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# Heterotopic Implantation of an Embolized Valve During Transcatheter Mitral Valve Replacement

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A 74-year-old man with New York Heart Association class III heart failure symptoms presented with exertional dyspnea and reduced exercise capacity. His past history included hypertension, diabetes mellitus, persistent atrial fibrillation, and long pauses with a leadless pacemaker. In 2019, he underwent mitral and tricuspid valve annuloplasty (Memo 3D-ReChord size 36, Physio tricuspid ring size 30), and surgical left atrial appendage closure for severe regurgitation.

Echocardiography revealed recurrent severe mitral regurgitation (effective regurgitant orifice area 0.47 $cm^2$), and 3D mitral valve area of 0.37 $cm^2$ and a retracted posterior leaflet, unfavorable for mitral transcatheter edge-to-edge repair. Cardiac computed tomography demonstrated suitable anatomy for transcatheter mitral valve replacement (TMVR). The Society of Thoracic Surgeons predicted an 8.8% mortality risk and 28.3% composite morbidity/mortality risk, classifying him as high risk for redo surgery. The heart team opted for TMVR with surgical salvage as bailout.

Due to large annuloplasty ring with a computed tomography–derived ring area of 690 $mm^2$ (Figure 1a), a size 30.5 mm MyVal Octacor transcatheter heart valve (THV) was selected, which can accommodate a native valve annulus area of 630-770 $mm^2$ (Figure 1k). Transseptal puncture was challenging due to gross left atrial enlargement and was performed at 4.1 cm height (Figure 1b). Deployment under rapid pacing (160 bpm) resulted in a tilted valve and moderate paravalvular leak (PVL) laterally.

A second 30.5 mm MyVal THV aimed at more ventricular deployment to address PVL, but pacing capture was lost during deployment. Due to an angulated trajectory from septum to mitral valve (Figure 1c), the system had no backup force to follow valve advancement, which resulted in gradual embolization of THV into the left atrium after loss of capture (Figure 1d and e, Video 1). Meanwhile, the left ventricular wire remained in place. Surgical retrieval was considered high risk and was declined.

A plan was made to seal the PVL with a third THV and stabilize the embolized valve at the interatrial septum with atrial septal defect (ASD) occluder. After placement of a screw-in pacing wire, a third 30.5 mm MyVal THV was deployed under rapid pacing of 180bpm, and successfully sealed the PVL (Figure 1f, Video 2). Subsequently, a new Safari XS wire was advanced through the embolized valve to improve alignment for ASD occluder deployment (Figure 1g, Video 3). An ASD delivery sheath was used to position a 32 mm ASD occluder, which anchored the embolized valve heterotopically across interatrial septum (Figure 1h and k, Video 4). The left disc was secured against left atrium, whereas the right disc was deployed in right atrium following gentle pullback. Stability was confirmed with tug test.

Final imaging confirmed well-seated TMVR and stable heterotopic position of embolized valve (Figure 1i and j). At 1 month, echocardiography showed mild PVL over TMVR and a stable embolized valve position, with no shunts observed.

This case demonstrates valve embolization during valve-in-ring implantation and successful heterotopic stabilization by ASD occluder, providing an effective bailout strategy in high-risk patients.

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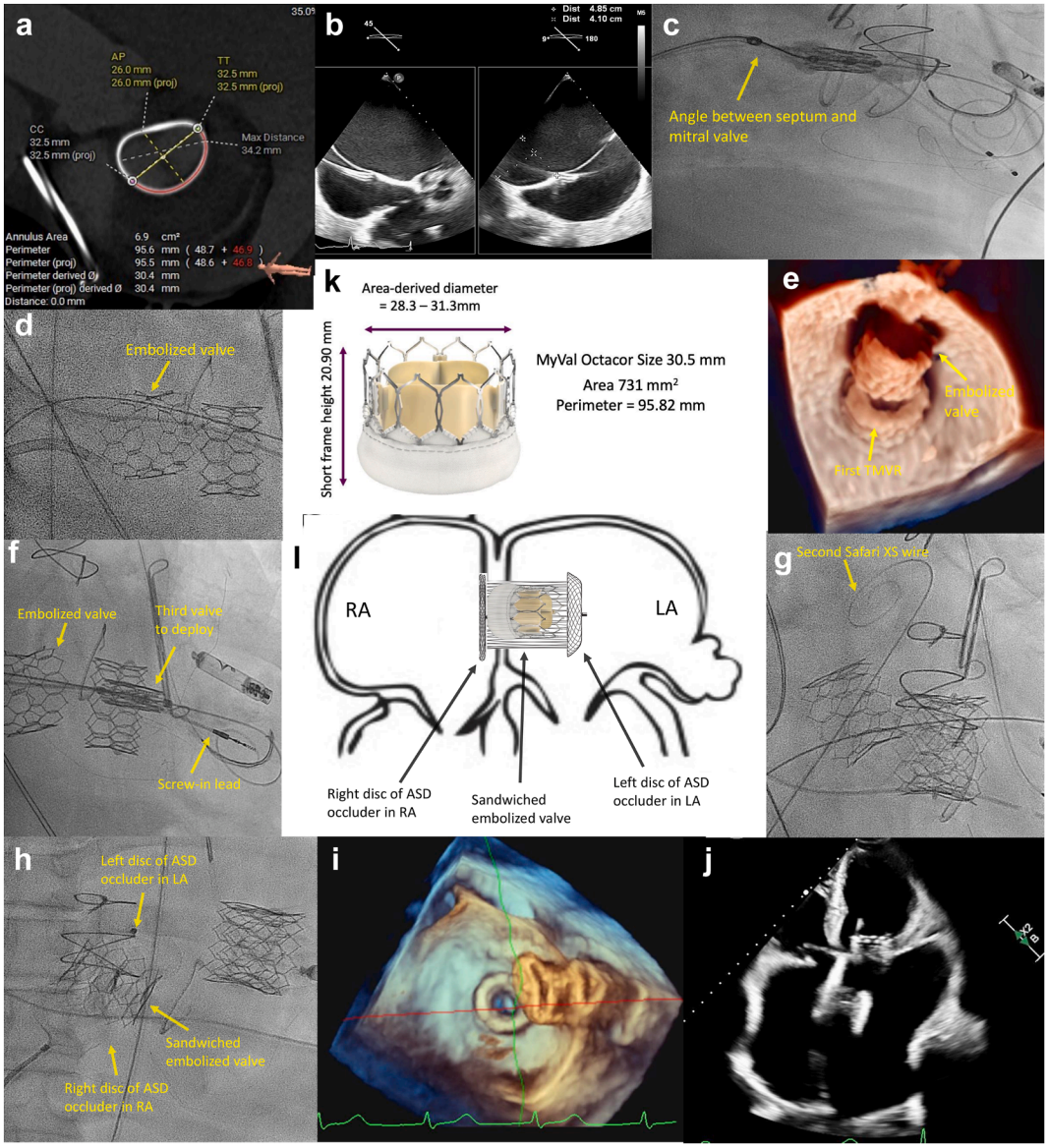


**Figure 1.** (a) Preprocedure CT showing mitral ring dimensions. (b) Transeptal height at 4.1 cm was attained. (c) The angulated trajectory between the septum and mitral valve provided no backup force and hence limited valve advancement during delivery. (d) Second THV embolized toward left atrial side due to loss of pacing capture. (e) TEE with 3D-MPR showing the embolized valve in the left atrium. (f) After inserting a screw-in lead, the third THV was delivered to a position lower than the first valve and deployed subsequently. (g) A second Safari XS wire passed through the embolized valve, to manipulate it toward IAS. (h) The ASD occluder was deployed via ASD delivery sheath, with left disc over LA, and right disc over RA. (i) TEE with 3D-MPR showing the embolized valve sandwiched by the ASD occluder at the IAS. (j) Postprocedure 1-month transthoracic echocardiography images showing stable position of embolized valve sandwiched at the IAS with an ASD occluder. (k) Specifications of MyVal Octacor size 30.5. (l) Schematic diagram illustrating the embolized valve at the IAS sandwiched by the ASD occluder, with left disc in LA and right disc in RA. Abbreviations: ASD, atrial septal defect; CT, computed tomography; IAS, interatrial septum; LA, left atrium; MPR, multiplanar reconstruction; RA, right atrium; TEE, transesophageal echocardiogram; THV, transcatheter heart valve.

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Patient consent was obtained for publication of this case.

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## Disclosure Statement

Kent Chak-yu So reports a relationship with Abbott that includes consulting or advisory; reports a relationship with Boston Scientific Corporation that includes consulting or advisory; reports a relationship with Edwards Lifesciences Corporation that includes consulting or advisory; reports a relationship with Medtronic that includes consulting or advisory; reports a relationship with Jenscare Scientific Co Ltd that includes consulting or advisory; reports a relationship with Venus Medtech (Hangzhou) Inc. that includes consulting or advisory. The other authors had no conflicts to declare.

## Supplementary Material

Supplemental data for this article can be accessed on the publisher's website.