Meeting abstract

2051 LV reverse remodeling imparted by aortic valve replacement for severe aortic stenosis; is it durable? A cardiovascular MRI study sponsored by the American Heart Association

Robert WW Biederman*, James A Magovern, Saundra Grant, Ronald Williams, June Yamrozik, Diane A Vido, Vikas K Rathi and Mark Doyle

Address: Allegheny General Hospital, The Gerald McGinnis Cardiovascular Institute, Pittsburgh, PA, USA
* Corresponding author

Background
In patients with severe aortic stenosis (AS), long-term data tracking surgically induced beneficial effects of afterload reduction on reverse LV remodeling are not available. Echocardiographic data is available short term, but in limited fashion beyond one year. Cardiac MRI (CMR) offers the ability to track changes in LV metrics with small numbers due to its inherent high spatial resolution and low variability. Following aortic valve replacement (AVR) for severe aortic stenosis there is initially marked improvement in many LV reverse remodeling metrics. The durability for such observations is explored.

Hypothesis
We hypothesize that progressive changes following aortic valve replacement (AVR) are detectable by CMR and changes in LV structure and function, triggered by AVR, continue for an extended period following AVR.

Methods
Ten patients (67 ± 12 yrs, 6 female) with severe, but compensated, AS underwent CMR pre-AVR and post AVR at 6 ± 2 mo, 1 yr ± 2 mo, and up to 4 yrs ± 5 mo. LV mass index (LVMI), LV geometry, volumetrics and EF were measured (GE, EXCITE 1.5 T, Milwaukee, WI). A Kruskall-Wallis one-way ANOVA was performed.

Results
All 10 pts survived AVR and underwent CMR at up to the 4-year time point (40 total time points). LVMI markedly decreased at 6 months (157 ± 42 to 134 ± 32 g/m2, p < 0.005) and continued to trend down at 4 yrs (127 ± 32 g/m2). Similarly, EF increased pre to post AVR (55 ± 22 to 65 ± 11%, (p < 0.05)) and continued trending upward, remaining stable at years 1–4 (66 ± 11 vs. 65 ± 9%). LVEDV index, initially high pre AVR, normalized post AVR (83 ± 30 to 68 ± 11 ml/m2, p < 0.05) trending even lower by yr 4 (66 ± 10 ml/m2). LV stroke volume increased rapidly from pre to post AVR (40 ± 11 to 44 ± 7 ml) continuing to increase at 4 yrs (49 ± 14 ml, p = 0.3). Most importantly, LVMI/volume, a 3D measure of LV geometry, remained unchanged initially but over 4 yrs markedly improved (1.07 ± 0.2 to 0.94 ± 0.24, p < 0.05) all paralleling improvements in NYHA (3.2 ± 1.0 to 1.5 ± 1.1, p < 0.05).

Conclusion
After the initial beneficial effects imparted by AVR in severe AS patients, there are, as expected, marked improvements in LV reverse remodeling. We have shown, via CMR, that surgically induced benefits to LV structure and function, including favorable alterations in LV geometry, are durable and, unexpectedly, show continued improvement through 4 years post-AVR concordant with...
sustained improved clinical status. This supports down
regulation of both mRNA and MMP activity acutely with
robust suppression long term.