ACC.13
62nd Annual Scientific Session & Expo
TCT@ACC-i2

E1100
JACC March 12, 2013
Volume 61, Issue 10

Imaging

SEGMENTAL ANALYSIS OF MITRAL VALVE LEAFLETS IN ISCHEMIC MITRAL REGURGITATION

Poster Contributions
Poster Sessions, Expo North
Monday, March 11, 2013, 9:45 a.m.-10:30 a.m.

Session Title: Imaging: Echo XV
Abstract Category: 18. Imaging: Echo
Presentation Number: 1313-346

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Background: Despite rising interest in percutaneous interventions for mitral valve (MV) disease little is known about dynamic leaflet change. We aim to evaluate leaflet characteristics in patients (pts) with ischemic mitral regurgitation (MR) using 3D transesophageal echocardiography (3D TEE).

Methods: 3D TEE (Philips Healthcare, Andover, MA) was performed in 32 pts (21 significant (s)MR (65±11 years (y), 48% males (m)), 11 mild MR (59±16y, 73%m)) and 27 normal (NL) (57±16y, 41% m)). 3D volumes were analyzed with semi-automated MVA software (TomTec® Imaging Systems, Munich, Germany). Leaflet length was manually traced from mitral annulus to coaptation line at end-diastole, mid-systole and end-systole.

Results: Annulus area and all anterior leaflet segments increase with MR grade (see figure), reaching significance in pts with sMR compared to NL ($p<0.05$). There is no difference in posterior leaflet segments. In NL, anterior leaflet segments and annulus area increase significantly in early systole whereas in sMR this increase is at end-systole. There is a decrease in posterior leaflet lengths in early systole in all three groups.

Conclusion: With significant ischemic MR, the anterior, but not the posterior leaflet increases to accommodate an enlarged annulus area. The heart cycle related increase in annulus area and anterior leaflet length occurs later in systole in pts with sMR compared to NL. Posterior leaflet segments are shortening during systole, probably due to tethering.

	End-Diastole			Mid-Systole			End-Systole		
	Normal	Mild MR	Sign. MR	Normal	Mild MR	Sign. MR	Normal	Mild MR	Sign. MR
Annulus Area (cm²)	7.69	8.13	10.40*	8.17+	8.57	10.30*	8.32	8.19	10.82*#
A1 (cm)	1.84	2.14	2.32*	2.02+	2.22	2.44*+	2.03	2.28	2.52*#
A2 (cm)	1.93	2.17	2.39*	2.01+	2.20	2.43*	2.05	2.19	2.51*#
A3 (cm)	2.09	2.19	2.38*	2.03	2.15	2.37*	2.07	2.13	2.44*#
P1 (cm)	1.00	0.93	1.04	0.96	0.93	0.98+	1.01	0.92	1.00
P2 (cm)	1.19	1.18	1.29	1.12	1.07	1.19+	1.15	1.12	1.18
P3 (cm)	1.06	1.12	1.17	1.00+	1.00+	1.08+	0.99	0.99	1.08

Table: mitral leaflet segments during systole

MR = mitral regurgitation
A = anterior segment, P = posterior segment
Sign. = significant MR (moderate + severe MR)

* significant difference compared to normal
\+ significant difference compared to ED in the same pts group
\# significant difference compared to MS in the same pts group