

MINI-FOCUS ISSUE: INTERVENTIONAL COMPLICATIONS AND THEIR MANAGEMENT

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

A Rare Complication of Transcatheter Aortic Valve Replacement



Aortic Root–Left Atrium Fistulization

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ABSTRACT

The authors report the case of an 87-year-old man undergoing transcatheter aortic valve replacement via transfemoral approach who developed a life-threatening complication, i.e., fistulization between the aortic root and the left atrium, which was successfully treated by surgery. At 6-month follow-up, the clinical course was uneventful. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2019;1:116–7) © 2019 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Aortic wall injury during transcatheter aortic valve replacement (TAVR) is a rare and life-threatening complication. Annular rupture can be classified into supra-annular, annular, subannular, and combined injury (1). Supra-annular rupture usually occurs during balloon overdistension when aortic root and/or sinotubular junction are heavily calcified and aortic cusps are pressed toward the aortic wall.

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Incidence, clinical impact, and management strategies of post-TAVR aseptic intracardiac shunts have not been well investigated. We report the case of a patient that developed an iatrogenic fistula between the aortic root and the left atrium (LA) after TAVR and that underwent successful surgical repair. An 87-year-old man was admitted to our hospital with dyspnea due to severe aortic stenosis. Transthoracic echocardiography revealed an ejection fraction of 55% and a mean transaortic gradient of 51 mm Hg. Because of the coexistence of several comorbidities (EuroSCORE [European System for Cardiac Operative Risk Evaluation] II: 9.74%; Society of Thoracic Surgery risk score: 12.37%), the patient was scheduled for TAVR. Pre-operative computed tomography showed bulky calcification of the aortic cusps. Due to the elliptic shape of the annulus (ellipticity index: 1.2) and its diameters (minimum: 25 mm; maximum: 30 mm; area: 5.6 cm²) (Supplemental Figure 1), the Heart Team decided to implant a 29-mm Edwards Sapien 3 bioprosthesis (Edwards Lifesciences LLC, Irvine, California). After pre-dilatation with a 25 × 40 mm balloon, the prosthesis was implanted through femoral access with no intraprocedural complications, reducing the mean gradient to 10 mm Hg. Two days later, the patient developed dyspnea and hypotension. Transthoracic echocardiography confirmed normal gradients and showed a well-seated prosthesis; a mild posterior leak and an abnormal flow into the LA were detected. Transesophageal echocardiography revealed perforation of the mitro-aortic continuity with left sinus of Valsalva pseudoaneurysm and inferior fistulization through the interatrial septum draining into the LA (Figure 1, Videos 1, 2, 3, and 4). Due to rapid hemodynamic deterioration, the patient underwent surgery. The aorto-LA fistula appeared evident at surgical inspection. The LA wall was repaired with direct suture. After prosthesis removal, the aortic annulus was reconstructed with a Teflon strip, with consequent reduction of the

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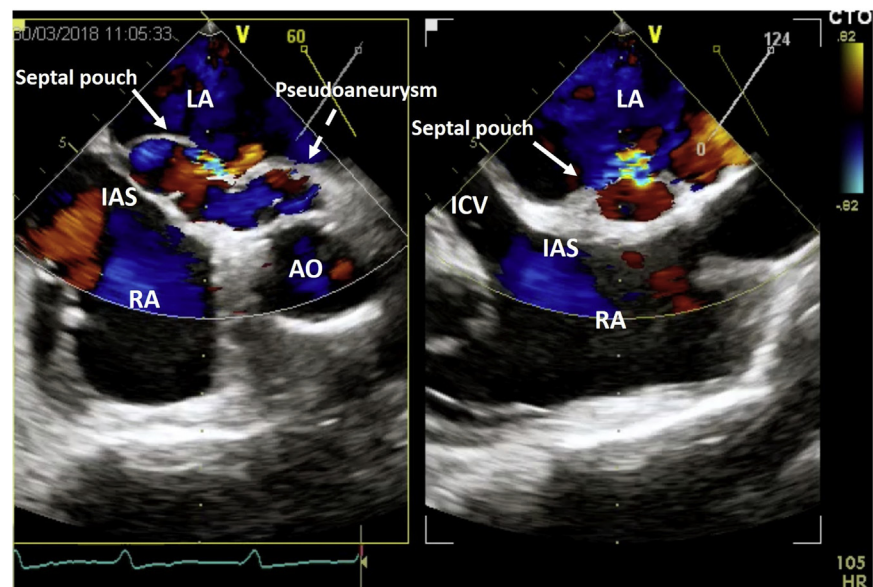
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annulus diameter to 23 mm. Subsequently, a new aortic bioprosthesis (BioIntegral Versaflex 23 mm, BioIntegral Surgical, Inc., Mississauga, Canada) was implanted. At 6-month follow-up, the clinical course was uneventful. Transthoracic echocardiography showed no intracardiac shunts and normal transprosthetic mean pressure gradient (9 mm Hg) without significant periprosthetic leak. As has also been confirmed in a recent multicenter study (2), this is not the first case of an iatrogenic fistula between the aortic root and the LA after TAVR (3). However, to the best of our knowledge, this is the first case where this fearsome complication occurred using the transfemoral approach and was successfully treated by surgery. Surgical repair and valve replacement should be considered in patients with intracardiac shunts due to supra-annular rupture involving the sinus of Valsalva. Conversely, a conservative approach with frequent imaging-guided follow-up may be adopted in hemodynamically stable patients with self-limiting aortic wall rupture post-TAVR. Percutaneous or surgical intervention should be considered by the Heart Team if clinical instability arises.

**ABBREVIATIONS
AND ACRONYMS**

LA = left atrium
TAVR = transcatheter aortic valve replacement
TTE = transthoracic echocardiography

FIGURE 1 An Unusual Acquired Intracardiac Aseptic Shunt



Multiplane transesophageal echocardiography view at 60° and 124° showing pseudoaneurysm of the aortic root (dotted arrow) with wide fistulization through the interatrial septum draining into the left atrium (LA) (septal pouch) (solid arrows). See Videos 1, 2, 3, and 4. AO = aortic root; IAS = interatrial septum; ICV = inferior caval vein; RA = right atrium.

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KEY WORDS aorta, cardiovascular surgery, complication, echocardiography, intracardiac shunt, valve replacement

APPENDIX For a supplemental figure and videos, please see the online version of this paper.