Influence of device generations on alternations of mitral annulus after transcatheter edge-to-edge repair: a real-time three-dimensional transesophageal echocardiography study

M. Ohmori¹, K. Hirasawa¹, M. Izumo², M. Ochida¹, Y. Satou², Y. Kobayashi², S. Kuwata², K. Okuyama², H. Arima¹, Y. Akashi², T. Sasano¹

¹Tokyo Medical And Dental University, Tokyo, Japan
²St. Marianna University School of Medicine, department of Cardiovascular Medicine, Kawasaki, Japan

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Background: Alternation of the mitral annulus (MA) after transcatheter edge-to-edge mitral valve repair (TEER) is reported to be associated with a reduction of mitral regurgitation (MR). However, the influence of the new device system with 4 device size options (MitraClip G4) on MA geometry compared to the conventional device (G2) remains unknown.

Methods and results: A total of 129 patients (mean age 79±10 years, male 66%) including 38 primary MR and 91 secondary MR who underwent TEER guided with three-dimensional (3D) transesophageal echocardiography (TEE) were included. MA area, anterior-posterior (AP) diameter, inter-commissure (CC) diameter, and MA ellipticity before and after MitraClip implantation were measured using 3D TEE images assessed by dedicated software. MitraClip G4 was used in 54 cases (42%). In patients with secondary MR, greater changes in MA area, AP diameter, and MA ellipticity were observed in patients treated with G4 compared to G2 (P=0.001, 0.003, and 0.39, respectively). In contrast, patients with primary MR had no differences in the change of MA parameters between G2 and G4. Patients with significant residual MR had less increase of MA ellipticity after device implantation in secondary MR (P=0.014), but not in primary MR (P=0.062).

Conclusion: In patients with secondary MR, MitraClip G4 made greater changes in MAA, AP diameter, and MA ellipticity compared to MitraClip G2, but not in CC diameter. The change of ellipticity was associated with a reduction of MR after device implantation in secondary MR. These findings indicated that MitraClip G4 may lead favorable MA alternation than G2, especially in secondary MR.