


Procedural Vignettes in Structural Heart Disease

Iatrogenic Aortic Stenosis During a Case of Aortic Paravalvular Leak Closure

Jennifer Jdaidani, MD^a, Dounia Z. Iskandarani, MSc^a, Omar Chaabo, MD^a, Pierre M. Sfeir, MD^b, Ziyad M.B. Ghazzal, MD^a, Walid Gharzeddine, MD^a, Fadi J. Sawaya, MD^{a,*} 

^a Division of Cardiology, American University of Beirut Medical Center, Beirut, Lebanon

^b Division of Cardiothoracic Surgery, American University of Beirut Medical Center, Beirut, Lebanon

ARTICLE INFO

Article history:

Submitted 27 October 2021

Revised 12 January 2022

Accepted 31 January 2022

Available online 25 March 2022

Keywords:

Aortic paravalvular leak closure

Aortic stenosis

Iatrogenic aortic stenosis

Paravalvular leak

Percutaneous device closure of paravalvular leak

Case Presentation

We report the case of a 70-year-old male patient with prior aortic valve replacement (AVR) using a Carpentier-Edwards PERIMOUNT Magna Ease pericardial bioprosthesis 19 mm valve for severe aortic stenosis. He presented to our institution 2 years later with severe hemolytic anemia requiring regular blood transfusions and pulmonary edema hospitalizations.

Transthoracic echocardiography showed a stenotic valve with a mean pressure gradient of 37 mm Hg (postoperative gradient of 28 mm Hg), as well as a torrential central and paravalvular aortic regurgitation ([Supplemental Video 1](#)). Given the small valve implanted and the high probability of recurrent patient-prosthesis mismatch, the heart team opted for a strategy of percutaneous paravalvular leak (PVL) closure to address the hemolytic anemia and aortic PVL, with a staged valve-in-valve transcatheter AVR with bioprosthetic valve fracture, to achieve the biggest effective orifice area.

Under general anesthesia and transesophageal echocardiography guidance, multiple PVL leaks were crossed using MP/AL1 and Terumo wires, leading to the insertion of 3 large 13 × 5 mm Amplatzer Vascular Plugs III (AVP III; [Supplemental Videos 2-5](#)). The paravalvular regurgitation significantly decreased from torrential to mild with a small residual anterior jet ([Supplemental Videos 6 and 7](#)).

AVP III has an oblong cross-sectional shape made of multiple Nitinol mesh layers and has extended rims. Device rims extending beyond the device body enable covering a larger surface area, making AVP III our device of choice in big crescentic and extensive leaks like this case.

Despite a mild hemolytic anemia improvement (lactate dehydrogenase from 1150 to 678 IU), the patient was readmitted for pulmonary edema 2 months later. Transthoracic echocardiography showed mild central aortic regurgitation and mild PVL, however, with an increase in transaortic mean pressure gradient to 48 mm Hg and a restricted movement of one of the cusps ([Figure 1](#)).

Given the persistent elevated lactate dehydrogenase with some blood transfusion requirements, we believed a surgical AVR would be the best approach at this point.

Intra-operatively, we found 2 AVP III plugs well seated in the perivalvular space with, to our surprise, the third plug located in an intravalvular position obstructing flow while sealing a perforated leaflet ([Figure 2](#) and [Supplemental Video 8](#)). Adjacent leaflet perforation was also appreciated in another cusp. The valve was replaced with an appropriate size 23 mm Carpentier-Edwards PERIMOUNT Magna Ease pericardial bioprosthesis.

This case was worthwhile reporting, as we failed to perceive the leaflet perforation and the intravalvular location of one of the plugs with transesophageal echocardiography, although appreciated retrospectively when the plug was detected moving with the leaflet in systole and diastole ([Supplemental Videos 9 and 10](#)). Proper imaging and careful panning from left anterior oblique to right anterior oblique in this small 19 mm valve could have appreciated the location of the crossing wire and

Abbreviations: AVP III, Amplatzer Vascular Plug III; AVR, aortic valve replacement; PVL, paravalvular leak.

* Address correspondence to: Fadi J. Sawaya, MD, American University of Beirut Medical Center, Cairo Street, Beirut, Lebanon

E-mail address: fjsawaya@gmail.com (F.J. Sawaya).

<https://doi.org/10.1016/j.shj.2022.100022>

2474-8706/© 2022 The Author(s). Published by Elsevier Inc. on behalf of Cardiovascular Research Foundation. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

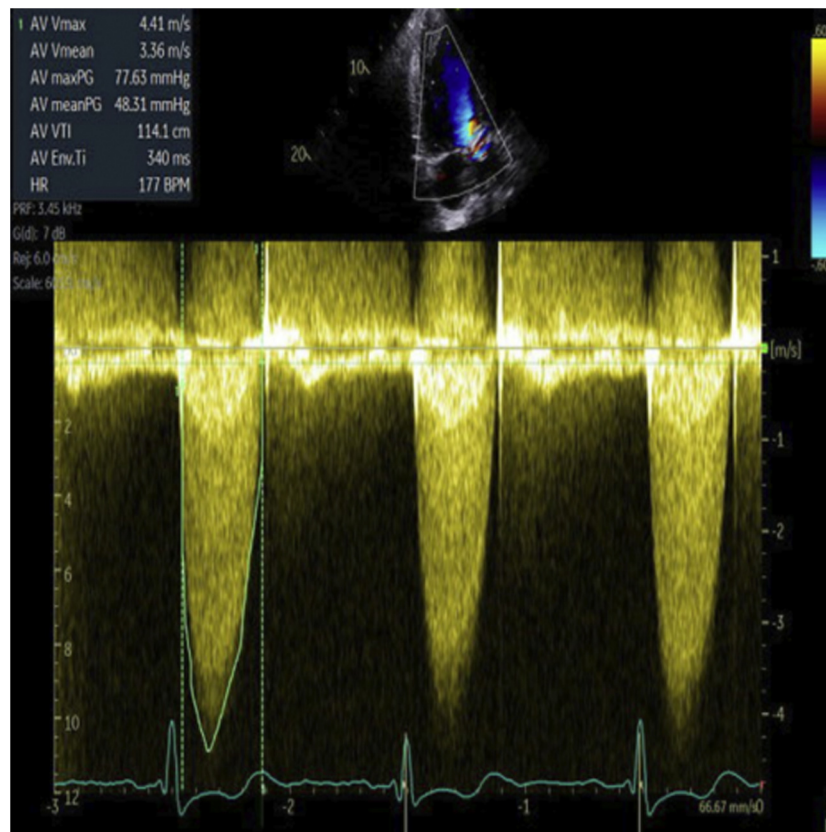


Figure 1. Severe aortic stenosis on transthoracic echocardiography: Aortic bioprosthesis stenosis with mean pressure gradient of 48 mm Hg.

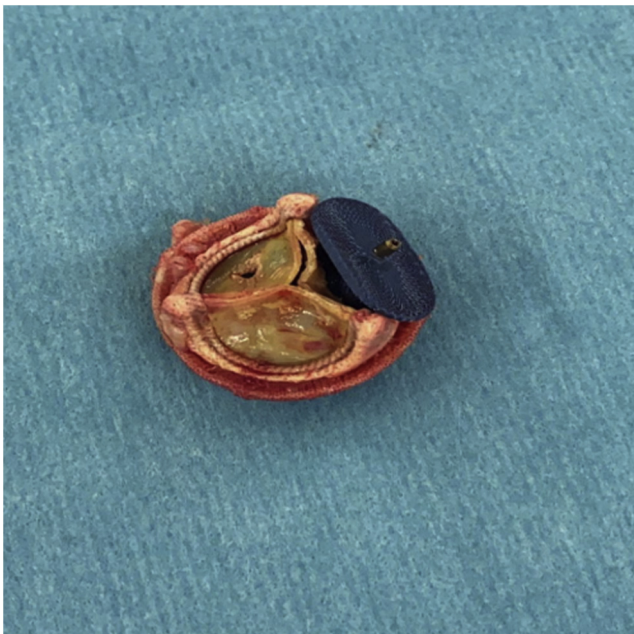


Figure 2. Intravalvular Plug: Amplatzer Vascular Plug III (AVP III) plug sealing an aortic leaflet perforation. Adjacent leaflet perforation in another cusp is appreciated as well.

avoided this iatrogenic aortic stenosis. Moreover, transgastric images would have allowed us to appreciate the increase in aortic gradients.

ORCIDiS

Fadi J. Sawaya  <https://orcid.org/0000-0002-6623-4243>

Consent Statement

Patient consent for publication has been obtained by the authors.

Funding

The authors have no funding to report.

Disclosure statement

F.J.S. is a TAVR proctor for Edwards Lifesciences, Medtronic, Abbot Vascular, and Boston Scientific. All remaining authors have nothing relevant to disclose.

Supplementary Material

Supplemental data for this article can be accessed on the [publisher's website](#).