

SNAPSHOTS

A holy situation: An unexpected complication during a transcatheter aortic valve implantation procedure[☆]



Uma complicação inesperada durante um procedimento de TAVI

Inês Ferreira Neves^{*}, Tiago Mendonça, Ruben Ramos

Department of Cardiology, Hospital de Santa Marta, Centro Hospitalar Universitário de Lisboa Central, ULS S. José, Lisbon, Portugal

Received 22 January 2025; accepted 29 January 2025
 Available online 5 April 2025

An 86-year-old male patient underwent transcatheter aortic valve implantation (TAVI) for severe aortic stenosis, having presented with syncope. His past medical history was relevant for dyslipidemia, right bundle branch block, chronic kidney disease and peripheral artery disease.

Prior to the procedure, an echocardiography showing a peak velocity in aortic valve of 5 m/s, with mean pressure gradient of 69 mmHg and an area of valve of 0.95 cm² and a computerized tomography (CT) scan demonstrating a tricuspid aortic valve of 24.9 mm diameter according to 78.2 mm perimeter of aortic annulus had been performed. The valvular calcium score was 3645, with a valvular area of 0.8 cm². A severe calcification of the aortic arch was also noted on the CT scan (Figure 1A–C).

A SAPIEN 3 ULTRA valve was implanted (Supplemental video 1). Pre-dilation was performed with a valve balloon dilated to 22 mm. After the implantation of the

valve, a moderate residual leak was noted (Supplemental videos 2 and 3). Post-dilation with the same balloon was attempted, encountering difficulty with balloon progression (Supplemental video 4). At this time, the patient presented with hemodynamic collapse and cardiac arrest. Echocardiogram showed no pericardial effusion, excluding annular rupture, and the coronary arteries were patent. While performing advanced life support maneuvers, an aortography was performed, revealing a rupture at the transition between the aortic arch and the descending aorta (Figure 2 and Supplemental video 5). Tamponade with a 28 mm balloon was performed and a TEVAR 28 mm was implanted with subsequent dilation using a RELIANT balloon. While resolution of the active rupture was achieved angiographically (Figure 3 and Supplemental videos 6–8), and despite 55 minutes of resuscitation maneuvers, cardiac rhythm could not be restored.

Aortic rupture is a rare complication of TAVI, occurring in <1% of the procedures, but it is generally catastrophic.^{1,2} Rupture can occur from puncture of the aorta by the delivery catheter when trying to advance around an acute angulation in a tortuous aorta.² A high level of suspicion is needed, and the diagnosis should be considered in any patient undergoing TAVI who experiences hemodynamic instability.^{1,2} It

[☆] Clinical case winner of the Young Intervention Cardiologist Award 2024 in the structural intervention category.

^{*} Corresponding author.

E-mail address: inessferreiraneves@gmail.com (I. Ferreira Neves).

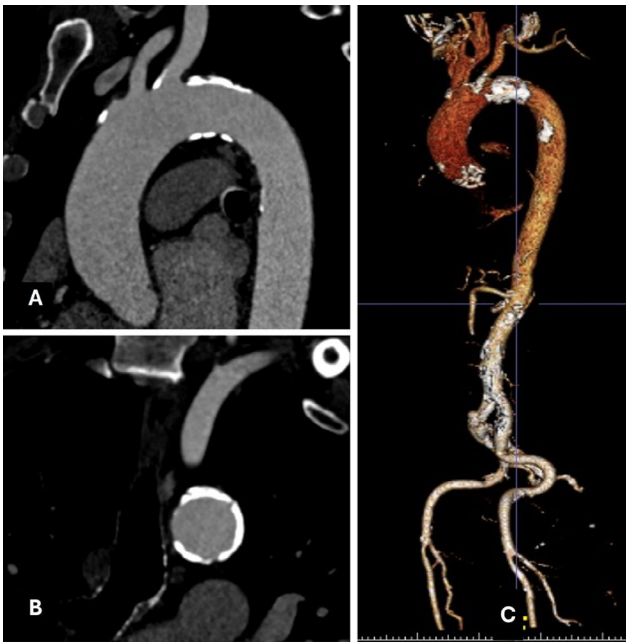


Figure 1 (A–C) Calcification of the aortic arch in the CT scan.



Figure 2 Aortic rupture at the transition between the arch and the descending aorta.

is a life-threatening complication, as it causes rapid onset hemorrhagic shock. Management options include surgical or endovascular repair (with covered stent grafts).² Despite appropriate interventions, mortality remains high.^{1,2}

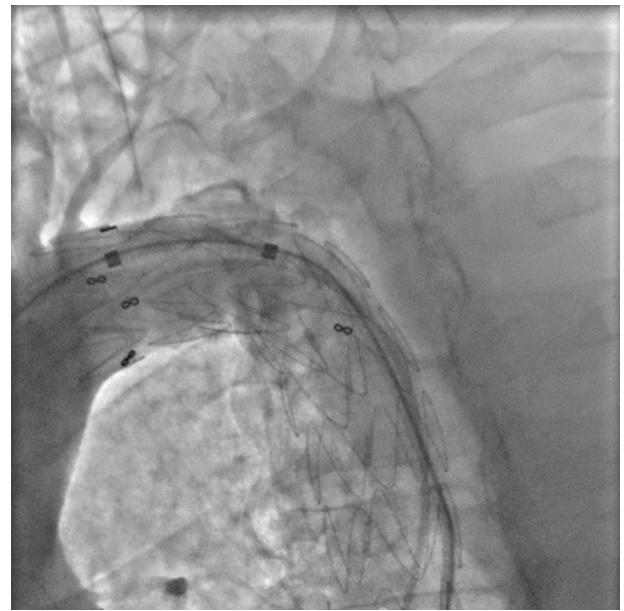


Figure 3 Angiographic resolution with a TEVAR 28 mm.

Funding

We declare that there is no funding for this work.

Conflicts of interest

None of the authors have conflicts of interest to disclose.

Appendix A. Supplementary data

Supplementary material associated with this article can be found in the online version at <https://doi.org/10.1016/j.repc.2025.01.004>.

References

1. Mangla A, Gupta S. Vascular complications post-transcatheter aortic valve procedures. *Indian Heart J.* 2016;68:724–31.
2. Coughlan JJ, Kiernan T, Mylotte D, et al. Annular rupture during transcatheter aortic valve implantation: predictors, management and outcomes. *Interv Cardiol Rev Res Resour.* 2018;13:140–4.