PRE-OPERATIVE GEOMETRY OF THE MITRAL VALVE IMPACTS THE OUTCOMES OF MITRAL ANNULOPLASTY IN ISCHEMIC MITRAL REGURGITATION

ACC Poster Contributions
Georgia World Congress Center, Hall B5
Monday, March 15, 2010, 3:30 p.m.-4:30 p.m.

Session Title: Clinical Decision Making in Valvular Disease
Abstract Category: Valvular Disease
Presentation Number: 1226-381

Authors: Muralidhar Padala, Vinod H. Thourani, David H. Adams, Ajit P. Yoganathan, Georgia Institute of Technology, Atlanta, GA

Background: 40% of the patients undergoing annuloplasty for ischemic mitral regurgitation (IMR) have persistent or recurrent IMR. In this in-vitro study we sought to investigate the impact of variability in 3D geometry of the mitral valve on the outcomes of annuloplasty.

Methods: Porcine mitral valves (N = 8; Size 28) were studied in an in-vitro pulsatile heart simulator at 120 mm Hg transmitral pressure; 5 L/min cardiac output; and 70 bpm. Each valve was first evaluated with its physiological geometry to obtain baseline conditions. Two pathological geometries of the valve were replicated - [A] Annular Dilation (34 mm) + 10 mm Apical papillary muscle displacement (PMD); and [B] Annular Dilation + 10 mm (Apical + Lateral + Posterior) PMD. Mitral annuloplasty (28 mm) was performed in both cases and MR volume (ml/beat), coaptation length (mm) and tenting area (mm²) were measured and compared to baseline.

Results: At baseline none of the valves had IMR; but, annular dilatation and PMD induced significant MR (Fig 1A). For apical displacement, annuloplasty reduced IMR to trace levels while in the other case significant remnant MR was measured. Differences in leaflet tethering were also evident between the two pathological geometries (Fig 1B).

Conclusions: Variability in the 3D valve geometry significantly impacts the outcomes of annuloplasty. Instead of performing annuloplasty in all patients, a thorough analysis of the valvular and ventricular geometry with 3D echocardiography may aid in optimal patient selection.