EDITORIAL

Is Wilkins Score the Ideal Tool to Predict Outcomes after Percutaneous Mitral Valvuloplasty?

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Today, percutaneous mitral valve replacement (PMV) is the preferred technique for the treatment of rheumatic mitral stenosis in patients with flexible valves. However, it has some limitations; in a considerable number of patients, a sufficient opening of the valve is not reached, that is, an area greater than or equal to 1.5 cm^2, which is considered a suboptimal outcome because it does not allow adequate functional recovery of the patient. On the other hand –and fortunately less commonly–, some patients develop severe mitral regurgitation (SMR) as a result of this procedure, and in some cases requiere valve replacement. (1)

Reported incidence of SMR is between 2-19%; what was observed in the work of Echarte et al (2) is within the range published in the literature. (3)

In a report on the temporal trends in PMV for a 15-year period in a large number of patients, Lung observed that despite the refinements of the technique introduced and the greater experience accumulated, SMR incidence remained stable over time, and was the most frequent complication of valvuloplasty. (4)

The cornerstone in evaluating a patient to determine if a mitral valve replacement is feasible and to predict this type of complications is the structural assessment of the valve by two-dimensional echocardiography. The widely used tool is the score developed by Wilkins, which takes into account the mobility of the leaflets, their thickening, calcification, and involvement of the subvalvular apparatus. The grading system assigns 0 to 4 points in increasing severity to each of these features.

Its validation revealed that a score ≤ 8 in the absence of significant mitral regurgitation characterizes the best candidates for valvuloplasty. (5)

This score has been widely assessed on a large number of patients, and showed its predictability both for immediate and long-term outcomes. (6, 7)

For the assessment of immediate outcomes, a combined endpoint expressed as good outcome was used, which added a valve area greater than 1.5 cm^2, an increase of valve area of no less than 25%, and the absence of significant mitral regurgitation.

In this analysis, while the rate of success was lower for patients with a score of 9 to 11, a significant percentage obtained a good outcome with valvuloplasty.

It was also observed that among those patients with favorable scores, there were cases with suboptimal outcome, and that all patients who developed SMR had ideal scores.

Possibly, this is because as score increases sensitivity also increases, whereas specificity decreases in similar proportions, as is usual with any prognostic measure. With a cut-off point ≤ 8, the sensitivity is 72% and the specificity is 73%, with a positive predictive value of 84% and a negative predictive value of 58%. (6)

The mechanism of valvuloplasty to increase valve area is the splitting of the fused commissures; this has been confirmed with the first intraoperative valvuloplasties, in series of autopsies, and through transesophagic echocardiography (TEE). (8-13)

There are cases of severe mitral stenosis with low commissural fusion in which valve stenosis is determined primarily by the calcification of the ring, the rigidity of the leaflets, and the involvement of the subvalvular apparatus, where valvuloplasty presents increased risk of leaflet tearing, and benefits from commissural splitting are hardly achieved. These findings are more common in patients with previous commissurotomy.

Moreover, the operative findings in patients who developed SMR, as well as TEE studies, reveal that, in most cases, the mechanism for regurgitation is a tearing of the valve cusp close to a severely calcified or densely fibrotic commissure. (12, 14, 15)

Therefore, it is clear that echocardiography to assess commisssural involvement is vital in predicting valvuloplasty outcome, and the Wilkins score does not include it.

In a retrospective evaluation of 149 patients, Cannan analyzed the presence of calcification in each of the commissures, and compared it with the Wilkins score with a combined endpoint of death, functional class, new PMV, and mitral valve replacement at late follow-up outcome. Patients with a Wilkins score < 8 showed a trend toward improved survival at 36 months free of events, versus those patients with higher scores (75% vs 64%; p = 0.07); however, the difference of events was significantly different between patients with commissural calcium and those without commissural calcium (38% vs 82% p = 0.001). He concluded that the presence of commissural calcium assessed by two-dimensional echocardiography can be used as prognostic marker. (16)

Sutaria developed a score of commissure involvement through the assessment of commissures with TEE. He assigned a score of 4 to greatly fused com-

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missures with no calcification, which reflect increased likelihood of splitting during valvuloplasty; conversely, severely calcified or densely fibrotic commissures added to the cases of low commissure fusion were scored 0, because in these cases it is not reasonable to expect benefits from valvuloplasty. Each commissure was assessed individually.

In the 72 patients assessed, he observed that this score has a positive predictive value of 67% and a negative predictive value of 82% ($p < 0.001$) to obtain good results, and adds prognostic information to the Wilkins score; however, it showed no ability to discriminate the patients who developed SMR, unless combined with the Wilkins score. (15)

In this analysis, it was observed that the prevalence of commissure calcification increased progresively with age and among patients with the highest Wilkins score.

Based on the observation of the pathology of 31 patients who presented SMR, Padial developed an echocardiographic score of mitral regurgitation that assessed the uneven distribution of thickness in each of the leaflets, the commissure involvement and calcification, and the subvalvular calcification, by grading each of the components 0 to 4 (total 0-16). By using a cut-off point ≤ 10 for the development of SMR, he obtained a sensitivity of 90% and a specificity of 97% ($p < 0.0001$), which is the highest reported for this type of scores. This assessment, which was initially conducted on patients treated with double-balloon technique, was confirmed by similar outcomes in a second assessment on patients treated with Inoue technique. (11-17)

The recent addition of the three-dimensional echocardiography software to the TEE has provided some advantages to the assessment of the mitral valve, especially to the quality of measurements of the valve area by planimetry on patients with rheumatic mitral stenosis, (18) but no outcomes about its importance in identifying predictors that can anticipate the development of severe valve regurgitation have been reported yet.

CONCLUSION

While it is believed that the development of SMR in mitral valvuloplasty is multifactorial, and that age, functional class, previous commissurotomy, lower initial valve area, and effective valve area expansion are considered predictors, (4-19) most of these predictors are direct or indirect markers of major structural involvement of the mitral valve; therefore, its assessment should be comprehensive, and adding the extent of the commissural involvement to the other elements considered in the Wilkins score is of vital importance in predicting outcome.

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