



Case Report

Kissing balloon inflation for transcatheter aortic valve replacement and abutting ostial coronary artery stent^{☆,☆☆}



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ABSTRACT

In patients with ostial coronary stents protruding into the aorta, there is concern for stent injury while undergoing transcatheter aortic valve replacement (TAVR) with balloon-expandable transcatheter heart valve (THV). An 82-year-old male with history of symptomatic aortic stenosis, heart failure, and coronary artery disease with multiple interventions to right coronary artery (RCA) and a history of stent fracture requiring stent-in-stent placement one year previously, was evaluated for TAVR. His ostial RCA stent was protruding into the aorta at the level of sinotubular junction, with ostial stent to aortic wall (SAW) distance of 25.2 mm. There was concern for balloon inflation during TAVR leading to stent injury. The RCA was cannulated with a 6 French JR4 guide and wired with 0.014' coronary wire. Appropriately sized noncompliant balloon was advanced into RCA. Under rapid pacing, the coronary balloon was inflated across the RCA ostium followed by simultaneous deployment of THV. Intravascular imaging of the ostial RCA stent revealed no stent fracture. SAW distance is important to determine the possibility of balloon-induced stent injury during valve deployment. In cases where an ostial stent may interact with balloon inflation, kissing-balloon inflation may be performed to prevent stent injury.

Learning objective: In patients with ostial coronary stents protruding into the aorta, stent to aortic wall distance is important to determine the possibility of balloon-induced stent injury during balloon-expandable transcatheter heart valve deployment. Kissing-balloon inflation may be performed to prevent stent injury.

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Introduction

Transcatheter aortic valve replacement (TAVR) with a balloon-expandable (BE) transcatheter heart valve (THV) may result in aortic root injury particularly due to significant force deployed during balloon deployment [1]. Although TAVR has been performed safely with ostial coronary artery stents, there is concern for stent crush or deformation in patients with protruding ostial stents [2]. We present a case of TAVR in a patient with an ostial right coronary artery (RCA) stent protruding into the sinus with an inadequate stent to aortic wall (SAW) distance. Using a strategy that involved simultaneous inflation of the BE THV and a coronary balloon covering the ostium of the stent (kissing balloon inflation) we were able to perform a successful TAVR without causing stent injury.

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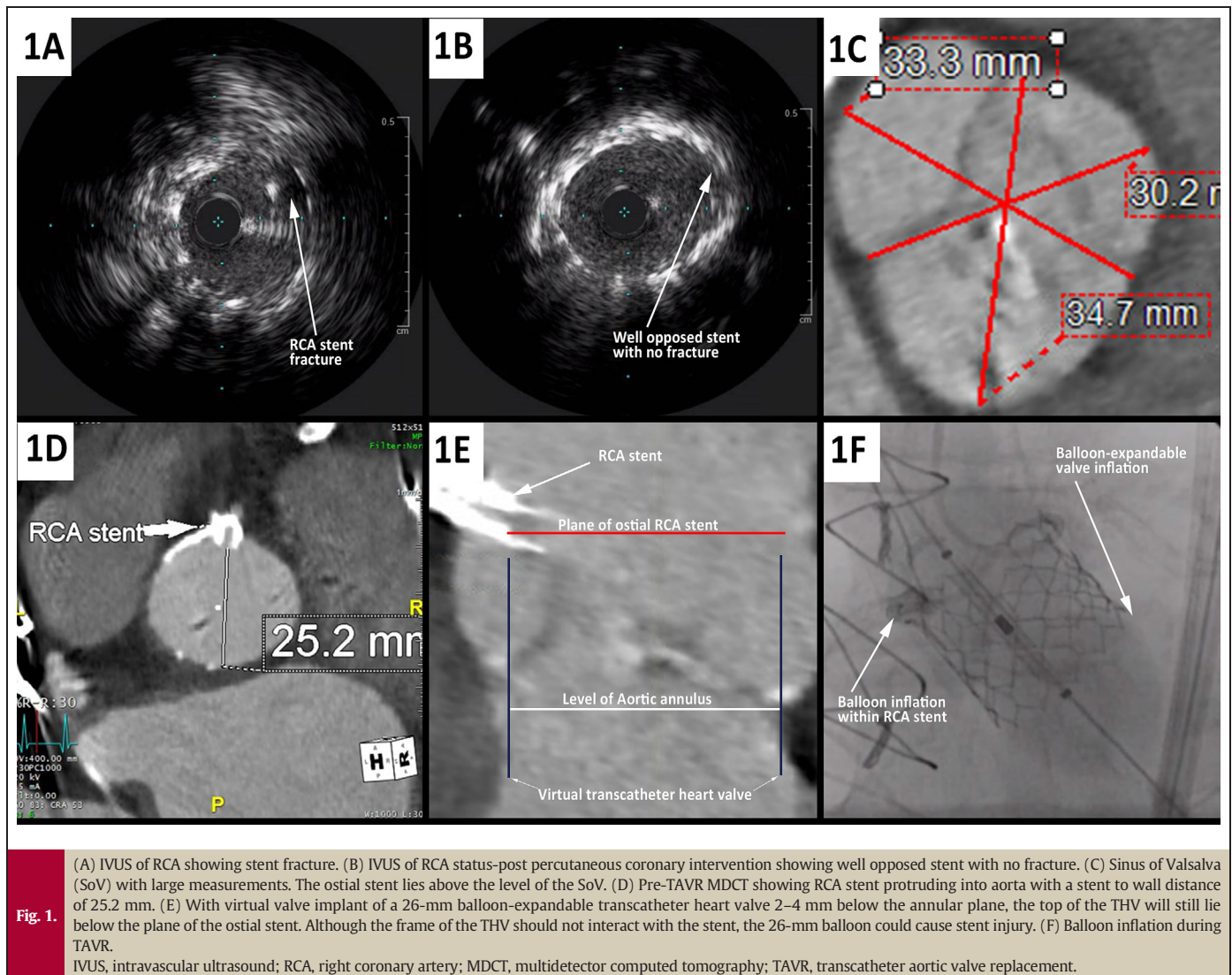
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Case report

An 82-year-old male with a past medical history of symptomatic aortic stenosis, chronic systolic heart failure, and coronary artery disease was being evaluated for TAVR. He had multiple percutaneous coronary interventions to the RCA, with a history of stent fracture requiring stent-in-stent placement one year previously (Fig. 1A, B). Preoperative multi-detector computed tomography (MDCT) was performed for TAVR planning which revealed anatomy suitable for a 26-mm BE THV (Fig. 1C). His ostial RCA stent was protruding into the sinus, with a SAW distance of 25.2 mm (Fig. 1D). There was concern that balloon inflation would lead to further trauma of the stent (Fig. 1E). The procedure was performed in the hybrid operating room under conscious sedation and heparin was administered for anticoagulation. The aortic valve was crossed, and a stiff pre-shaped left ventricle (LV) wire was placed in the LV. The RCA was cannulated with a 6Fr JR4 guide and wired with an 0.014' coronary wire. A noncompliant balloon, sized appropriately to the RCA stent, was advanced into the RCA. A 26-mm Sapien S3U Ultra (Edwards Lifescience, Irvine, CA, USA) was advanced across the aortic valve. Under rapid pacing, the RCA balloon was inflated across the ostium of the RCA stent followed by



simultaneous deployment of the THV (Fig. 1F, Video 1). The THV was well placed, and intravascular imaging of the ostial RCA stent revealed no stent fracture (Fig. 1B).

Discussion

To prevent stent injury, we performed coronary balloon inflation simultaneously with TAVR inflation (kissing balloon inflation) with successful result. Other potential ways to overcome this risk could be with the use of a self-expandable THV, which offer less forceful radial expansion than BE THV implantation [1]. However, in patients with known coronary artery disease and prior PCI, coronary access may become an issue with a self-expandable THV frame. Previously, a short height mechanically expanding valve has been used to avoid stent deformation (LOTUS Edge, Boston Scientific, Natick, MA, USA), however this THV system is no longer on the market [3]. We feel that the 'kissing balloon inflation' technique works best if the stent lies above the top frame of the THV, whereby the coronary balloon inflation prevents THV balloon-induced stent injury. In our patient, the ostial stent was protruding at the level of the sinotubular junction, which was above the anticipated top of the THV frame (Fig. 1D, E). If the THV is expected to land above the ostial stent, stent injury after balloon deflation may still occur

due to the THV frame interaction with the ostial stent. For these cases, operators should consider underfilling a BE THV to reduce THV frame expansion if permissible. Our patient's post-TAVR course was uneventful. Six months post-procedure, the patient has reported improved symptoms with no angina.

Conclusion

The shoulder of the balloon with the current BE THV (Sapien S3U Ultra) extends beyond the top of the THV frame. Therefore, the SAW distance is important to analyze for assessment of possible balloon-induced deformation during valve deployment.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jccase.2023.05.007>.

Patient permission/consent statement

The patient provided informed consent for publication of the case report.

Conflict of interest

none

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