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Balloon-Assisted Valve Tracking

Atraumatic Retrieval of a Ventricularized Transcatheter Aortic Valve Prosthesis



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We report a novel percutaneous approach for the retrieval of a migrated balloon-expandable transcatheter aortic valve (TAVR) that: 1) minimizes interaction with the unstable valve; 2) stabilizes it on an arteriovenous rail; and 3) minimizes vascular trauma.

A 90-year-old gentleman underwent successful TAVR with a 23-mm SAPIEN 3 Ultra valve, with no residual gradient or paravalvular regurgitation (Video 1).

The following day, the patient developed hemolysis and acute renal injury, and was found to have severe paravalvular regurgitation on echocardiogram (Video 2). Aortography showed the valve had slipped into the left ventricular outflow tract, with the top of the frame pinning the native leaflet open (Video 3).

We considered valve-in-valve TAVR, but felt the valve was too unstable to cross retrograde or pass a new valve through it. To prevent it from embolizing and inverting inside the ventricle, we stabilized the valve by wiring it antegrade (Figure 1). Transseptal access was obtained under transesophageal echocardiographic (TEE) guidance, and the mitral valve was crossed with a balloon-tipped catheter. The valve was crossed with a Versacore wire (Abbott Vascular, Santa Clara, California), which was exchanged for a 400-cm

Nitrex flexible shaft guidewire (Medtronic, Dublin, Ireland), which was snared and externalized through the femoral artery.

A 25-mm NuCLEUS-X balloon (Braun, Kronberg, Germany) was advanced retrograde, and its tapered waist was centered inside the prosthesis. The balloon was inflated while rapidly pacing, securing the prosthesis between the balloon shoulders, and pulled en bloc from the ventricle to the proximal descending aorta (Figure 2, Video 4).

Aortography confirmed no dissection or perforation of the aorta (Video 5). The valve was then stabilized with a 30-mm Z-stent (Cook Medical, Bloomington, Indiana) (Video 6).

We elected to defer repeat TAVR (Figure 3). Transesophageal echocardiographic demonstrated mobile native leaflets and only mild regurgitation, suggesting either leaflet compliance improved or the stenosis had been overestimated. The patient recovered and was discharged the following day.

Valve migration into the left ventricular outflow tract is a rare, but potentially devastating, complication that often requires sternotomy. Obtaining central wire access across the valve is critical to eliminate the potential for it to invert and obstruct ventricular outflow. The antegrade transseptal approach achieves

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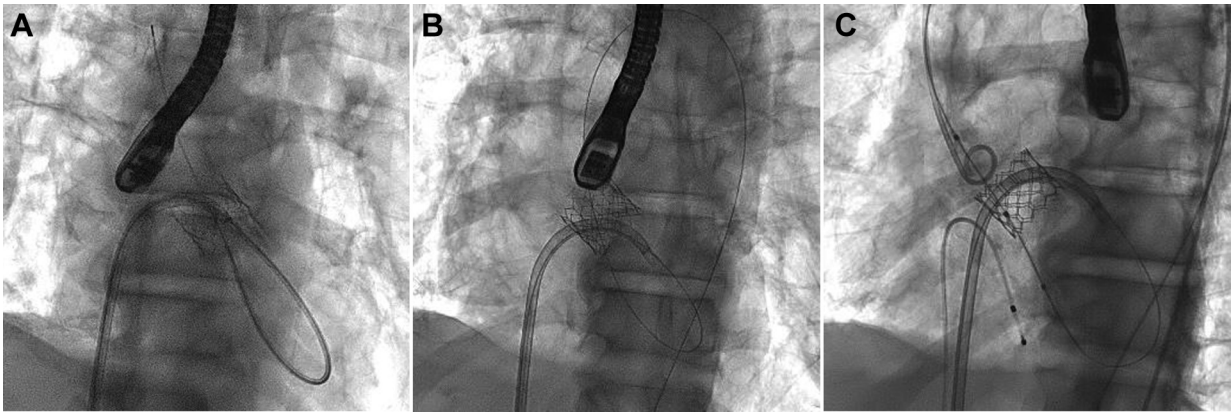
The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC: Cardiovascular Interventions* [author instructions page](#).

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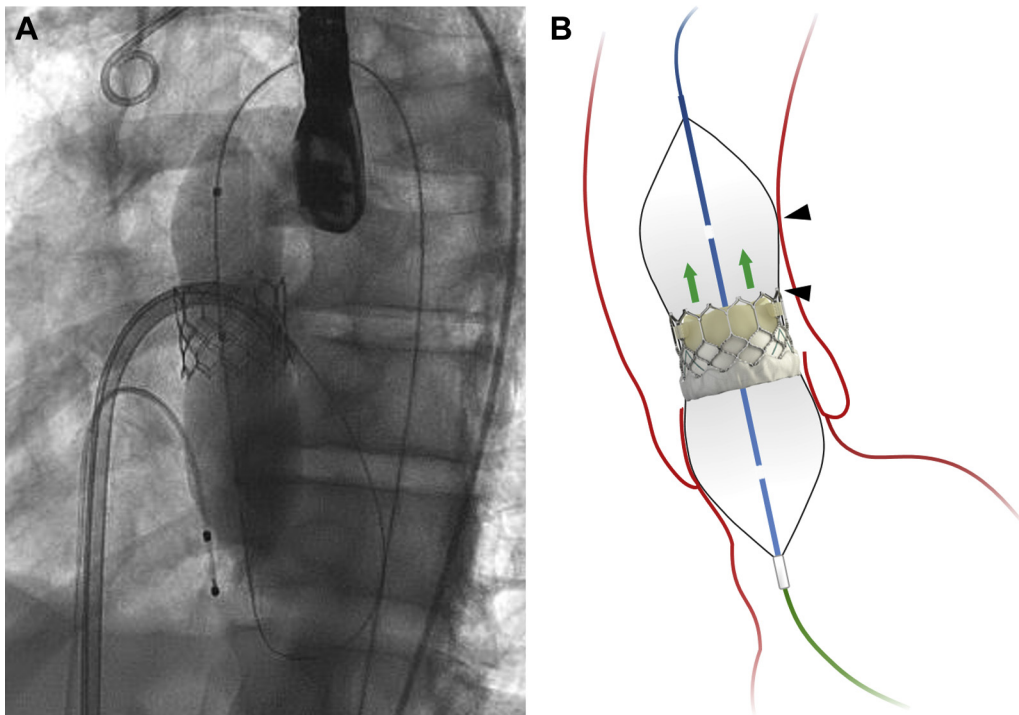
<https://doi.org/10.1016/j.jcin.2020.06.052>

FIGURE 1 Antegrade Wiring, Externalization, and Balloon Positioning

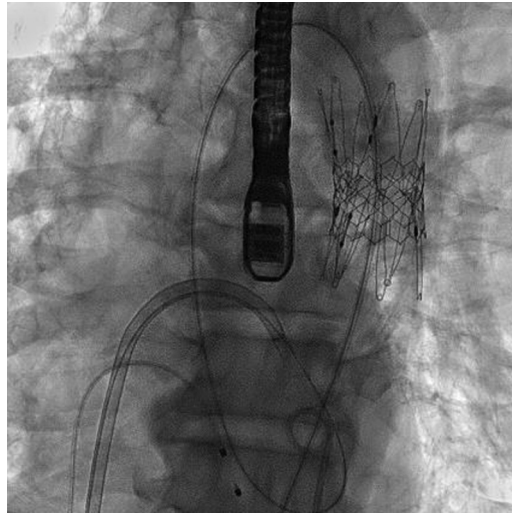


(A) Antegrade wiring, (B) externalization, and (C) balloon positioning.

FIGURE 2 Balloon-Assisted Valve Retrieval and Schematic



(A) Balloon-assisted valve retrieval and (B) schematic. Balloon shoulders protrude beyond the leading edge of the frame (arrowheads) minimizing vascular trauma.

FIGURE 3 Final Valve Position

this without disturbing the valve. Utilizing a “dog bone”-shaped balloon such as the NuCLEUS allows for the valve to be repositioned without further expanding it, and the oversized shoulders protect the aorta from the frame.

AUTHOR RELATIONSHIP WITH INDUSTRY

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS balloon-assisted tracking, complication, embolization, migration, TAVR, transcatheter aortic valve replacement

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