Transient severe reversible functional mitral regurgitation: a three-dimensional transoesophageal perspective

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Mrs B, a 49-year-old female, was referred to our institution for severe mitral regurgitation. Transthoracic echocardiography showed only a moderate organic mitral regurgitation, but a transient severe reversible functional mitral regurgitation was observed during transoesophageal echocardiography (TEE). Three-dimensional TEE clearly demonstrated the functional nature of the regurgitation with a transient and sudden tenting of the mitral leaflets with a circular mitral annulus resulting in a total absence of leaflet coaptation.

Keywords

Mitral regurgitation • Three-dimensional echocardiography

Mrs B, a 49-year-old female, was referred to our institution for severe mitral regurgitation. Approximately 15 years ago she underwent mediastinal radiotherapy and chemotherapy for Hodgkin disease. Six months ago she started to feel short of breath (NYHA functional class II) and was seen in an outside clinic. Physical examination revealed a 3/6 apical systolic murmur and there was a severe mitral regurgitation on transthoracic echocardiography (TTE).

At admission, physical examination showed a 1/6 systolic murmur. She was in sinus rhythm with a known left bundle branch block. Chest X-ray was unremarkable. Transthoracic echocardiography showed a normal left ventricle size (49 and 29 mm end-diastolic and end-systolic diameters, respectively) with a slightly depressed ejection fraction (45%) and a septum dyskinesia due to left bundle branch block. The mitral aortic membrane was thickened due to radiotherapy and surprisingly only a moderate mitral regurgitation was observed (vena contracta 4 mm, effective regurgitant orifice 0.17 cm², and regurgitant volume 37 mL) (Figure 1). Systolic pulmonary artery pressure was normal. Due to discrepancies between the 2 TTE, a transoesophageal echocardiography (TEE) was performed immediately after (without sedation) and revealed a massive functional regurgitation due to a complete absence of leaflet coaptation (Figure 2A and B and see Supplementary data, Movies 1 and 2). A few minutes later, the MR spontaneously resolved and was only graded as mild with normal leaflet coaptation (Figure 2D and E and see Supplementary data, Movies 4 and 5). Three-dimensional TEE, performed at the same time, clearly showed the functional nature of the regurgitation with a transient and sudden tenting of the mitral leaflets with a circular mitral annulus resulting in a total absence of leaflet coaptation (Figure 2C and F and see Supplementary data, Movie 3). Unfortunately, no blood pressure was recorded before or during the echocardiography. Coronary angiography was normal; no methylergonovine test was performed. During exercise echocardiography, we were not able to induce any MR changes. The patient was discharged home on beta-blocker.

This observation unveils an unusual type of functional MR named ‘eclipsed MR’, i.e. a transient massive and reversible functional MR in the absence of epicardial coronary artery stenosis. Only a few case reports have been reported in the literature. To the best of our knowledge, this is the first three-dimensional demonstration of the functional nature of eclipse MR. Mechanisms, evolution, and optimal treatment are currently unknown. A possible role of vasospasm or microvascular dysfunction has been suggested. Due to the potential risk of acute pulmonary oedema, these patients should be closely monitored and mitral valve surgery should be discussed.
Figure 1  Baseline transthoracic echocardiography showing a moderate organic mitral regurgitation due to the previous thoracic radiotherapy. (A) Parasternal long-axis view showing the thickening of aorto-mitral aponevrosis highly suggestive of radiation-associated valvular disease. (B) Four-chamber view showing a moderate mitral regurgitation using Colour Doppler. (C) Vena contracta was 4.5 mm. (D) Flow convergence of the regurgitant jet: the effective regurgitant orifice was 0.17 cm² and the regurgitant volume 37 mL.

Figure 2  Transoesophageal echocardiography performed immediately after the transthoracic echocardiography. (A) Complete absence of coaptation between leaflets during systole with (B) severe mitral regurgitation. (C) Almost complete disappearance of the regurgitation a few minutes later. (D) Three-dimensional transoesophageal echocardiography at the beginning of the examination showing a circular mitral annulus and the lack of coaptation between the leaflets and (E) a few minutes later showing a normal oval shape of the annulus and normal leaflets coaptation. LA, left atrium; LV, left ventricle; AML, anterior mitral valve leaflet; PML, posterior mitral valve leaflet.
Supplementary data

Supplementary data are available at European Journal of Echocardiography online.

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