

A Case of Successful Reopening of Left Main Coronary Artery Occlusion After Transcatheter Aortic Valve Replacement



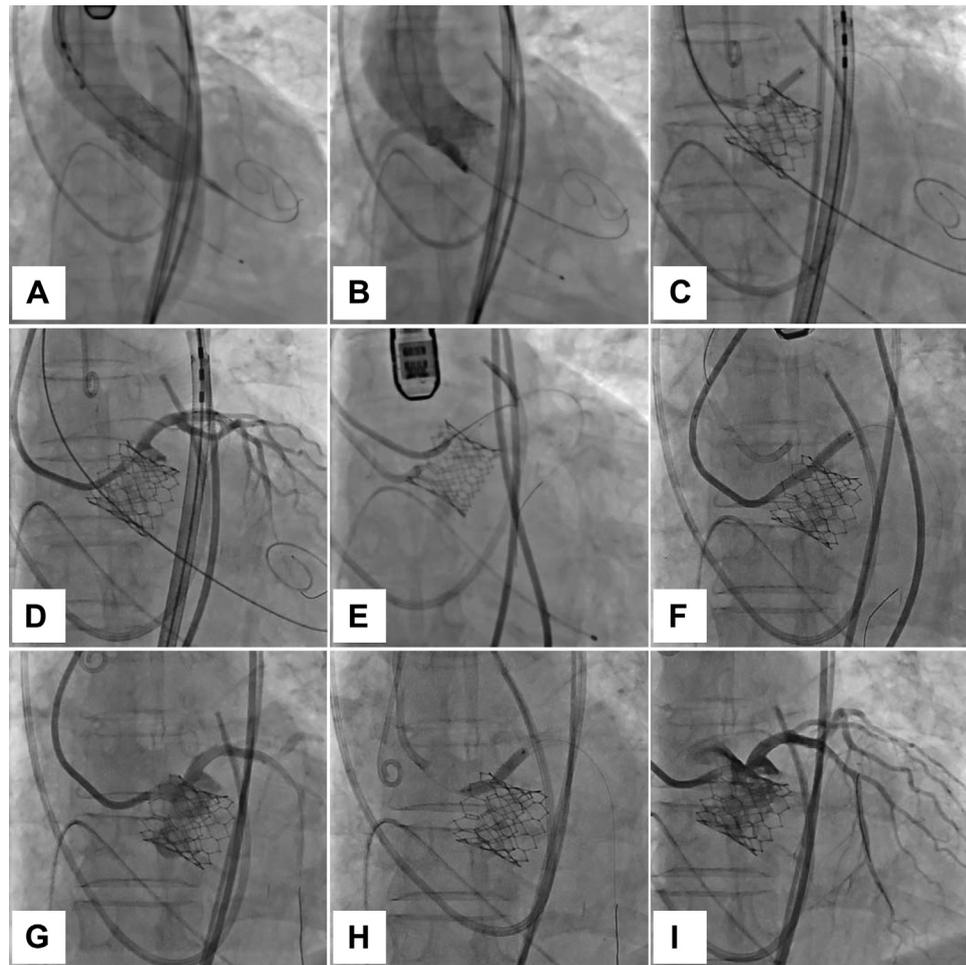
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An 86-year-old woman with severe aortic stenosis was referred for transcatheter aortic valve replacement (TAVR). The transfemoral TAVR procedure was conducted under general anesthesia. Aortography during pre-dilatation with a 20-mm balloon demonstrated reduced blood flow through the left main coronary artery (LMCA). A 0.014-inch guidewire with a 3.0-mm noncompliant balloon catheter was placed in the left anterior descending coronary artery before valve implantation. A 23-mm SAPIEN 3 valve (Edwards Lifesciences, Irvine, California) was deployed under rapid right ventricular pacing (Figure 1A). Aortography immediately after the valve implantation demonstrated total occlusion of the LMCA ostium, and the patient developed cardiogenic shock (Figure 1B). The LMCA was immediately dilated using the 3.0-mm noncompliant balloon catheter, and the hemodynamic condition improved (Figures 1C and 1D). As the metallic frame of the SAPIEN 3 covered the LMCA ostium, there were 2 ways to access the LMCA (Figure 2A): 1) from outside the metallic frame using the guidewire placed in the coronary artery; and 2) through the metallic frame of the SAPIEN 3 after crossing another 0.014-inch coronary guidewire.

The second way was chosen because we considered more physiological coronary blood flow could be achieved. We tried to advance another 0.014-inch guidewire into the left anterior descending coronary artery (Figure 1E). However, although we were crossing the guidewire, the patient again became hypotensive. We gave up the attempt and instead used the first way. We dilated the 3.0-mm noncompliant balloon catheter and a 3.5 mm × 23 mm everolimus-eluting stent was implanted (Figure 1F). An intravascular ultrasound examination revealed that the proximal half of the stent was compressed by the native aortic wall and the implanted valve (Online Video 1). Balloon dilatation using a 4.5-mm noncompliant balloon catheter was conducted twice. Coronary angiography showed good coronary flow (Figure 1G), but stent compression was still observed on performing fluoroscopy. Another 3.5 mm × 15 mm drug-eluting stent was implanted (Figure 1H), and post-dilatation using the 4.5-mm noncompliant balloon catheter was performed with a high inflation pressure. Intravascular ultrasound examinations showed improved stent compression (Online Video 2), and the procedure was completed (Figure 1I). Post-procedural multislice computed tomography imaging showed the

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FIGURE 1 Fluoroscopic Image During the Procedure

Fluoroscopy during the procedure: **(A)** 23-mm SAPIEN 3 valve implantation; **(B)** aortography after the valve implantation showing the left coronary artery occlusion; **(C)** balloon dilatation; **(D)** coronary angiography after the balloon dilatation; **(E)** trying to cross a guidewire into the left main coronary artery; **(F)** an everolimus-eluting stent is implanted in the left main coronary artery through the guidewire placed in advance of the valve implantation. The proximal half of the stent is compressed by the native aortic valve and the implanted valve in intravascular ultrasound (IVUS) examination ([Online Video 1](#)). **(G)** Coronary angiography after the first stent implantation; **(H)** the second everolimus-eluting stent implantation. Improved stent compression is observed in IVUS examination ([Online Video 2](#)). **(I)** Final coronary angiography after the second stent implantation.

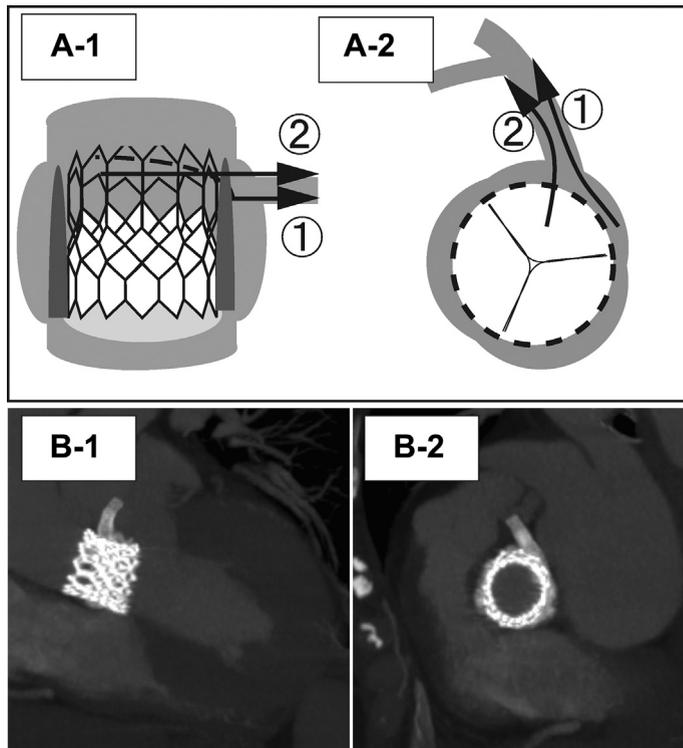
well-dilated coronary stents implanted outside the metallic frame of the SAPIEN 3 ([Figure 2B](#)). The patient was doing well 6 months post-procedurally.

Coronary obstruction after TAVR is a serious but rare complication ([1,2](#)). This case suggests that in case of LMCA occlusion after SAPIEN 3 implantation, coronary stenting using the guidewire that had been placed before the valve implantation should be considered. However, this “under-the-valve”

technique may become a problem when a coronary intervention to the LMCA is required in the future because coronary access will be very difficult.

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FIGURE 2 Schematic and Computed Tomography Image Depicting the Relationship Between the Coronary Stent and the SAPIEN 3 Frame



(A) Two different ways to access the left main coronary artery: (A-1) long-axis view, (A-2) short-axis view. The first access way is from the outside of the metallic frame of the SAPIEN 3. The second access way is through the SAPIEN 3 frame. (B) Post-procedural computed tomography scan image (maximum intensity projection): (B-1) long-axis view, (B-2) short-axis view.

REFERENCES

1. Ribeiro HB, Webb JG, Makkar RR, et al. Predictive factors, management, and clinical outcomes of coronary obstruction following transcatheter aortic valve implantation: insights from a large multicenter registry. *J Am Coll Cardiol* 2013;62:1552-62.
2. Rambod M, Terrien EF, Dauerman HL. White line sign of impending coronary occlusion in

transcatheter aortic valve replacement. *Circ Cardiovasc Interv* 2017;10:e005011.

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