

# Robotic artificial chord implantation for repair of extensive noncontiguous posterior mitral leaflet prolapse



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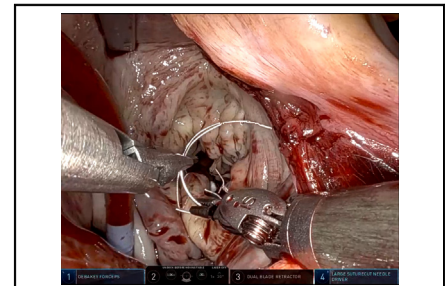
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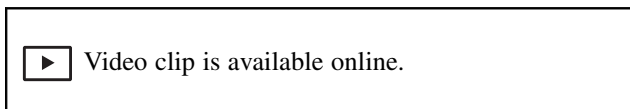


Robotic posterior leaflet repair with artificial chordae.

### CENTRAL MESSAGE

In prolapse involving noncontiguous regions of the posterior leaflet, our strategy is to use artificial neochordae as a simple approach to a complex pathology.

See Commentary on page 75.



### CASE REPORT

A 58-year-old asymptomatic man was found to have severe mitral regurgitation (MR) after routine examination detected a murmur. Echocardiography revealed a broad anteriorly directed jet of severe MR due to extensive posterior mitral prolapse involving noncontiguous regions of the leaflet (Figure 1). His preoperative workup did not identify

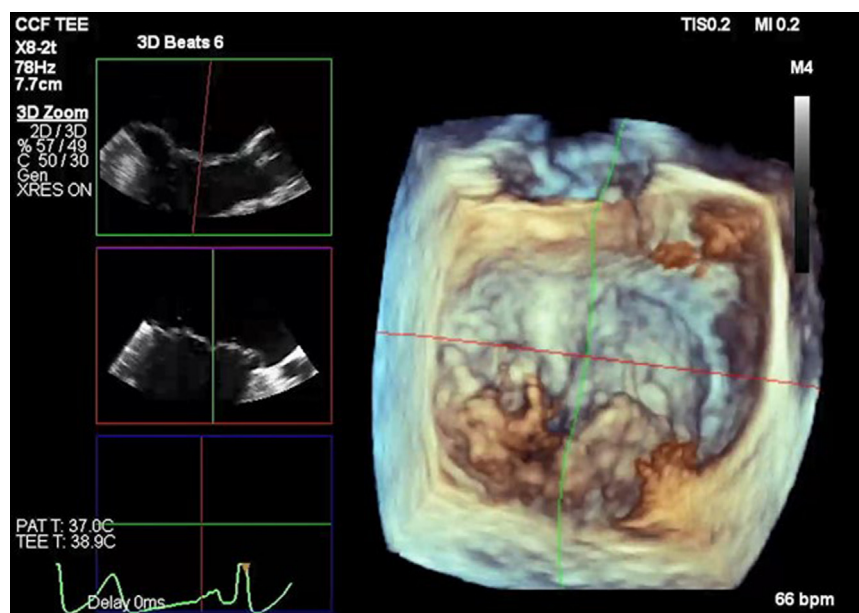
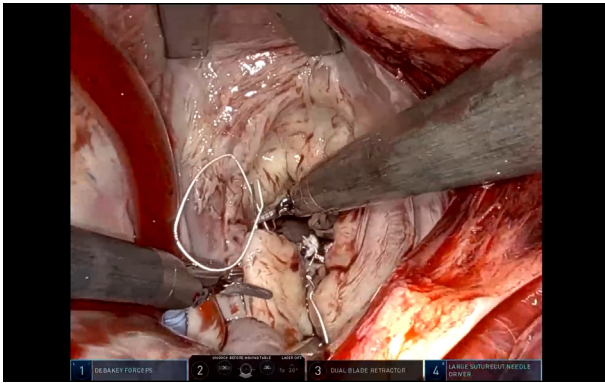


FIGURE 1. Echocardiography demonstrating extensive posterior mitral prolapse involving noncontiguous regions of the leaflet.



**VIDEO 1.** Robotic posterior leaflet repair with artificial chordae. Video available at: [https://www.jtcvs.org/article/S2666-2507\(23\)00358-9/fulltext](https://www.jtcvs.org/article/S2666-2507(23)00358-9/fulltext).

any contraindications to performing a robot-assisted operation according to our institution's previously described screening algorithm.<sup>1</sup> In particular, angiography demonstrated no coronary artery disease and computed tomography of the aorta showed no aortopathy or peripheral vascular disease. Informed consent was obtained for the publication of this study data; institutional review board approval was not required.

We performed mitral valve repair using the DaVinci Xi robotic platform (Intuitive Surgical Inc). Direct inspection of the mitral valve revealed ruptured chordae to P3 and elongated chordae to P2. Artificial chordal replacement has been demonstrated to achieve successful long-term results and was our preferred repair strategy for this case.<sup>2</sup> We placed an artificial neochordal suture from the atrial surface of P3 through the posterior trunk of the posteromedial papillary muscle as a felt pledget-reinforced U-stitch (Video 1). The leading end of the suture was then passed back from the ventricular to the atrial surface of the leaflet, making 3 passes through the leaflet edge to finish adjacent to the first limb of the suture. We adjusted the posterior leaflet height such that the leaflet dipped into the ventricle when lifting up on the posterior annulus. The chord was

then tied securely with 10 to 15 throws. A second artificial neochord was placed laterally from the atrial surface of P2 through the anterolateral papillary muscle in the same way as the first chord. Due to the broad area of prolapse, 4 passes were required to return to the first limb of the suture. This second chord was simply tied using a surgeon's knot to allow further adjustment, if required, after the static test. Annuloplasty was performed using a flexible band with a running suture technique, which our institute has previously described.<sup>3</sup> Static testing demonstrated a posterior coaptation line and no residual MR. The second chord was then tied securely to complete the repair. Intraoperative transesophageal echocardiography off cardiopulmonary bypass confirmed a successful repair with no MR, no systolic anterior motion, and good left ventricular function along with excellent leaflet mobility.

The patient was discharged on postoperative day 7 awaiting assessment for permanent pacemaker requirement, which was subsequently not indicated, but otherwise had a satisfactory recovery.

#### Conflict of Interest Statement

The authors reported no conflicts of interest.

The *Journal* policy requires that editors and reviewers disclose conflicts of interest and to decline handling 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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