

Computed tomography characteristics of patients with functional MR receiving MitraClip

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Background: Percutaneous leaflet repair with the MitraClip device (Abbott Vascular, Menlo Park, CA) is safe and effective in patients with severe functional mitral regurgitation (FMR). Residual or recurrent MR may occur in up to 40% of patients and is associated with persistent symptoms and impaired survival. The anatomical characteristics associated with residual or recurrent MR after MitraClip are not well defined by computed tomography angiography (CTA) in FMR population.

Methods: A retrospective analysis of patients with significant FMR, who underwent retrospective-gated CTA at Minneapolis Heart Institute between July 2015 to January 2020, identified those who underwent percutaneous leaflet repair with MitraClip. Anatomical and functional parameters were assessed by pre-procedure CTA and compared between those with and without residual (≥ 2) MR.

Results: A total of 25 patients were included (median[Q1, Q3]; age, 80[75, 85]; 44% men) and classified into ventricular FMR (V-FMR, n = 12) and atrial FMR (A-FMR, n = 13) according to anatomical and functional characteristics by CTA. 50% of V-FMR and 38% of A-FMR had residual/worsening MR. Among V-FMR patients with residual/worsening MR, shorter coaptation length was observed (2.2[2, 2.3] mm vs. 3.5[3, 4], p = 0.006) (Figure). No differences in anatomical or functional characteristics were seen in A-FMR patients.

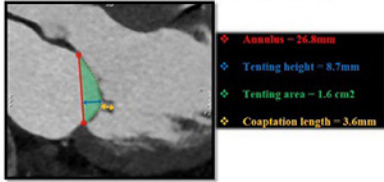
Conclusion: Longer coaptation length in V-FMR is predictive of successful MitraClip procedure, whereas mitral annulus size and cardiac volumes are not.

<Ventricular FMR>	Total (N = 12)	No residual/no worsening MR (N = 6)	Residual/worsening MR (N = 6)	P value
Septal-lateral diameter, mm	31.9 (30.5, 37.9)	32.2 (30.1, 39.8)	31.9 (29.5, 35)	0.749
Annulus area, cm ²	11.2 (10.4, 13.6)	11.3 (10.1, 14.6)	11.1 (9.6, 12.6)	0.631
Tenting area, cm ²	1.6 (1.3, 2.1)	1.6 (1.2, 2.2)	1.7 (1.2, 2.3)	0.873
Tenting height, mm	8.5 (6.5, 9.7)	8.5 (6.6, 9.3)	8.3 (6.3, 10.1)	0.749
Coaptation length, mm	2.6 (2.1, 3.5)	3.5 (3.0, 4.0)	2.2 (2.0, 2.3)	0.006
<Atrial FMR>	Total (N = 13)	No residual/no worsening MR (N = 8)	Residual/worsening MR (N = 5)	P value
Septal-lateral diameter, mm	32.3 (29.5, 39.0)	32.0 (29.2, 39.9)	34.3 (30.8, 39.02)	0.464
Annulus area, cm ²	10.3 (9.2, 14.7)	10.2 (9.0, 14.6)	12.4 (9.4, 14.7)	0.661
Tenting area, cm ²	1.2 (0.8, 1.8)	1.1 (0.7, 2.2)	1.3 (0.7, 1.8)	0.884
Tenting height, mm	5.5 (4.1, 6.9)	6.3 (4.1, 8.7)	4.6 (3.7, 5.8)	0.213
Coaptation length, mm	2.3 (1.5, 2.8)	2.5 (1.4, 3.5)	1.9 (1.5, 2.6)	0.464

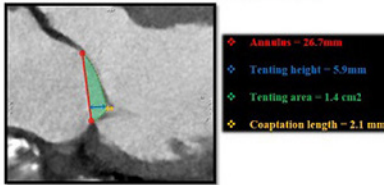
Comparison of baseline CT parameters between no residual/ no worsening MR and residual/ worsening MR
Abstract Figure.

Comparison of mitral leaflet between no residual/no worsening and residual/worsening in patients with V-FMR

<No residual/no worsening V-FMR case with longer coaptation length>



<Residual/worsening V-FMR case with shorter coaptation length>



CTA parameters

