

IMAGES IN INTERVENTION

Feasibility of Anterior Mitral Leaflet Flail Repair With Transapical Beating-Heart Neochord Implantation



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A 91-year-old man was referred following congestive heart failure with acute pulmonary edema that was medically treated. Echocardiography revealed the presence of severe mitral regurgitation (MR) as a result of chordal rupture on the anterior leaflet at the level of the A2 segment (Figures 1A to 1C, Online Videos 1, 2 and 3). He presented with a history of arterial hypertension, hypothyroidism, chronic moderate renal failure, actively bleeding bladder and bowel polyps, and right coronary myocardial infarction treated with percutaneous coronary intervention 2 years before. The patient was scheduled for urgent mitral valve (MV) procedure. Mortality EuroSCORE II was 6.31%, and STS score, 20.33%. Because of the high risk, he underwent transapical off-pump beating heart MV repair with implantation of 3 Gore-Tex (W.L. Gore & Associates, Flagstaff, Arizona) neochords using the NeoChord DS1000 device (NeoChord, Eden Prairie, Minnesota) (1).

The device is introduced through a standard purse-string apical ventriculotomy, advanced towards the MV under 2-dimensional/3-dimensional

transesophageal guidance (Figures 1D and 1E, Online Videos 4 and 5) (2). The prolapsing segment of the anterior leaflet is grasped using the instrument's jaws, confirmed by the 4-fiberoptic monitor. The neochord is implanted and then retracted outside the heart. Under echocardiographic guidance, the neochord is properly tensioned, achieving a correct MV function (Figures 1F and 1G, Online Videos 6 and 7). The operation is finalized with external fixation of the neochord on the apex of the heart.

The patient made an uneventful further recovery and was discharged 10 days after surgery. At 4 months follow-up, he presented with a mild residual MR and New York Heart Association functional class I. This case illustrates the first-time successful physiological repair of an anterior mitral leaflet flail through a transcatheter procedure.

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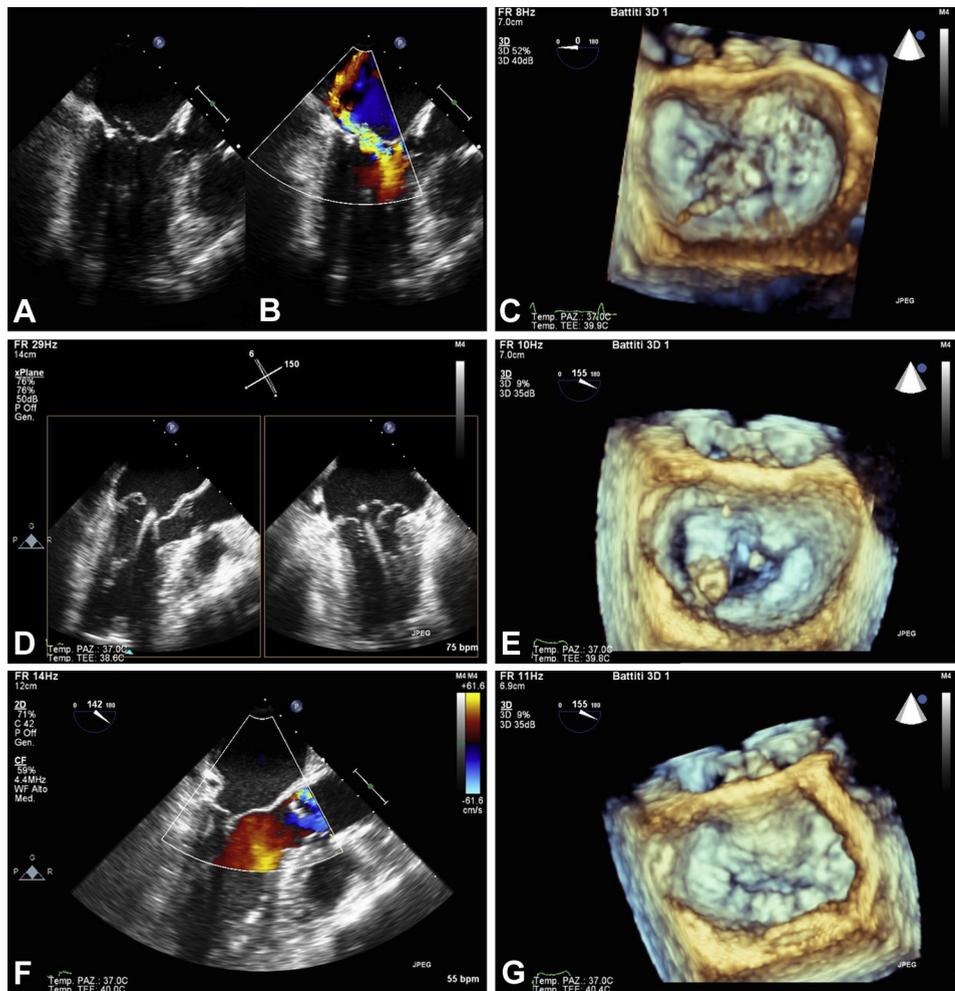


FIGURE 1 Pre-Operative, Intraoperative, and Post-Operative Evaluation of the Anterior Leaflet Repair Using the NeoChord Procedure

(A) Pre-operative mitral valve assessment. Two-dimensional (2D) transesophageal echocardiography showing an important flail of the anterior leaflet (Online Video 1). (B) Functional pre-operative mitral valve assessment. 2D transesophageal color Doppler echocardiography showing a severe eccentric mitral regurgitation (Online Video 2). (C) Pre-operative anatomic reconstruction of the mitral valve. 3D transesophageal echocardiography showing an important flail of the anterior leaflet (A2 segment) (Online Video 3). (D) Intra-cardiac navigation of the device. 2D transesophageal echocardiography X-plane guidance of the NeoChord device through the left atrium (Online Video 4). (E) Three-dimensional (3D) positioning of the device. 3D transesophageal echocardiography guidance of the NeoChord device through the left atrium (Online Video 5). (F) Final result of the procedure. 2D transesophageal color Doppler echocardiography showing a correct mitral valve function after tensioning the neochords (Online Video 6). (G) Final 3D result of the procedure. 3D transesophageal echocardiography showing the final anatomic result of the repaired mitral valve (Online Video 7).

REFERENCES

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APPENDIX For the supplemental videos, please see the online version of this article.