Percutaneous mitral valve repair in patient with severe mitral valve stenosis and suprasystemic pulmonary hypertension

Valvoplastia mitral percutânea em paciente com estenose mitral grave e hipertensão arterial pulmonar suprassistêmica

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ABSTRACT – Severe mitral stenosis is associated to congestive symptoms, increased pulmonary artery pressure, atrial fibrillation, and thromboembolic events. Among the treatment options, balloon mitral valve repair is the first choice in patients with favorable anatomy. We report a case of mitral valve repair using balloon in a patient with severe mitral stenosis and suprasystemic pulmonary hypertension (systolic pressure of pulmonary artery estimated at 135mmHg). Valve surgery was contraindicated due to functional class III (NYHA), after hospitalization for ischemic stroke.

RESUMO – A estenose mitral grave está associada a sintomas congestivos, aumento da pressão da artéria pulmonar, ocorrência de fibrilação atrial e eventos tromboembólicos. Dentre as medidas terapêuticas, a valvoplastia mitral por cateter balão é a primeira escolha em pacientes com anatomia favorável. Relatamos um caso de valvoplastia mitral por cateter balão em paciente portadora de estenose mitral grave com hipertensão pulmonar suprassistêmica (pressão sistólica de artéria pulmonar estimada em 135mmHg), com contraindicação à cirurgia cardíaca, em classe funcional III (NYHA), após internação hospitalar, devido a acidente vascular encefálico isquêmico.

INTRODUCTION

Mitral valve stenosis is confirmed by clinical symptoms of mitral valve impairment, as well as evaluation of structural changes and hemodynamic repercussion. Diagnosis is made mainly by echocardiography that quantifies the transvalvular pressure gradient, area of the valve, and pulmonary artery pressure (PAP), which are severity parameters and prognostic markers of the disease.1

Among the treatment options, percutaneous balloon mitral valvotomy (PBMV) is considered the first choice in patients with favorable anatomy, and it is essential to recognize the determinants of immediate and long-term success.2

We report a case of PBMV in a patient with severe mitral stenosis and suprasystemic pulmonary hypertension (systolic PAP estimated at 135mmHg by echocardiography), New York Heart Association (NYHA) functional class III-IV, after hospital admission due to ischemic stroke.

CASE REPORT

Patient S.C.S., 40-year-old, female, Caucasian, current smoker, hypertensive, seen at the psychiatry department for bipolar disorder. In the medical evaluation, she was...
Cypriano PE et al. diagnosed with severe mitral stenosis of probable rheumatic etiology and pulmonary artery hypertension. Medical treatment was initiated with a diuretic combined with beta-blocker and referred to the department of cardiac surgery for evaluation. A right heart catheterization with pulmonary vasoreactivity test with nitric oxide was ordered, which revealed significant pulmonary arterial hypertension (PAP 106/55mmHg), and reduced pulmonary vascular resistance from 8.6 Woods to 4.6 Woods after using nitric oxide. The surgical procedure was contraindicated, being the patient maintained with optimized medication, however with persistent symptoms.

After a short follow-up at the outpatient clinic, the patient progressed with an acute neurological event, presenting left hemiparesis and dysarthria. A brain computed tomography (CT) confirmed the presumptive diagnosis of ischemic stroke, and full anticoagulation with warfarin was initiated due to a probable embolic cause. Transesophageal echocardiogram during hospitalization showed a mitral valve area of 1.0cm², a mean transvalvular gradient of 23mmHg, systolic PAP of 135mmHg, and Wilkins score of 8; no thrombus was found in the left chambers (Figure 1).

In face of the severity of the condition, the case was discussed again with the heart team, and the decision was for PBMV. The standard technique was used for the procedure, with Inoue balloon-catheter. The procedure was uneventfully and the transmitral gradient was reduced to 5mmHg, with no significant mitral regurgitation (Figure 2). She was discharged 5 days after intervention, on warfarin, metoprolol and hydrochlorothiazide, and followed up at the cardiology outpatient clinic.

A new transthoracic echocardiogram performed after 6-month follow-up showed mitral valve with a mean transvalvular gradient of 11mmHg and area of 1.6cm², mild to moderate holosystolic regurgitation, and systolic PAP of 80mmHg. Patient is currently NYHA functional class I, with no jugular vein distention or lower limb edema, maintaining slight facial neurological sequela.

**DISCUSSION**

In this case report, we confirmed the feasibility of PBMV in severe mitral valve stenosis with suprasystemic pulmonary hypertension and surgical contraindication according to the initial evaluation. Mitral stenosis leads to progressively increased resistance to transvalvular intracavitary flow, due to changes in mobility, calcification and thickening of the valve apparatus. It is classified as severe when the valve area reaches ≤1.0cm², and the mean diastolic gradient is >10mmHg in echocardiographic measurements. Physiologically, the rise in left atrial pressure is retrograde transmitted to the pulmonary vascular bed, causing an increase in PAP and congestive symptoms, which, together with the presence of atrial fibrillation, are the main markers of poor prognosis.

PBMV is the treatment of choice in patients with favorable anatomy, who present flexible, non-calcified valvar
leaves, with little subvalvular involvement, according to Wilkins echocardiographic score ≤8. The main exclusion criteria for percutaneous treatment are unfavorable Wilkins score (score ≥12 contraindicates and, between 9 and 11, requires individualized evaluation), moderate to severe mitral regurgitation, and thrombus in the left atrium. The latter demands for a preoperative transesophageal echocardiogram, especially if the patient has already presented embolic events, such as ischemic stroke of the case herein reported.

In the present context, the suprasystemic value of PAP secondary to severe mitral stenosis is poorly described in the literature. This condition, associated to the cardioembolic ischemic stroke and the high functional class, led to the percutaneous approach. There was significant reduction in the mean mitral transvalvular gradient from 23mmHg to 11mmHg, and an increase in the mitral area from 1.0cm² to 1.6cm². These values meet the success criteria, i.e., final mitral area >1.5cm² and absence of mitral regurgitation greater than moderate. As to PAP, there was a drop from 135mmHg to 80mmHg, providing a better quality of life after 6-month follow-up, which was demonstrated by the functional class I.

We know there is limited amount of scientific evidence on the impact of the absolute or relative value of response to pulmonary vasoreactivity testing to define treatment in extreme cases of this disease, which are still frequent in Brazil. This case may help expanding the limits of the interventional practice to benefit patients.

FINANCING
None.

CONFLICTS OF INTEREST
The authors declare no conflicts of interest.

REFERENCES