

# Successful mitral repair for central bridge double-orifice mitral valve via right minithoracotomy



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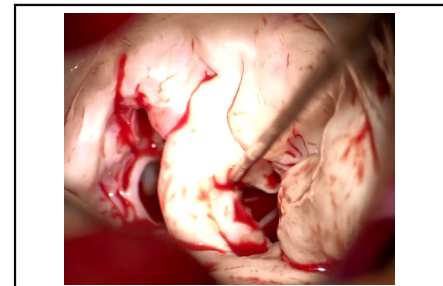
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Mitral repair for MR associated with central bridge DOMV.

## CENTRAL MESSAGE

Mitral repair for complex MR from DOMV is considered challenging. This case report provides a noteworthy example of successful repair using the same techniques as for degenerative MR.

▶ Video clip is available online.

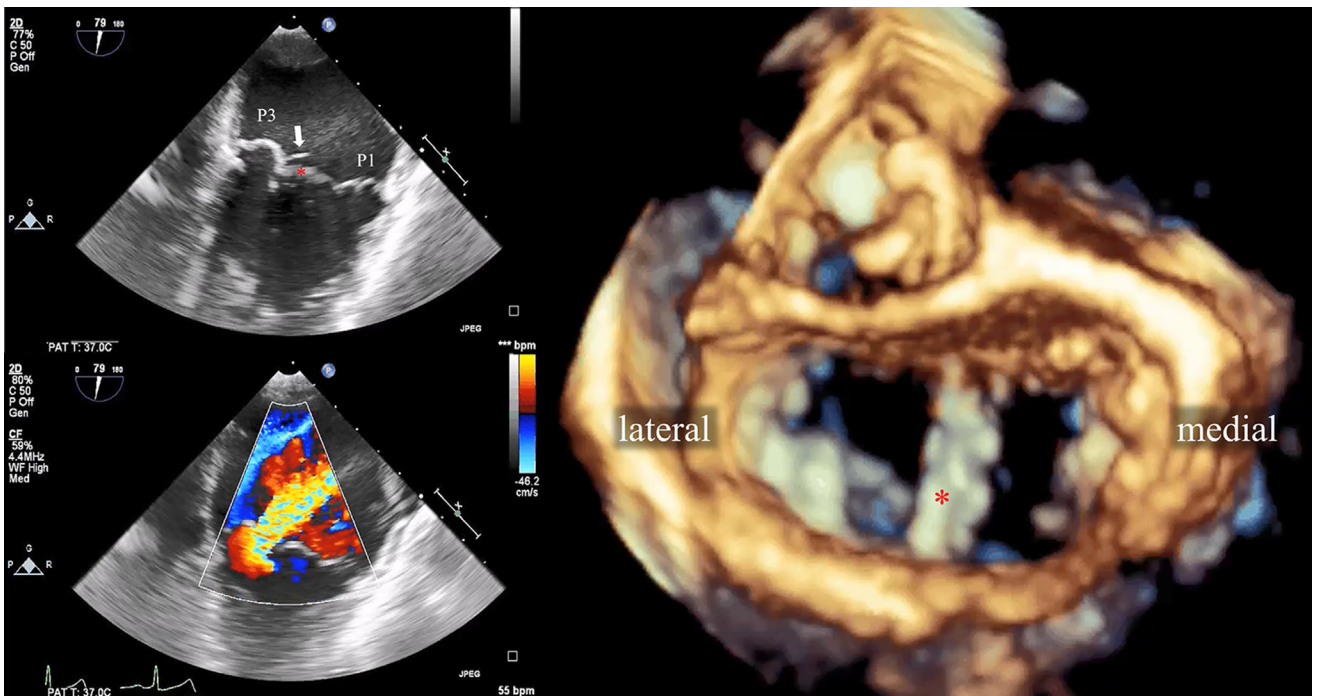
Double-orifice mitral valve (DOMV) is a rare congenital mitral valve disease. Some patients with DOMV develop acquired mitral regurgitation (MR). Many surgeons consider complex MR associated with DOMV unsuitable for repair. However, we present a successful case of minimally invasive mitral repair for MR associated with DOMV. Institutional review board approval was not required; the patient provided informed written consent to publish this case report and accompanying images.

## CASE REPORT

A 21-year-old woman presenting with MR and New York Heart Association class II exertional dyspnea was referred to our hospital. Echocardiography revealed severe MR from DOMV with a central bridge and a billowing posterior leaflet with prolapse at the medial scallop (P3) with torn chordae. The orifices were divided approximately equally. The annular diameter was 30 mm in the apical 4-chamber view. The severe regurgitation jet originating from the P3 site was directed toward the lateral side (Figure 1).

The operation was performed through a right minithoracotomy approach via the fourth intercostal space. Cardiopulmonary bypass was established through right femoral artery perfusion and venous drainage via the right internal jugular and right femoral veins. After aortic crossclamping, the mitral valve was exposed through a right-sided left atriotomy under cardiac arrest. Upon inspection, the mitral valve was found to have 2 orifices

separated into approximately equal segments by a fibrous bridge between segments A2 and P2. Prolapsed P3 with torn chordae was observed on the posteromedial orifice. Myxomatous changes were observed at A2, A3, P2, and P3 (Figure 2). Mitral repair was performed without dividing the fibrous bridge through triangular resection and suture of P3 using 5-0 monofilament sutures and neo-chord reconstruction of the torn chordae using 4-0 expanded polytetrafluoroethylene suture. The suture was passed through the head of the posteromedial papillary muscle. Lastly, annuloplasty was performed with a 32-mm Cosgrove-Edwards annuloplasty ring (Edwards Lifesciences). The size of the annuloplasty ring was selected on the basis of the area of the anterior leaflet and the distance between the bilateral fibrous trigones (Video 1). Intraoperative transesophageal echocardiography demonstrated successful repair with no regurgitation or mitral stenosis. The patient has remained well for 6 years after repair, with recent echocardiography indicating no MR or mitral stenosis.



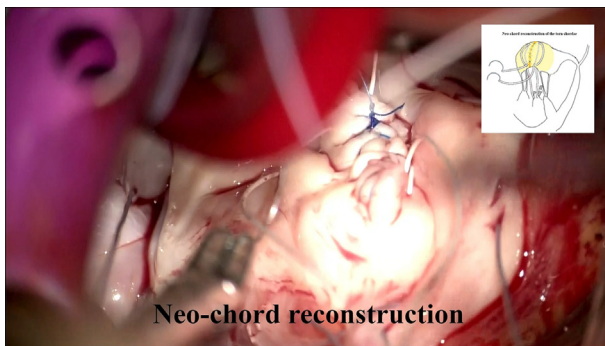
**FIGURE 1.** Preoperative transesophageal echocardiography demonstrating prolapsed P3 with torn chordae (*white arrow*) and fibrous bridge (*red asterisk*). Color Doppler imaging demonstrating regurgitation jet originating from P3 site.

**DISCUSSION**

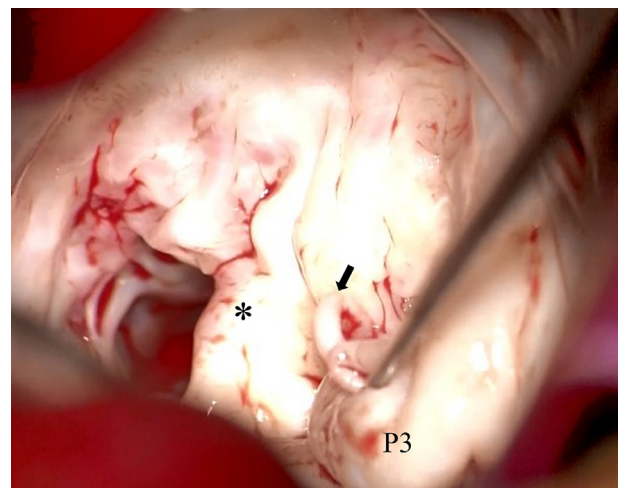
DOMV is a rare malformation, with a prevalence of 0.05% as an isolated disease and 1% when coexisting with other congenital heart diseases, such as atrioventricular septal defects.<sup>1</sup> In most patients, the sizes of the 2 orifices are unequal and regurgitation originates from a cleft in the major orifice or accessory orifice itself, for which cleft closure is widely performed as part of mitral repair. The central bridge type and duplicate mitral valves in our case remain uncommon. Moreover, our case presented a complex lesion of a billowing leaflet with prolapse with torn chordae. Mitral repair for complex MR associated with DOMV is technically challenging. In cases of extensive or

complicated mitral defects, valve replacement is often mandatory.<sup>2</sup> Mitral repair is preferable, especially for younger patients, as in our case. However, limited data are available regarding mitral repair for complex MR associated with DOMV.

In this case, a combination of triangular resection and neo-chord reconstruction techniques was successfully performed. The principle involves restoring the coaptation



**VIDEO 1.** Minimally invasive mitral repair for MR associated with central bridge DOMV. Video available at: [https://www.jtcvs.org/article/S2666-2507\(24\)00149-4/fulltext](https://www.jtcvs.org/article/S2666-2507(24)00149-4/fulltext).



**FIGURE 2.** Intraoperative image showing myxomatous change of mitral leaflet and prolapsed P3 with torn chordae (*black arrow*). The orifices were separated by bridging tissue (*black asterisk*).

area through triangular resection of excess tissue and re-establishing the coaptation line through neochord reconstruction, the same as for degenerative mitral disease. We considered the etiology of this case as repairable using techniques based on this principle. Preoperative real-time 3-dimensional transesophageal echocardiography proved valuable in understanding the mechanism of MR and the morphology of the mitral valve. Mitral repair was accomplished without dividing the fibrous bridge. In line with a previous report,<sup>1</sup> we opted not to divide the bridging tissue because of its importance in maintaining the valve component. However, it is worth noting that a case of successful mitral repair by dividing the bridging tissue has been reported.<sup>3</sup>

## CONCLUSIONS

We suggest that common mitral repair techniques remain reliable and durable, even for central bridge DOMV regurgitation. It is essential to evaluate lesions to determine the

extent of the resection, and the indication of neochord reconstruction in each case.

## Conflict of Interest Statement

The 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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