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Case Report

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Challenging Situations in the Management of Mitral Stenosis through Percutaneous Commissurotomy

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Abstract

Percutaneous mitral commissurotomy (PMC) remains essential in treating mitral stenosis (MS). Thanks to technological advancements and interventional cardiologists' progress, this procedure thrives with optimized equipment. However, patient selection remains a crucial factor in achieving successful outcomes. In practice, challenging situations arise where mitral dilation becomes the primary therapeutic solution, even in the absence of optimal conditions or in the presence of relative contraindications to this procedure. In these cases of complex mitral stenosis where dilation is challenging, the usual goals aiming for a significant improvement in mitral valve area after dilation are often far from being achieved.

Keywords: Percutaneous Mitral Commissurotomy, Mitral Stenosis, Mitral Dilatation, Echocardiography, Complications.

Introduction

Difficult cases of percutaneous mitral commissurotomy (PMC) refer to situations where the procedure carries increased risks due to specific patient or disease characteristics. Indeed, in some cases, these risks are taken into consideration because CMP is the primary therapeutic solution, even when optimal conditions are not met or there are relative contraindications to the procedure. This article aims to present four complex cases of mitral stenosis in which CMP was the only viable therapeutic option, despite unfavorable anatomy, severe calcifications, degenerative anatomy, and other extracardiac issues that can complicate the procedure, such as scoliosis.

Observations

Observation N° 1: B.N., 24 years old, was referred for the management of severe mitral stenosis (MS) in NYHA class III, associated with pulmonary hypertension (PH), and sinus rhythm (SR) during her 24 weeks of amenorrhea (SA) pregnancy. Transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) revealed a mitral valve area (MVA) of 0.9 cm² with bicommissural fusion, a mean gradient (MG) of 31 mmHg, grade II mitral regurgitation (MR), a systolic pulmonary artery pressure (SPAP) of 71 mmHg, and an unfavorable valvular anatomy for PMC, with a Wilkins score of 13 (Fig 1). After PMC, the MVA was 2.2 cm², MG was 9 mmHg, and PAPs reduced to 45 mmHg, but grade III MR with commissural predominance was still present.

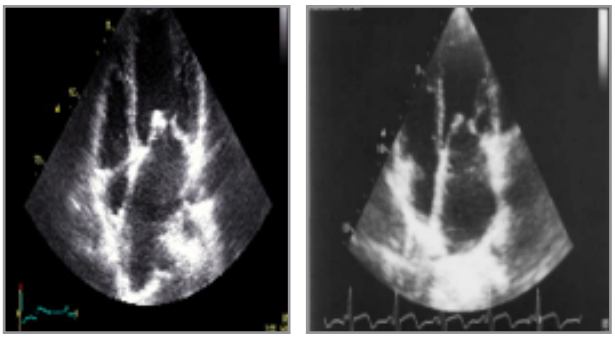

Figure 1: Calcified rheumatic mitral stenosis: Wilkins a 13

Observation N° 2: H.Z., 51 years old, with a history of scoliosis and bronchodilation complicated by severe restrictive respiratory syndrome (FEV1 at 0.8 L) and significant cachexia. She was referred to us for the management of a very tight MS, in NYHA class III, with pulmonary hypertension (PH) and sinus rhythm (SR). TTE and TEE revealed an MVA of 0.5 cm² with bicommissural calcifications, a mean MG of 16 mmHg, grade I MR, a Wilkins score of 12, and a SPAP of 51 mmHg (Fig 2). It should be noted that the patient was excluded for valvular surgery. After PMC, the MVA was 1.1 cm², MG was 8 mmHg, with a partially open external commissure, and PAPs were reduced to 36 mmHg.

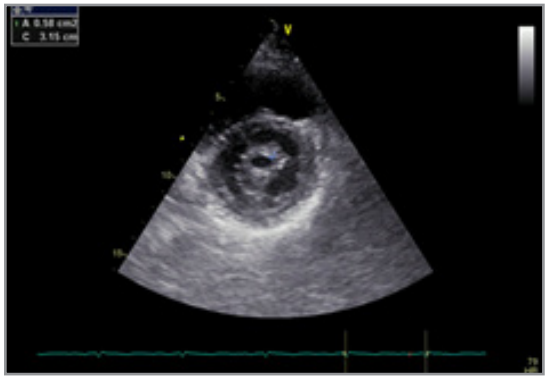

Figure 2: Severe mitral stenosis

Observation N° 3: R.A., 41 years old, was referred for the management of a very tight MS, in NYHA class IV, with atrial fibrillation (AF) and supra-systemic pulmonary hypertension (PH) at 120 mmHg. TTE and TEE revealed a mitral valve area (MVA) of 0.5 cm², a mean gradient (MG) of 23 mmHg, grade I MR, grade III tricuspid regurgitation (TR), a Wilkins score of 13, and a patent foramen oval (PFO) with a right-to-left shunt (Fig 3). After PMC, there was clinical improvement, with an MVA of 1 cm², MG of 13 mmHg, and a SPAS of 70 mmHg, but significant mitral regurgitation persisted. After a few weeks, the patient was referred for surgery for mechanical mitral valve replacement, which resulted in a spectacular outcome.

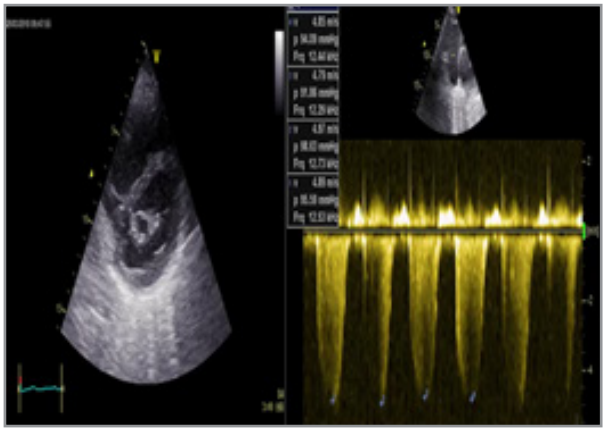

Figure 3: Severe mitral stenosis in suprasystemic arterial hypertension

Observation N° 4: A.R., 80 years old, with a well-functioning mechanical aortic prosthesis, presents with multiple allergies, severe chronic anemia due to heterozygous β-thalassemia, celiac disease with malnutrition, as well as hypothyroidism and severe chronic kidney disease. She was referred for the management of a very tight MS, with a degenerative component due to annular calcifications, in NYHA class IV (Sub Nocturnal Pulmonary Edema), with AF and PH. She was excluded from surgery due to a high operative risk. TTE and TEE revealed an MVA of 0.6 cm² with significant calcifications predominantly on the annulus, a MG of 8 mmHg, minimal MR, and a Wilkins score of 14 (Fig 4). After PMC, the MVA increased to 1.1 cm², MG was 5 mmHg, and the SPAS was 48 mmHg, with grade I mitral regurgitation without complications.

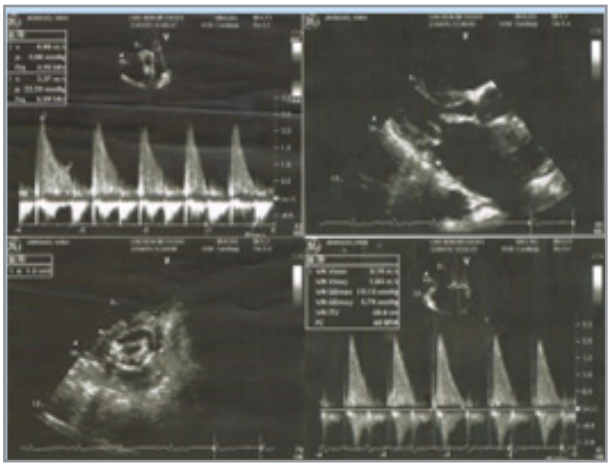

Figure 4: Calcified degenerative mitral stenosis

Discussion

The technical success and occurrence of complications depend on the choice of the patient and the experience of the operator [1]. Clinical and anatomical characteristics greatly influence the post-PMC outcomes, and among the most adverse factors are, advanced age, female sex, history of PMC, severity of mitral stenosis, Wilkins score >11, presence of mitral regurgitation, and very high transmittal mean gradient [2-6].

In the first observation, despite unfavorable valvular anatomy, PMC was performed with the dual aim of improving the patient's clinical tolerance and allowing her to carry her pregnancy to term. In such conditions, PMC should be considered from the 20th week of gestation, with appropriate precautions and by experienced hands with surgical treatment being considered in the short or long term [7-9].

In the second observation, the high operative risk made simultaneous surgical correction unlikely, especially considering the poor clinical tolerance of the MS. PMC is the procedure of choice when surgery is contraindicated in the absence of absolute contraindications to this technique [7].

In the third observation, the objective of PMC was to lower the systolic pulmonary artery pressure (PAP to prepare the patient for surgery. PMC is the preferred procedure as a bridge to surgery for patients with unstable hemodynamic status or transient contraindications to surgery [7].

In the fourth observation, despite unfavorable clinical and anatomical characteristics, the patient's poor clinical tolerance of the valvopathy and the impossibility of surgical correction due to the very high operative risk motivated the performance of PMC (rescue dilation). This significantly improved the patient's clinical and hemodynamic status. However, in such circumstances, only a trained operator is authorized to perform PMC to minimize the risk of complications [7].

Conclusion

Percutaneous mitral commissurotomy is the preferred method for treating mitral stenosis when anatomical characteristics allow for it. However, there are specific situations where this technique is favored even in the presence of unfavorable anatomical

features. In these cases of complex mitral stenosis where dilation is challenging, the usual goals aiming for a significant improvement in mitral valve area after dilation are often far from being achieved.

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