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EVALUATION THE ALTERATION OF MITRAL VALVE STRUCTURES IN FUNCTIONAL MITRAL REGURGITATION USING REAL-TIME THREE-DIMENSIONAL TRANSESOPHAGEAL ECHOCARDIOGRAPHY

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Objectives To investigate the geometric alterations of the mitral leaflets (MV) and annulus (MA) in different heart disease using real-time three-dimensional transesophageal echocardiography (RT-3DTEE), and to clarify the effect of MV structures' changes in FMR occurrence.

Methods Twenty-five patients with paroxysmal supraventricular tachycardia, 25 isolated paroxysmal atrial fibrillation patients and 20 old myocardial infarction patients without functional mitral regurgitation (FMR) were enrolled as controls, 20 ischaemic cardiomyopathy cases with FMR were ICM group. Standard RT-3DTEE evaluations were performed. All data were exported to Tomtec MV analysis software for advanced quantification of MA, MV. The parameters include: (1) MA: anterior-posterior diameter (APD), anterolateral-posteromedial (ALPMD), three dimensional annulus circumference (3DAC), two dimensional annulus area (2DAA), three dimensional annulus area (3DAA), sphericity Index (SI), non-planar angle (NPA), two dimensional annulus area fraction (2DAAF). (2) MV: tenting volume (TV); tenting height (TH); commissural diameter (CD), anterior leaflet area (ALA), posterior leaflet area (PLA), tenting volume index (TVI), tenting volume fraction (TVF), coaptation index (CI).

Results There were significant difference of APD, ALPMD, NPA, AC, 2DAA, 3DAA, TV, TH, CD, ALA, PLA, TVI, CI, AAF in different groups ($F > 3.84$, $p < 0.05$). Correlation analysis revealed significant negative correlations between left ventricular dimension, left atrial dimension, left ventricular ejection fraction and MA, MV parameters except for SI, TVF and NPA ($p < 0.05$).

Conclusions Our study found the geometric and function alteration of MA and MV not only the final way of FMR, but also make the FMR worsen. The application of a series of new quantitative parameters in this study, including NPA, TVI, CI, increase the comparability of individuals and evaluate accurate the change of mitral valve structures. These will helpful to make up the appropriate FMR therapeutic plans and assess the prognosis.