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IMAGES IN CARDIOVASCULAR INTERVENTION

# Protecting stent trapped between surgical and transcatheter aortic valve in valve-in-valve procedure

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A 75-year-old female who underwent surgical aortic valve replacement with a 21-mm mosaic bioprosthetic valve (Medtronic, Dublin, Ireland) 8 years prior presented symptomatic severe bioprosthetic valve stenosis. She was deemed high risk for open aortic valve replacement (STS score 13.3%) and a transcatheter aortic valve replacement (TAVR) was considered. Because the patient had relatively large body surface area (1.85 $cm^2$), even with a self-expandable valve, a prosthesis-patient mismatch was concerned. Thus, we planned a bioprosthetic valve fracturing as necessary. Due to the several risks of coronary obstruction (average diameter of sinuses of Valsalva was 27.7 cm, low coronary arteries, small virtual transcatheter heart valve-coronary distances, Fig. 1a, b), we planned coronary protection with a stent. In this situation, we thought that the balloon-expandable valve was preferable because the catheter manipulation would be easier when there was a necessity to deliver devices into the coronary other than the stent. Therefore, we planned valve-in-valve TAVR, possible valve fracturing, with a 23-mm Edwards Sapien 3 valve (S3, Edwards Lifesciences, CA, USA) with a coronary protection.

The procedure was performed via transfemoral. A stent was left undeployed in the LAD. After deployment of the S3, there was a residual mean gradient of 37 mmHg. The bioprosthetic valve was then fractured with an Atlas Gold 22 × 40-mm (C.R. Bard, NJ, USA), which reduced the gradient to 8 mmHg. As the coronary flow was not limited, the coronary stent system was removed. Upon removal, the stent was noted to no longer be attached to the delivery system and was seen angiographically trapped against the S3 (Fig. 1c). Snaring the stent was unsuccessful. The IVUS demonstrated that the stent was fully out of the left main and the proximal stent edge was pinched between the S3 and the stent post of the bioprosthetic valve (Fig. 1d–f). As the stent was well fixed at the position, no further attempts were made. The patient was discharged at day four. We planned 6 months of dual antiplatelet therapy (our routine is 3 months) and 60-day follow-up was uneventful.

We assume that the stent delivery system was sandwiched between the S3 and the stent post before the removal as shown in Fig. 1g. The guide catheter or a guiding catheter extension could be placed at the coronary ostium at the time

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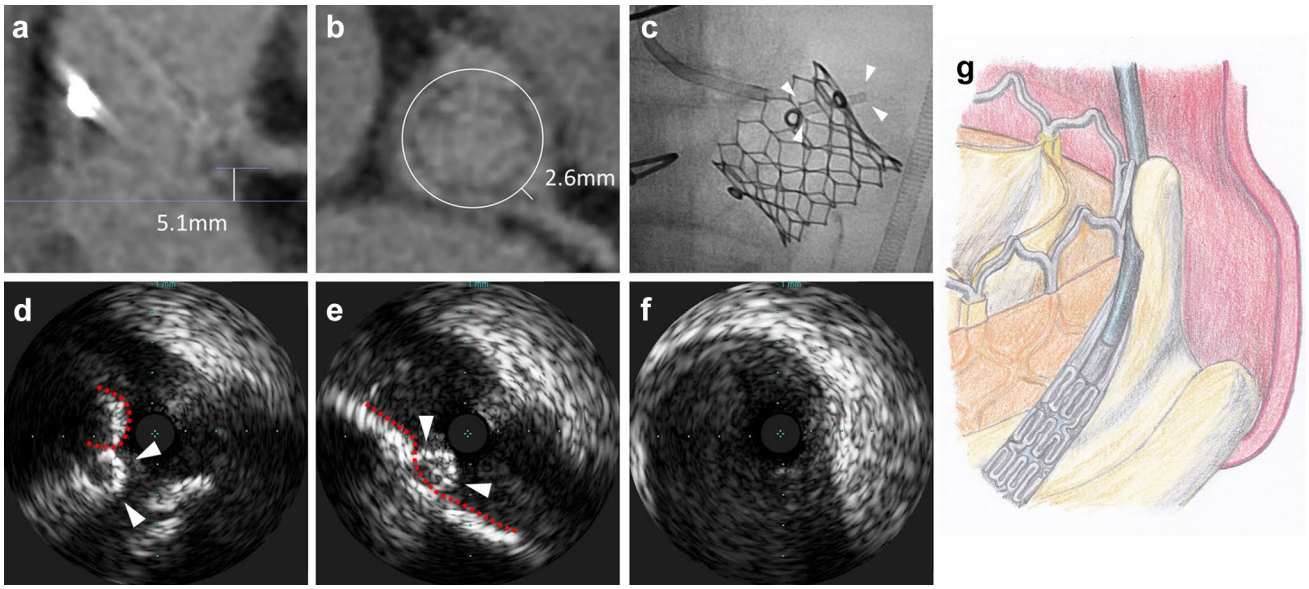


**Fig. 1** **a** The left main ostial height. **b** The virtual transcatheter heart valve-coronary distance of the left coronary artery. **c** Trapped coronary stent at the stent post of the bioprosthetic valve. **d** IVUS images showing the proximal part of the stent (arrows) sandwiched between the stent post (dotted line) and the Sapien valve. **e** The distal part of the stent (arrows) was contiguous with the Sapien valve (dotted line). **f** No stent in the left main. **g** Assumed position of the coronary stent delivery system before detachment of the stent

of deployment of the valve and used to remove the undeployed stent.



## Compliance with ethical standards

**Conflict of interest** The authors have no conflicts of interest to declare.