

P149. Secondary Chordal Cutting For Ischemic Mitral Regurgitation: 3d Echocardiographic Guidance By Comprehensive Leaflet Geometric Analysis

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OBJECTIVES: Recurrence of mitral regurgitation is common after ischemic MR (IMR) repair. Transection of secondary chordae tendineae has been proposed as means to limit anterior leaflet tethering and improve repair. We have developed a 3D echocardiographic technique to assess the degree of secondary chordal tethering.

METHODS: Ten patients with severe IMR and 7 normal patients underwent transesophageal real-time 3-dimensional echocardiography (3DE). Full-volume data sets of the valvular apparatus were obtained at mid systole, and analyzed offline using Tomtec software (4D Echo View; TomTec Imaging Systems, Munich, Germany). Individual leaflet data were interpolated, reconstructed, and meshed using in-house Matlab algorithms (The Mathworks, Inc, Natick, Mass). Intercommissural (IC), Septolateral (SL) and Gaussian curvature (GC) were calculated at 340-400 points along the mitral leaflets. These values were then collimated by leaflet region (A1-A3;P1-P3). Gaussian curvature maps of the valves were produced.

RESULTS: Seven of the 10 IMR anterior leaflets had excess convexity towards the ventricle on Gaussian curvature mapping (see figure). Intercommissural curvatures showed loss of bulging (i.e. flattening) of A2 in these valves ($-0.092 \pm 0.27 \text{mm}^{-1}$ compared to normal $-0.59 \pm 0.26 \text{mm}^{-1}$, $p=0.06$). "Hotspots" of curvature ($\text{GC} > 2.45 \pm 0.9 \text{mm}^{-1}$) were also identified on the anterior leaflet of these 7 IMR valves (2 in one area, 5 in two areas) in the region of secondary chordal insertion.

CONCLUSIONS: The location and extent of chordal tethering can be assessed with 3DE. This technique could be used to select patients that would benefit most from chordal transection.

Gaussian curvature: side and atrial view

