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Infective aortitis after self-expanding transcatheter valve implantation: a case report of a new reality for cardiac surgeons

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Abstract

A 62-year-old female patient was admitted to hospital care due to an ischaemic stroke and fever of unknown origin, 6 months after a transfemoral aortic valve implantation for symptomatic aortic stenosis. Further study resulted in the diagnosis of infective aortitis, and clinical course deemed prosthesis explantation necessary. In this case report, we describe the technique used to explant the partially endothelized aortic valve and review the alternatives found in literature for safe prosthesis removal.

Keywords: Transcatheter aortic valve replacement • Aortitis • Valve surgery

CASE REPORT

A 62-year-old female patient presented to the emergency department with disorientation, low-grade fever and night sweats over the past 2 weeks. She had from B-cell chronic lymphocytic leukaemia, chronic anaemia, rheumatoid arthritis, morbid obesity, asthma and severe sleep apnoea. Six months prior, she had been considered a patient with high surgical risk and offered a self-expanding size 27 Medtronic™ CoreValve™ Evolut™ transfemoral valve implantation to treat symptomatic severe aortic stenosis. Initial workup showed leucocytosis and elevated C-reactive protein levels. Cerebral computed tomography revealed a subacute ischaemic stroke, and the initial echocardiogram was innocent, except for aortic root thickening. Blood cultures were drawn before the initiation of broad-spectrum antibiotics.

The suspicion of endovascular infection increased when blood cultures were positive for *Enterococcus faecalis*. Transoesophageal echocardiography revealed a voluminous cavity, contiguous with the right aspect of the aortic wall around the superior border of the CoreValve (Video 1). The findings were confirmed by thoracic computed tomography angiography (Fig. 1A and B). Given the implications of the diagnosis, positron emission tomography was requested, which revealed avid fluorodeoxyglucose uptake on the topography of the protrusion from the ascending aorta (Fig. 1C).

Persistent fever, leucocytosis and positive haemocultures deemed surgery unavoidable. After sternotomy, the pseudoaneurysm protruded from the aortic wall (Fig. 2A). The aorta and right atrial appendage were cannulated to establish cardiopulmonary bypass. The aorta was cross-clamped and divided high above the frame of the CoreValve after administering cold blood cardioplegia. The cavity was evident from inside the aorta, above the non-coronary cusp and adjacent to the superior border of the valve, which was endothelized at the level of the aortic root and left ventricle outflow tract. Two polypropylene sutures were passed through the upper holes on the CoreValve frame, one in each half of the structure, and their ends were passed through rubber snuggers (Video 2). These snuggers were passed inside an aortic prosthesis sizer. Tying them and pushing the sizer against the aortic annulus made the upper part of the valve nitinol mesh coalesce and separate from the aortic wall (Fig. 2B and C). Iced water was poured into the surgical field to soften the mesh. Cautious dissection was used to completely separate the tightly adherent inferior half of the prosthesis. Explantation provoked a tear in the anterior leaflet of the mitral valve, which was straightforwardly corrected. The pseudoaneurysm was excluded from the aortic lumen using a pericardial patch, and a size 23 bioprosthesis was implanted before aortic closure. The cardiopulmonary bypass time was 124 min, and the intraoperative echocardiogram revealed a normally functioning prosthesis. After 180 min of surgery, the patient was admitted to intensive care, where she remained for 2 days. Intravenous antibiotics were administered for 6 weeks before she was discharged, 42 days after surgery.

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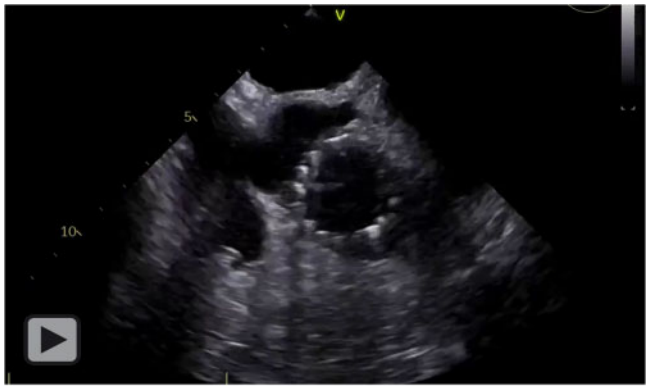

Video 1: Transthoracic echocardiogram showing a cavity continuous with the aortic lumen throughout the CoreValve™ mesh.

Video 2: Step-by-step of CoreValve explantation.

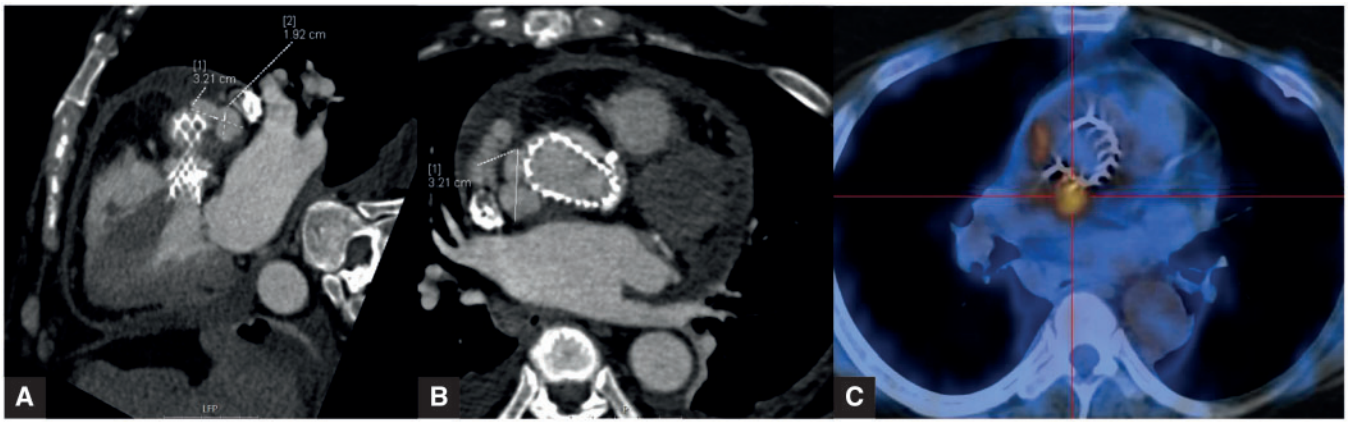

Figure 1: (**A**, **B**) Oblique and axial planes of the thoracic computed tomography angiogram revealing a protrusion from the aortic wall continuous with the vessel lumen, adjacent to the superior border of the prosthesis. (**C**) Positron emission tomography summary graphic showing avid fluorodeoxyglucose uptake on the topography of the pseudoaneurysm.

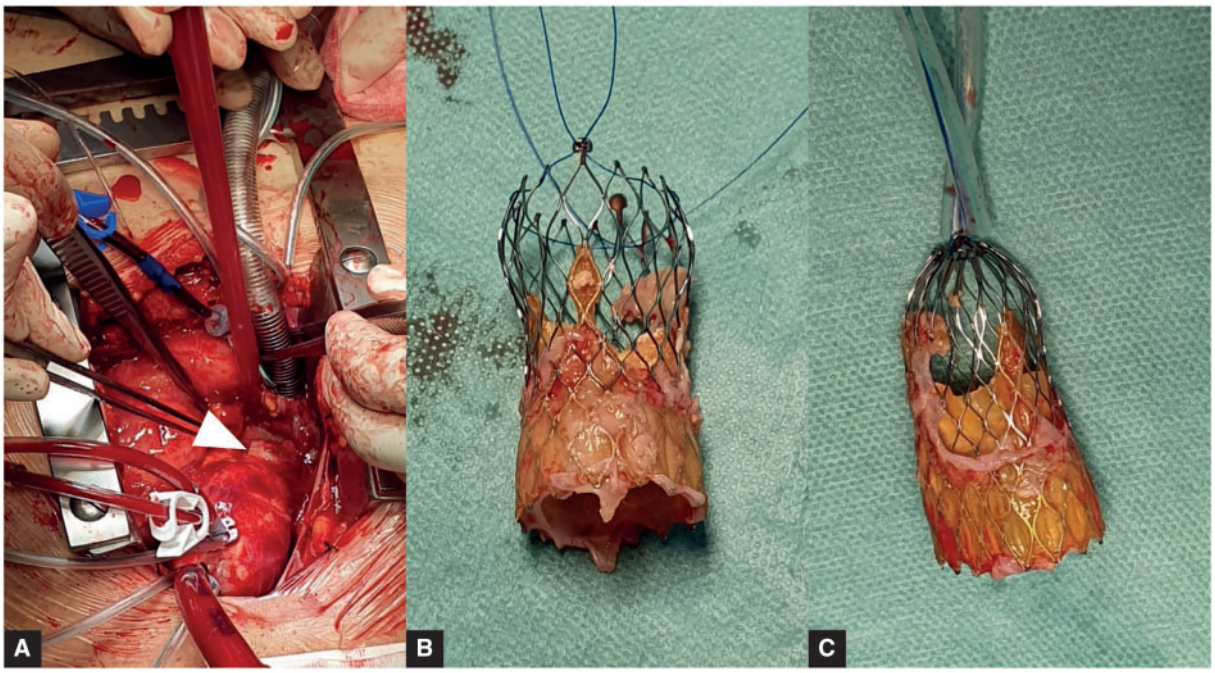

Figure 2: (**A**) Arrowhead points to the protrusion from the aortic wall. (**B**, **C**) Side-by-side comparison of the CoreValve™ after explantation, before and after tying the snuggers passed through the upper holes of its mesh.

DISCUSSION

Transcatheter aortic valve replacement is an established treatment for aortic valve disease and its use and indications are expanding [1]. This is paralleled by the growth of transcatheter aortic valve replacement complications, and cardiac surgeons share responsibility in its management.

In the largest series of surgical aortic valve replacements after transcatheter aortic valve replacement, outcomes were worse than expected [2]. This was partially attributed to the complexity of prosthesis removal and CoreValve explantation has additional particularities [2, 3]. Therefore, safe removal of the valve was the main concern of our team. Simple traction was successfully used by Thyregod *et al.* [4] in a non-endothelized valve, while Bruschi *et al.* [5] described using sutures and a pushing device (the original deployment system). We partially employed this technique; however, additional dissection was needed to completely explant the valve, which we attribute to a longer time since the index intervention.

Conflict of interest: none declared.

Reviewer information

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