Diagnosis of early dysfunction of a tissue mitral valve replacement by three-dimensional transoesophageal echocardiography

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We present the case of a 42-year-old man who underwent tissue mitral valve replacement for symptomatic mitral stenosis. Post-operative course was unremarkable but three-dimensional transoesophageal echocardiography clearly indicated that one cusp had very restricted motion with incomplete opening and premature closure. The cause of this early single cusp failure is unclear. It was not related to flow effects. It is conceivable that cusp failure such as here might contribute towards the degeneration of tissue valve replacements.

Keywords
Tissue valve prosthesis • 3D transoesophageal echocardiography

A 42-year-old man with a previous history of rheumatic mitral stenosis and balloon mitral valvuloplasty in 2002 underwent tissue mitral valve replacement for symptomatic restenosis with a Carpentier Edwards Perimount 29 bioprosthesis. The tricuspid annulus had been found to be dilated pre-operatively, so a tricuspid annuloplasty was also performed. No intra-operative transoesophageal echocardiography (TEE) was performed. His immediate post-operative course was unremarkable. On post-operative day 7, a TEE was performed systematically, as is usually done in our department. TTE showed an unobstructed mitral valve prosthesis that appeared to be functioning well with a mean gradient of 4 mmHg. Two-dimensional (2D) TEE suggested that one of the cusps of the bioprosthesis has restricted mobility with premature closure (see Supplementary data online, Movie 1). Real-time three-dimensional (3D) TEE demonstrated abnormal cusp motion more clearly than 2D, allowing the motion of all three cusps to be simultaneously visualized (Figure 1; see Supplementary data online, Movies 2 and 3). The patient was discharged to close follow-up.

The mechanism of this early single cusp failure is unclear. Present findings were discussed with the surgical team. There were no unusual technical difficulties. The abnormal leaflet was contralateral to the left ventricular outflow tract (LVOT) (see Supplementary data online, Movie 1), and Doppler colour flow images did not demonstrate any aortic regurgitation, LVOT flow acceleration or any other flow jets to account for the leaflet restriction. A literature review did not identify any similar cases. Optimal diagnostic images were obtained using real-time 3D TEE. It is conceivable that it might contribute towards the degeneration of tissue valve replacements. Three-dimensional TEE should be considered in the assessment of valve bioprosthesis, especially to help elucidate unusual findings.

Supplementary data

Supplementary data are available at European Journal of Echocardiography online.

Conflict of interest: none declared.
Figure 1  (A) Two-dimensional transoesophageal echocardiography. The image of bioprosthesis in diastole suggesting that one leaflet is restricted. Three-dimensional transoesophageal echocardiography view in diastole (B) from the left ventricle and (D) from the left atrium showing restricted opening of one leaflet followed by early closure, whereas (C) in systole, the valve is closed and appears normal. The aorta is on the right side, lateral wall of the left ventricle or atrium on the left.