Expanding the indications for percutaneous mitral commissurotomy in rheumatic mitral stenosis: look carefully at the commissures, and proceed cautiously and skillfully

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This editorial refers to ‘Feasibility of percutaneous mitral commissurotomy in patients with commissural mitral valve calcification’¹, by J. Dreyfus et al., on page 1617

Percutaneous balloon mitral valve commissurotomy (PMC) was introduced by Inoue in the 1980s, as an alternative to surgical closed commissurotomy.¹ PMC is the first example of a transcatheter valve intervention replicating a surgical procedure, and the fact that Inoue is a surgeon underlines the influence of multidisciplinary efforts in the evolution of transcatheter therapies.

Today PMC is the first-line therapy for most symptomatic patients with mitral valve stenosis with favourable clinical and anatomical characteristics (with a recommendation class IB by the latest European guidelines).² The main objective of PMC is to delay surgery, particularly when this would imply the implantation of a valve prosthesis. In patients not amenable to PMC, in Western countries, closed mitral commissurotomy has been replaced by open mitral commissurotomy using cardiopulmonary bypass in selected patients. Subvalvar apparatus management is the main advantage of open commissurotomy leading to greater valve areas as compared with closed commissurotomy and with PMC in patients with papillo-commissural fusion.³ However, most patients with anatomy not amenable for PMC are also suboptimal candidates for surgical repair and mostly undergo valve replacement.

Patient selection plays a key role in PMC, as is the case for other transcatheter interventions. More specifically, anatomical and clinical characteristics are predictive of early and long-term success of the percutaneous procedure. Echocardiography plays a central role in the contemporary decision-making process, and several scores have been developed to predict early and long-term outcomes of PMC.⁴,⁵ A contemporary focus of the pre-procedural echocardiographic screening for PMC should include a meticulous analysis of the commissures. The commissures are the target of open surgical mitral repair: careful commissural opening, with splitting of the subvalvar apparatus is the main objective of surgery, and it is associated with long-term repair durability (Figure 1). Since commissural opening is the primary mechanism of increase of the mitral valve area, it is the main determinant of early and late clinical outcomes following PMC. However, commissural opening can also be associated with excessive mitral regurgitation, particularly in patients with more advanced pathology in the commissural area. It is interesting to note that most commonly used scoring systems do not incorporate commissural anatomy in the algorithm, while commissural thickening and calcification has been incorporated in more recent predictive scores.⁶,⁷

Outcomes in patients with commissural calcification are ambiguous, and the indication for PMC under these circumstances remains debated. The presence of commissural calcification is considered a relative contraindication to both PMC and surgery due to the risk of valve lesions and insufficient valve area increase. Sutaria et al.⁸ reported an extremely low procedural success rate of PMC (≏ 50%) in patients with significant commissural calcification, associated with unsatisfactory functional improvement. As a consequence, the authors suggest that in the presence of calcified commissures, surgery should be considered as first-line treatment.

However, Dreyfus et al.⁹ in a series of 464 patients undergoing PMC in a contemporary time frame of 3 years in a high volume centre of excellence for mitral interventions, reported promising outcomes in patients with unfavourable commissural anatomy. Although the authors observed an expected lower success rate in patients with commissural calcification, procedural success could still be achieved in most patients (three out of four) and not at the expense of an excess procedural complication rate. Based upon this recent experience, the authors suggest that PMC should still be considered a first-line treatment of patients with severe mitral stenosis even in the presence of (unilateral) calcified commissures with otherwise favourable clinical characteristics. Severe bilateral calcification should be still considered an absolute contraindication to PMC. A limitation of the study is the short...
follow-up period, although it is well known that immediate procedural results are the main determinant of long-term outcome.

It is important to underline that such outcomes have been achieved in an experienced centre and in a contemporary series of selected patients; therefore, they might not be reproduced elsewhere. The early success rate was indeed higher than that reported by other groups,8 reflecting a very high level of expertise.

The good outcomes of PMC in this challenging population are due to a combination of factors: meticulous patient selection, optimal technical performance, accurate echo-guidance, and decision-making assistance during the procedure.

Patient selection plays an important role: Heart-Team discussion is fundamental to identify the optimal therapy for the individual patient. Specifically in the case of mitral stenosis, complementary integration of medical therapy, and surgical and interventional management strategies is mandatory to achieve the goal of improving quality of life while maintaining life expectancy. Most patient undergoing PMC will become surgical candidates,10 although PMC can be repeated in selected patients. Surgical treatment should be deferred as long as possible to reduce the morbidity related to prosthesis implantation; however, surgery should be considered as an alternative option particularly in patients with associated cardiovascular conditions amenable to surgical treatment, and in the presence of an acceptable risk profile. Although surgery (Figure 2) can provide a larger valve area particularly in patients with aggressive subvalvar involvement, the haemodynamic benefit of surgery should be weighted against the morbidity of surgery also in view of the need for further open-heart intervention in the case of recurrence of valve stenosis. In addition, since surgical commissurotomy at present is performed infrequently, there are currently fewer surgeons with sufficient experience in this specific technique.

Accurate echocardiographic assessment is a fundamental step in the decision-making process. In the reported series from Dreyfus et al., two-dimensional (2D) transthoracic echocardiography has been used as the main imaging methodology to assess valve, and more specifically, commissural anatomy. More recently, 3D echocardiography has become widely available and can integrate and supplement the information attainable by 2D echocardiography.11 Transoesophageal 3D echocardiography is becoming widely available and it is performed in several centres not only to assess mitral anatomy but also to rule out the presence of intra-auricular thrombi in patients scheduled for PMC. In the future the role of multimodality imaging, including multidetector cardiac computed tomography, could further expand current diagnostic capabilities.12 Computed tomography could be particularly useful in exactly locating and quantifying commissural fusion, thickening, and calcification.

Echocardiography also plays a fundamental role during procedural decision-making. The step-wise approach utilized by the authors is well described in the manuscript. The balloon size was chosen according to the patient’s height; however, progressive inflations were done in steps of 1–2 mm. At the end of each balloon inflation, echocardiography should evaluate the risk—benefit of an additional inflation with larger volumes, aiming at obtaining a valve area larger than 1.5 cm² with at least one commissural splitting while preventing the occurrence of significant mitral regurgitation.

To achieve this goal, intense communication between the operators is required during the procedure. Operator skills are also an important...
factor influencing decision-making. Expansion of the indications can only be advocated in centres with specific expertise in transseptal puncture and PMC where the procedure is performed safely and effectively. Any institution should adapt the decision-making strategy according to the local skill-set characteristics. Under a proper multidisciplinary team approach, a patient-oriented approach is today the secret for excellent and up-to-date contemporary management of valve disease. This is particularly the case in the presence of challenging anatomical and clinical presentation, such as patients with calcific commissures and mitral stenosis: the article by Dreyfus et al. opens up new perspectives for patients with mitral stenosis in order to postpone further the need for implanting a valve prosthesis. The example provided by PMC can be transferred to the overall field of transcatheter valve interventions, where a progressive expansion of current indications is expected. The secret is: look carefully at the details, and proceed cautiously and skilfully.

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References


