

CASE REPORT

ADVANCED

TECHNICAL CORNER: EDITOR'S HIGHLIGHTS

Balloon Fracture During TAVR

Effective and Repeatable Technique Not Written in the Textbook



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ABSTRACT

An 88-year-old man was referred to transcatheter aortic valve replacement for severe symptomatic aortic stenosis. Edwards 26-mm Sapien bioprosthetic valve (Sapien) implantation was planned after accurate computed tomography-based procedure planning. When the valve was released, the inflation pressure decreased rapidly due to the balloon bursting. (**Level of Difficulty: Advanced.**) (J Am Coll Cardiol Case Rep 2022;4:455-459) © 2022 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/>).

An 88-year-old man was referred to transcatheter aortic valve replacement for severe symptomatic aortic stenosis. Edwards 26-mm Sapien bioprosthetic valve (Sapien) implantation was planned after accurate computed tomography-based procedure planning (**Central Illustration**).

The procedure was performed using right femoral approach to advance the Edwards 14F eSheath

Introducer. When the valve was released, the inflation pressure decreased rapidly due to the balloon burst (**Video 1**). The aortic valve was already correctly released. The balloon catheter was immediately pulled back into the descending aorta. Its 2 edges had the shape of 2 facing parachutes (**Figure 1, Video 2**). Although the proximal could be easily withdrawn into the sheath, the distal one prolapsed over the sheath edge and could not be further retracted back into the delivery system (**Figures 1 and 2**).

In accordance with the suggestions of the manufacturer, emergency cardiosurgical intervention appeared to be the solution.^{1,2} However, the difficulty of clamping the aorta and the retroperitoneal seat of the aorta gave an inauspicious outcome to the procedure.

LEARNING OBJECTIVES

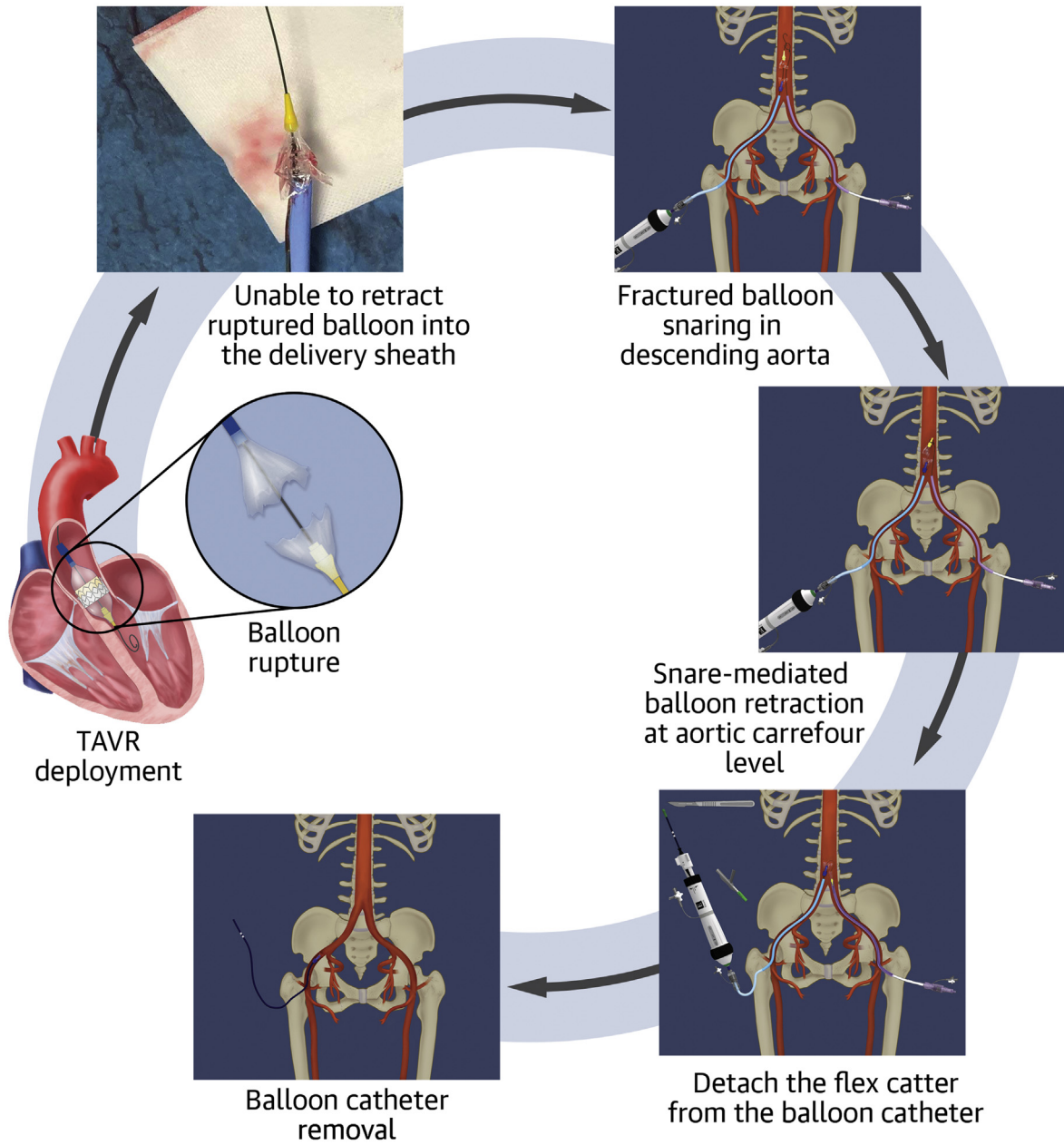
- Balloon fracture can be an unwanted complication during Edwards Sapien TAVR.
- We describe a full endovascular technique to recover the 2 constituting parts of the fractured balloon.

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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 [Author Center](#).

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CENTRAL ILLUSTRATION Management of Balloon Rupture During TAVR



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FIGURE 1 Flask Broken in 2 Parts, Not Recoverable by Introducer

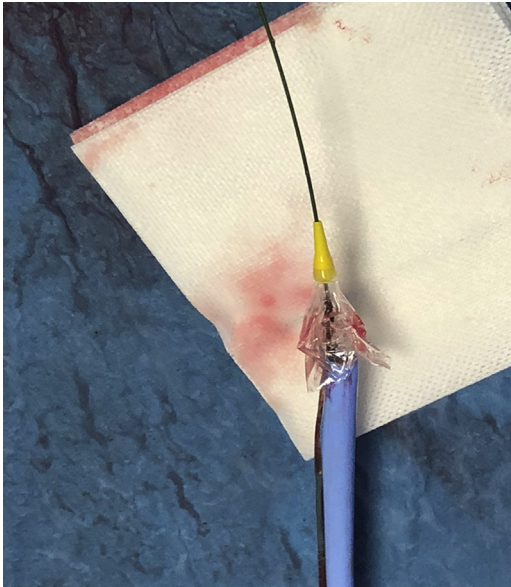


FIGURE 2 Flask Broken in 2 Parts, Not Recoverable by Introducer (Angiography)



The knowledge of the exact internal structure of the delivery balloon was crucial to provide the chance of a complete endovascular solution to this unwanted complication. The 0.038-inch wire slides within an internal bar jointly integrated with the noscom, which is in turn attached to the distal edge of the balloon. Conversely, the internal bar is surrounded by a larger catheter—the one constituting the visible shaft of the catheter—which is distally connected with the proximal edge of the balloon. The concept of a complete endovascular solution to this complication is based on the separability of these 2 parts—the internal one linked to the distal edge of the balloon by the noscom, while the outer shaft to the proximal one.¹

Having this in mind, left femoral artery percutaneous access was obtained and an 18-F sheath advanced just above carrefour (Figure 3). The wire of the delivery system was then captured at the level of the descending thoracic aorta by a Goose-neck snare (Figures 3 to 5, Videos 3 and 4), previously advanced from left access. The 2 systems—the fractured balloon together with the delivery system and the snare entrapping the 0.038-inch wire—were thus gently pulled back in parallel just above the aortic carrefour. The delivery wire was then

FIGURE 3 Snare (First Step)

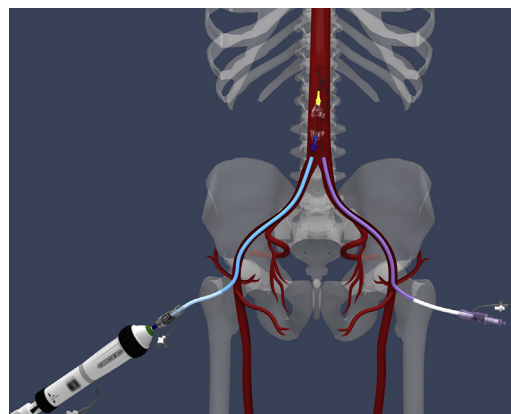


FIGURE 4 Snare (First Step Angiography)

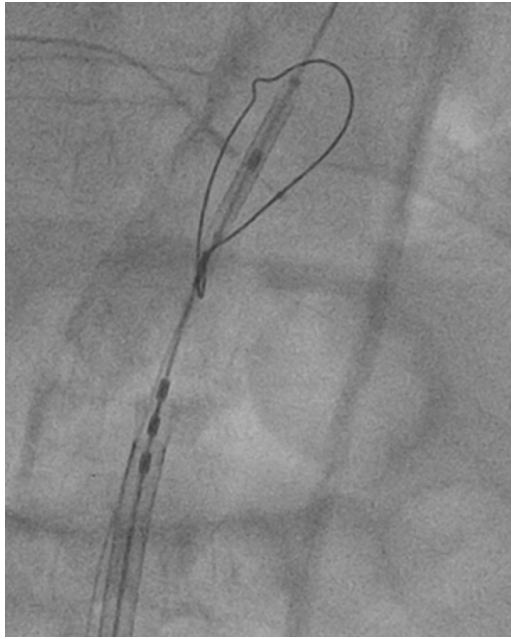


FIGURE 5 Snare (Second Step Angiography)

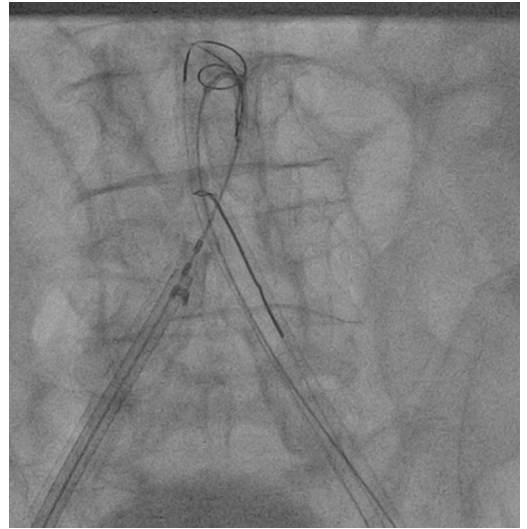
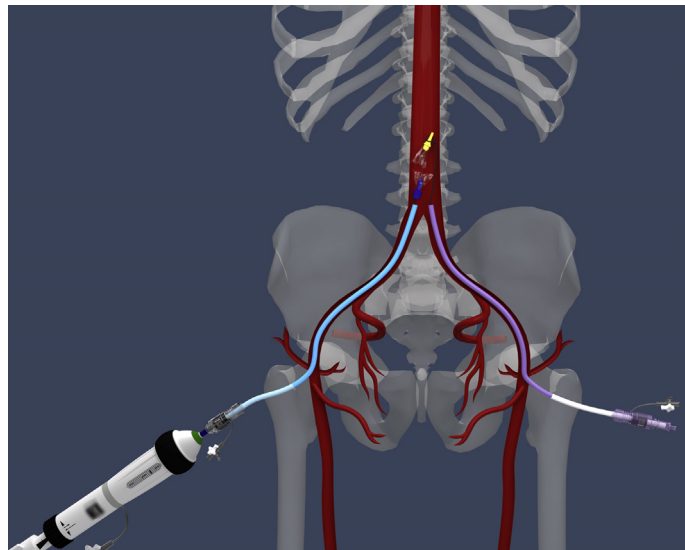


FIGURE 6 Snare (Third Step)



externalized, thus creating a right-to-left femoral loop. The snare was again readvanced from left femoral sheath over the wire up to the noscom, which was then easily captured at the level of aortic carrefour (Videos 5 to 7). At this stage, the shaft of the catheter was cut with a blade just distally to the Y valve to free the internal core (Figures 5 to 7, Videos 5 to 7). In this way, the system internal core-noscom-distal edge of the balloon was gently removed, simply tractioning the snare through the left femoral access. As the final step, the proximal part of the balloon adhering to the balloon catheter was easily pulled out from the right femoral sheath (Figure 8, Videos 8 and 9)

The patient was asymptomatic and consequently discharged home after 3 days. After a few weeks after the successful management of this complication, we had a similar balloon fracture during valve positioning, we repeated the same maneuver with effective resolution of the complication in approximately 30 minutes.

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Dr. Berti has been a proctor for Abbott, St. Jude, and Edwards. All other authors have reported that they have no relationships relevant to the content of this paper to disclose.

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FIGURE 7 Detach the Flex Catheter From the Balloon Catheter

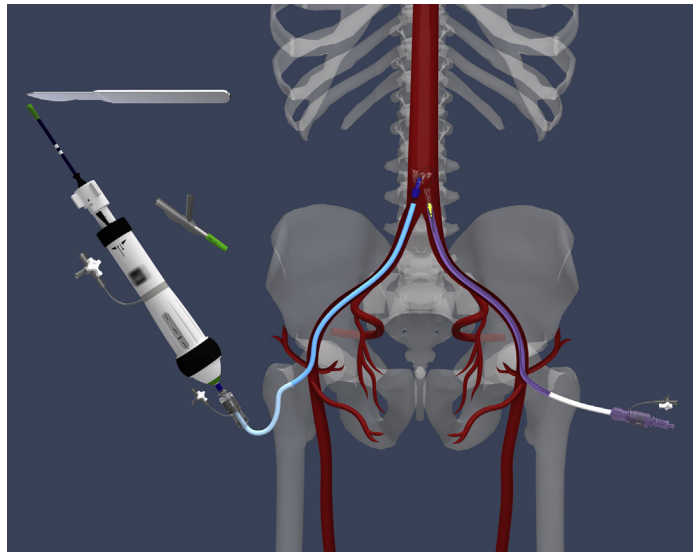
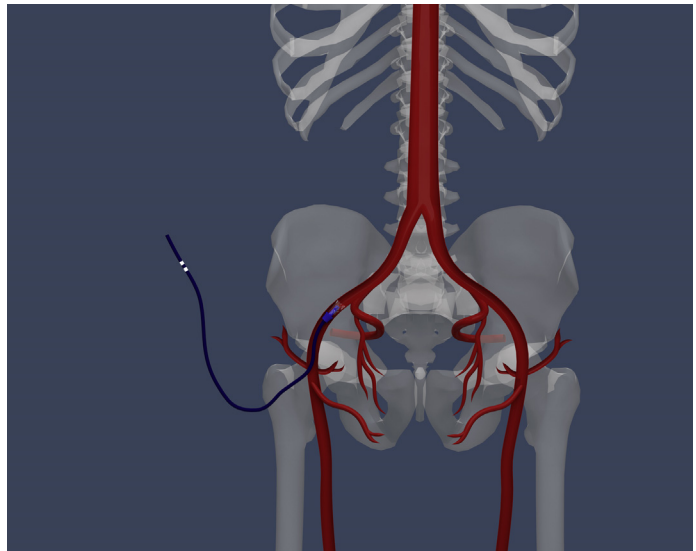


FIGURE 8 Balloon Catheter Removal



REFERENCES

1. Edwards SAPIEN 3 Kit - Transfemoral instructions for use. Released Date: 2016-11-08.
2. Arai T, Hovasse T, Chevalier B. Fracture of the delivery balloon shaft during balloon-expandable prosthesis alignment during implantation of an Edwards SAPIEN 3. *Catheter Cardiovasc Interv*. 2018;91:997-999.

KEY WORDS balloon fracture, new technique, transcatheter aortic valve replacement system

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