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IMAGES IN INTERVENTION

Novel Technique for Implanting the Second Valve Accompanied by Simultaneous Snorkel Stenting

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In this article, we report details on the case of an 86-year-old woman with severe aortic stenosis and a history of coronary artery stenting who underwent transcatheter aortic valve replacement (TAVR) with a 23-mm balloon-expandable valve. Following leaflet malfunction and significant aortic regurgitation after postdilatation, a second valve was successfully implanted using a novel technique involving simultaneous orthotopic snorkel stenting to protect the left coronary artery. This approach ensured optimal valve positioning while avoiding sinus sequestration and maintaining coronary artery patency, as confirmed by postprocedural imaging and angiography.

Transvalvular leakage after TAVR with the SAPIEN 3 Ultra RESILIA (Edwards Lifesciences), a balloon-expandable transcatheter heart valve, is rare. While TAVR-in-TAVR as a bailout technique is effective, it can sometimes lead to coronary obstruction and potentially fatal outcomes. To the best of our knowledge, the technique we report herein is unprecedented, as it combines the implantation of a second valve with coronary protection using orthotopic snorkel stenting.

We believe that our study makes a significant contribution to the literature because this case highlights a unique solution for managing complications during TAVR, combining a second valve implantation with coronary protection through snorkel stenting. We believe that this technique also offers potential applicability in managing long-term transcatheter heart valve degeneration.

An 86-year-old woman presented with external dyspnea. Echocardiography revealed a severe aortic stenosis. Computed tomography showed an annulus area of 363 mm^2. TAVR with a 23-mm balloon-expandable transcatheter heart valve (THV) was performed.

Following implantation of a 23-mm THV, postdilatation was performed (Video 1). After dilatation, aortography revealed significant aortic regurgitation (Video 2). Transesophageal echocardiography confirmed a transvalvular leak, leading to the implantation of a second valve. The patient had a narrow sinotubular junction; therefore, the risk of sinus sequestration after the second valve implantation was high. Therefore, we decided to protect the left coronary artery.

Engagement was attempted from outside the valve; however, this was difficult because of the narrow space. Consequently, a strut was placed at the uppermost end (**Figure 1A**). Critically, positioning the second valve at the same height deformed the coronary stent; thus, the second valve had to be

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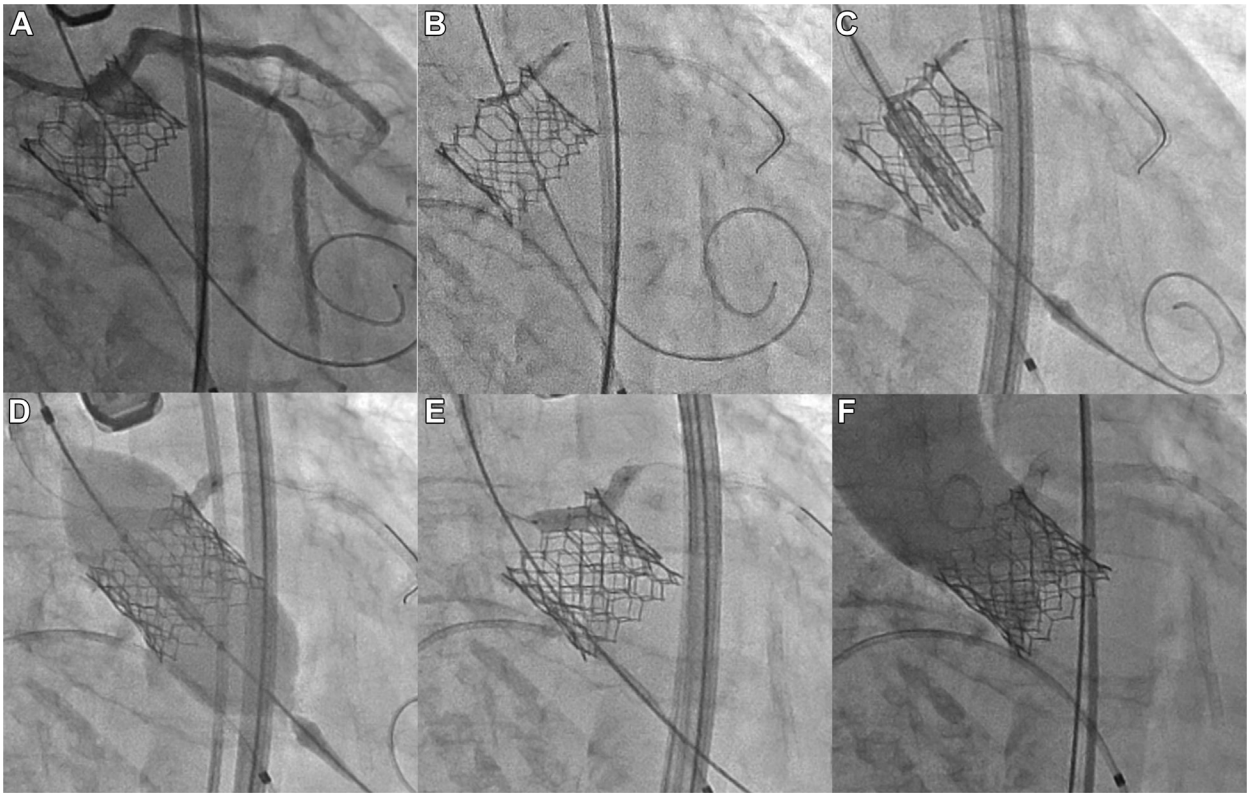
shifted downward according to the diameter of the coronary stent. A 4 × 20 mm² everolimus-eluting coronary stent was placed (**Figure 1B**), and the second valve was carefully delivered (**Figure 1C**, Video 3). The second valve (23-mm THV) was positioned downward by half a strut, and simultaneous dilation was performed (**Figure 1D**, Video 4). Postdilation was performed (**Figure 1E**), and the procedure was completed (**Figure 1F**, Video 5). Cardiac computed tomography confirmed that each valve had been implanted with a 3-mm gap between them, and the coronary stent was not deformed (**Figure 2**, Video 6).

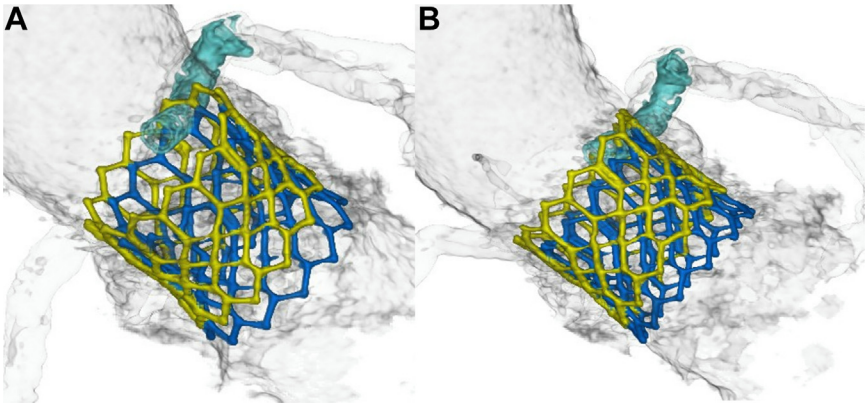
Leaflet malfunction of THV is rare, with only a few previous reports.[1] The technique in this report is novel, as it combines implantation of a second valve with coronary protection using simultaneous orthotopic snorkel stenting. This technique can also be used to address long-term TAVR valve degeneration.

FIGURE 1 Implanting the Second Valve Accompanied by Simultaneous Orthotopic Snorkel Stenting



(A) Coronary angiography; (B, C) positioning of the coronary stent and second valve; (D) simultaneous dilation of the second valve and coronary stent; (E) postdilatation of the coronary stent; (F) final aortography.

FIGURE 2 3-Dimensional Analysis Using Cardiac Computed Tomography



(A) The coronary stent was not deformed; (B) 2 prosthetic valves implanted with a 3-mm gap. The first valve is shown in yellow, the second valve in blue, and the coronary stent in green.

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KEY WORDS sinus sequestration, snorkel stenting, structural valve deterioration, TAVR-in-TAVR, transvalvular leakage

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