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IMAGES IN STRUCTURAL HEART DISEASE

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Transcatheter Aortic Valve-in-Valve Intervention with Simultaneous Stent Implantation for Coronary Protection

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An 84-year-old frail woman with severe aortic stenosis secondary to structural valve deterioration of a 21-mm Mitroflow bioprosthesis (Sorin, Saluggia, Italy) was referred to our emergency department for heart failure. The patient was deemed at high risk for open redo surgery by the heart team (STS score, 12%; EuroSCORE II, 13%), and thus scheduled for transcatheter valve-in-valve implantation.[1] The Mitroflow valve design is characterized by a supra-annular implantation and pericardial leaflets sutured outside the stent, which may extend outwards following valve-in-valve procedure, and potentially cause coronary occlusion. Predictors of this life-threatening complication include anatomic factors, i.e. low-lying coronary ostia, shallow sinuses of Valsalva and low sinus height, and factors related to the bioprosthesis, namely, stented valves with externally mounted leaflets, stentless bioprostheses, and a supra-annular position.[2,3] Contrast-enhanced computed tomography indicated a high risk of obstruction in both coronary arteries (Figures 1 and 2, Supplemental Online Video 1). Accordingly, pre-emptive stent deployment was planned to protect the ostia from displacement of the degenerated leaflets, and two zotarolimus-eluting stents (Onyx Resolute, Medtronic, Minneapolis, MN) were positioned and left unexpanded on supportive Grand Slam wires (Asahi Intecc, Tokyo, Japan) in the proximal segment of left and right coronary arteries. Subsequently, a self-expandable 23-mm Evolut R valve (Medtronic, Minneapolis, MN) was partially released, attaining a stable position with about 80% of the valve deployed. Both stents were then expanded and anchored 5–6 mm in the coronary vessels, with most of their length left protruding upstream in the aortic root to detach the coronary ostia from the degenerated valve leaflets. After completion of valve release, with the guiding catheters still entrapped outside the Evolut R outflow crown, stent post-dilatations were performed with the stent delivery balloons previously left in both coronary arteries. Final angiography showed successful valve and stent implantation (Supplemental Online Video 2), confirmed the following day by computed tomography (Figure 3). At 9 months follow-up, the patient is asymptomatic and required no hospitalization.

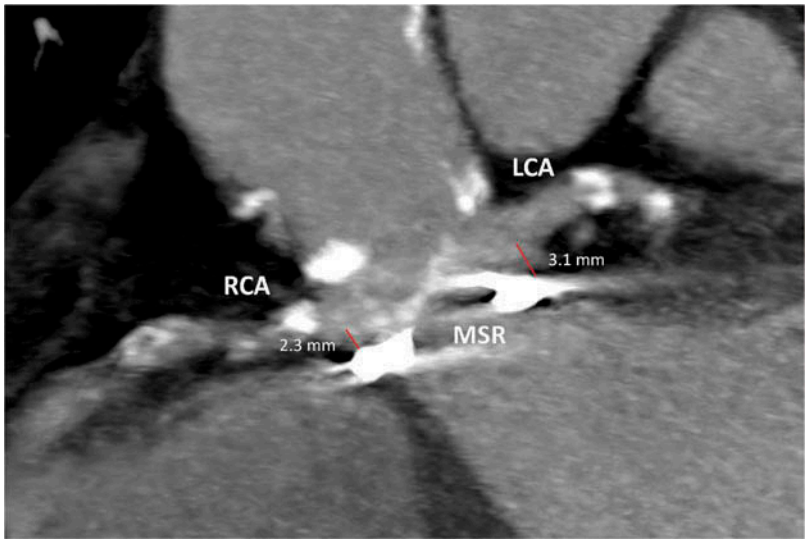

Figure 1. Pre-procedural contrast-enhanced computed tomography. Modified axial view of aortic root showing the coronary ostia and the Mitroflow bioprosthesis. The bioprosthesis is implanted suprannularly with externally mounted leaflets, its sewing ring (MSR) is radiopaque with asymmetric valleys/peaks. Red lines indicate the height of left (LCA) and right (RCA) coronary arteries.

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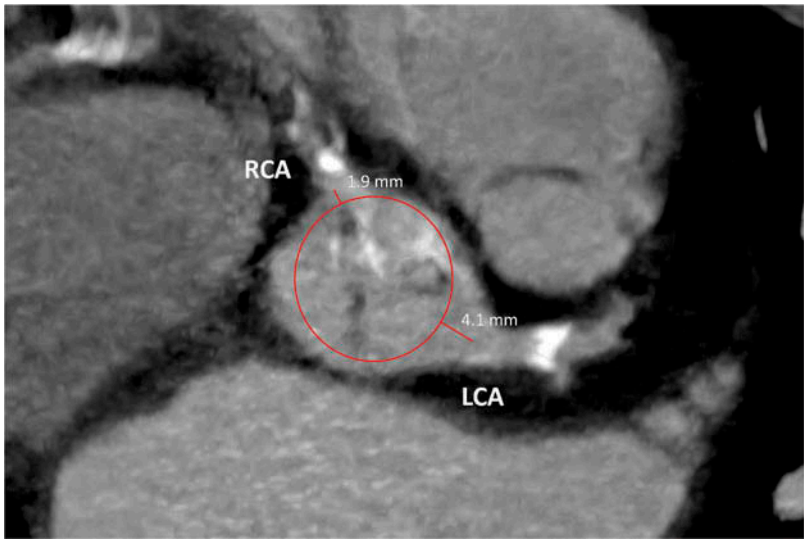

Figure 2. Pre-procedural contrast-enhanced computed tomography. Modified axial view of aortic root. The red circle indicates the expected position of degenerated bioprosthesis leaflets after valve-in-valve procedure. The radiolucent profiles inside the red circle elucidate the degenerated leaflets. The minimal distance (red lines) between the coronary ostia and the Mitroflow valve indicates a high risk of coronary obstruction.

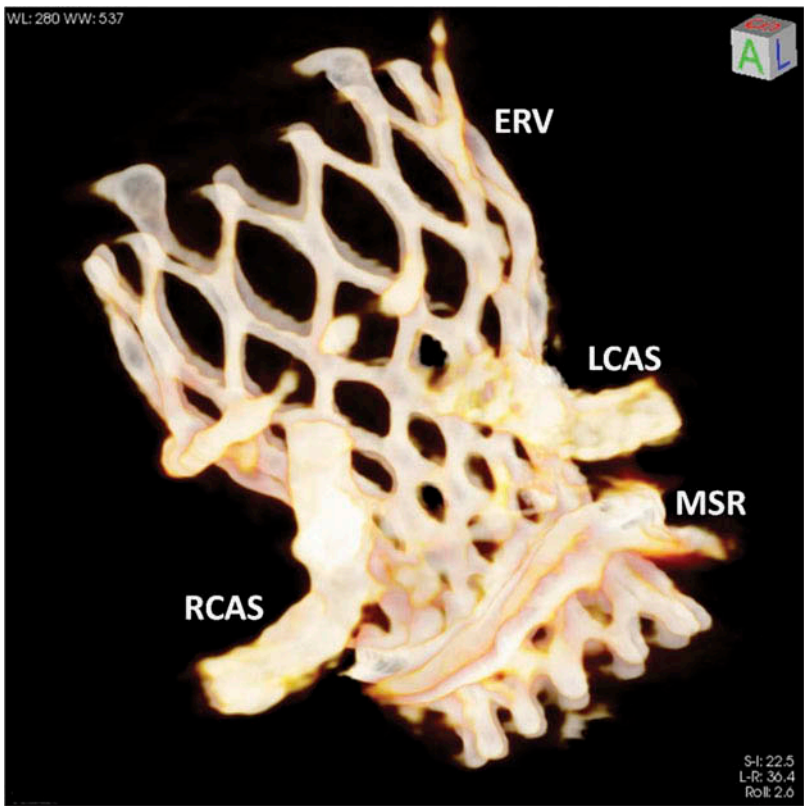

Figure 3. Post-procedural computed tomography. Three-dimensional reconstruction shows the 23-mm Evolut R valve (ERV) inside the sewing ring of Mitroflow bioprosthesis (MSR), and the two coronary stents above the ring. On the left, a 3.5 × 30 mm Onyx Resolute zotarolimus-eluting stent (RCAS) is implanted in the right coronary artery, on the right a 4.0 × 26 mm Onyx Resolute zotarolimus-eluting stent in the left coronary artery (LCAS). Both stents are anchored in the proximal segments of coronary arteries, with most of their length left protruding upstream in the ascending aorta.

Disclosure statement

The authors have no conflicts of interest to disclose.

References

1. Dvir D, Webb J, Brecker S, et al. Transcatheter aortic valve replacement for degenerative bioprosthetic surgical valves: results from the global valve-in-valve registry. *Circulation*. 2012;126 (19):2335–2344. doi:10.1161/CIRCULATIONAHA.112.104505.
2. Dvir D, Leipsic J, Blanke P, et al. Coronary obstruction in transcatheter aortic valve-in-valve implantation: preprocedural evaluation, device selection, protection, and treatment. *Circ Cardiovasc Interv*. 2015;8(1):pii:e002079. doi:10.1161/CIRCINTERVENTIONS.114.002079.
3. Ribeiro HB, Rodés-Cabau J, Blanke P, et al. Incidence, predictors, and clinical outcomes of coronary obstruction following transcatheter aortic valve replacement for degenerative bioprosthetic surgical valves: insights from the VIVID registry. *Eur Heart J*. 2017 Aug 14. doi:10.1093/eurheartj/ehx455. [Epub ahead of print].