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CASE REPORT

HOW WE DID IT

Transapical Retrieval of an Embolized Valve During Transcatheter Mitral Valve Replacement Using a Retrieval Basket

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ABSTRACT

OBJECTIVE To describe a transcatheter mitral valve replacement case complicated by valve embolization into the left ventricle (LV) retrieved with the ŌNŌ (ŌNŌCOR LLC) retrieval basket via a transapical approach.

KEY STEPS Maintain wire position. Cannulate for venous-arterial extracorporeal membrane oxygenation. Perform left lateral thoracotomy at the fifth intercostal space and LV apex access. Advance a 21-F Certitude sheath (Edwards Lifesciences) over Amplatz Extra Stiff Wire (Cook Medical). Advance a 12-F ŌNŌ retrieval system through the sheath. Use grasping device and forceps (Raptor) to secure the valve in the basket.

POTENTIAL PITFALLS Maintaining wire position is critical when a transcatheter mitral valve replacement valve has embolized to prevent movement and possible LV outflow tract obstruction.

TAKE-HOME MESSAGES A transapical approach using the ŌNŌ retrieval basket is a less invasive alternative for embolized TMVR valve retrieval in high-risk patients. (JACC Case Rep. 2026;■:107715) © 2026 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Transcatheter mitral valve replacement (TMVR) with balloon-expandable valves is an emerging minimally invasive option for treatment of mitral regurgitation (MR) in high-risk surgical patients with degenerated bioprosthetic mitral valves, or for failed surgical mitral valve repair.[1,2] Valve-in-valve (ViV)/valve-in-ring (ViR) TMVR has lower in-hospital and 30-day mortality

TAKE-HOME MESSAGE

- A transapical approach using the ŌNŌ retrieval basket is a feasible, less-invasive alternative for retrieval of embolized transcatheter mitral valve replacement valves compared to open sternotomy in high-risk surgical patients.

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ABBREVIATIONS AND ACRONYMS

ECMO = extracorporeal membrane oxygenation

LV = left ventricle

MR = mitral regurgitation

TEE = transesophageal echocardiogram

TMVR = transcatheter mitral valve replacement

ViR = valve-in-ring

ViV = valve-in-valve

and lower early postprocedural complication rates than redo surgical MVR.[3] ViV, ViR, and valve-in-mitral annular calcification TMVR is associated with improvements in quality of life and heart failure classification at 5 years.[2]

One feared complication of any transcatheter valve implantation is valve embolization, which occurs in about 1.8% of ViV TMVR procedures.[4] Valve embolization or migration occurs due to inadequate positioning, inadequate anchoring, or undersizing.[5] A transcatheter valve with minimal migration may be managed by deploying another transcatheter valve inside the migrated valve to anchor both valves, but if there is significant malposition or embolization, the primary treatment is emergent conversion to open surgery to retrieve the valve.[5]

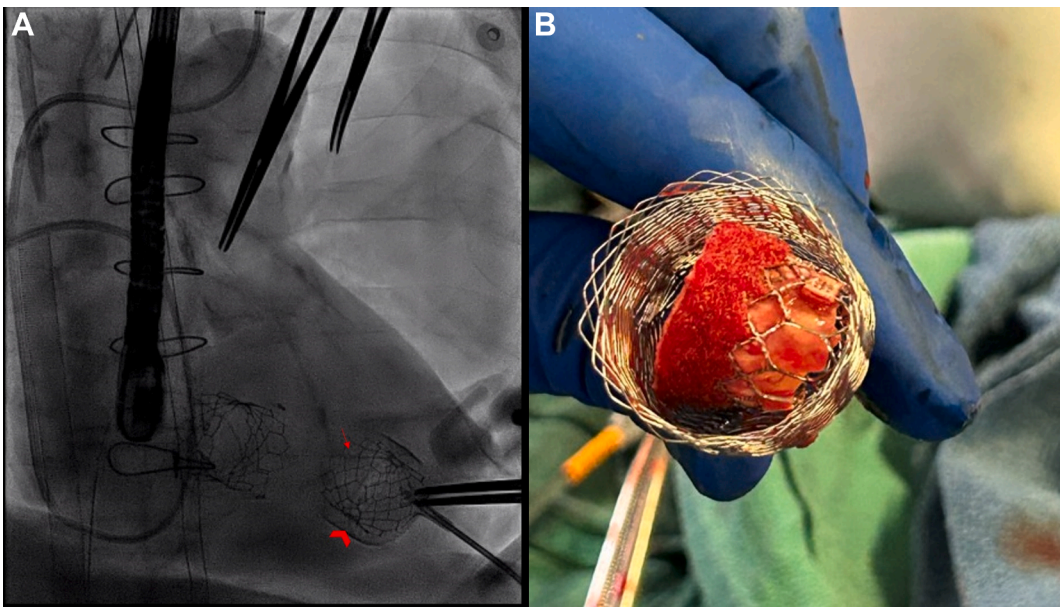
The ŌNŌ (ŌNŌCOR LLC) retrieval system is a novel transcatheter device compatible with a 12-F or larger vascular sheath and consists of a nitinol basket fused to a 7.5-F inner-diameter catheter which can accommodate a snare or manipulation device up to 7-F.[6] We describe the first reported use of the ŌNŌ retrieval system to remove an embolized TMVR valve from the left ventricle (LV) via a transapical approach.

CASE SUMMARY

A 74-year-old male former smoker with a history of ischemic heart failure with improved ejection fraction, coronary artery disease status post coronary artery bypass and mitral valve replacement with a 29-mm Mosaic valve (Medtronic) in 2014, chronic kidney disease stage 3b, paroxysmal atrial fibrillation, and infrarenal abdominal aortic aneurysm status post endovascular repair presented to an outside hospital with bradycardia, lethargy, and lower-extremity edema. He was determined to be in myxedema coma from amiodarone use (elevated thyroid stimulating hormone level of 190 μIU/mL and low free T4 level of 0.42 ng/dL) and cardiogenic shock. He was treated with intravenous levothyroxine and diuretics. A transesophageal echocardiogram (TEE) showed severe MR from a torn bioprosthetic leaflet. He was transferred to our hospital on inotropes for evaluation of his severe MR.

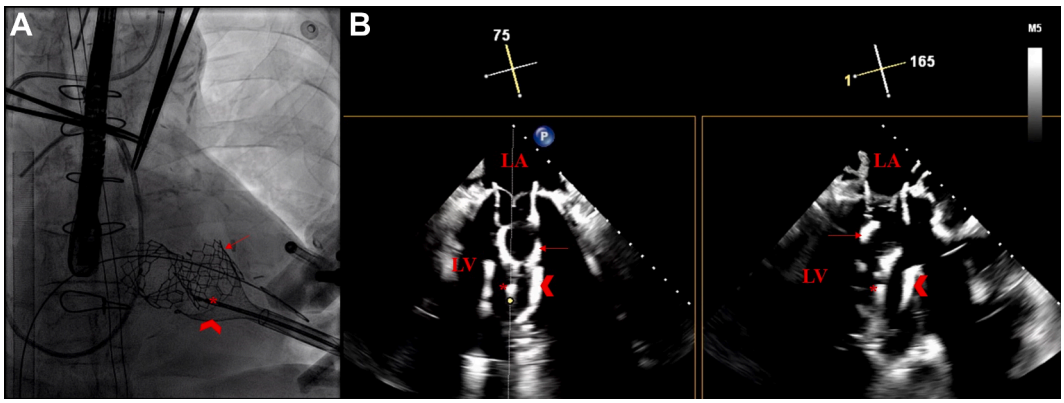
Computed tomography with angiography and coronary angiogram were deferred due to his acute renal injury on chronic kidney disease requiring continuous renal replacement therapy during admission. His case was discussed in a multidisciplinary heart team meeting where it was felt he was too high-risk for redo mitral valve replacement and

VISUAL SUMMARY **Capture of Embolized Transcatheter Mitral Valve**



(A) Fluoroscopy image showing embolized Sapien S3 ULTRA valve (Edwards Lifesciences) (red arrow) being extracted within the transapical ŌNŌ basket (ŌNŌCOR LLC) (red chevron). (B) Photograph of the extracted valve within the ŌNŌ basket.

FIGURE 1 **Retrieval of Embolized Transcatheter Mitral Valve**



(A and B) Fluoroscopy and mid-esophageal intraprocedural transesophageal echo images showing the embolized Sapien S3 ULTRA valve (Edwards Lifesciences) (red arrow) grasped with the Raptor forceps (Steris Healthcare) (red asterisk) and captured by the ŌNŌ basket (ŌNŌCOR LLC) (red chevron). LA = left atrium; LV = left ventricle

that he would be better suited for ViV TMVR (ViV TMVR) with a 26-mm Edwards Sapien S3 ULTRA valve (Edwards Lifesciences) via the right common femoral vein with a transseptal puncture.

During the procedure, there was difficulty achieving coaxiality of the S3 ULTRA valve with the surgical valve due to its medial-to-lateral trajectory despite multiple maneuvers and extreme (right anterior oblique cranial >50°) fluoroscopic angulations that could not be achieved. This resulted in a canted deployment with good contact on the lateral aspect, but low on the medial aspect resulting in valve embolization into the LV. Wire position was maintained, and a second 26-mm S3 ULTRA valve was deployed successfully with no residual regurgitation or paravalvular leak. The patient remained hemodynamically stable. Next, we had intraprocedural discussion with the cardiothoracic team about how to safely retrieve the embolized valve, which remained on the Safari[2] wire (Boston Scientific). It was felt the patient was too high risk for open sternotomy, and the decision was made to cannulate the patient for venous-arterial extracorporeal membrane oxygenation and attempt transapical retrieval of the embolized valve using the 12-F ŌNŌ retrieval system to avoid a full sternotomy.

PROCEDURAL STEPS

The patient was under general anesthesia with a TEE probe in place for TMVR. Access sites that were obtained include a 14-F eSheath (Edwards Lifesciences) in the right common femoral vein for TMVR deployment, a 6-F sheath in the left common femoral vein, and an 8-F sheath in the left common femoral artery. At this point in the procedure, the embolized S3 ULTRA valve was moving freely on a Safari[2] wire in the LV, and the second 26-mm S3 ULTRA valve had been successfully deployed. Care was taken throughout the procedure to maintain wire position.

First, the left groin access sites were upsized to a 16-F arterial cannula and a 21-F venous cannula, and the patient was placed on the extracorporeal membrane oxygenation circuit prior to valve retrieval. Transapical access was obtained by the cardiothoracic surgery team via left lateral thoracotomy at the fifth intercostal space. The LV apex was identified with manual palpation under TEE guidance, and 3 concentric pledgeted 2-0 MH sutures were placed to encircle the apex. The apex was entered with a needle, and eventually an Amplatz Extra Stiff wire (Cook Medical) was advanced across the aortic valve into the descending aorta. A 21-F Certitude sheath (Edwards Lifesciences) was advanced over this wire followed by the 12-F ŌNŌ retrieval system. A 2.4-mm Raptor forceps (Steris Healthcare) was used to grab the frame of the embolized valve, at which point the wire was removed to allow the valve into the 12-F ŌNŌ basket (Figure 1). Once inside the basket, the profile of the valve was reduced with scissors, and the ŌNŌ system with the embolized valve were removed successfully as a unit.

During the remainder of his hospital stay, he was liberated from continuous renal replacement therapy

EQUIPMENT LIST Transapical Retrieval of Embolized TMVR Valve
Vascular access and closure
SonoSite X-Porte ultrasound system (Fujifilm)
HFL38xp transducer (Fujifilm)
Micropuncture needle and wire
6-F sheath
8-F sheath
14-F eSheath (Edwards Lifesciences LLC)
Perclose Prostyle (Abbott Vascular Inc)
Sutures
Prosthetic valve implantation
EPIQ CVx ultrasound system (Philips Healthcare)
X8-2t TEE transducer (Philips Healthcare)
VeraCross system (Baylis Medical)
12 mm × 40 mm × 135 cm Armada 35 balloon (Abbott Vascular Inc)
8.5-F 71-cm Agilis NxT steerable introducer (Abbott Vascular Inc)
Safari[2] pigtail guidewire (Boston Scientific)
6-F J-tip bipolar pacing catheter
26-mm Edwards Sapien S3 ULTRA (Edwards Lifesciences LLC.)
ECMO cannulation
16-F arterial cannula
21-F venous cannula
ECMO circuit
Transapical access and closure
Scalpel
Amplatz Extra Stiff wire (Cook Medical)
21-F Certitude sheath (Edwards Lifesciences)
2-0 MH pledgeted sutures
2-0 vicryl sutures
Retrieval of embolized prosthetic valve
12-F ŌNŌ retrieval system (ŌNŌCOR LLC)
Raptor grasping device (Steris Healthcare)

This list contains the equipment used to perform the transcatheter mitral valve-in-valve replacement and transapical retrieval of the embolized prosthetic valve.
ECMO = extracorporeal membrane oxygenation; TEE = transesophageal echocardiogram.

and inotropic support before being discharged to a skilled nursing facility. A transthoracic echocardiogram prior to discharge showed the S3 ULTRA valve was well-seated with no regurgitation and a mean gradient of 6 mm Hg. At 1-month follow-up, he was doing well with improved functional status and no signs or symptoms of heart failure.

POTENTIAL PITFALLS

VALVE MIGRATION/EMBOLIZATION OFF THE GUIDEWIRE. A meta-analysis containing 7,047 patients found that valve embolization occurred in about 1.8% of ViV and ViR TMVR cases.[4] In our case, the valve embolized but remained on the Safari[2] wire, preventing it from re-orienting in the LV cavity and obstructing the outflow tract. Maintaining wire position was critical during the deployment of the second valve and during retrieval of the embolized valve. We also ensured the embolized valve was firmly grasped with the Raptor forceps during retrieval off the wire, into the ŌNŌ basket, and out the body. The expanded 26-mm valve is not compatible with a 21-F Certitude sheath. The sheath must be removed prior to removing the basket and valve as a unit.

CONCLUSIONS

Although rare, TMVR valve embolization may necessitate surgical retrieval of the embolized valve in patients who are already high-risk for cardiothoracic surgery. A transapical approach using the ŌNŌ retrieval basket is a feasible, less-invasive alternative for retrieval of embolized TMVR valves compared to open sternotomy in high-risk surgical patients.

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Dr Seshiah is a proctor for Edwards Lifesciences. Dr Garcia is a consultant for Edwards Lifesciences, Medtronic, Abbott Vascular, Boston Scientific, Anteris, Capstan Medical, and B. Braun. He is a proctor for Edwards Lifesciences and the Abbott Vascular. He is on the advisory board for Medtronic and Boston Scientific. He has stock options in Capstan Medical. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS complication, mitral valve, valve replacement