

Interventional Closure of a Mitral Valvular Leaflet Defect After Partial Detachment of a Carpentier Perimount Annuloplasty Ring

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A 71-year-old man was transferred to our clinic with acute decompensated chronic heart failure New York Heart Association functional class IV. He had a history of ischemic cardiomyopathy with severely reduced left ventricular function after

coronary bypass surgery, aortic valve replacement, and restrictive mitral valve (MV) annuloplasty using a Carpentier-Edwards Perimount 23-mm ring (Edwards Lifesciences, Irvine, California) in 2012.

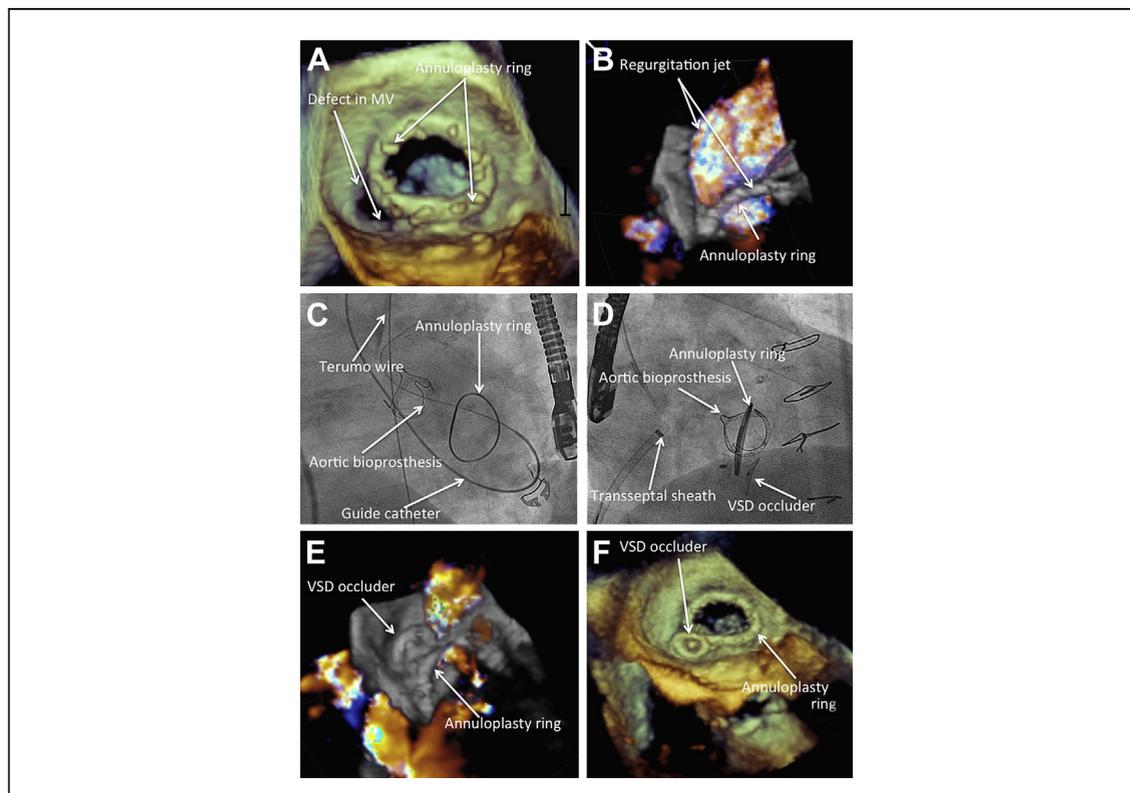


Figure 1. Pre-Procedural Evaluation and Result After Closure of the Mitral Leaflet Defect Using an Amplatzer VSD Occluder

(A) Three-dimensional (3D) transesophageal echocardiography (TEE) showing the defect at the mitral leaflet (arrows) (Online Video 1). (B) A 3D color Doppler image of the relevant regurgitation jet through the defect (Online Video 2). (C) Fluoroscopic image after establishing the arteriovenous loop. (D) Fluoroscopic result after implantation of the Amplatzer VSD occluder. (E) The 3D color Doppler image shows total closure of the leaflet defect after implantation of the occluder. (F) This 3D TEE image shows the final result, with the VSD occluder in place, adherent to the initially implanted ring (Online Video 3).

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Three-dimensional (3D) transesophageal echocardiography (TEE) revealed partial detachment of the Carpentier ring, resulting in a large defect at the anterior MV leaflet in segment A3 with severe

MV regurgitation (proximal isovelocity surface area: 1.4 cm, effective regurgitant orifice: 42 mm², regurgitant volume: 59 ml/beat) (Figs. 1A and 1B).

The heart team's decision was to avoid repeated open-heart surgery because of relevant comorbidities (EuroSCORE [European System for Cardiac Operative Risk Evaluation] II: 12.42%). Because mitral regurgitation was caused by an anatomical defect of the MV leaflet without relapse of significant transvalvular regurgitation, we decided to perform an interventional defect closure with real-time 3D TEE guidance.

After placing a wire (Terumo Medical Corporation, Somerset, New Jersey) using a 5-F Terumo Glide catheter (Terumo Medical Corporation, Somerset, New Jersey) retrograde across the defect, transseptal puncture was performed establishing an arteriovenous loop by snaring the wire in the left atrium using a 20-mm Multi-Snare (B Braun, Melsungen, Germany) (Fig. 1C). Thereafter, a 10-F sheath (Amplatzer, St. Jude Medical, Plymouth, Minnesota) was inserted antegrade across the defect (Figs. 1D and 1E). After successful deployment of an Amplatzer ventricular septum defect occluder (Amplatzer VSD occluder, 14/5 mm), 3D TEE confirmed a relevant reduction of the MV

regurgitation (Fig. 1E). Finally, the patient was discharged on day 5 after the procedure with improved functional New York Heart Association class II.

This is a rare case of partial detachment of an MV annuloplasty ring in which the anatomy of the mitral annulus was suitable for interventional defect closure. In this case, 3D TEE was an indispensable tool to identify the underlying pathology and for peri-interventional navigation during the complex procedure.

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APPENDIX

For accompanying videos, please see the online version of this paper.