Case report - Valves

Pseudoaneurysm of the mitral-aortic intervalvular fibrosa following aortic valve replacement – diagnosis and dynamic evaluation with multidetector CT and transesophageal echocardiography

Eduard Ghersin*, Diana Litmanovich#, Yoram Agmon$, Simcha Milo$

*Department of Radiology, Rambam Medical Center, B. Rappaport-Faculty of Medicine, Technion-Israel Institute of Technology, P.O. Box 9602, Haifa 31096, Israel
#Department of Cardiology, Rambam Medical Center, B. Rappaport-Faculty of Medicine, Technion-Israel Institute of Technology, Haifa 31096, Israel
$Department of Cardiac Surgery, Rambam Medical Center, B. Rappaport-Faculty of Medicine, Technion-Israel Institute of Technology, Haifa 31096, Israel

Received 4 May 2005; received in revised form 12 July 2005; accepted 2 August 2005

Abstract

Sixteen-slice multidetector CT findings of a pulsatile pseudoaneurysm of the mitral-aortic intervalvular fibrosa, in a woman following aortic valve replacement, are presented. Multidetector CT depicted the pseudoaneurysm and enabled dynamic evaluation of its lumen through the cardiac cycle, documenting expansion during systole and almost complete collapse during diastole. This case illustrates the capabilities of multidetector cardiac CT in the evaluation of aortic valve pathology.

© 2005 Published by European Association for Cardio-Thoracic Surgery. All rights reserved.

Keywords: Multidetector CT; Echocardiography; Pseudoaneurysm; Mitral-aortic intervalvular fibrosa; Aortic valve; Aortic valve replacement

1. Case report

A 61-year-old woman was admitted with a four-month history of recurrent fever accompanied by chills and myalgias. Nine months earlier she had her aortic valve replaced using a bileaflet mechanical prosthetic valve due to severe bicuspid aortic stenosis. Based on her history and clinical manifestations, prosthetic valve endocarditis was postulated. Transesophageal echocardiography (TEE) and ECG-gated cardiac multidetector CT (MDCT) were obtained. ECG-gated MDCT was performed during a 25-s breath hold at full inspiration, using a Brilliance™ 16-slice scanner (Philips Medical Systems, Cleveland, Ohio, USA). The post-processing reformations were performed on a Brilliance Extended Workspace™ workstation (Philips Medical Systems, Cleveland, Ohio, USA). MDCT evaluation of the prosthetic valve through the cardiac cycle (Fig. 1A and B), documented a 16-mm pulsatile pseudoaneurysm of the mitral-aortic intervalvular fibrosa (PMAIF) (solid black arrows), below the aortic valve annulus. Dynamic evaluation documented volume expansion during systole followed by almost complete collapse during diastole. The pseudoaneurysm lumen filled with contrast material from the left ventricle outflow tract through a 6-mm fistulous dehiscence of the suture line. Both prosthetic valve leaflets showed normal symmetric opening (Video 1). Coronary CT angiography demonstrated normal coronary arterial anatomy. TEE confirmed the aforementioned findings (Fig. 2A–D), as well as documenting turbulent flow in the pseudoaneurysm lumen. TEE additionally identified a 10-mm mobile vegetation at the pseudoaneurysm neck attached to the posterior aspect of the prosthetic valve ring (Fig. 2E). This vegetation was not depicted on MDCT even following retrospective analysis. The combined imaging findings of both modalities and positive blood cultures established the diagnosis of prosthetic valve infective endocarditis. Appropriate systemic antibiotic treatment resulted in complete clinical recovery. During a follow-up period of 10 months using serial TTEs, the patient remained asymptomatic, the PMAIF remained stable in size and a continuous contraction of the prosthetic valve vegetation was noted.

2. Discussion

PMAIFs are uncommon but potentially catastrophic complications of aortic valve surgery, aortic valve endocarditis or chest trauma [1]. These pseudoaneurysms, especially when large, may rupture into the left atrium or aorta, cause systolic compression of proximal coronary arterial segments, lead to systolic compression of the mitral valve with severe regurgitation and may even erode the chest wall [1–4]. PMAIFs are commonly diagnosed by transesophageal echocardiography and transthoracic echocardiography with a reported sensitivity of 90% and 43%, respectively [2,5,6]. The main imaging finding on TEE is the demonstration of a false lumen below the aortic valve annulus, at the mitral-aortic intervalvular fibrosa, which expands during systole and collapses during diastole. Color Doppler usually demonstrates an internal turbulent flow
Fig. 1. A and B: MDCT evaluation of the prosthetic aortic valve through the cardiac cycle documented a 16-mm pulsatile pseudoaneurysm in the mitral-aortic intervalvular fibrosa (solid long arrows), below the aortic valve annulus. Dynamic evaluation documented volume expansion during systole (B) followed by almost complete collapse during diastole (A). The pseudoaneurysm lumen filled with contrast material from the left ventricle outflow tract through a 6-mm fistulous dehiscence of the suture line (*). Both prosthetic valve leaflets demonstrated normal symmetric motion (dotted arrows). AA – ascending aorta, LV – left ventricle, solid short arrows – mitral valve.

Video 1. Dynamic evaluation of the mitral-aortic intervalvular fibrosa pseudoaneurysm, prosthetic aortic valve and left ventricular outflow tract using MDCT. Note the pulsatile pseudoaneurysm lumen (*) and the normal symmetric opening of both prosthetic valve leaflets (arrows).

Fig. 2. A–D: TEE confirmed the aforementioned findings during systole (A–C) and diastole (B–D), as well as documented turbulent flow in the pseudoaneurysm lumen. Solid arrows – pseudoaneurysm lumen, (*) – turbulent flow in pseudoaneurysm lumen, solid short arrow – mitral valve, dotted arrows – aortic prosthetic valve leaflets. E: TEE additionally identified a mobile vegetation (arrows) at the pseudoaneurysm neck attached to the posterior aspect of the prosthetic valve ring.

not only high-resolution 3-D anatomical detail, but also dynamic evaluation through the cardiac cycle.

References


