

Prosthetic Valve Endocarditis Five Months following Transcatheter Aortic Valve Implantation and Review of Literature

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ABSTRACT

There are only a few cases of prosthetic valve endocarditis (PVE) following transcatheter aortic valve implantation (TAVI) reported in the literature. Though not very frequent, this is a serious concern because patients are high risk for surgical aortic valve replacement (SAVR) by definition, and explanting the endocarditic prosthetic valve followed by SAVR increases risk even higher.

CASE REPORT

A 65-year-old woman was thought to be high risk for surgical aortic valve replacement (SAVR). The patient underwent transaortic transcatheter aortic valve implantation (TAVI) through a median hemi-sternotomy in December 2013. Her postoperative course was protracted because of her frail condition, but she did not experience major perioperative complications. She was discharged home on the eighth postoperative day. However, she had multiple readmissions for upper gastrointestinal bleedings (UGIB) that required endoscopic interventions. She returned to the hospital four months after TAVI with prosthetic valve endocarditis (PVE) and positive blood cultures for vancomycin resistant *Enterococcus faecalis* (VRE). Transesophageal echocardiography (TEE) revealed large vegetations on the prosthetic valve causing a significant gradient (mean gradient >50 mmHg). The patient was started on multiple antibiotics. During the same admission she experienced a major UGIB, which was managed with an endoclip. The patient was medically optimized and was taken to the operating room for surgical aortic valve replacement.

Surgery

After a median sternotomy, using an oscillating saw, the ascending aorta was cannulated with a 20 French cannula over the wire and the right atrium was cannulated with a single double stage 36-40 venous cannula. The cardiopulmonary

bypass was conducted, cross clamp was applied, antegrade and retrograde cardioplegia was given, and the heart was cooled to 32°C. During the procedure, additional retrograde cardioplegia was given through the coronary ostia. The aorta was opened 2 cm above the sinotubular junction and the valve was exposed. The aorta was found to be severely calcified and the prosthetic valve had multiple cauliflower vegetations but no clear destruction of the prosthetic leaflets. The valve otherwise sat very tightly crushing the native leaflet and there was no evidence of any perivalvular leak. There was a circular large vegetation including all three cusps of the prosthetic valve and a small abscess cavity on the noncoronary leaflet around the annulus. The prosthetic valve could be separated from the annulus without major difficulties. The frame of the valve was grasped with a clamp and a dissector was used to strip aortic tissue away from the prosthetic valve. The removal of the valve did not cause any injury to the aortic annulus and root. Following the removal of the valve, an extensive debridement of the aortic annulus and root was performed as in standard SAVR. The aortic root was irrigated with saline, and diluted Betadine was applied to the area. A size 21-mm Mitroflow aortic valve (Sorin) was implanted in supra-annular fashion using interrupted pledgeted 2-0 Tycron sutures. The aortotomy was closed with a running suture of 4-0 Prolene. Furthermore, the left atrial appendage was ligated using a TigerPaw device



Figure 1. Transthoracic echocardiography showing a large vegetation on the prosthetic valve.

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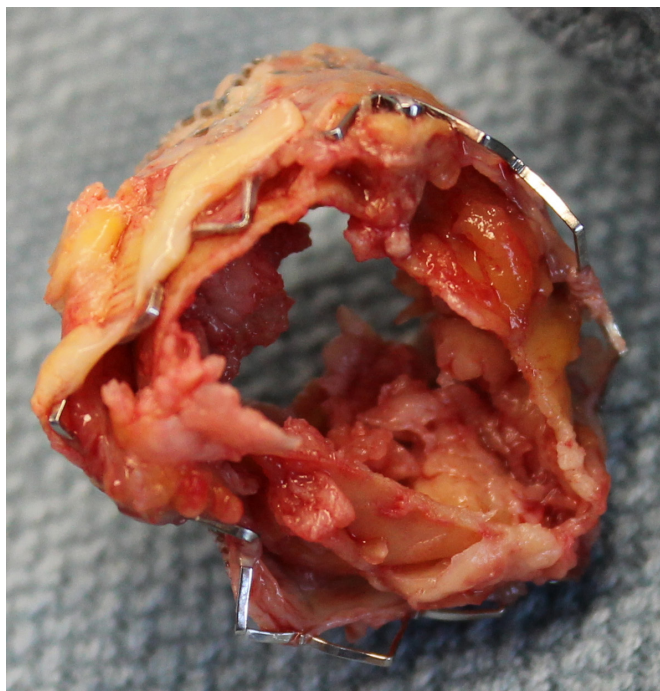


Figure 2. Explanted valve with large vegetations and near occlusion stenotic valve.

(TigerPaw System, Maquet, Fairfield, NJ, USA) because of her chronic atrial fibrillation. The patient was weaned off bypass without any difficulty and decannulated. Perioperative TEE demonstrated correct positioning of the new prosthetic valve and no sign of any paravalvular leak. The patient recovered from surgery and could be extubated on postoperative day 4. However, she had to be reintubated due to respiratory failure. The rest of her postoperative course was complicated by sepsis and multisystem organ failure. The patient expired on postoperative day 19. A postmortem autopsy was evident of necrotizing pancreatitis as the most plausible explanation for her ongoing sepsis and multisystem organ failure.

DISCUSSION

Considering the fact that TAVI is a fairly new procedure, there is not enough experience in documenting post-TAVI endocarditis, and the majority of reports in the literature are case reports. Echocardiography as a diagnostic tool is often inconclusive in the diagnosis of PVE following TAVI [Puls 2013]. The current literature regarding management of PVE following TAVI is limited to a few case reports and small case series, which have reported various treatment and outcomes [Puls 2013; Wilbring 2014; Loverix 2013; Santarpino 2013]. Further, PVE is not included in the Valve Academic Research Consortium (VARC) criteria, which makes its diagnosis and documentation more difficult [Neragi-Miandoab 2014].

In a series of 180 patients, Puls et al reported PVE in 3.4% ($n = 5$) of patients at one year. The authors suggested that leaving behind the calcified native aortic valve and the

paravalvular leak exposes the patients to a turbulent flow and possible endocarditis [Puls 2013]. Additional risk factors for PVE include frail condition of TAVI patients, age, and preoperative comorbidities [Puls 2013]. Wilbring et al reported PVE following transapical aortic “valve-in-valve” TAVI [Wilbring 2014]. As in our case report, Wilbring et al performed SAVR in their patient, which was found to be technically feasible [Wilbring 2014]. As with our patient, however, the patient expired two weeks later due to ongoing sepsis with an unidentifiable source of infection [Wilbring 2014]. Santarpino et al reported surgical management of PVE following TAVI in an 83-year-old woman who presented with positive blood cultures for *Enterococcus faecalis* with a large mobile vegetation and subvalvular abscess [Santarpino 2013]. The patient underwent SAVR and closure of the abscess cavity with a pericardial patch [Santarpino 2013]. Castiglioni et al reported a case of PVE in a patient with Osler-Weber-Rendu syndrome who underwent TAVI to avoid the risk of bleeding [Castiglioni 2012]. The patient was diagnosed with PVE and underwent an uneventful SAVR [Castiglioni 2012]. Head et al reported PVE with *Histoplasma capsulatum* a few months following TAVI, and although high risk, the patients survived SAVR [Head 2011]. While SAVR remains the gold standard for PVE, some authors report medical management of PVE due to the high surgical risk for these patients [Loverix 2013]. In one case, PVE seven months after TAVI caused by *Staphylococcus haemolyticus* was inoperable, due to a history of coronary artery bypass grafting with patent bypasses and a poor general prognosis. Therefore, the patient was successfully treated with antibiotic therapy [Loverix 2013].

Conclusion

This case report adds some limited knowledge to post-TAVI endocarditis on the prosthetic valve. A high degree of suspicion is required to initiate the diagnostic studies early. Further, removal of the valve is feasible without any damage to the aortic root and coronary arteries. Including the post-TAVI endocarditis into VARC criteria may help to establish a standardized documentation of this serious complication. Finally, the dismal outcome of surgical intervention in PVE following TAVI attests to the fact that these patients carry a prohibitive risk for traditional aortic valve replacement.

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