

# Transcatheter repair of massive primary mitral regurgitation: beyond the reach of the guidelines

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A 58-year-old male with prior history of mechanical aortic valve replacement (AVR) in 2009 for severe symptomatic aortic regurgitation in a bicuspid aortic valve, and since 2013 a new-onset severe asymptomatic primary mitral regurgitation (MR) due to prolapse of the anterior mitral valve leaflet (AMVL) presented himself with acute heart failure. Based on current guidelines recommendations, this patient was not eligible for transcatheter mitral valve edge-to-edge repair (TEER), as well he was found as too high risk for conventional mitral valve repair. However, as a last resort TEER was undertaken with an unconventional strategy, which resulted in resolution of the MR and improvement of clinical, biochemical findings.

**Keywords** Valvular heart disease • Mitral regurgitation • Transcatheter intervention • Case report

**ESC Curriculum** 2.1 Imaging modalities • 4.3 Mitral regurgitation • 6.4 Acute heart failure



**Figure 1** Upper left: three-dimensional transoesophageal echo showing the flail gap > 10 mm; bottom left: colour Doppler of the massive mitral regurgitation; middle: fluoroscopy after clipping, asterisk for Mitraclip (3 in total); upper middle: left atrial V-wave of 85 mmHg before transcatheter mitral valve edge-to-edge repair; bottom middle: left atrial V-wave of 20 mmHg after clipping; upper right: three-dimensional transoesophageal echo after clipping showing no flail or gap anymore; bottom right: colour Doppler of grade I mitral regurgitation after transcatheter mitral valve edge-to-edge repair. Ao, aortic valve; AMVL, anterior mitral valve leaflet; PMVL, posterior mitral valve leaflet.

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A 58-year-old male with prior history of mechanical aortic valve replacement (AVR) in 2009 for severe symptomatic aortic regurgitation in a bicuspid aortic valve, and since 2013 a new-onset severe asymptomatic primary mitral regurgitation (MR) due to prolapse of the anterior mitral valve leaflet (AMVL) presented himself with acute heart failure. This MR did not require intervention prior to the presentation in the emergency department (ED) in 2022. In the ED, he had severe shortness of breath due to acute left-sided heart failure. Echocardiography showed a hyperdynamic left ventricle [ejection fraction (EF) 66.8%, left ventricular end-systolic diameter (LVESD) 41 mm, left ventricular end-diastolic diameter (LVEDD) 66 mm] with massive MR due to flail of the AMVL with a flail gap > 10 mm and flail width > 15 mm (*Figure 1*, upper left; [Supplementary material online, Videos S1–S3](#)). Echocardiography and right heart catheterization also revealed severe post-capillary pulmonary hypertension (systolic pulmonary artery pressure 75–80 mmHg and wedge pressure 44 mmHg) and moderate right ventricular systolic dysfunction (reduced tricuspid annular plane systolic excursion [TAPSE] on echo). The Heart Team concluded that this patient was at too high risk for conventional mitral valve surgery (European System for Cardiac Operative Risk Evaluation [EuroSCORE] II 17.44%). According to current guidelines for valvular heart disease and echocardiographic criteria (too large flail gap and flail width), this patient was not eligible for transcatheter mitral valve edge-to-edge repair (TEER).<sup>1,2</sup> However, as a last resort, TEER was undertaken. The MR was clipped with three XTW MitraClip devices (Abbot Vascular, Menlo Park, CA, USA) from medial to lateral ('zipper like strategy') (*Figure 1* upper right). Along the procedure and placements of the clips (see [Supplementary material online, Videos S4–S7](#)), blood pressure rose gradually, the MR decreased after placing the third clip (*Figure 1* bottom right; [Supplementary material online, Videos S4 and S7](#)), lung vein flow normalized, and the prominent

left atrial V-wave (systolic left atrial pressure) decreased from 85 mmHg to 20 mmHg (*Figure 1* upper and lower middle). There were no signs of mitral valve obstruction due to clipping with a mean gradient of 4 mmHg (heart rate 69/min). In the week following the procedure, the patient was free from symptoms, and his N-terminal (NT)-pro hormone natriuretic peptide (NT-proBNP) decreased from 3180 pg/mL (admission) to 483 pg/mL (hospital discharge) and to 212 pg/mL (3-month follow-up). The EF during follow-up was 60.4%, LVESD 38 mm, and LVEDD 61 mm.

## Supplementary material

[Supplementary material](#) is available at *European Heart Journal – Case Reports* online.

**Consent:** The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

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## References

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