Transcatheter Mitral Valve Repair, MitraClip, in a Nonagenarian Patient with Acute Regurgitation

Denise Castro de Souza Côrtes¹,², Paulo Roberto Dutra da Silva¹,³, Antonio Sérgio Cordeiro da Rocha¹,³, Alexandre Siciliano Colafrancheschi¹,³, Carolina Garbin Comandulli¹, Eduarda Barcellos¹

¹Hospital Pró-Cardíaco – Rio de Janeiro, RJ – Brazil
²Fundação de Assistência e Previdência Social do BNDES – Rio de Janeiro, RJ – Brazil
³Instituto Nacional de Cardiologia – Rio de Janeiro, RJ – Brazil

Abstract

MitraClip transcatheter implant is a promising option for treating mitral regurgitation (MR) in patients with high surgical risk. This report describes the case of a nonagenarian patient with acute MR for chordae rupture that, due to prohibitive surgical risk, underwent a successful MitraClip transcatheter implant.

Keywords: Mitral valve insufficiency; Mitral valve prolapse; Vascular access devices

Introduction

Acute mitral regurgitation (MR) is usually caused by acute structural abnormalities of the mitral valve, either by infection causing destruction of the tendinous chordae or valve leaflet by either spontaneous rupture of the tendinous chordae or rupture of papillary muscle due to acute myocardial infarction¹.

Acute volume overload on the left ventricle causes pulmonary congestion and low cardiac output. If this volume overload is not tolerated, despite full drug treatment, emergency surgery should be performed¹. These patients, however, face high surgical risk inherent in the procedure, which can become prohibitive in the presence of old age and comorbidities². In such circumstances, non-surgical treatment options, such as transcatheter mitral repair, appear as less invasive and lower risk treatment alternatives².

This report describes the case of a nonagenarian patient with acute MR and high surgical risk who underwent successful MitraClip transcatheter implant.

Case Report

Female patient, 94 years old, was admitted to hospital with dyspnea rapidly progressing to orthopnea (functional class IV of the New York Heart Association — NYHA) in the last 45 days; hypertension, type II diabetes, obesity, hypothyroidism, chronic venous insufficiency and mitral valve prolapse.

On admission, the patient was diagnosed with severe MR due to tendinous chordae rupture (Figure 1A and B). Despite the therapeutic measures adopted, the patient developed anasarca, severe hyponatremia and
hypokalemic metabolic alkalosis. Continuous ultrafiltration and non-invasive ventilation were indicated. Due to the operative mortality risk of 24.13% by EuroSCORE II and 48.38% by the STS score, the heart team opted for the MitraClip transcatheter implant.

The procedure, guided by three-dimensional transesophageal echocardiography (Figure 2A and B), was uneventful, requiring only the implant of a device. After the procedure, there was progressive recovery of spontaneous diuresis and stabilization of nitrogenous compounds. The patient was discharged in NYHA functional class II on the fifteenth day after the procedure.

Mitral valve repair or surgery are considered the gold standard treatment for severe MR associated with left ventricular dysfunction or symptoms. The good result of surgery in this group of patients is directly related to the improvement of symptoms and life expectancy. However, there is a significant number of patients with symptomatic MR and severe comorbidities that place them at high risk of surgical morbidity and mortality. If the surgical risk is considered prohibitive, the patient is relegated to clinical treatment.

It is estimated that about half of symptomatic patients with severe MR do not undergo surgery. For those patients without a good therapeutic option, transcatheter
Mitral valve repair becomes a viable therapeutic alternative, especially with the implant of MitraClip, which is analogous to the surgical procedure of creating a dual orifice.

The MitraClip transcatheter implant, which enables a less invasive approach to severe MR, is supported by the study EVEREST II. In this trial, 279 patients with severe MR, with bad coaptation of the middle part of the anterior or posterior leaflet were randomized for MitraClip transcatheter implant or mitral valve surgery (valve repair or replacement). At the end of 48 months of follow-up, mortality was similar in both groups of patients: 17.4% in the MitraClip and 17.8% in the surgery (p=0.91). There was no significant difference between the groups regarding the percentage of severe residual mitral regurgitation: 21.0% in the MitraClip and 20.2% in the surgery (p=0.74). However, the need for early or late surgical intervention or reoperation was significantly higher in the MitraClip group (25.0% vs. 5.0%; p<0.001).

In a substudy of EVEREST II, which involved high-risk patients, with an estimated operative mortality above 12.0%, of which 56.0% had functional MR and 44.0% had degenerative MR, there was decreased MR severity, improvement of symptoms, reversed remodeling, reduced hospitalizations, improved in quality of life and survival at 12 months in patients treated with MitraClip compared to the control group.

In a study involving 127 patients with severe degenerative MR and prohibitive surgical risk, the implant surgery was successful in 95.0% of the cases, survival at one year was 74.0%, there was improvement in functional class, quality of life, left ventricular (LV) remodeling index and reduced recurrent hospitalizations for heart failure.

In the ACCESS-US study (A two phase observational study of the MitraClip system in Europe), which analyzed 567 patients, the implant success rate was 99.6%. Thirty-day mortality was 3.4% and, in 12 months, it was 19.0%. In one year, open mitral surgery was necessary in 6.3% of patients, 3.4% required another MitraClip to treat residual MR and the incidence of MR 3 or 4+ was 21.0%.

Among the survivors, 71.0% were in NYHA functional class I or II, with better performance in the 6-minute walk test and quality of life scores.

Surgical repair after MitraClip implant surgery is feasible, although a higher degree of valvular fibrosis after the clip is implanted may involve valvar exchange. In the study EVEREST II, 37 patients out of 178 who have had MitraClip implanted required surgery in 12 months. Mitral valve repair was possible in 20 and valve replacement was possible in 17 patients. Clip removal becomes more difficult after 30 days of implantation due to fibrosis and scarring of the leaflets. Involvement of the anterior leaflet is predictive of need for valvar replacement.

Therefore, MitraClip transcatheter implant is an alternative that should be considered for patients at high or prohibitive surgical risk and anatomy favorable to the procedure, as in the case reported here.

In the last guideline for valvular diseases of the American Heart Association and American College of Cardiology, mitral valve transcatheter repair is considered as IIb recommendation class, evidence level B.

To maximize the clinical success of this procedure the participation of a multidisciplinary team (heart team) is essential. A careful pre-assessment of the mitral valve anatomy and function, cavity dimensions, biventricular functions, pulmonary artery pressures and any concomitant aortic or tricuspid valve disease, in addition to the knowledge of the coronary anatomy and comorbidities are key components in the process.

Potential Conflicts of Interest
This study has no relevant conflicts of interest.

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Academic Association
This study is not associated with any graduate programs.
References


