

BACKGROUND. Mitral valve (MV) repair with MitraClip system is a safe treatment option for high-risk patients with significant mitral regurgitation (MR). We aimed to characterize, by three-dimensional echocardiography (3D-E), changes occurring in MV after implantation of third generation MitraClip XT_R device, with specific reference to the underlying MR mechanism (functional vs. degenerative, FMR vs DMR).

METHODS. We prospectively enrolled 59 patients, who underwent intra-procedural 3D-E before and after device deployment. Three-D datasets were analysed off-line, using a dedicated semiautomatic software, to obtain parametric quantification of mitral anatomy.

RESULTS. Post-procedural MR of mild or lesser degree was achieved in 40 patients (68%), with no differences between FMR and DMR (p 0.9). After MitraClip XT_R implantation, the FMR group experienced an immediate annular resizing, with reduction of antero-posterior diameter (p 0.024) and sphericity index (p 0.017), next to a recovery of physiological saddle-shape, defined by lower non-planar angle (p ≤ 0.001) and higher annulus height to commissural width ratio (p ≤ 0.001). On the opposite, the DMR group revealed a significant decrease of maximum annular velocity (p 0.027), addressing a mechanic effect of the device deployment. Finally, baseline anterior mitral leaflet angle was found as the strongest independent predictor of acute procedural result (OR 0.91, [CI 0.84-0.99], p = 0.030).

CONCLUSIONS. MitraClip XT_R implantation acts in restoring the original mitral geometry, with distinctive effects according to MR mechanism. Three-D parametric quantification of MV sheds new light on changes occurring in the valvular apparatus, and helps identifying possible new predictors of acute procedural success.