



# Valvular Heart Disease

## CHORDAL RUPTURE CORRELATES WITH ELASTIC FIBRIL FRAGMENTATION AND DISORGANIZATION OF THE POSTERIOR LEAFLET IN MYXOMATOUS MITRAL VALVE PROLAPSE: IMPLICATIONS FOR LEAFLET STABILITY AND DISEASE PROGRESSION

ACC Moderated Poster Contributions  
McCormick Place South, Hall A  
Sunday, March 25, 2012, 9:30 a.m.-10:30 a.m.

Session Title: Mitral Regurgitation: Mechanisms and Treatment Options  
Abstract Category: 10. Valvular Heart Disease: Clinical  
Presentation Number: 1148-196

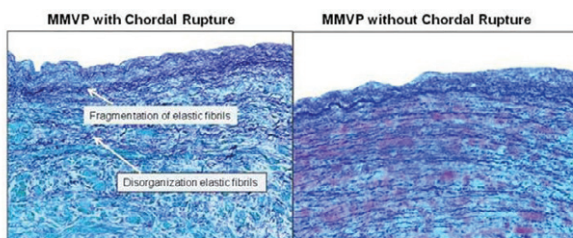
Authors: *Purushothaman K-Raman, Meerarani Purushothaman, David Adams, Federico Milla, Patrick A. Lento, William N. O'Connor, Samin Sharma, Valentin Fuster, Pedro Moreno, Mount Sinai School of Medicine, New York, NY, USA, University of Kentucky, Lexington, KY, USA*

**Background:** Mitral valve leaflet stability is maintained by extra-cellular matrix and valvular interstitial cells (VICs). In myxomatous mitral valve prolapse (MMVP), decreased type I collagen and increased type III collagen and proteoglycan deposition as a result of reduced lysyl oxidase (LOX) expression may alter elastic fibrillar organization and tensile strength of valve cusps, predisposing to chordal rupture.

**Methods:** Histopathological features of posterior mitral valve leaflets from 20 MVP with chordal rupture (9) and without chordal rupture (11) were evaluated. Picro-Sirius red (for collagen type I and III), Alcian blue@ pH 2.5 (for proteoglycans), elastic trichrome stain (for elastic fragmentation and disorganization), and immunohistochemistry for VICs (fibroblast specific protein-1,  $\alpha$ -actin and vimentin) and LOX were performed. Elastic fibril fragmentation and disorganization was graded as, grade 0: no elastic fragmentation and disorganization; grade 1: mild; grade 2: moderate; and grade 3: severe. Polarization microscopy and computerized planimetry were used to quantify collagens, proteoglycans and VICs density.

**Results:** See figure and table.

**Conclusion:** MMVP complicated by chordal rupture correlates with increased elastic fibril fragmentation and disorganization and associated with reduced LOX, type I collagen, increased type III collagen, proteoglycan, and VICs densities. These morphological changes may be responsible for mitral regurgitation in chordal rupture.



Histological Parameter	Chordal Rupture (n=9)	No- Chordal Rupture (n=11)	p-value
Elastic fibril Fragmentation	2.86 ± 0.03	1.36 ± 0.28	0.001
Elastic fibril Disorganization	2.71 ± 0.06	1.34 ± 0.26	0.001
Lysyl oxidase score	0.5 ± 0.12	1.3 ± 0.28	0.03
Collagen type I density	0.17 ± 0.02	0.33 ± 0.04	0.02
Collagen type III density	0.49 ± 0.03	0.40 ± 0.04	0.06
Proteoglycan density	0.51 ± 0.04	0.41 ± 0.05	0.01
FSP-1 density	166.45 ± 4.65	99.67 ± 20.19	0.009
Alpha- Actin density	93.59 ± 4.76	66.29 ± 7.18	0.007
Vimentin density	90.53 ± 3.41	46.3 ± 4.26	0.03