Case report

Pseudoaneurysm in the mitral-aortic intervalvular fibrosa. A cause of mitral regurgitation

Juan Salvador Espinosa-Caliani a,*, Angela Montijano a, José María Melero b, Angel Montiel a

a Cardiology Department, Málaga University Hospital Virgen de la Victoria, Málaga University School of Medicine, Málaga, Spain
b Cardiovascular Surgery Department, Málaga University Hospital Virgen de la Victoria, Málaga University School of Medicine, Málaga, Spain

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Abstract

Left ventricular outflow tract pseudoaneurysm is an uncommon but potentially catastrophic complication of aortic valve surgery, aortic valve endocarditis or chest trauma [1]. It is usually located in the mitro-aortic intervalvular fibrosa and the diagnosis may be made by means of echocardiography-Doppler [1–3], cardiac catheterization [4] or ultrafast computed tomography [5].

LVOT PsA may rupture into the pericardium or into the left atrium. In some instances the PsA remains intact and appears as a pulsatile cavity with systolic expansion. Successful surgical management relies of knowledge of the exact location and extension of the pseudoaneurysmal cavity and involvement of the mitral-aortic intervalvular fibrosa [3].

We describe a case of a LVOT PsA 1 month after an aortic valve replacement that caused a systolic compression of mitral valve and a severe regurgitation. The diagnosis was confirmed using transoesophageal echocardiography, magnetic resonance image and intraoperative endoscopy. Surgical repair of the pseudoaneurysm corrected the mitral regurgitation. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: Left ventricular outflow tract pseudoaneurysm; Aortic valve replacement; Mitral regurgitation

1. Introduction

Left ventricular outflow tract pseudoaneurysm (LVOT PsA) is an uncommon but potentially catastrophic complication of aortic valve surgery, aortic valve endocarditis or chest trauma [1]. It is usually located in the mitro-aortic intervalvular fibrosa and the diagnosis may be made by means of echocardiography-Doppler [1–3], cardiac catheterization [4] or ultrafast computed tomography [5].

LVOT PsA may rupture into the pericardium or into the left atrium. In some instances the PsA remains intact and appears as a pulsatile cavity with systolic expansion. Successful surgical management relies of knowledge of the exact location and extension of the pseudoaneurysmal cavity and involvement of the mitral-aortic intervalvular fibrosa [3].

We describe a case of a LVOT PsA 1 month after an aortic valve replacement that caused a systolic compression of mitral valve and a severe regurgitation. The diagnosis was confirmed using transoesophageal echocardiography (TEE), magnetic resonance image and intraoperative endoscopy. Surgical repair consisted of patch closure of the cavity and reconstruction of the aortic anulus to seat a new prosthetic valve. Postoperative TEE confirmed the disappearance of LVOT PsA and mitral regurgitation.

2. Case report

A 44-year-old woman was referred to our hospital 7 years after aortic valve replacement with a 21 mm Medtronic Intact biological valve (Medtronic Inc, Minneapolis, MN) for degenerative severe prosthetic valve regurgitation. She had previous history of rheumatic fever, chronic seronegative arthritis, hyperuricemia, essential hypertension and mild renal failure. Therefore a new operation was performed and a 21 mm Carbomedics Standard mechanical prosthesis (Carbomedics Inc, Austin, TX) was implanted in supranuellar position. Before discharge, a transthoracic echocardiogram showed normal prosthetic valve function, mild mitral regurgitation and preserved systolic left ventricular function.

One month later the patient was readmitted for congestive failure with a prominent systolic murmur. The transthoracic echocardiogram showed severe mitral regurgitation caused by prolapse of the anterior leaflet valve. A TEE showed a PsA in the mitral-aortic intervalvular fibrosa with diastolic collapse, pulsing in systole and a turbulent flow was demonstrated inside, (Fig. 1A–C). The severe mitral regurgitation and the prolapse of the anterior mitral leaflet were caused by a displacement of the anterior valve anchor in the aortic anulus. The magnetic nuclear resonance allowed to locate the PsA behind aorta, with contrast inside (Fig. 2A). The blood cultures were negatives and there was not any sign of endocarditis.
The patient underwent a new operation. The aortic prosthetic valve was removed and a 10 mm thoracoscope was introduced through the aortotomy, revealing a 12 mm diameter orifice below the aortic annulus between the left and the non-coronary cusps (Fig. 2B) and a cavity without any trombi inside. The corresponding area of the left ventricular outflow tract and the anterior mitral leaft had disconnected from the aortic annulus and were being held by a rim of fibrous tissue. The pseudoaneurysm extended below aorta and laterally and superior to the roof of the left atrium. The defect was repaired with a Dacron patch sutured to the fibrotic rim and the aortic annulus. A 21 mm Top Hat Carbomedics (Carbomedics Inc, Austin, TX) was implanted in suprannular position. Postoperative TEE confirmed the disappearance of LVOT PsA and mitral regurgitation. No microorganisms were isolated in the prosthesis culture, and the clinical picture was considered to be related as a mechanical tear. The postoperative overcome was favourable and she is asymptomatic at 12 months’ follow-up. The echocardiogram revealed normal function of aortic valve prosthesis and absence of mitral regurgitation.

3. Discussion

LVOT PsA is an uncommon complication following aortic valve surgery, infective endocarditis or chest trauma [1–3]. It is usually located in the mitro-aortic intervalvular fibrosa. LVOT PsA may rupture into the pericardium causing fatal tamponade, or may compress coronary arteries causing angor. In some instances the PsA remains intact and appears as a pulsatile cavity with systolic expansion. In our case the PsA compressed the left atrium in systole and produced a severe mitral regurgitation due to the disconnection of the anterior mitral leaft. With surgical treatment the PsA orifice was repaired with a Dacron patch eliminating the pseudoaneurysm behind aortic The high density image represents the turbulent flow inside the pseudoaneurysm (*). R, right side; L, left side; AO, aorta; P, pulmonary artery. (B) Retrograde aortic endoscopy. The orifice of pseudoaneurysm (*) is located between the insertion of the mitral anterior leaft (1) and the non-coronary aortic annulus (2).
the systolic compression of left atrium and the anterior mitral leaflet was fixed with the sutures of the valve prosthesis disappearing the mitral regurgitation.

The diagnostic sensitivity of transthoracic echocardiogram to detect this condition is 43% and it may increase to 90% in the patients in which a TEE is performed [1]. The evidence of systolic expansion and diastolic collapse of the PsA together with the systolic turbulent flow demonstrated by colour Doppler technique (Fig. 1A–C) allowed the differentiation between this condition and the abscess of the annulus [1]. Magnetic resonance image has been used to identify and locate a LVOT PsA, with better resolution of the echocardiographic features. This is the first case described in the literature in which the thoracoscope help us to assess the location and the anatomic details necessary to perform the operation.

Although most of these unusual complication are due to infective endocarditis, in our patient, anatomical and microbiological data suggest a mechanical complication secondary to the previous surgical procedures.

In summary, we describe a case of LVOT PsA as a mechanical complication following previous aortic valve surgery, that caused a severe mitral regurgitation. The diagnostic tools used: TEE, magnetic nuclear resonance image and intraoperative endoscopy. The mitral regurgitation was corrected with the surgical repair of the LVOT PsA.

References