

Real assessment of mitral regurgitation by three-dimensional transesophageal echocardiography

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Introduction: Quantification of mitral regurgitation (MR) by two-dimension transthoracic echocardiography (ETT2D) is based on the analysis of the proximal flow convergence (PFC) and the "vena contracta" (VC), assuming geometries that they could be wrong. Three-dimensional transesophageal echocardiography (TEE3D) not assumed such geometries, allowing a better evaluation of the MR.

Aims: assess the feasibility of the TEE3D for the quantification of MR and evaluate the concordance of the values of the VC and PFC between ETT2D vs TEE3D in the assessment of MR.

Methods: 27 consecutive patients undergoing TEE2D/3D were studied prospectively. Quantification of MR was performed with two-dimensional (2D) classical methods based on the PFC. Diameters of the VC in orthogonal planes by TEE3D were estimated, a sphericity index was established and the VC area (AVC) was measured by direct planimetry. In case of multiple jets the sum of the areas of the VC was performed.

Results: The VC by ETT2D was 0.60 mm (± 0.13). The VC by TEE2D (3 Chamber view) was 0.64 mm (± 0.15). Acceptable agreement was observed between both VC measurements (Lin coefficient 0.67).

The diameter of the VC by TEE3D was 0.56 ± 0.20 mm. There was no concordance between the diameter of the VC by TEE3D vs the diameter by TTE2D (coefficient of Lin 0.14); or vs the VC by TEE2D (coefficient of Lin 0.14).

The average diameter between greater and minor axis of the VC by TEE3D was 0.85 mm (± 0.26). This average diameter of orthogonal planes showed an area (A_v AVC) of 0.62 cm² (± 0.40).

ERO by ETT2D was 0.50 (± 0.18) cm², and by TEE2D was 0.52 (± 0.20) cm². There was an adequate concordance between the measurement of both ERO (Lin coefficient 0.78).

In TEE3D, the AVC planimetry was 0.82 (± 0.37) cm². In 19 p (70%) we observed more than one regurgitant jet, and in 11 p of them we correctly differentiate and measured each PISA and VC. Total AVC planimetry was estimated (as the sum of each AVC) which was 0.92 (± 0.32) cm².

Comparing the ERO by ETT 2D vs AVC measured with TEE3D we see that ERO ETT 2D vs AVC planimetry Lin coefficient 0.30; vs AVC PDO: Lin coefficient 0.20 and vs total AVC Planimetry Lin coefficient 0.23.

The sphericity index of the VC was: 2.08 (± 0.72) and represents a non-circular VC. The AVC was feasible measure with TEE3D and differentiates and estimates a total AVC.

Conclusions: 3D transesophageal echocardiography is a feasible method for real assessment of MR, allows quantification of MR without assuming geometric shapes. Future work will establish cutoffs to determine the severity of MR by this method.



