

# Totally endoscopic robotic mitral valve replacement after intraoperative failure of mitral valve repair with bilateral percutaneous cannulation



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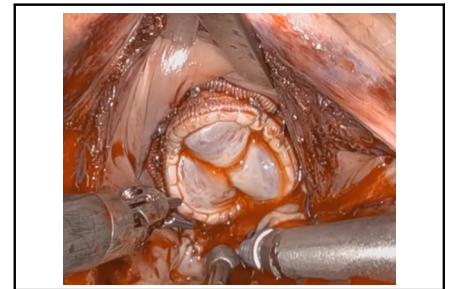
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Robotic mitral valve replacement after failed repair.

## CENTRAL MESSAGE

The totally endoscopic robotic approach allows for easy intraoperative transition from mitral valve repair to replacement.

▶ Video clip is available online.

To view the AATS Annual Meeting Webcast, see the URL next to the webcast thumbnail.

This case demonstrates the adaptability of the totally endoscopic robotic approach, which facilitated efficient conversion to mitral valve replacement after an initial attempt at repair via annuloplasty and posterior leaflet augmentation.

## CASE PRESENTATION

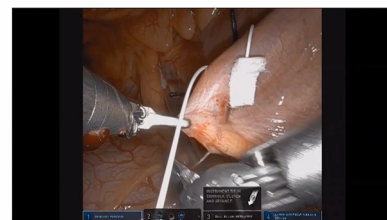
A 42-year-old female patient with severe Carpentier type III mitral regurgitation and restricted posterior leaflet motion was deemed a candidate for totally endoscopic robotic mitral valve repair (institutional review board #21E.023, January 21, 2021, and #21E.453, April 29, 2021, respectively). The patient consented to videotaping of the procedure (Video 1).

The patient was undergoing work-up for ascites and, while being considered for liver transplantation, was found to have severe mitral regurgitation. Collaboration between hepatology, cardiology, and cardiac surgery determined she was an appropriate-risk patient for totally endoscopic mitral valve repair. Preoperative imaging revealed femoral

artery diameters of 6 and 7 mm, precluding the use of an arterial cannula with an endoballoon side port.

Five-eight-millimeter ports were placed in the right chest wall. Percutaneous cardiopulmonary bypass (CPB) was established using a 28-French right femoral venous cannula, a 16-French right femoral arterial sheath for endoballoon placement into the aorta, a 19-French left femoral arterial

Surgeon at console  
**Diaphragmatic retraction suture**  
Figure of eight suture through tendon of R hemidiaphragm



**VIDEO 1.** Demonstrative case of mitral valve replacement after intraoperative failure of mitral valve repair with bilateral percutaneous cannulation. Video available at: [https://www.jtcvs.org/article/S2666-2507\(23\)00401-7/fulltext](https://www.jtcvs.org/article/S2666-2507(23)00401-7/fulltext).

perfusion cannula, and superior vena cava cannulation via the right internal jugular vein with a 19-French drainage catheter connected to the bypass circuit.

After intercostal nerve cryoablation, the mitral valve was repaired using a 30-mm semirigid ring. After weaning from CPB, transesophageal echocardiogram showed persistent moderate-to-severe mitral regurgitation. The decision was made to replace the valve by enlarging the working port from 8 to 30 mm. A 31-mm porcine valve was introduced through the working port and secured with interrupted sutures. Completion echocardiogram showed a properly functioning bioprosthetic valve.

## DISCUSSION

Robotic mitral valve repair has shown comparable morbidity and mortality with open sternotomy and other minimally invasive approaches for mitral repair.<sup>1</sup> Although Arslanhan and colleagues<sup>2</sup> recently demonstrated favorable postoperative outcomes in a series of 117 patients who underwent robotic mitral valve replacement with a 4-cm mini-thoracotomy, literature describing a totally endoscopic robotic approach is limited to isolated case reports.<sup>3</sup>

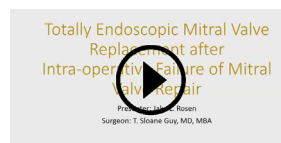
Our totally endoscopic robotic technique reduces postoperative pain by eliminating rib spreading. Percutaneous femoral cannulation for CPB has lower rates of groin complications than open cutdown.<sup>4</sup> Endoballoon enables aortic occlusion without aortic puncture, minimizing intrathoracic clutter. Bilateral percutaneous cannulation preserves benefits in patients with inadequate femoral arteries. Barbed sutures decrease knot tying, improving efficiency.

## CONCLUSIONS

The totally endoscopic robotic approach allows for easy intraoperative transition from mitral valve repair to replacement.

## Webcast

You can watch a Webcast of this AATS meeting presentation by going to: <https://www.aats.org/resources/totally-endoscopic-robotic-mitral-valve-replacement-after-intra-operative-failure-of-mitral-valve-repair>.



## Conflict of Interest Statement

Dr Guy is a consultant for Edwards Lifesciences, Medtronic, and a case observation site and proctor for Intuitive Surgical. All other authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

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