



Case Report

Prosthetic Mitral Valve Stenosis Caused by Preserved Native Anterior Mitral Valve Leaflet

Sigurdur Ragnarsson, Andrea Amabile, Arnar Geirsson, Markus Krane*

Division of Cardiac Surgery, Department of Surgery, Yale School of Medicine, 333 Cedars Street, New Haven CT 06511, USA

***Corresponding authors:** Markus Krane, Division of Cardiac Surgery, Department of Surgery, Yale School of Medicine, 333 Cedars Street, New Haven CT 06511, USA

Citation: Ragnarsson S, Amabile A, Geirsson A, Krane M (2023) Prosthetic Mitral Valve Stenosis Caused by Preserved Native Anterior Mitral Valve Leaflet. Ann Case Report. 8: 1204. DOI:10.29011/2574-7754.101204

Received: 02 March 2023, **Accepted:** 07 March 2023, **Published:** 09 March 2023

Abstract

We present a case of severe mitral valve stenosis in a patient who had received mitral valve replacement with a pericardial mitral valve prosthesis. The etiology was found to be related to the preserved native anterior mitral valve leaflet, which had fully encircled two commissural posts of the bio prosthesis and adhered to the ventricular side of the bio prosthetic leaflets. The patient successfully underwent redo mitral valve replacement. This case, albeit uncommon, highlights a potential drawback of preserving the native anterior mitral valve leaflet during mitral valve replacement.

Keywords: Mitral Valve; Stenosis; Replacement; Prosthesis

Introduction

Mitral valve disease are treated with mitral valve replacement when the valve is not repairable. The importance of preserving the subvalvular apparatus has been demonstrated in experimental and clinical studies, and consensus exists around attempting to preserve the native chordal apparatus [1,2]. In this frame, whether the preservation of the subvalvular apparatus should involve both the anterior and posterior leaflets' versus the posterior leaflet's alone remains a matter of scientific debate. Regardless, the spared subvalvular apparatus should neither interfere with the implanted valve nor cause a substrate for left ventricular outflow tract obstruction [3]. We present a case of severe, bio prosthetic mitral valve stenosis whose etiology was related to the preserved native anterior mitral valve leaflet.

Case Report

A 65-year-old male was admitted to our hospital with worsening shortness of breath. Their medical history included mitral valve replacement with a 29 mm Carpenter Edwards pericardial prosthesis and concomitant coronary artery bypass graft to the right coronary artery 15 years before. Additionally, the

patient had a history of ST elevation myocardial infarction with percutaneous coronary intervention to the left anterior descending and circumflex coronary arteries 3 years before. The patient was now hospitalized with acute hypoxic respiratory failure and evidence of pulmonary edema. Echocardiography showed severe mitral stenosis with peak and mean gradients of 17 and 12 mmHg, respectively. The mitral valve area was 1.22 cm². Transesophageal echocardiography revealed that only one of the three commissures opened during diastole (Figure 1). Left ventricular ejection fraction was 35%. A redo median sternotomy was performed and after establishment of cardiopulmonary bypass, the left atrium was accessed through the interatrial groove. Upon inspection of the malfunctioning prosthesis, we found that both the anterior and posterior leaflets had been left in situ during the prior surgery. Therefore, large portions of the native anterior mitral valve leaflet were wrapped around two of the commissural posts (Figure 2). The encircling of the commissural posts by the native anterior mitral leaflet was deemed responsible for the inadequate opening of the two commissures. The fusion of the commissure posts with the native mitral valve leaflet and the preserved subvalvular apparatus made explanation technically challenging. After explanation was completed, a 29 mm Edwards Mitris Resilia valve was successfully implanted. The patient had a prolonged postoperative stay due

to delayed respiratory recovery and postoperative delirium. The patient was discharged home 17 days after surgery and remains asymptomatic at latest follow-up.

Discussion

The current case report details the uncommon phenomenon of preserved native mitral valve tissue encircling commissural posts of an implanting biological prosthesis, leading to adhesion of the native mitral valve tissue to the ventricular surface of the valve and therefore hindering its function. This clinical scenario has been previously reported in only two patients (who however had early onset [4]) and therefore appears to either be a rare phenomenon or be underrepresented in the literature. In the current case and in the previously reported cases, significant amount of both leaflet had been preserved during the initial mitral valve replacement. Various techniques of subvalvular apparatus sparing have been described, spanning from preserving the posterior leaflet only to also sparing the entire anterior leaflet partially or in its entirety [5]. Currently, there is insufficient evidence that preserving both leaflets is superior to only preserving the posterior leaflet, and thoughtful judgement should be exercised when sparing native tissue to avoid the complication we here report.

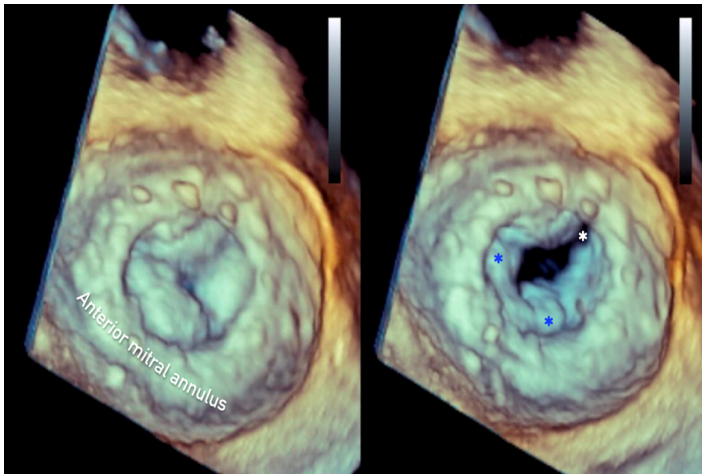


Figure 1: Preoperative 3D transesophageal echocardiography showing the two commissural posts of the bioprosthesis encircled by the native anterior mitral valve leaflet (blue asterisks) as well as the single functioning commissure (white asterisk).

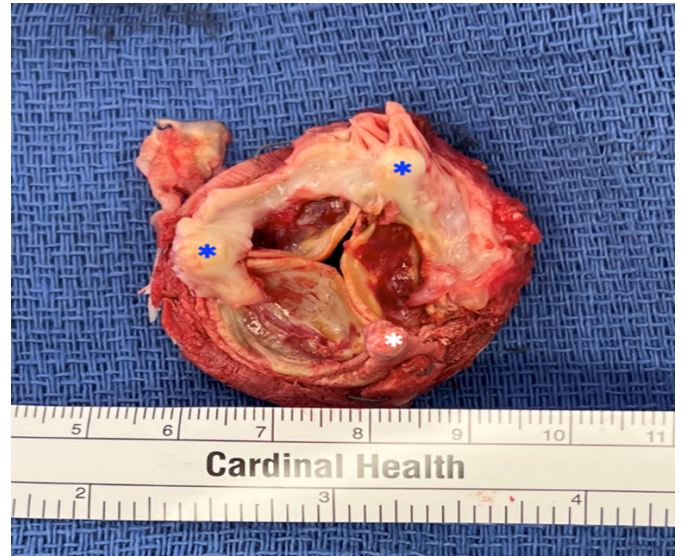


Figure 2: Explanted specimen showing the native anterior mitral valve leaflet encircling two of the commissural posts of the bioprosthesis (blue asterisks) and hindering prosthetic leaflets mobility. The free commissural post of the explanted valve is marked with a white asterisk.

Conflicts of interest: Dr. Ragnarsson has no conflict of interest; Dr. Amabile receives consulting fees from JOMDD; Dr. Geirsson receives consulting fees for being a member of the Medtronic Strategic Surgical Advisory Board and from Edwards Lifesciences; Dr. Krane is a physician proctor and a member of the medical advisory board for JOMDD, a physician proctor for Peter Duschek, is a medical consultant for EVOTEC and Moderna and has received speakers' honoraria from Medtronic and Terumo.

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