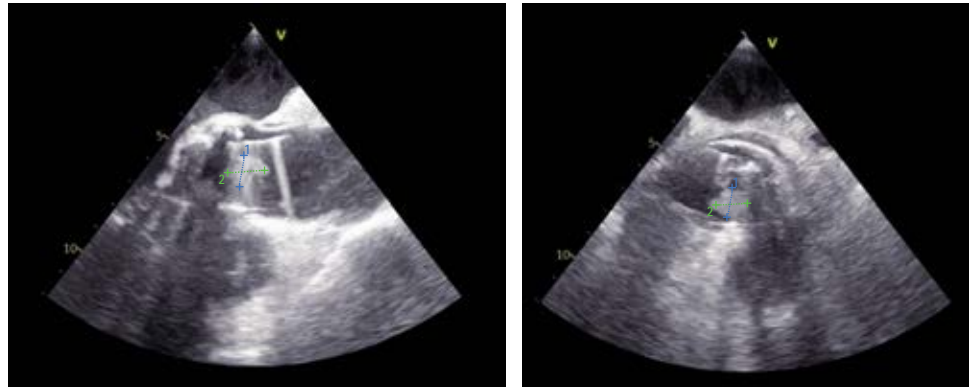
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Figure 1:

Echocardiographic study that shows a large vegetation on transcatheter aortic valve replacement endoprosthesis.



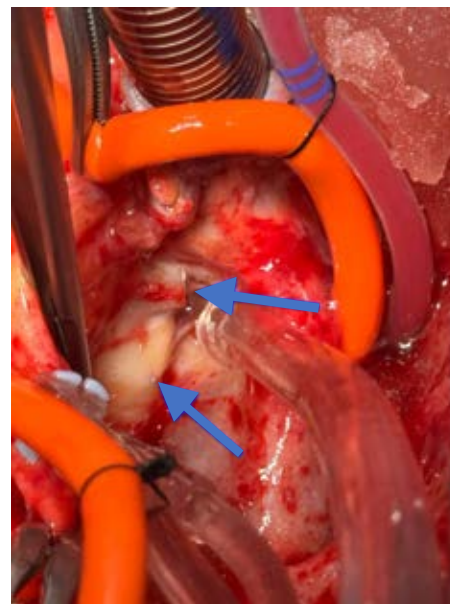
(SAVR) are recommended as class of recommendation I Level of Evidence A in AS symptomatic patients between 65 and 80 years of age, while TAVR is recommended as indication IA over SAVR in patients older than 80 years-old.³ Thus, TAVR has quickly surpassed the usage rates of traditional SAVR, with a relation TAVR:SAVR as 3.4:1 in 2019.⁴

With the increasing rise in TAVR usage, the complications inherent to this technique have been constantly increasing. Causes of SAVR after TAVI failure are multifactorial; degenerative, physical or infectious factors can be identified. The incidence of early infective endocarditis (IE) after TAVR has been reported as 0.86%, late IE of 1.3% (mean follow-up of 3.4 years).⁵ Although the incidence of IE is very similar in TAVR and SAVR, overall mortality has been reported higher in TAVI patients (43%) than in SAVR patients (32.8%).⁶ Moreover, annular abscess is described in 34%, and mitral valve involvement in 31% of cases of IE after TAVI. Also, mitral valve replacement has been reported as necessary in 22% of the series. Postoperative in-hospital mortality for SAVR after TAVR for IE is described in 28%.⁷ Opposed to the above, medical management entails overall hospital mortality of 47%, and 66% at 1-year follow-up. Heart failure and septic shock have been identified as factors associated with increased in-hospital mortality.⁸ Hence, SAVR after TAVR failure due to IE seems to be the preferable treatment of choice, particularly if severe TAVR failure, heart failure, or local extension of the infection are present. Despite this fact, SAVR after TAVR is performed in only approximately 20% of series.⁹

We describe here one case of IE after TAVR, which was successfully treated by means of SAVR.

CASE DESCRIPTION

We present herein the case of a 76-year-old male patient diagnosed with post-TAVR endocarditis. In August 2023 he underwent TAVR for symptomatic aortic stenosis. The patient

**Figure 2:**

Intraoperative view of the aortic root. Blue arrows indicate the unexpected finding of aortic wall perforations due to transcatheter aortic valve replacement stented struts emerging through aortic root.

was admitted for repetitive dizziness and anemia, which required treatment with a transfusion of 4 red blood cells. Due to clinical neurological data, after a screening protocol, hematoma versus left occipital frontal subdural empyema was diagnosed. Given the presence of a diastolic murmur in the aortic focus, the patient was studied by echocardiographic study demonstrating the presence of moderate-severe aortic regurgitation, without significant transaortic gradient, and the presence of multiple vegetations in the aortic endoprosthesis (TAVR), the largest of which was 1.3 by 1.5 cm in diameter (*Figure 1*).

On April 2024, the surgery was performed through standard sternotomy, with extracorporeal circulation and aortic cross-clamping times of 151 minutes and 118 minutes, respectively. Intraoperative findings were three lacerations in the aortic wall (*Figure 2*), aortic endoprosthesis (TAVR) with multiple vegetations on the entire surface of all the three leaflets

(Figure 3), a heavy calcified native valve and annular abscess that extended to the ostium of the left coronary artery. The endoprosthesis (TAVR) was removed (Figure 4). In addition, annulus repair and native valve removal were performed, combined with aortic root repair with ePTFE patch and pericardium to repair the lesions caused by the endoprosthesis (TAVR) (Figure 5). The postoperative course was uneventful, being discharged on the 9th day after surgery. The patient has been checked in the output clinic, with full recovery and free from any major adverse cardiac event.

COMMENT

As the use of TAVR expands, complications related to this transcatheter technique become more common.

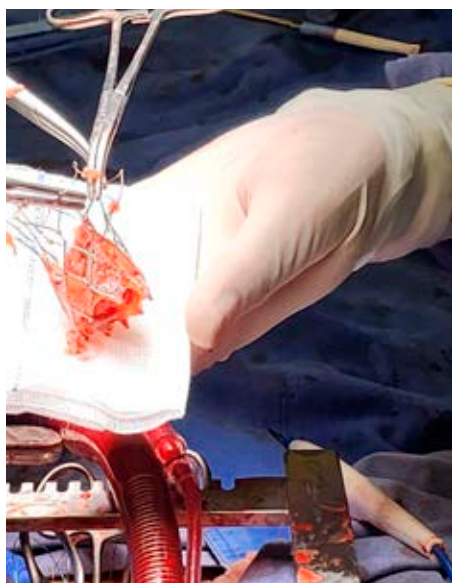


Figure 3:

Transcatheter aortic valve replacement endoprosthesis explanted.

According to data coming from 2019, the most frequently seen complications after TAVR are as follows: in-hospital mortality of 1.3%, 30-days mortality of 2.5%, 1-year mortality of 16%; in-hospital stroke of 1.6%, 30-days stroke of 2.6%; 30-days permanent pacemaker of 10.8%; 30-days moderate-severe regurgitation of 1.6%.⁴ Overall incidence of infective endocarditis has been described as 2%.⁵

Although there are two treatment options for TAVR failure, SAVR after TAVR (TAVR-explant) and redo TAVR have been used in fairly similar proportions. The reported incidence of TAVR-explant is approximately 0.5 to 2% of the series. Out of them, the indication for reoperation SAVR after TAVR (TAVR-explant) is due to endocarditis in 36% of cases, and structural valve deterioration in 64%.¹⁰

As formerly described yet, SAVR after TAVR failure due to IE is indicated particularly if severe TAVR failure, heart failure, or local extension of the infection are present.⁹ Our case presented here showed sepsis clinical data including persistent fever and anemia requiring several red blood packs. Although the patient had dizziness, no evidence of AV block or any other electrocardiographic abnormality was documented. The presence of a heart murmur indicative of aortic regurgitation in the presence of TAVR several months before, led us to an echocardiographic study, whose main findings were vegetations in the TAVR endoprosthesis (one of them > 1 cm in diameter, with a high probability of embolism), in addition to moderate-severe aortic regurgitation.

In our case, both echocardiographic findings were indicative for SAVR after TAVR (TAVR-explanted). Of note, in cases of IE of TAVR, despite operative mortality is much better with early surgery compared to conservative medical management (28 vs 43%), no additional benefit was found in the previous literature.⁹ In fact, only roughly 20% of cases for IE after TAVR undergoes SAVR after TAVR (TAVR-explanted).⁹ We are convinced that the management of IE in

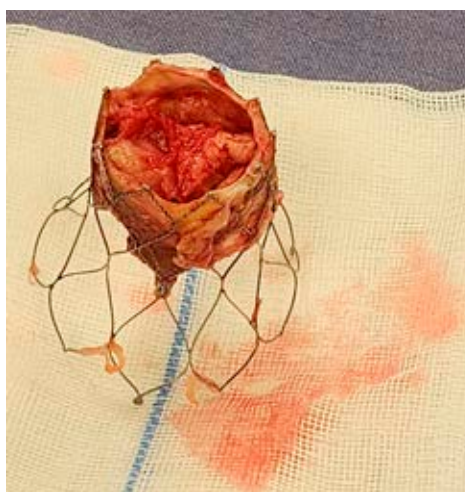
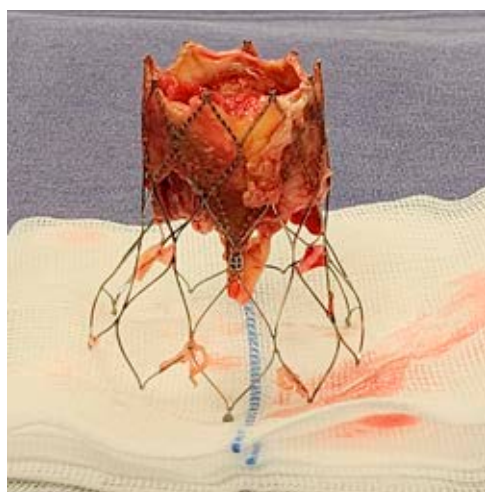


Figure 4:

Transcatheter aortic valve replacement endoprosthesis explanted with multiple vegetations and signs of edema on all prosthetic leaflets.

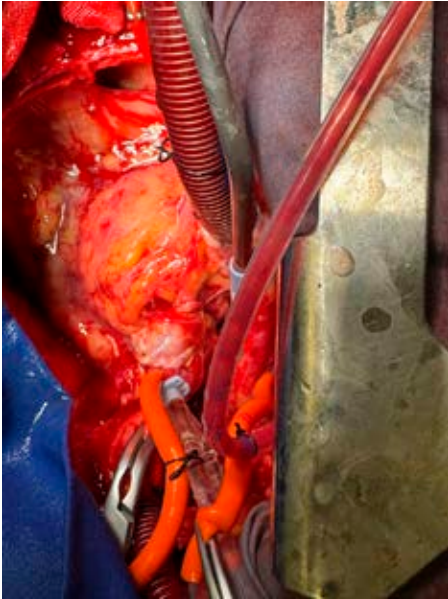


Figure 5:

Final view of the aortic root after repair using PTFE and pericardial patch.

TAVR should be the same as that applied in cases of prosthetic valve endocarditis: uncontrollable infection, extravalvular extension, severe prosthetic failure, heart failure, and presence of vegetations at risk of embolism.⁹ In this case, one vegetation > 1 cm in diameter was present and at high risk of embolism. In addition, severe TAVR failure as severe aortic regurgitation was also indicative for surgery.

Some other findings not seen at the echo were also observed in the operating room. Multiple vegetations on all three aortic leaflets of TAVR endoprosthesis, and periannular abscess extended towards one of the coronary ostia. The unexpected finding of three aortic wall perforations due to TAVR stented struts made aortic root surgery necessary, together with the installation of an aortic prosthesis, just as previously described by Bodwish et al. in 28.8% of cases for SAVR after TAVR (TAVR-explant).¹⁰

When compared to previously described in TAVR de novo complications,⁴ SAVR after TAVR (TAVR-explant) is more dangerous, with operative mortality rate of 15.8%, stroke of 4.5%, renal failure of 11.1%, permanent pacemaker implantation of 14.6%, and the need for some aortic root procedure of 28.8%.¹⁰ Although our case had a complication-free postoperative evolution, operative mortality in these

cases has been reported to be 15.8%.¹⁰ That means an increase between 5 and 10 times when compared to standard SAVR.

CONCLUSIONS

It is important to remark, when thinking in expanding the use of TAVR in low-risk and younger patients, the unnecessary risk of a disproportionate increase in terms of morbidity and mortality. SAVR after TAVR (TAVR-explant) should be highlighted as a real and definite treatment in cases of IE after TAVR.

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