Three-dimensional transoesophageal echocardiography in a patient undergoing percutaneous mitral valve repair using the edge-to-edge clip technique


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We report a case of percutaneous mitral valve repair, using the Mitraclip device, in which we show that application of real-time three-dimensional transoesophageal echocardiography (3D-TEE) is extremely helpful for the guidance of this procedure. Because of its excellent visualization capacities, 3D-TEE simplifies the transseptal puncture, the positioning of the clip above the mitral valve orifice, the grasping of the mitral valve leaflets, and the evaluation of the final result. Therefore, we conclude that 3D-TEE has the potential to increase the safety and efficacy of this new technique to treat mitral regurgitation in patients who cannot undergo conventional valve surgery.

KEYWORDS
Mitral valve; Catheter; Echocardiography

Surgical mitral valve repair is the preferred therapy for severe mitral regurgitation (MR). In cases of unacceptable high peri-operative risk, percutaneous mitral repair using a clip (Mitraclip™, Evalve Inc., Menlo Park, USA) may be an alternative approach.1,2 The first phase-I clinical trial showed safety and feasibility of this technique.3 The clip device system is delivered to the left atrium via a transseptal puncture and enables placement of a clip on the mitral valve leaflets, resulting in permanent leaflet approximation similar to the approximation achieved with the suture-based edge-to-edge repair technique to create a double-orifice mitral valve.4 Correct positioning of the clip device over the mitral orifice, perpendicular to the line of leaflet coaptation, is mandatory to prevent clip disengagement and to obtain an acceptable MR reduction. Therefore, guiding with fluoroscopy and both transthoracic (TTE) and transoesophageal echocardiography (TEE) are required. We added three-dimensional TEE (3D-TEE, Philips probe, transducer X7-2t) imaging to optimize the guiding during the procedure and to evaluate the anatomic result and residual MR.

An 82-year-old female patient was admitted for elective percutaneous mitral valve repair. She was known with a dilated cardiomyopathy due to chronic, severe MR. Left ventricular ejection fraction was estimated at 35%. Echocardiography revealed a left ventricular end-diastolic diameter of 70 mm with significant annular dilatation. She had developed pulmonary hypertension with a mean pulmonary artery pressure of 35 mmHg and consequently experienced an important and progressive reduction in functional capacity (New York Heart Association class IV). Her predicted operative mortality rate was 27%, using the logistic Euroscore. She was declined for surgery.

The procedure was performed under general anaesthesia. At the beginning of the procedure, colour Doppler 2D-TEE showed a severe central MR due to annular dilatation (Figure 1). After transseptal puncture, the clip delivery system was centred above the mitral orifice and advanced into the left ventricle, just below the free edges of the leaflets (Figure 2). Correct positioning was improved using live 3D-TEE guiding. While the clip was retracted, the leaflets were grasped during systole. When correct positioning was confirmed by echocardiography, the clip was closed, creating a double mitral valve orifice (Figure 3). Colour Doppler echocardiography showed an adequate reduction in MR at the end of the procedure (Figure 4). The patient was discharged in improved condition 4 days later.

This case demonstrates that adding 3D-TEE for percutaneous mitral valve repair simplifies the guiding procedure and should contribute to a higher success rate of this new technique.

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Supplementary data

Supplementary data are available at *European Journal of Echocardiography* online.

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References


