Utility of 3-dimensional transoesophageal echocardiography for mitral annular sizing in transcatheter mitral valve replacement procedures: a cardiac computed tomography comparative study

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Background. 3-dimensional transoesophageal echocardiography (3D-TEE) is frequently used as an initial screening tool in the evaluation of patients who are candidates to Transcatheter Mitral Valve Replacement (TMVR). However, little is known about the imaging correlation with the gold-standard computed tomography (CT) imaging. We aimed at testing the quantitative differences between these two modalities and finding the best 3D-TEE parameters for TMVR screening.

Methods. We included 57 patients referred to our Heart Valve Clinic for TMVR with prostheses specifically designed for the mitral valve. Mitral annulus (MA) analyses were performed using commercially available software in 3D-TEE and CT.

Results. 3D-TEE was feasible in 52 patients (91%). Although 3D-TEE measurements were slightly lower than in CT, both measurements of projected MA area and perimeter showed excellent correlation with small differences between the two modalities (r = 0.88 and r = 0.92 respectively, p < 0.0001). Correlations were significant but lower for MA diameters (r = 0.68 to 0.72, p < 0.0001) and mitro-aortic angle (r = 0.53, p = 0.0001). ROC curve analyses showed that 3D-TEE had a good ability to predict TMVR screening success defined by constructors based on CT measurements with a range of 12.9 to 15cm² for MA area (AUC = 0.88-0.91, p < 0.0001), 128 to 139mm for MA perimeter (AUC = 0.85-0.91, p < 0.0001), 35 to 39mm for anteroposterior diameter (AUC = 0.79-0.84 p < 0.0001) and 37 to 42mm for posteromedial-anterolateral diameter (AUC = 0.81-0.89, p < 0.0001) (Figure 1). Conclusion. 3D-TEE measurements of MA dimensions display strong correlation with CT measurements in patients undergoing TMVR screening process. 3D-TEE should be proposed as a reasonable alternative to CT in this vulnerable population.

Abstract Figure.