

## Letter to the Editor

### Validation of New Real-Time Three-Dimensional Transesophageal Echocardiographic Scoring System in Prediction of Immediate and Long-term Outcome After Percutaneous Balloon Mitral Valvuloplasty

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Dear Editor,

The guidelines recommend percutaneous mitral balloon commissurotomy (PMBC) as the first choice therapy for symptomatic patients with moderate or severe mitral stenosis (MS) with favorable valve morphology and for asymptomatic MS patients with pulmonary hypertension (1). Echocardiography is the main diagnostic imaging method for assessing mitral valve stenosis and evaluating the severity and hemodynamic consequences of MS as well as valve morphology and disease extension (2). The main predictor of successful BMV is mitral valve morphology. Therefore, the MV scoring system using echocardiography is very important. Several two-dimensional echocardiographic scoring systems have been proposed to evaluate MV morphology, the severity of which is related to immediate and long-term outcome (3). Most cardiologists use the Wilkins score for evaluation of MV anatomy. Although, none of the available 2DE scores have not been shown to be superior to any of the other scores (4). The evaluation of the MV Wilkins score depends on the assessment of four parameters, which include: leaflets mobility, thickness, calcification, and subvalvular involvement. Each parameter is given a score of 1-4 and by calculating its sum, the total score of 1-16/16 (mild involvement = 1-4/16, moderate involvement = 5-8/16, and severe involvement > 8/16) is obtained (3). The ideal echocardiographic scoring system should have the following characteristics:

- Quantitative and qualitative evaluation of each component of the MV apparatus separately to determine the deformity in a specific portion
- The inclusion of all the points that have been proven through a large study affects the BMV result
- Easy to use and interpretable by most cardiologists at a reasonable time
- High reliability and reproducibility (4)

In recent years, real-time three-dimensional echocardiography technology has evolved rapidly. RT3DE provides detailed morphologic display and analysis of the mitral valve structure. Improving the RT3DE probe technology, especially transesophageal probes, highlights the need to introduce a RT3DE scoring system (5). Anwar et al. introduced the first scoring system using real-time three-dimensional transthoracic

echocardiography (RT3D-TTE) in patients with mitral valve stenosis candidate BMV, and compared the new score with the Wilkins score in predicting outcome after BMV. In the new RT3DE score, each leaflet was divided into three scallops (anterolateral A1-P1, middle A2-P2, and posteromedial A3-P3) and each scallop was scored separately for thickness, calcification, and mobility, as follows: 0 for normal thickness and mobility, 1 for abnormal thickness and restricted mobility, and for scoring calcification: 0 for the absence of calcification, 1 for calcification of middle scallop (A2 or P2) and 2 if there is calcification of commissural scallops (A1, A3-P1, P3). For scoring subvalvular apparatus, the anterior and posterior chordae were scored at three levels as follows: proximal (valve level), middle, and distal (papillary muscle level). Each level was scored separately for thickness and separation in between as follows: 0 for normal thickness, 1 for abnormal thickness, also 0 in case of normal chordal separation (distance in between >5 mm), 1 in case of partial separation (distance in between <5 mm) and 2 in case of absence separation. From the sum of these points, a total score of 0-31/31 (mild MV involvement <8, moderate MV involvement 8-13, and severe MV involvement >14) is obtained (6). 3D-Anwar score is complex and time consuming. This is due to the many anatomical and morphological components to achieve an accurate assessment. The available 3D score is highly selective for optimal BMV result, which leads to more patients being referred for surgery (5). So we decided to introduce a three-dimensional transesophageal (3D-TEE) echocardiographic scoring system that meets the criteria of an ideal echocardiographic scoring system, and evaluate the validity of the new score in predicting the immediate and long-term outcome of patients after BMV. We also believe that many studies are needed to achieve an ideal RT3DE scoring system.

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