Characterization of anatomic lesions in infective endocarditis: the added value of transthoracic 3D echocardiography

Clinical Case Portal

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Abstract

This case report illustrates the diagnostic value of three-dimensional transthoracic echocardiography (3D TTE), as a supplement to standard two-dimensional (2D) and Doppler examination, for a more accurate and detailed characterization of various anatomic lesions in valvular endocarditis.

Introduction

A 71-year-old man was admitted for fatigue and shortness of breath of recent onset. Medical history revealed low-grade fever in the past two weeks, and blood tests showed normocytic normochromic anemia, elevated ESR and NT-proBNP. Since cardiac murmurs were detected by physical examination, an urgent transthoracic echocardiography (TTE) was indicated for suspected endocarditis.

Case Report

Two-dimensional TTE showed an aortic valve prolapse causing a severe acute regurgitation (Figure 1), with a large mobile mass (1.5 cm) attached on the ventricular side of the aortic valve, suggestive for a vegetation (asterisk, Figure 2A, Video 1). At 3D TTE from apical approach (Figure 2B, Video 2), the mass was seen attached at the level of the left coronary cusp, which was lacerated and flail; the right coronary cusp was also thickened and severely prolapsing in the left ventricular outflow tract.

The examination of the mitral valve revealed leaflet thickening with no clear evidence of pathological masses, and a severe regurgitation with a double jet, highly suggestive for a perforation of the anterior mitral leaflet (Video 3). Dynamic 3D reconstruction of the mitral valve by 3D TTE confirmed the presence of a sizeable perforation of the anterior mitral leaflet at the level of A_2 scallop (Figure 3A, Videos 4-5), adjoining a small bulging seen from the “surgical view”. The left ventricle was mildly dilated and hyperdynamic (ejection fraction 70 % by 3D TTE), and there was a severe elevation of pulmonary systolic pressure (estimated pulmonary systolic pressure=69 mmHg).

A transoesophageal study was performed, which confirmed the anatomic lesions described and, in addition, identified an aneurysm of the anterior mitral valve as the nature of the small bulging seen by 3D TTE, with coexisting perforation (Figure 4).

Blood cultures were positive for Streptococcus bovis. The patient was referred for surgical treatment and underwent aortic valve replacement with a 23-mm Carpentier-Edwards Magna Ease bioprosthesis, mitral annuloplasty (30-mm St Jude saddle ring) and closure of mitral leaflet perforation with a pericardial patch. Intraoperative findings were similar to the 3D TTE aspects (Figure 3). Surgical intervention was successful (Video 6) and recovery was uneventful.

Discussion

Transthoracic echocardiography (TTE) is the first-line imaging modality whenever infective endocarditis is suspected[1]. Careful echocardiographic examination of the mitral leaflets is required in all patients with aortic infective endocarditis, and the integration of functional information from Doppler with detailed morphology (2D and 3D)[2] is crucial, in order to provide surgeons with the full picture of the type and extent of leaflet damage. In our case, echocardiography and in particular the 3D modality were extremely helpful to decide for the type of surgical correction: mitral valve repair and aortic valve replacement (due to the large extent of aortic valve damage). Transoesophageal echocardiography may add new anatomic details or rule out a perivalvular abscess and is mandatory when TTE has suboptimal quality.

Conclusion

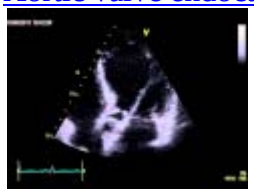
In patients with infective endocarditis and good acoustic window (even from a single approach), 3D TTE should complement standard echocardiography for a more accurate characterization of anatomical lesions.

References

References

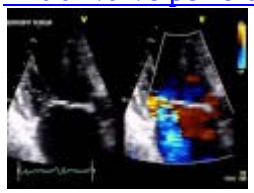
1. Habib G, Badano LP, Tribouilloy C, Vilacosta I, Zamorano JL. Eur J Echocardiogr 2010;11:202-219
2. Lang RM, Badano LP, Tsang W, Adams DH, Agricola E, Buck T et al. Eur Heart J Cardiovasc Imaging 2012;13(1):1-46

Video 1 :
Aortic valve endocarditis (2D)

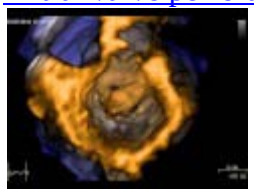


Video 2 :
Aortic valve endocarditis (3D)

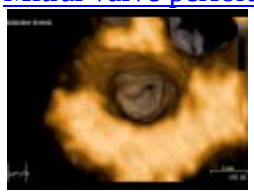
Video 3 :
Mitral valve perforation (2D)



Video 4 :
Mitral valve perforation (3D - ventricular view)



Video 5 :
Mitral valve perforation (3D - atrial view)



Video 6 :
Echocardiographic control after surgical intervention

Fig. 1 :
Severe aortic regurgitation

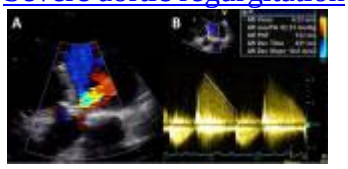


Fig. 2 :
Aortic valve endocarditis

Fig. 3 :
Mitral valve perforation (3D rendering in comparison with intraoperative finding)

Fig. 4 :

Mitral valve aneurysm and perforation (2D transoesophageal view)