

Robotic Assisted Mitral Clip Removal at Time of Mitral Valve Replacement

JS Newman¹, A Luckert¹, D Chowdhury¹, D. Torrington², NC Patel¹

¹ Northwell Health Cardiovascular Institute, Manhasset, NY, USA | ²Zucker School of Medicine at Hofstra / Northwell, Hempstead, NY, USA

OBJECTIVE

Mitral transcatheter edge-to-edge repair (mTEER) is increasing internationally in its implementation. As such, cardiac surgeons are seeing growing numbers of patients with failed TEER treatments requiring surgical intervention. We present a robotic assisted approach for removal of the prior mTEER device that may allow salvage of the native mitral valve.

METHODS

The Da Vinci Xi robotic system (Intuitive Surgical, Sunnyvale, CA) was employed, and the right chest was accessed in the standard fashion for mitral valve surgery. After initiation of cardiopulmonary bypass and hyperkalemic diastolic arrest, the mitral valve was exposed and the valve assessed. The MitraClip device (Abbott, Abbott Park, IL, USA) was identified, with one having poor attachment to a billowing, redundant posterior leaflet. A suture was passed through the hinge on the devices, and with minimal additional leaflet damage the devices were able to be released. In this case, the valve was too damaged and required replacement with a porcine bioprosthetic valve.

CONCLUSIONS

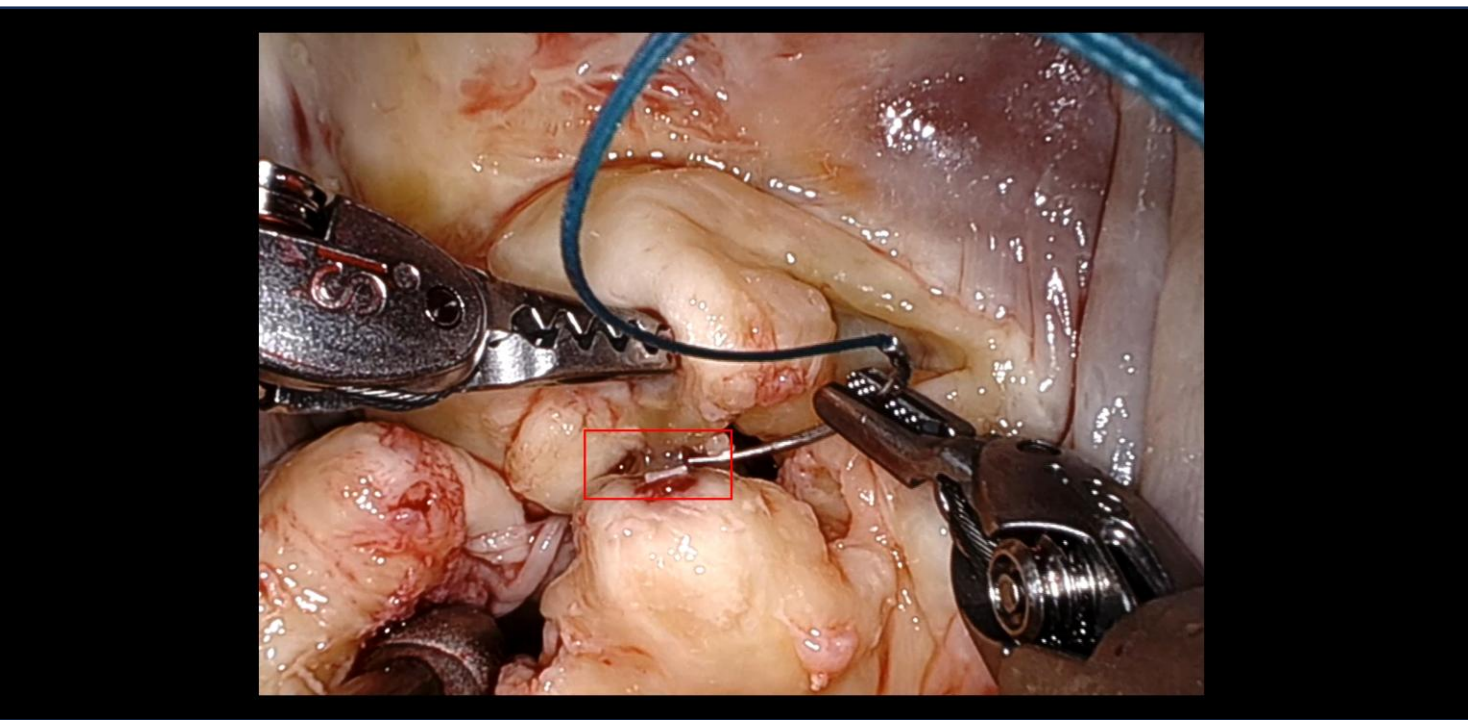
mTEER is being performed with increasing frequency in younger, lower risk patients. As such, post mTEER interventions are increasing. We present a robotic assisted approach to removal of the mTEER device at time of valve replacement in a minimally invasive fashion. Additionally, this approach to device removal may facilitate valve preservation and repair in appropriate patients..

OPERATIVE PROCEDURE

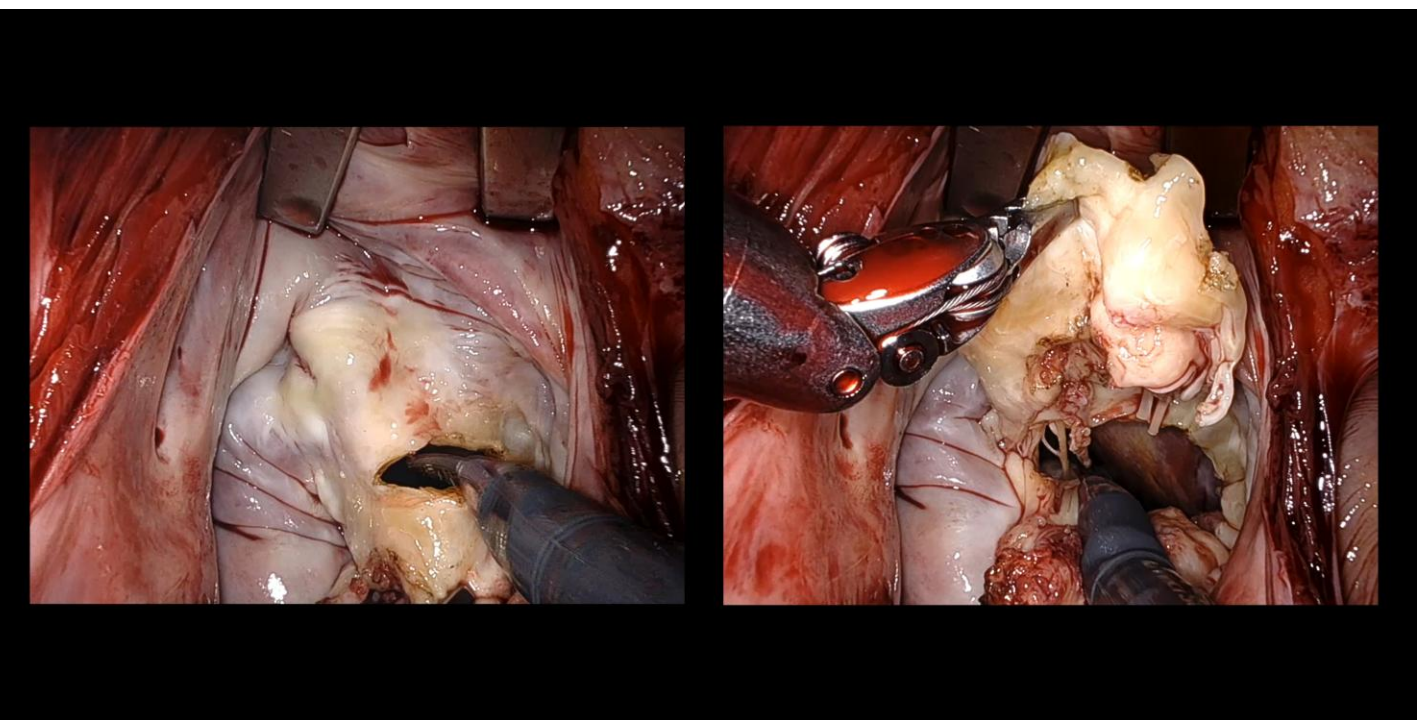


Patient is positioned supine with a bump under the right scapula with the right arm below the operative table.

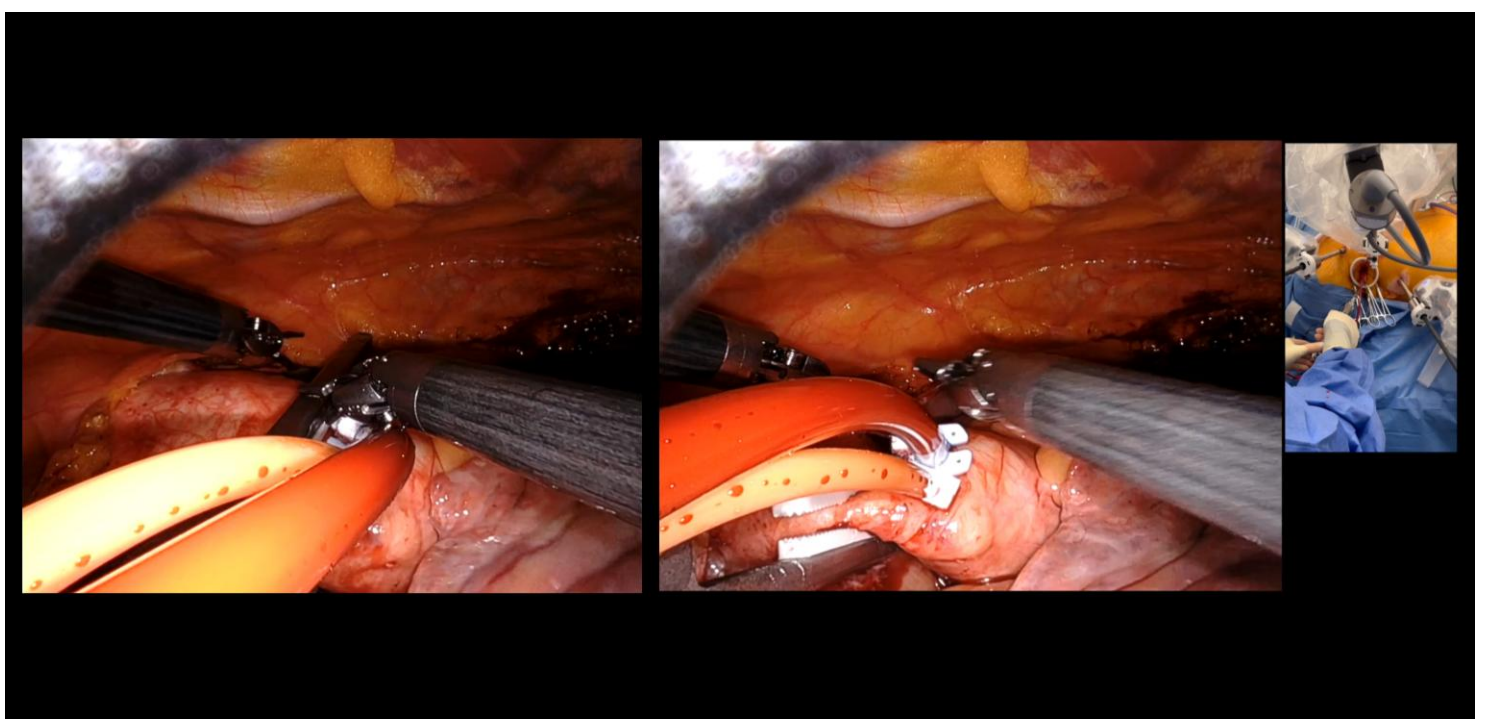
Right femoral arterial and venous cannulation and left IJ cannulation for CPB.



The metallic anchors that hold the clip to the deployment catheter are demonstrated by the red box. Re-engaging these allows the clip to release the valve leaflets.

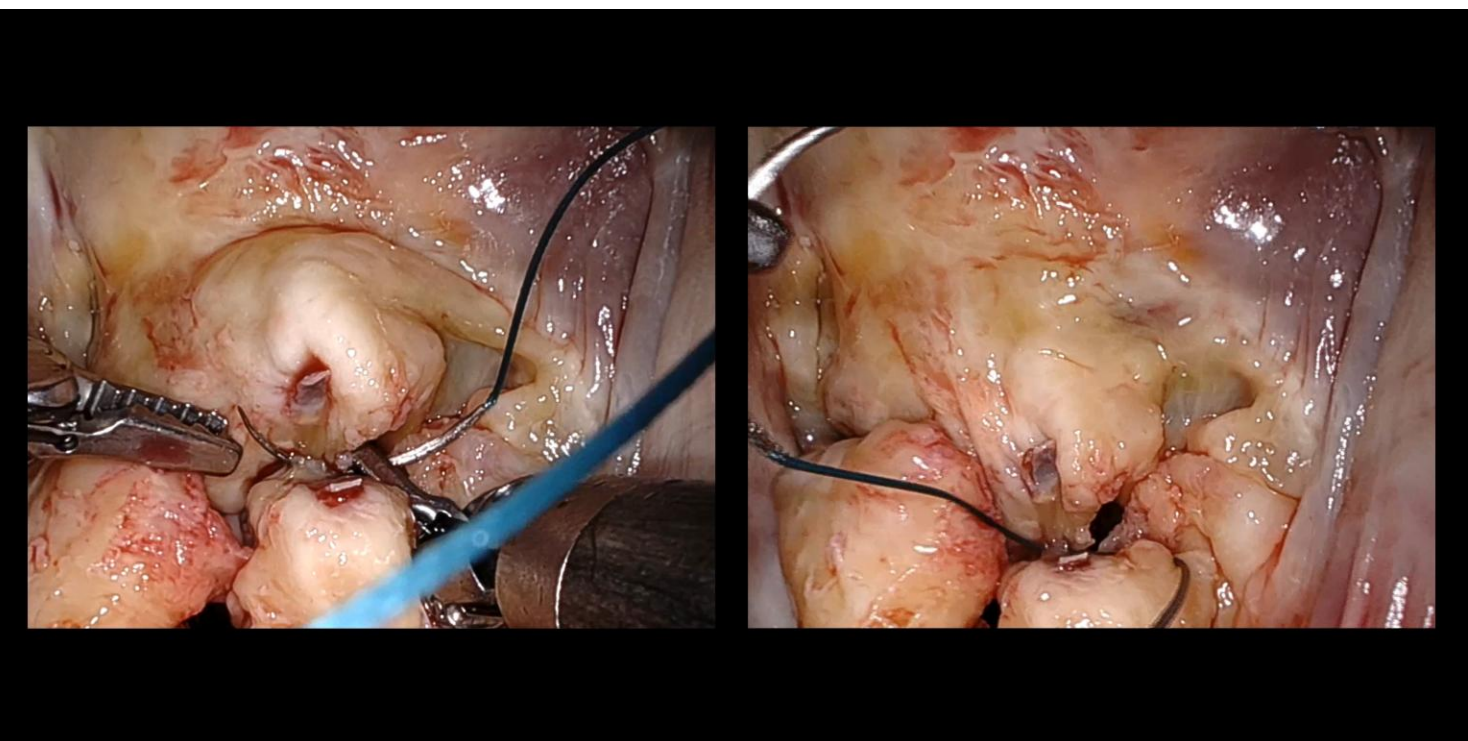


As the valve was not salvageable, a mitral valve replacement was pursued with resection of the anterior leaflet of the mitral valve.

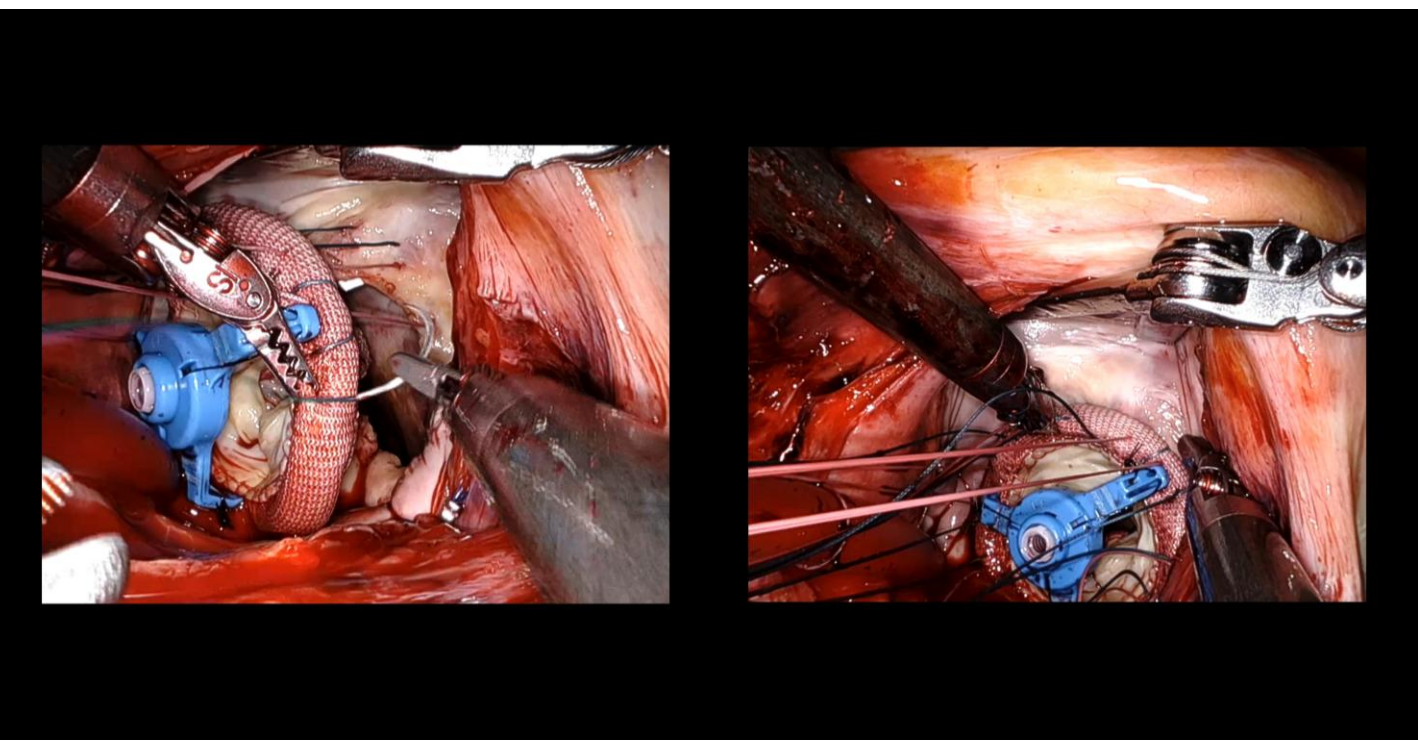


After appropriate setup, the aortic root vent, antegrade cardioplegia catheter and aortic cross clamp are positioned.

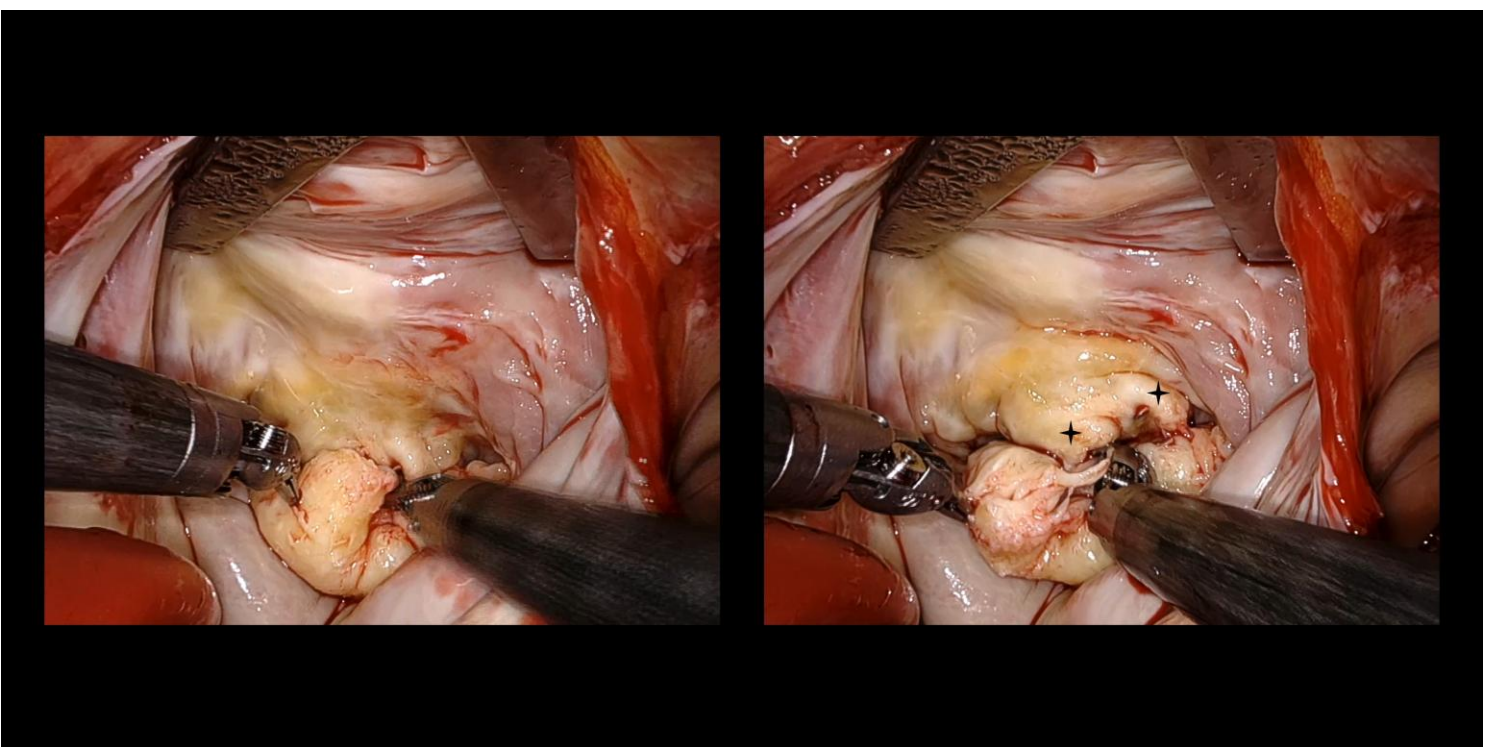
The clamp is secured and cardioplegia is administered.



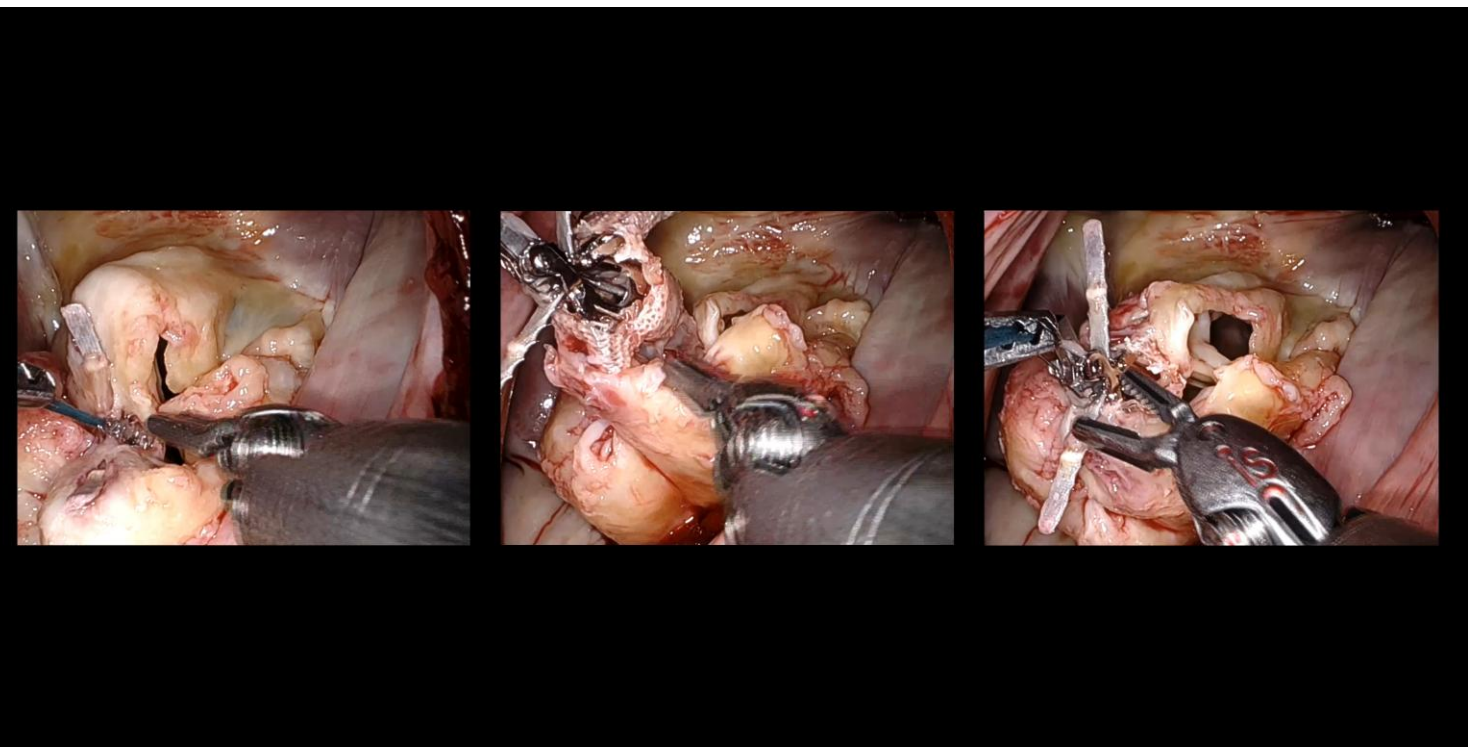
A 2-0 suture was placed through the clip anchors. This suture was placed under gentle traction by the bedside assistant.



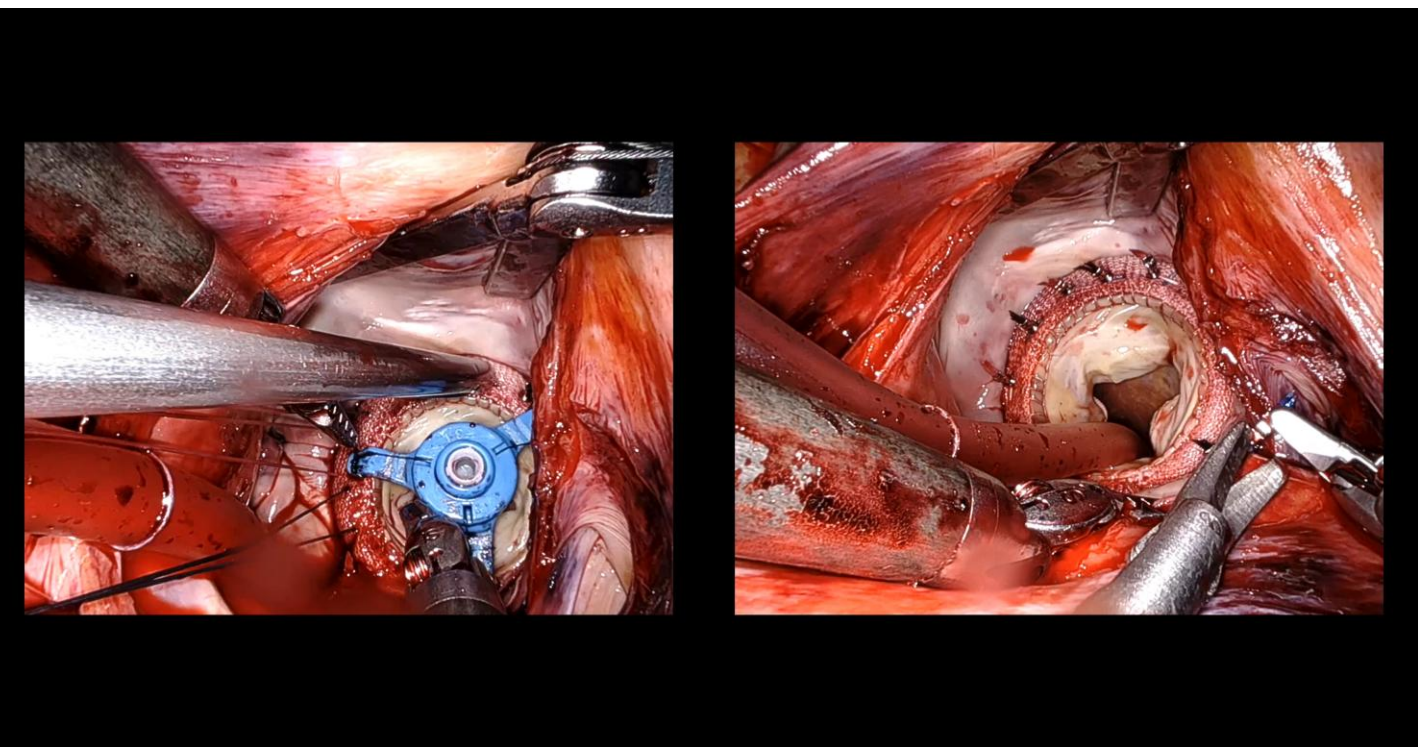
Pledgeted 2-0 braided suture is placed ventriculo-to-atrial and then through the sewing ring of the bioprosthetic valve. The valve is seated with all struts below the annulus and no sutures caught.



The mitral valve is exposed and inspected. In this case, the valve is severely diseased and prolapsed with failure of the MitraClip device, denoted by the (*).



Gentle traction on the anchors causes the clip to release the valve leaflets. Gentle blunt dissection can remove the valve leaflet from the clip in a valve preserving fashion.



The valve sutures are secured with the Cor-Knot device. The ventricular vent is placed across the valve and the remainder of the operation completed in the usual fashion.

DISCLOSURES

A Luckert: Intuitive Surgical Solutions (Consultant)

NC Patel: Intuitive Surgical Solutions (Consultant), Vascular Graft Solutions (Advisory Board)

REFERENCES

Mirabel M, Iung B, Baron G, et al. What are the characteristics of patients with severe, symptomatic, mitral regurgitation who are denied surgery? European Heart Journal. 2007;28(11):1358-1365.

Makkar RR, Chikwe J, Chakravarty T, et al. Transcatheter Mitral Valve Repair for Degenerative Mitral Regurgitation. JAMA. 2023;329(20):1778-1788.

Shah, M, Dalak, F, Alsamadi, F, et al. Complications Following Percutaneous Mitral Valve Edge-to-Edge Repair Using MitraClip. J Am Coll Cardiol Case Rep. 2021 Mar, 3 (3) 370-376.