Letters to the Editor

Predicting Mitral Regurgitation Following Percutaneous Mitral Valvotomy with the Inoue Balloon: Comparison of Two Echocardiographic Scoring Systems

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To the Editor:

Although Mezilis *et al.* reported the echocardiographic scoring system of Padial *et al.*¹ to be a better predictor for development of severe mitral regurgitation after percutaneous balloon mitral valvuloplasty (PBMV) than the scoring system of Wilkins *et al.*,² the series consisting of 23 patients is too small to be of statistical significance. By the way, both Padial *et al.*¹ and Wilkins *et al.*² were from the same echocardiographic laboratory at the Massachusetts General Hospital in Boston.

Whether one uses the scoring system of Padial *et al.*¹ or Wilkins *et al.*,² neither could be relied upon to predict for certain the acute outcome of most of the patients subjected to PBMV using the Inoue balloon catheter. This has been amply proven by multicenter studies from both the United States (162 patients)³ and China (4,832 patients).⁴ The unique characteristics of the Inoue balloon and the controlled stepwise balloon sizing technique are the two most important factors in ensuring maximal dilation of the stenotic mitral valve with minimal post-PBMV mitral regurgitation. By using stepwise inflations with the Inoue balloon catheter and evaluating mitral regurgitation with color Doppler echocardiography after each inflation, it is possible to stop before mitral regurgitation becomes worse.

In the early experience only patients with pliable, noncalcified mitral valves were considered for PBMV. With more experience, patients with mildly to moderately calcified mitral valves or mild to moderate subvalvular deformities, or both, can also be treated. The *in vitro* studies⁵ revealed that the inflated balloon splits preferentially through calcified mitral commissures. Therefore, mitral calcification is not a contraindication for PBMV. However, if both commissures had heavy calcification, the risk of severe mitral regurgitation would be quite high and the long-term results less favorable.⁶ Nevertheless, the procedure may yet be a desirable option for these patients even if clinical improvements are sustained for only a few years.⁷ Currently, there are only two absolute contraindications to PBMV: significant mitral regurgitation and a mobile thrombus.⁷

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Author's reply:

There are several points in Dr. Cheng's letter with which I would certainly agree. Although the long-term outcome of percutaneous balloon mitral valvuloplasty (PBMV) can be predicted on the basis of patients' baseline characteristics,¹ the development of severe mitral regurgitation is an unpredictable event in a large proportion of patients. However, anatomical studies of torn leaflets after valvotomy using the Inoue balloon^{2,3} show consistently thin leaflet areas and asymmetrical thickened commissures. Rupture occurs usually along these thin areas. This mechanism is quite different from commissural split, which results in successful dilatation as Dr. Cheng points out. In our study, although the numbers are small, none of the patients with severe mitral regurgitation had significant amounts of commissural calcium. This finding is in line with Dr. Cheng's statement that mitral calcification is not a contraindication for PBMV. The clear message of our study, however, is that the valves with uneven distribution of thickening and/or calcification have a higher incidence of undesirable events, such as the development of severe regurgitation.

The perioperative evaluation of mitral regurgitation using color Doppler echocardiography after each inflation could be misleading in a number of cases due both to the "spraying effect" originating from small regurgitant areas and to acute changes in hemodynamic parameters such as blood pressure, left atrial compliance, and the development of atrial septal defect. The assessment of pulmonary venous flow using transesophageal echo contributes to an accurate assessment of the severity of the regurgitation.

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