

IMAGES IN INTERVENTION

Grabbing the Transcatheter Valve Skirt

Bail-Out Technique for Valve Embolization During Valve-in-Valve Transcatheter Mitral Valve Replacement



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An 80-year-old man with history of coronary artery bypass grafting and mitral annuloplasty with a semirigid Physio-1 ring 30 mm (Edwards Lifesciences, Irvine, California) for ischemic mitral regurgitation was referred to our hospital because of worsening shortness of breath. An echocardiogram revealed severe mitral regurgitation with an ejection fraction of 30% (**Figure 1A**). Considering the patient's cardiac status and comorbidities, a transcatheter mitral valve-in-ring procedure was recommended by the heart team. Because the patient fully understood the benefits and potential risks of the procedure and consented to the procedure, the transcatheter procedure was planned. Using computed tomography findings (**Figure 1B**), we planned to deploy a 26-mm Sapien-3 valve (Edwards Lifesciences).

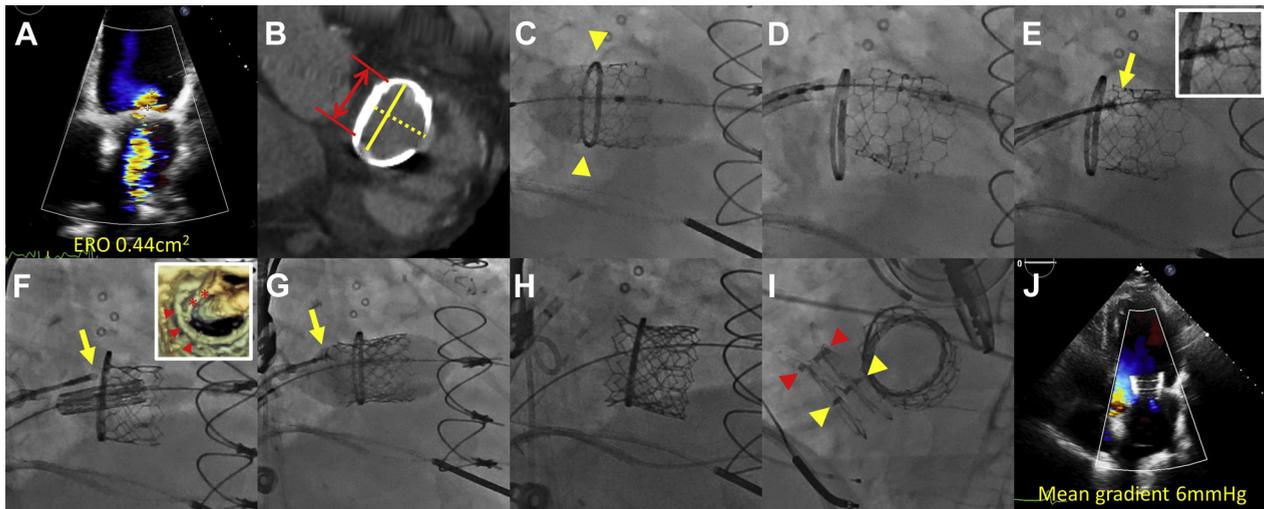
The procedure was performed under local anesthesia with conscious sedation in the catheterization laboratory. After transseptal puncture, a LAMPOON (Intentional Laceration of the Anterior Mitral Valve Leaflet to Prevent Left Ventricular Outflow Tract Obstruction) procedure was performed for a long anterior mitral leaflet (1,2). After this procedure, a 26-mm Sapien-3 valve was advanced into the left atrium, placed across the annular ring, and then deployed under rapid pacing (**Figure 1C**). During post-dilation immediately after

the valve deployment, the valve embolized into the left ventricle, remaining on the wire just distal to the ring (**Figure 1D**, **Online Video 1**). We performed a second septal puncture, and a biptome Biopsy Forceps catheter (Argon, Plano, Texas) was advanced through an Agilis catheter (St. Jude, St. Paul, Minnesota) and used to grab the skirt of the embolized 26-mm valve under the guidance of fluoroscopy and 3-dimensional transesophageal echocardiography (**Figure 1E**, **Online Video 2**). After grabbing the skirt and pulling the 26-mm valve back against the ring, a 29-mm Sapien-3 valve was then advanced within the 26-mm valve over the original delivery wire (**Figure 1F**). The new valve was deployed, anchoring both the 29-mm valve to the ring and to the 26-mm valve (**Figures 1G and 1H**, **Online Videos 3 and 4**). The biopsy forceps were removed and the 2 septal holes were closed (20-mm and 30-mm Cardioform septal occluders, Gore, Newark, Delaware) (**Figure 1I**). A final echocardiogram showed no paravalvular leak (**Figure 1J**, **Online Video 5**). The patient was discharged with symptom relief on post-operative day 3.

Device embolization or malposition during transcatheter mitral valve replacement may occur. In this case, we used a biptome catheter to retrieve and maintain position of the embolized valve during a valve-in-valve deployment within

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FIGURE 1 Grabbing the Transcatheter Valve Skirt



(A) Pre-procedural echocardiogram showed severe mitral regurgitation with an effective regurgitation orifice (ERO) area of 0.44 cm²; (B) The intertrigonal distance (red arrow), the intercommisural distance (yellow solid line), and the septal-to-lateral distance (yellow dotted line) were 24 mm, 28.9 mm, and 18.6 mm, respectively, by 3-dimensional computed tomography. (C) A 26-mm Sapien-3 valve was deployed across the annular ring (arrowheads) under rapid pacing. (D) Embolization of a 26-mm Sapien-3 valve from annular ring (Online Video 1). (E) The biopptome Biopsy Forceps catheter (arrow) grabbing the valve skirt (Online Video 2). (F) Stabilizing the valve with the biopptome catheter (arrow) at the beginning of the implantation of a 29-mm valve (Online Video 3). The biopptome catheter (star) was grabbing the skirt of the valve (red arrowheads), not the stent frame of the valve (Online Video 4). (G) The biopptome catheter (arrow) was pulled back after the valve deployment (Online Videos 3 and 4); (H) Final anchoring of the 26- and 29-mm Sapien-3 valves within the ring. (I) The atrial septum was closed with a 20-mm (red arrowheads) and a 30-mm (yellow arrowheads) Cardioform septal occluder. (J) Post-procedural echocardiogram showed trace mitral regurgitation with a mitral gradient of 6 mm Hg (Online Video 5).

the mitral ring (3,4). An oversizing strategy as well as careful device positioning is essential to avoid this complication (5-7). The longest distance of the ring, the intercommisural distance, may be the best indicator for an appropriate valve sizing.

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APPENDIX For supplemental videos and their legends, please see the online version of this article.