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Case Report

Acquired discrete subaortic stenosis late after mitral valve replacement



Jagdish C. Mohan^{*}, Madhu Shukla, Vishwas Mohan, Arvind Sethi

Fortis Institute of Cardiac Sciences, Fortis Hospital, Shalimar Bagh, New Delhi 88, India

ARTICLE INFO

Article history:

Received 25 November 2015

Accepted 1 January 2016

Available online 20 January 2016

Keywords:

Acquired discrete subaortic stenosis

Carpentier-Edwards bioprosthesis

Mitral valve replacement

Mitral stenosis

ABSTRACT

Although acquired left ventricular outflow obstruction has been reported in a variety of conditions, there are scant reports of its occurrence following mitral valve replacement (MVR). This study describes two female patients, who developed severe discrete subaortic stenosis, five years following MVR. In both cases, the mitral valve was replaced by a porcine Carpentier-Edwards 27-mm bioprosthesis with preservation of mitral valve leaflets. The risk of very late left ventricular outflow tract obstruction after bio-prosthetic MVR with preservation of subvalvular apparatus needs to be kept in mind in symptomatic patients.

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1. Introduction

In patients, who undergo mitral valve replacement (MVR) with a high- or low-profile prosthesis, left ventricular outflow tract (LVOT) obstruction is a well-recognized but infrequent postoperative complication.^{1–9} The LVOT obstruction can be transient or dynamic^{1–6} or may be due to projecting preserved exuberant anterior mitral leaflet⁷ or can be fixed due to development of discrete subaortic stenosis (DSS).^{8,9} Transient obstruction can occur immediately after MVR, if the LV cavity is small, anterior basal septum is thick, aorto-mitral angle is steep and/or excessive inotropes are used in presence of under-filled ventricle.^{1–6} Fixed DSS has been described in a few cases late after MVR due to development of an abnormal tissue ridge or membrane secondary to flow disturbance caused by

abnormally oriented prosthetic struts.^{8,9} Systolic contact between interventricular septum and prosthetic struts may lead to subendocardial remodeling resulting in a fibromuscular membranous ridge in susceptible subjects. Herein, we report two cases of very late LVOT obstruction after MVR with a bio-prosthesis and preservation of the native posterior mitral valve leaflet.

2. Case report 1

In February 2010, a 28-year-old woman underwent MVR due to severe mitral stenosis and 2+ mitral regurgitation complicated by cardiac failure. Preoperative echocardiography showed a normally functioning aortic valve with no LVOT gradient. She underwent implantation of a 27-mm porcine mitral valve

^{*} Corresponding author.

E-mail address: a51hauzkhas@gmail.com (J.C. Mohan).

Abbreviations: LV, left ventricle; RV, right ventricle; AO, aortic root; LA, left atrium; MVO, mitral valve orifice; LVOT, left ventricular outflow tract.

<http://dx.doi.org/10.1016/j.ihj.2016.01.001>

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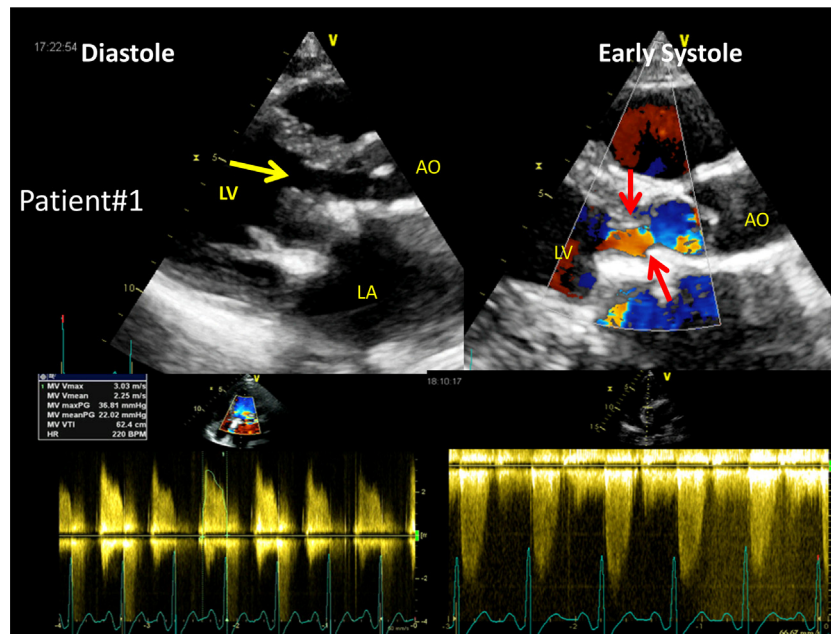


Fig. 1 – Upper panels show 2D-echocardiographic transthoracic parasternal long axis views in diastole (yellow arrow) along with narrow LVOT and turbulent jet (red arrows) in early systole. Left lower panel shows a mean trans-mitral diastolic gradient of 22 mmHg. Right lower panel shows peak velocity of 5.1 m/s across the LVOT.

bioprosthesis (Edwards Lifesciences, S.A.; Horw, Switzerland) with preservation of the native posterior mitral valve leaflet and its subvalvular apparatus. The postoperative course was smooth, and the patient was discharged on medical therapy. She became symptomatic with exertional dyspnea in July 2015. She progressively worsened over next three months. At presentation, her physical examination revealed pulse rate of 102/minute, supine blood pressure of 100/80 mmHg, distended jugular veins, hepatomegaly, basal rales, a loud apical pansystolic murmur with a prominent basal ejection systolic murmur. A 12-lead electrocardiogram showed normal sinus rhythm, sinus tachycardia and left atrial overload. Hematological and biochemical parameters were unremarkable. Plain chest skiagraphy showed enlarged cardiac silhouette, pulmonary venous congestion and a small right-sided pleural effusion. Her trans-thoracic echocardiogram revealed enlarged left atrium, normal left ventricular ejection fraction, asymmetric septal hypertrophy, anteriorly oriented mitral prosthesis, moderate tricuspid regurgitation, dilated inferior vena cava and estimated pulmonary systolic pressure of 86 mmHg. The leaflets of mitral bioprosthesis were thickened, two of the leaflets were immobile while the one leaflet was flail and prolapsed into the left atrium during systole causing severe mitral regurgitation along with a narrow antegrade jet during diastole (vena contracta = 7 mm). On Doppler examination, mean trans-mitral diastolic gradient was 22 mmHg, and peak systolic gradient was 244 mmHg (Fig. 1).

The LVOT was narrow in systole and diastole with reduced distance between the struts of the mitral bioprosthesis and the anterior septum. Color Doppler evaluation showed flow turbulence and continuous-wave Doppler examination revealed a peak LVOT gradient of 104 mmHg (mean 65 mm). There was no aortic regurgitation. Careful examination of the

LVOT revealed a membrane attached to the ventricular surface of the bioprosthetic strut and the left side of the interventricular septum (Figs. 2 and 3). Multi-planar 3D reconstruction of the left ventricle in short axis view showed narrow elliptical LVOT and a prominent ridge of tissue attached to the anterior aspect of the struts and protruding into the LVOT.

The patient is awaiting MVR and reconstruction of the LVOT.

3. Case report 2

A 38-year old female was evaluated for complaints of fatigue and class II dyspnea in September 2010. She had undergone MVR with a #27 Carpentier-Edwards bioprosthesis with preservation of posterior leaflet, five and a half years back for calcific mitral stenosis. At the time of operation, detailed echocardiogram showed normal aortic valve and the LVOT. At presentation, her physical examination showed an average built lady, pulse rate 78 BPM, supine blood pressure of 120/86 mmHg and no evidence of heart failure. Precordial examination revealed normal heart sounds, a basal ejection systolic murmur and a high-pitched early diastolic murmur along left sternal border. A 12-lead electrocardiogram showed sinus rhythm and non-specific ST-T changes. Plain chest skiagraphy was unremarkable. Her routine biochemistry was normal.

Trans-thoracic echocardiogram revealed thickened left ventricular walls, anteriorly oriented mitral prosthesis projecting into the LVOT, which showed flow turbulence during systole on color Doppler examination (Fig. 4). Continuous-wave Doppler examination showed a peak gradient of 65 mmHg across the LVOT (mean 38 mmHg) and moderate

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