Successful transcatheter mitral paravalvular leak closure complicated with stuck mechanical valve and device migration

Brief title: Stuck valve during PVL closure

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KY and SK made substantial contributions to the concept of the work. TM made significant contributions to the imaging analysis and interpretation. KY drafted the original manuscript. SK and KK substantially contributed to the revision of the manuscript drafts. All authors have approved the submitted version of the manuscript and agreed to be accountable for any part of the work.

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An 80-year-old man who underwent mitral and aortic mechanical valve replacement 27 years ago presented with hemolytic anemia and heart failure. Transesophageal echocardiogram (TEE) confirmed severe eccentric mitral paravalvular leak (PVL) (Figure A, Video 1). We performed transcatheter PVL closure using Amplatzer Vascular Plug II (AVP II, Abbott Vascular, IL).

Using the retrograde transseptal approach, a 10-mm AVP II was implanted in the PVL through a 6-Fr Destination sheath (Terumo, Japan). Because the device interfered with the mechanical valve leaflet, it was deployed more proximally (Figure B-C). After the PVL decreased to moderate, another device was tried to be added. When the sheath was re-advanced to the left ventricle (LV), the first device dislodged and moved to the LV (Figure D, Video 2). Then, a 7-Fr JR 4.0 guide catheter with an EN snare (Merit Medical, UT) was inserted into the LV through the PVL. After several attempts, the device was successfully snared and retrieved (Figure E-F).

Using a 12-mm AVP II was difficult as it caused a stuck mechanical valve (Figure G). Therefore, two downsized 8-mm AVP II devices were deployed after the insertion of two 6-Fr Destination sheaths. The device's distal disk interfered the mechanical valve leaflet, but it partially opened (Figure H, Video 3). With a mean mitral valve pressure of 4 mmHg, TEE didn’t display significant mitral stenosis, and the PVL had nearly disappeared (Figure I, Video 4). After confirming stability, the devices were released. The patient was uneventfully discharged 8 days following the procedure.
Device migration and stuck mechanical valve are important complications of PVL closure (1).

Learning points of this case are follows: (1) the device migrated to the LV can be retrieved through the mitral PVL; (2) when the device interferes the mechanical valve leaflet, the mechanical valve function can be preserved if the leaflet partially opens.

Patient consent

The authors confirmed that written consent for submission and publication of this case report, including the images and associated text, have been obtained from the patient in accordance with COPE guidelines.

Data availability

Data cannot be shared for ethical and privacy reasons.

Reference

Figure legends.

Three-dimensional color images of the posteromedial paravalvular leak (PVL) (A: red arrow). A 10-mm Amplatzer Vascular Plug (AVP) II (*) interfered with the mechanical mitral valve (B: arrowhead). Therefore, the device was deployed more proximally to avoid a stuck valve (C). However, the device accidentally dislodged and entered the left ventricle (D). After several attempts, the device was successfully snared and retrieved through the PVL (E, F). A 12-mm AVP II (**) caused a stuck mechanical valve (G). Simultaneously, the two downsized 8-mm AVP II (***) deployed also interfered the mechanical valve leaflet keeping it only partially opened (H). The PVL completely disappeared without mitral stenosis, and the devices were released (I).

Supplemental Video 1. Baseline 3D-TEE image of mitral PVL.
Supplemental Video 2. Device embolization to left ventricle.
Supplemental Video 3. Partially opened mechanical valve leaflet after two 8-mm AVP devices deployment.
Figure 1

159x159 mm (DPI)