EDITORIAL

# Timing of Surgery of Severe and Asymptomatic Mitral Insufficiency

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The beneficial time for surgical repair of permanent mitral insufficiency due to primary valvular lesion remains controversial, and gives rise to different criteria in dealing with this valve disease.

Recognizing the involvement of the left ventricular function at the time of surgery as determinant of late prognosis, in addition to proving the efficiency and low risk of mitral valve repair, has led to the generalized idea that an earlier surgery as a strategy in treating mitral insufficiency is beneficial. (1-4) However, the lack of adequate information arising from prospective and controlled studies on homogeneous populations has not determined yet the exact parameters to recommend the surgery for the different clinical situations.

The decision to perform surgery on a patient with mitral insufficiency is a complex process that involves careful evaluation of the severity of the regurgitation, its effect on the auricular and left ventricular (LV) reconstruction, the left ventricular function and the pulmonary pressure, the symptomatic state, the possibility of a valve repair, the associated pathologies, and the surgical risk in each patient.

There is wide consensus about recommending the surgery for all patients with severe mitral insufficiency when symptoms are present, or in case of asymptomatic patients, when clear parameters of left ventricular dysfunction are confirmed to be related to poor clinical evolution (left ventricle ejection fraction [LVEF] < 60% or left ventricular end-systolic diameter [LVESD] ≥ 45 mm). Surgery is also recommended in asymptomatic patients with preserved ventricular function if significant pulmonary hypertension (> 50 mm Hg) is proven, or if there is recurrent auricular fibrillation, and in asymptomatic patients with early signals of deterioration of the ventricular function (LVESD ≥ 40 mm), particularly if the valve repair is highly probable and the surgical risk is low.

In contrast, the surgery in asymptomatic patients with preserved parameters of the systolic LV function arises more controversies and it may not be widely recommended, even as opposed to the high probability of repair.

In these cases, the arguments in favor of a systematic surgery are based on the progressive characteristics of the reconstruction and deterioration of the ventricular function when the mitral insufficiency is severe, as well as on the difficulty to detect the contractile deterioration that may occur insidiously in asymptomatic patients and thus condition poor evolution after the surgery. Regarding this position, the early valve repair surgery –with low surgical risk and good late evolution– in patients with no associated cormobilities may avoid complications and improve the adverse prognosis observed when there is irreversible deterioration of the ventricular function at the time of the surgery.

However, there are certain issues to be considered regarding this strategy of prophylactic early procedure. The possibility of a valve repair is set according to the etiology, the type of valve involvement and anatomofunctional mechanism, and the surgical team's experience with this technique. But altough it is possible to identify patients with high-likelihood through echocardiography, it is not possible to predict mitral repair with precision. Thus, some patients undergoing repair surgery may end up in a valve replacement with prosthesis, with a late and higher risk.

Compared to the replacement with prothesis, mitral valve repair has shown long-term positive outcomes and less complications. Nevertheless, the repair is not the final solution for a considerable number of patients, since there is a need for reoperation due to recurrent disfunction in about 1% of the patients per year, similar to what has been observed in the replacement with prosthesis. (5)

Although the mitral repair techniques have been highly spread, valve replacement is still being the most frequent procedure in patients who underwent mitral insufficiency, possibly due to the technical limitations of many surgical teams in the healthcare system. In turn, the surgical risk of an isolated mitral plastic surgery is low, about 2%, but still interesting when referred to a surgery in asymptomatic patients with good late prognosis. (6)

On the other hand, even though the evidence available about the evolution of asymptomatic severe mitral insufficiency with preserved ventricular function shows dissimilar data regarding the need for surgery and its late prognosis, the only prospective study that included a significant homogenous population with those characteristics showed that these patients may have a clinical follow-up safely until some of the classic surgery criteria are present (symptoms, deterioration of the ventricular function [LVEF < 60%, LVESD ³ 45 mm], pulmonary hypertension, or auricular fibrillation). (7) With adequate clinical control, these patients had a survival rate similar to the expected in the overall population: the survival rate with no recommended surgery based on those criteria was 92%

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± 2% in two years, and 65% ± 5% in six years; no significant event differences were observed in patients with flail valve, and good evolution was observed after surgery, both in the symptoms and the ventricular function, as in the late prognosis, in those patients who underwent surgery when they reached those parameters.

Falconi et al's article, published in this issue of the *Revista,* represents a new contribution to the knowledge about the stratification risk and the surgical opportunity for the asymptomatic mitral insufficiency. (8) The authors proved the usefulness of a score that includes a combination of clinical, echocardiographical, and exercise variables to predict late evolution (10 ± 3.5 years) in a large population (n = 375) of patients with asymptomatic severe mitral insufficiency and preserved ventricular function (LVEF ³ 60%). By means of this score, based on simple variables and easy to get in healthcare practice, subgroups with different risk levels of set surgery recommendations were identified (primary end point: the onset of symptoms or ventricular disfunction), or the possibility of a valve surgery depending on the primary care physicians' decision. Patients with a high score, > 3, showed a high rate of primary events (73.9 ± 9) and of valve surgery (84 ± 7), evidently higher than the rate observed in low-score patients, < 2, (2.3 ± 01 and 19 ± 5) or mean score, 2-3, (28 ± 4 and 57 ± 8, respectively).

As it has been observed in other series, this study outcomes show that the population with asymptomatic severe mitral insufficiency and LVEF ≥ 60% is not homogeneous, and their clinical evolution and prognosis may be rather different among these patients. The possibility to identify the subgroup with higher risk of developing symptoms, deterioration of the ventricular funciton (or with an incipient deterioration already), an excessive reconstruction of the left cavities, or significant short-term pulmonar hypertension may contribute to taking better decisions. In this clinical-risk subgroup, determining the high probability of valve repair and surgical risk in each case, together with the surgical team's experience, may define whether an early surgery is convenient or not.

In turn, to be able to identify the patients with severe mitral insufficiency showing low-risk of adverse evolution and good prognosis, and with no need for a the long-term corrective surgery is also clinically important. Based on what has been observed in this studio, the survival rate with no symptoms or deterioration of ventricular function was 98% (CI 95% 94-100) for patients with a < 2 score, and 71% (CI 95% 65-76) for those with 2-3 score in a mid-term follow-up of 10 years. While the rate of patients who underwent surgery during the follow-up according to their phisicians' criteria (19 ± 5 with a < 2 score and 57 ± 8 with a score between 2 and 3) should be considered, these findings show that a significant number of patients with asymptomatic severe mitral insufficiency and preserved parameters of ventricular function can remain stable, asymptomatic, with an excellent survival prognosis, and can be clinically followed up, with no need for surgery for long periods of time.

This score capacity to discriminate subgroups with different risks may be explained by the association of variables that have proved their individual capacity to predict these patients' prognosis. The LVESD ³ 40 mm and the effective regurgitant orifice area (EROA) > 55 $mm^2$ were the most significant variables in the score.

The LVESD is related to the ventricular dilation degree and is a parameter for the ventricular function, more load-independent than the LVEF. In patients with asymptomatic mitral insufficience and with normal LVEF, the ≥ 40 mm cut-off value showed that it highly identifies the early pre-surgical contractile deterioration, and predicts the ventricular function during the post-surgical period, whereas a > 22 $mm/m^2$ value predicts the start of symptoms and the deterioration of the ventricular function. (9-11)

The EROA, a quantitative parameter to specify more precisely the severity of mitral regurgitation, helps evaluate the magnitude of the valve lesion and volume overload related to the disease progression. Also in clinically followed-up patients with asymptomatic mitral insufficiency, an EROA of > 55 $mm^2$ showed it is a significant predictor of ventricular disfunction and symptoms onset; in another experience, a ≥ 40 $mm^2$ value was associated with higher mortality rate and cardiac complications. (11, 12)

The left auricular volume is related to the severity of the valve disease and the resulting volume overload. The magnitude of this cavity reconstruction may soften the symptoms even in patients with ventricular involvement, and is associated with a worsen clinical evolution. The onset of auricular fibrillation indicates the mitral insufficiency progression, and is also related to the start of symptoms, the development of heart failure, and a higher mortality rate during post-surgery. In turn, the objective determination of the functional capacity and the exercise tolerance time evaluated by the stress tests help identify easily those patients who are self-limited in their activities or who have symptoms that are difficult to interpretate.

Other variables not used in this study and helpful in detecting subclinic left ventricular disfunction in the mitral insufficiency, like the contractile reserve evaluated by echocardiography with exercise or the atrial natriuretic peptide levels, may contribute to the stratification of these patients; however, more evidence of the additive value to define the clinical use is required. (13)

As mentioned above, the population with asymptomatic severe mitral insufficiency with preserved LVEF includes heterogeneous patients with different evolution and prognosis. Even though different experiences have proved some variables are helpful in identifying higher clinical risk patients, including the ones

testing LV functional deterioration and dilation (LVESD), or the mitral regurgitation severity (EROA), none of them should be used individually to recommend surgery to these patients.

The use of a score including these and other variables that are also associated with poor clinical evolution may contribute to better stratification in patients with different risk; nevertheless, its clinical added value should be evaluated prospectively, compared to the criteria used at present.

In conclusion, to define the surgical opportunity in asymptomatic severe mitral insufficiency still remains a clinical challenge for the cardiologist, since it is not possible to set precise recommendations yet. However, through adequate evaluation combining clinical, echocardiographical and functional variables, it is possible to identify the low-risk population in which the adequate clinical follow-up is recommendable, and other intermediate-risk or high-risk groups requiring closer control in which progressive deterioration in the variables of the ventricular function, together with high likelihood of repair and low surgical risk, may lead us to choose an early surgery. In these populations, the information from prospective and randomized studies comparing early surgery versus adequate clinical control and follow-up to reach classical parameters to recommend surgery will provide us with the answer regarding the most convenient strategy.

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