

C A S E R E P O R T

When 3D echocardiography truly makes the difference: a case report of mitral annular ring dehiscence

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Abstract. Real time 3D echocardiography has an established incremental diagnostic value over 2D imaging, especially during transesophageal evaluation of native and prosthetic heart valves. A 66 years old male patient, with an history of previous cardiac surgery for mitral annuloplasty and recurrent fever, came to the attention of our echo lab with an indication for transesophageal echocardiography after previous inconclusive transthoracic echocardiograms. Real time 3D echocardiography and 3D color doppler imaging resulted of outmost importance to clarify the presence of annular ring dehiscence, previously not well defined from 2D echocardiography imaging. (www.actabiomedica.it)

Key words: 3D echocardiography, *transesophageal echocardiography*, mitral regurgitation, cardiac surgery, computed tomography.

Introduction

Annuloplasty ring dehiscence is a rare postoperative complication of surgical mitral valve repair caused by the detachment of the sutures anchoring the annuloplasty ring to the mitral annulus (1).

The reported rate of such complication is approximately 1-2,3% of patients with degenerative mitral valve regurgitation, leading usually to reoperation.

Dehiscence is mainly reported along the posterior annulus and several factors, such as unequal suture force distribution along the mitral annulus and its variability during the cardiac cycle, the variability in the collagen density of mitral annulus and also suture technique and device size and shape have been advocated to explain the underlying mechanism of mitral annular dehiscence (2).

Real time 3 D echocardiography, particularly “en face” surgical view during transesophageal echocardiography (TEE), provides incremental diagnostic

advantage for the investigation of prosthetic valves morphology and function (3).

We present a case of mitral annular dehiscence depicting the pivotal role of 3D echocardiography in accurate diagnosis of rare postoperative complications in the setting of daily practice from our echo lab.

Case Report

A 66 years old male underwent cardiac surgery in March 2020 for CABG, aortic valve and ascending aorta replacement (Bentall-De Bono technique with SJM Masters 25 mechanical prosthesis) and mitral annuloplasty with flexible C-shaped Edwards-Cosgrove ring n. 30 on a functional mitral regurgitation in three vessel coronary artery disease.

One year after surgery, the patient had a TEE in our lab for suspected endocarditis, as per current guidelines, which, at initial 2D evaluation (Figure 1A),

showed a small and apparently fixed rounded echogenic mass in the left atrium, just above the mitral annular plane, splitting the diastolic color Doppler inflow color Doppler image in two (Figure 1A, on the right) (4).

Real time 3D and 3D zoom evaluation and live 3D color showed an outstandingly clear image of dehiscence of the postero-lateral (approximately corresponding to P1 and P2) portion of the Cosgrove annulus (Figure 1B), a rarely described complication of mitral valve repair surgery, with secondary severe regurgitation of the mitral valve.

The aforementioned finding was confirmed also by cardiac CT scan, performed for pre-surgical planning, (Figure 1C) and the patient was consequently referred to the cardiac surgeon for an urgent evaluation

and subsequent cardiac surgery (Figure 1D) of mitral valve replacement with SJM Masters 29 mechanical prosthesis.

Conclusions

Three dimensional echocardiographic imaging is the ideal tool for the definition of anatomic and functional characteristics of the components of mitral apparatus with an established incremental diagnostic value over 2D imaging (5).

Annuloplasty ring dehiscence is an unusual complication of mitral valve repair, caused principally by the detachment of the sutures anchoring the

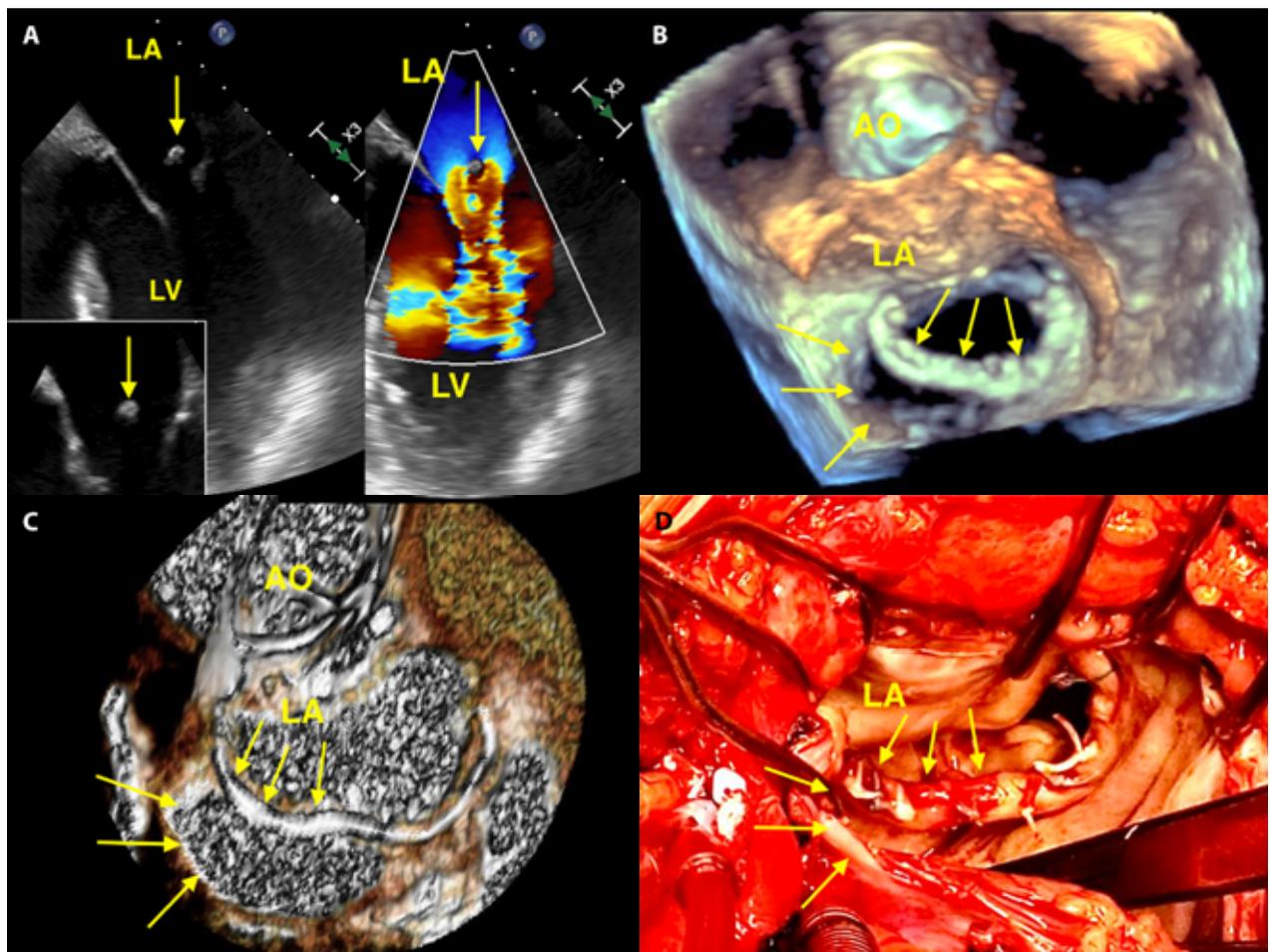


Figure 1. Mitral annular dehiscence as seen at initial 2D TEE evaluation (A), 3D TEE “en face” mitral view (B), CT scan (C) and during surgical intervention (D).

annuloplasty ring to the annulus, more often affecting the posterior annulus and potentially causing recurrent mitral regurgitation, haemolysis, device migration and or embolization.

The correct diagnosis of this rare postoperative failure can be challenging in the context of 2 dimensional echocardiography, particularly for the exact location of dehiscence as can be observed from “en face” left atrial perspective (surgical view) and the site of mitral regurgitation, both relevant aspects for the planning of reoperation usually required in this clinical setting (6).

We think that the reported case can contribute to reinforce the concept, also in the daily clinical practice, of the additional diagnostic value of three dimensional echocardiography in the setting of evaluation of prosthetic and native mitral valve dysfunction.

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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Supplementary files

Supplementary file 1. Video of 3D zoom transesophageal “en face” view of mitral annular dehiscence

Supplementary file 2. Video of mitral annular dehiscence as seen at initial 2D TEE