Aortic regurgitation and unusual diastolic mitral regurgitation

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In patients with infective endocarditis affecting the aortic valve, a secondary involvement of subaortic structures may occur in a mechanism of direct extension or as a result of an infected jet of aortic regurgitation striking the ventricular surfaces of the mitral-aortic intervalvular fibrosa and the anterior mitral leaflet (AML). We present a 29-year-old male with infective endocarditis of the bicuspid aortic valve, who developed a secondary infection of the subaortic tissues complicated by a perforation of the AML. Echocardiographic examination revealed not only systolic, but also diastolic mitral regurgitation.

KEYWORDS
Endocarditis; Bicuspid aortic valve; Mitral valve leaflet perforation; Echocardiography

Introduction

Infective endocarditis affecting the aortic valve may lead to secondary involvement of the mitral-aortic intervalvular fibrosa and the anterior mitral leaflet (AML). Aortic lesions may extend along the continuity of the mitral-aortic structures. Yet, the secondary damage to the AML is caused more often by the infected jet of aortic regurgitation hitting the ventricular surface of the leaflet, or by the pronounced bacterial vegetation prolapsing from the aortic valve into the left ventricular outflow tract. The latter, known as the 'kissing lesion', is observed in 10–15% of patients with infective endocarditis of the aortic valve.1,2 In this case report, we describe a patient with infective endocarditis of the bicuspid aortic valve (BAV), who developed a severe mitral regurgitation (MR) due to the secondary involvement of the subaortic structures and a perforation of the AML. Additionally to systolic MR, a diastolic wave of retrograde blood flow was recorded through the perforation [from the left ventricle (LV) to the left atrium]. The mechanism of this diastolic MR was very unusual. In the echocardiographic examination, it was identified as a part of aortic regurgitant jet.

Case description

A 29-year-old man with the history of alcohol and drugs addiction, chronic viral hepatitis (type B and C), and mild BAV regurgitation was admitted to hospital with severe staphylococcal infection. The patient presented with purulent cerebrospinal meningitis, multiple brain and spleen abscesses, and ulnar artery mycotic aneurysm. Transthoracic echocardiography (TTE) performed in a local hospital revealed thickened margins of the BAV, progression of aortic regurgitation (from mild to moderate), a minor jet of central MR, and an additional ~1.5 cm long structure on the ventricular surface of the AML. After the initial success of the antibiotic therapy, a fever relapsed together with the signs of abrupt haemodynamic deterioration and the patient was immediately transferred to our institute for further evaluation and treatment.

TTE findings

Transthoracic echocardiography confirmed thickened margins of BAV (Figure 1). Diastolic jet of aortic regurgitation was directed towards the middle part of A2 segment of the AML, where it was further divided into two parts. One of them propagated along the surface of the AML, whereas the other was entering the left atrium through the large perforation located exactly at the place where the jet of aortic regurgitation was striking (Figure 2). Mitral retrograde flow (from the LV to the left atrium) was recorded during both systole and diastole. All time-dependent phenomena were assessed with the use of colour-coded M-mode and continuous wave Doppler (Figure 3).
Figure 1  Transthoracic echocardiography. Short axis basal view (A) reveals the morphology of the bicuspid aortic valve (arrow). Parasternal long axis view (B) shows minor thickening of the margins of the aortic valve leaflets with small vegetations (arrow) and obvious perforation of the anterior mitral leaflet (double arrow). RA, right atrium; LA, left atrium; RVOT, right ventricle outflow tract; RV, right ventricle; LV, left ventricle; Ao, aorta.

Figure 2  Doppler echocardiography with colour flow mapping. Transthoracic apical four-chamber view (A) reveals a perforation of the anterior mitral leaflet and massive retrograde wave directed into the left atrium. Apical long axis view (B) shows the jet of aortic regurgitation (single arrow) and its division into ‘ventricular’ and ‘atrial’ components (double arrows).

Figure 3  Doppler echocardiography. Continuous wave Doppler (A) and colour-coded M-mode (B) show retrograde flow through the AML perforation into the left atrium during systole (long arrows) and diastole (short arrows), the latter being actually a part of aortic regurgitant jet.
Transoesophageal echocardiography findings

Transoesophageal echocardiography (TEE) was applied to assess aortic valve more precisely. The margins of the aortic leaflets were smooth, with no features of bacterial vegetation (Figure 4A). Transoesophageal echocardiography confirmed a large perforation of the AML. Haemodynamically significant jets of regurgitation were visualized with colour flow mapping (Figure 4B and C).

Discussion

The patient described was diagnosed with BAV as a child, but his aortic regurgitation was mild and did not require a surgical repair. In the setting of chronic viral hepatitis and alcohol and drugs abuse, he developed infected endocarditis of BAV, complicated by peripheral embolism. Initial echocardiograms revealed minor inflammatory lesions in BAV and a large bacterial vegetation (~1.5 cm) on the ventricular surface of the AML. Infective endocarditis of the aortic valve may proliferate onto the adjacent structures. Lesions of the mitral valve that are secondary to the aortic infective process are known as ‘mitral kissing vegetations’. This type of lesion develops on morphologically and functionally normal leaflet, when the aortic valve vegetation or aortic retrograde flow has a direct contact with the ventricular surface of the AML. In the presented case, we were given only a description of lesions which might have been labelled as ‘mitral kissing vegetations’ and clinically resulted in extensive peripheral embolism. Rapid deterioration of general condition was caused by acute severe MR with prominent impact of aortic backward flow via the AML perforation. This should be regarded, in terms of haemodynamics, as diastolic MR. Its mechanism was very unusual, because high-velocity diastolic MR was generated directly by backward aortic flow to the left atrium, whereas diastolic MR more often is caused only by high end-diastolic LV pressure. Transoesophageal echocardiography, generally believed to be superior to TTE in the assessment of lesions and complications inflicted by infective endocarditis, confirmed all transthoracic findings and excluded vegetations on the mitral or aortic leaflets and helped to decide about the extent of surgical intervention. Aortic valve was replaced by an artificial prosthesis, and the AML perforation was repaired with a pericardium patch.

Conflict of interest: none declared.

References