



## Imaging

### RELATIVE CONTRIBUTION OF AFTERLOAD AND INTERSTITIAL TISSUE FIBROSIS TO PREOPERATIVE LONGITUDINAL FUNCTION IN PATIENTS WITH SEVERE AORTIC STENOSIS: IMPLICATIONS FOR POSTOPERATIVE FUNCTIONAL RECOVERY

Oral Contributions

West, Room 3006

Saturday, March 09, 2013, 8:00 a.m.-8:15 a.m.

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Session Title: Novel Applications of Echocardiography: Implications for Clinical Use

Abstract Category: 18. Imaging: Echo

Presentation Number: 909-3

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**Background:** Several previous studies have demonstrated that, in patients with severe aortic stenosis (SAS), chronic pressure overload hypertrophy frequently results in reduced longitudinal function as assessed by tissue Doppler or speckle tracking echocardiography (STE). The aim of the present study was to determine the relative contribution of structural (interstitial fibrosis) and functional (afterload) alterations in this process and to evaluate the implications thereof for functional recovery after aortic valve replacement (AVR).

**Methods:** 34 patients with isolated SAS underwent pre-operative resting conventional echocardiography and STE, to calculate end-systolic wall stress (ESS) and to measure global longitudinal strain (GLS) and left ventricular ejection fraction (LVEF). At the time of AVR, a per-operative transmural biopsy was obtained in every patient, to quantify the degree of interstitial fibrosis. Echocardiographic functional parameters were re-assessed 6 months after AVR.

**Results:** Compared to age-matched normal controls, SAS patients exhibited significantly reduced GLS ( $-12.5 \pm 3.9\%$  vs  $-18.2 \pm 1.5\%$   $p < 0.0001$ ) and LVEF ( $57 \pm 13$  vs  $66 \pm 4\%$ ,  $p = 0.026$ ). With univariate analysis, pre-operative GLS was found to correlate significantly with LVEF ( $r = 0.70$ ,  $p < 0.0001$ ), interstitial fibrosis ( $r = -0.60$ ,  $p = 0.0002$ ), LV mass ( $r = -0.52$ ,  $p = 0.002$ ) and ESS ( $r = -0.61$ ,  $p = 0.0001$ ). Using stepwise multiple regression analysis, only the degree of interstitial fibrosis and ESS were found to be independent correlates of pre-operative GLS ( $r = 0.74$ ). Interestingly, unstressed pre-operative GLS, extrapolated as GLS at zero stress, correlated well with interstitial fibrosis ( $r = 0.51$ ) and predicted GLS at the 6-months post-operative follow-up ( $r = 0.55$ ).

**Conclusions:** In patients with SAS, reduced longitudinal function results from both excessive afterload and structural tissue alterations (interstitial fibrosis). Unstressed pre-operative GLS was found to be a reasonable correlate of tissue fibrosis and to allow prediction of long term post-operative longitudinal function.