



RESEARCH ARTICLE

MITRAL ANNULUS CALCIFICATION AND SUCCESSFUL MITRAL VALVE REPAIR USING THE “DOUBLE-TEFLON” TECHNIQUE

*Pablo Maria Alberto POMERANTZEFF, Elinthon Tavares VERONESE, Carlos Manuel de Almeida BRANDÃO and Fabio Biscegli JATENE

Heart Institute – Cardiovascular Surgery Department University of São Paulo Medical School

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ABSTRACT

Mitral valve surgery in the presence of mitral annulus calcification presents as a technical challenge and the mitral valve repair is even more challenging. Consequently, a modified surgical strategy with limited or even without annular decalcification may be chosen. We report two successful mitral valve repair in a severe mitral valve regurgitation associated to annular calcification using the “Double-Teflon” Technique, a mitral valve repair without anuloplasty prosthetic rings.

INTRODUCTION

Mitral annulus calcification (MAC) is a chronic degeneration characterized by calcification of the mitral valve (MV) fibrous annulus. MV surgery in the presence of MAC presents a technical challenge and repairing a MV in the presence of MAC is even more challenging. We report two successful MV repair in a severe MV regurgitation associated to MAC using the “Double-Teflon” Technique after a segmental decalcification of the posterior mitral annulus.

CASE 1

An 87 years old female patient presenting dyspnea to ordinary activities was admitted in our institution. Her medical history included systemic arterial hypertension, non-dialytic chronic kidney disease, chronic atrial fibrillation and osteoporosis. Laboratory tests have no other relevant findings. The STS-PROM Score was 6, 14%. Preoperative transthoracic echocardiogram showed a preserved left ventricular ejection fraction (LVEF 62%), moderate pulmonary hypertension (arterial pulmonary systolic pressure of 40mmHg) and a MAC associated to a posterior leaflet prolapse (segment P2) resulting in a severe MV regurgitation.

*Corresponding author: Pablo Maria Alberto POMERANTZEFF, Heart Institute – Cardiovascular Surgery Department University of São Paulo Medical School.

In addition, the chest computerized tomography (CT) demonstrated a complete and severe posterior MAC.

CASE 2

A 54 years old male patient presenting dyspnea on moderate activities and orthopnea. His medical history included hypothyroidism secondary to thyroidectomy. Laboratory tests have no other relevant findings. The STS Score was 0.60%. Preoperative transthoracic echocardiogram showed a preserved left ventricular ejection fraction (LVEF 67%), moderate pulmonary hypertension (arterial pulmonary systolic pressure of 49mmHg) and a posterior leaflet cordal rupture (segment P2) resulting in a severe MV regurgitation and severe posterior MAC with a “spike” image in the left ventricular aspect of mitral valve posterior leaflet (Figure 1).

DISCUSSION

Mitral annulus calcification is a chronic and degenerative process of the fibrous support structure of the MV and its prevalence range from 8% to 15%. Although it has been considered an age-related process, female gender and other mechanisms as atherosclerosis, abnormal calcium-phosphorus metabolism (as Chronic Kidney Disease), congenital metabolic disorders (as Marfan Syndrome) also contribute to the development of MAC (Abramowitz et al., 2015). It is possible to proceed with the MV replacement without excising the calcium bar, but it may lead to downsizing the prosthesis and an increased risk of paravalvular leak and/or dehiscence

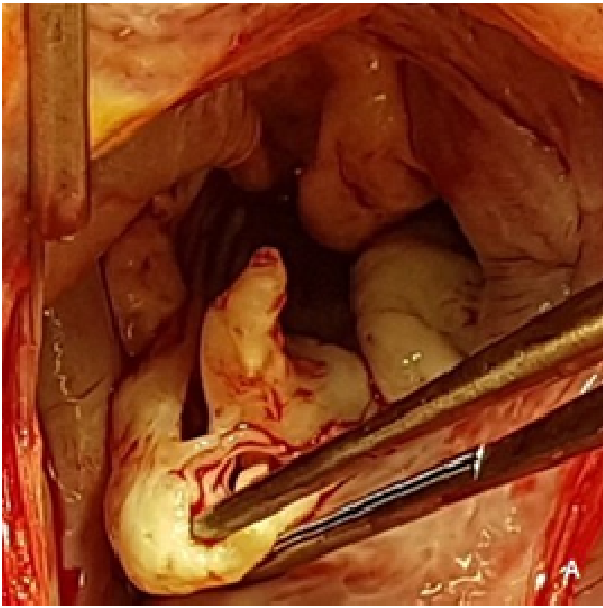


Figure 1. The surgical view of the MAC and the “spike” in the ventricular surface of mitral annulus. After the excision of this “spike” and a localized decalcification of the posterior annulus, a triangular resection of the P2 segment was made. So, a double-teflon patch was used to the segmental annulus plication and interrupted polipropilene sutures were placed to repair the posterior leaflet

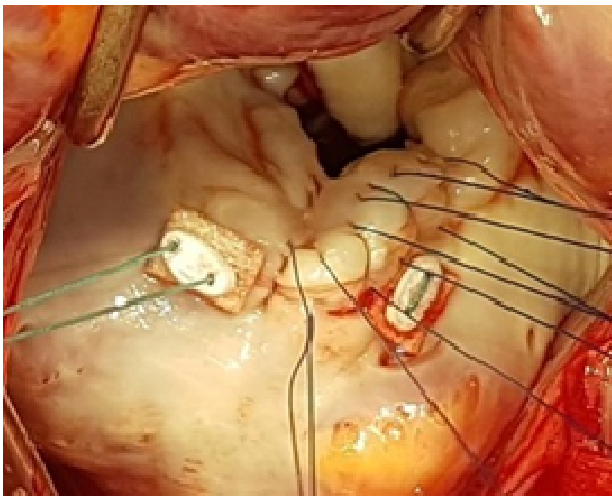


Figure 2. The Double-Teflon Technique. A quadrangular resection of the posterior leaflet and annulus segmental plication via a pledgetted suture over a teflon patch.

(Lad et al., 2014). Another strategy is performing MV surgery (repair or replacement) after complete decalcification and reconstruction of the annulus (Uchimuro et al., 2016). In the surgical scenario, the complete annular decalcification may lead to severe complications as damage to the circumflex artery and disruption of the atrioventricular groove. Consequently, a modified surgical strategy with limited or even without annular decalcification may be chosen (Tomšič et al., 2019). In both cases it has been performed a segmental decalcification of the posterior mitral annulus (P2 segment) associated with the MV repair using the “Double-Teflon” Technique. Described in 2002 by Pomerantzeff et al. (Pomerantzeff, 2002) it consists in a quadrangular resection of the posterior leaflet and annulus plication via a pledgetted suture over a teflon patch (Figure 2).

Pomerantzeff et al. (2007) also published this technique with safe and effective results in the presence of MAC with 92,3% freedom from reoperation in 14 years. Another publication has analyzed 133 patients with MV degenerative insufficiency submitted to the Double-Teflon Technique with 99.2% freedom from reoperation in the 10-year follow-up as published by Brandão et al. (?) Furthermore, it has been demonstrated by echocardiogram (Guedes et al., 2010; Guedes, 2015) the preservation of the mitral annulus mobility with maintenance of reduced posterior mitral annulus diameter, the MV competence and adequate reverse remodeling of left cardiac chambers. In a recent presentation in the Heart Valve Society Meeting, the cardiac magnetic resonance imaging has been used to analyze the first year follow up of 29 patients with MV degenerative insufficiency submitted to the Double-Teflon Technique and it demonstrated sustainable length of coaptation and no recurrence of MV insufficiency (Brandão, 2019). Both of our patients remains asymptomatic about one-year follow up and the transthoracic echocardiogram demonstrates a trivial mitral valve regurgitation.

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