

## Session 8 – Valvular Diseases, Protheses, Endocarditis

Friday May 29 – 15.30 – 16.00

47

### Echocardiography to predict artificial chordae length for complex mitral valve repair

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**Background** Artificial chordae replacement is an effective technique for mitral valve repair in anterior and/or posterior leaflet prolapse. This study aimed to assess the reliability and accuracy of transoesophageal echocardiography (TEE) and/or transthoracic echocardiography (TTE) to measure the length of artificial chordae preoperatively.

**Methods** From October 2006 to February 2014, 100 patients with severe mitral regurgitation underwent mitral valve repair using artificial chordae. Preoperative echocardiography was performed to measure the distance from the tip of each papillary muscle to the annular plane. Pre measured 4-0 polytetrafluoroethylene suture were marked to the appropriate length measured. The suture was then inserted on the prolapsed segment placing and on the corresponding papillary muscle. Ninety one patients (91%) required posterior leaflet repair and 63 patients (63%) required anterior leaflet repair. Additional procedures were required in 28 pts (28%) either tricuspid annuloplasty and/or CABG.

The preoperative logistic European System for Cardiac Operative Risk Evaluation was 4.7±5.1.

**Results** The clinical and echocardiographic follow up were complete. The mean follow up was 1.4±1.3 years per patient. The overall mortality was 2% (n=2). Also 3 patients (3%) with recurrent mitral regurgitation required mitral valve replacement (on postoperative day 1 and after 13 and 24 months). At follow up, all non reoperated survivors (n=95) were in New York Heart Association class I, with no or trivial regurgitation in 91 patients (91%), and grade 2 mitral regurgitation in 6 patients (6%).

**Conclusions** Preoperative echocardiography can accurately predict the length of artificial chordae. It is reproducible and facilitates complex mitral valve repair.

48

### Factors associated with left atrial size in severe aortic stenosis

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Left Atrial (LA) enlargement is associated with a poorer prognosis in several diseases, including aortic stenosis (AS). However, apart diastolic dysfunction, the main determinants of LA size in the setting of aortic stenosis are poorly understood.

**Objective** to assess the factors correlated with LA size in patients with severe AS (aortic valve area (AVA) <1cm<sup>2</sup> or <0.6 cm<sup>2</sup>/m<sup>2</sup>) with preserved left ventricular ejection fraction (LVEF >50%).

**Methods** 80 consecutive patients with isolated severe AS in sinus rhythm (mean age 72±10 years, 47.5% women, AVA 0.8±0.2 cm<sup>2</sup>, 0.44±0.1 cm<sup>2</sup>/m<sup>2</sup>, mean gradient 45±15 mmHg, LVEF 68±10 %) underwent a comprehensive

transthoracic Doppler echocardiography including the measurement of the LA volume at end-systole by the biplane area-length method (from the 4- and 2-apical chamber views), indexed to body surface area (ml/m<sup>2</sup>). LV mass was measured by ASE M-mode method, LVEF by the biplane Simpson's method, and early (e'), late diastolic (a'), and systolic (Sa) mitral annular Doppler tissue velocities were calculated as an average of the septal and lateral values.

**Results** The mean LA volume was 33±12ml/m<sup>2</sup> (extreme values: 13 and 72ml/m<sup>2</sup>), and dilated LA (defined as LA ≥34ml/m<sup>2</sup>) was found in 34 cases (43%). In univariate analysis, indexed LA volume was significantly linked to age, hypertension (all, p<0.05), LV mass/m<sup>2</sup> (r=0.5), pulmonary artery systolic pressure (PASP) (r=0.55), mitral E/A ratio (r=0.32), E/e' ratio (r=0.46), a' (r=-0.4), LVEF (r=-0.3) (all, p<0.01), and Sa (r=-0.27, p<0.05). In multivariate analysis, indexed LA volume was independently associated with LV mass/m<sup>2</sup>, E/e', and PASP (all, p<0.01). Furthermore indexed LA volume was significantly higher in symptomatic patients (n=46) when compared to asymptomatic patients (36±13 vs. 28±10ml/m<sup>2</sup>, p<0.01), with an independent link in a separate multivariate analysis (p<0.01), and was independently correlated to NT-proBNP (Log) in a subgroup of 53 patients who had plasmatic values of this biomarker available (r=0.6, p<0.01).

**Conclusion** In severe AS with preserved LVEF, LA size is higher in symptomatic patients, and is independently linked to LV remodeling, LV diastolic dysfunction, and PASP, as well as to NT-proBNP a surrogate of increased LV wall stress.

49

### Left atrial strain is a powerful predictor of pulmonary artery hypertension in patients with severe aortic stenosis

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**Background** Pulmonary hypertension is one of the most powerful predictors of outcome in patients with severe aortic stenosis (AS). However, the mechanisms of PH occurring in the setting of AS are not fully understood.

**Methods** We studied 50 consecutive AS patients referred for preoperative assessment. Echocardiographic assessment included left ventricular ejection fraction (LVEF) and mass (iLVM), mean aortic gradient (MAG), aortic valve area (AVA), mitral E/A ratio, mean E/e' ratio at the mitral annulus, maximal tricuspid velocity (TrV), TAPSE, indexed left atrial volume (iLAV), and left atrial longitudinal end systolic 2D strain using speckle tracking in the apical 4 (LAS-4C) and 2-chamber (LAS-2C) views. All patients underwent right heart catheterization (RHC) with measurement of pulmonary artery pressures (systolic: sPAP, mean: mPAP) and pulmonary capillary wedge pressure (PCWP).

**Results** Patient age was 81±8.8 years. MAG was 46±18 mmHg, AVA was 76±18cm<sup>2</sup>. Echocardiographic analysis yielded 63±16% (range 24-87) for LVEF, 150±43g/m<sup>2</sup> for iLVM, 1±0.5 for E/A ratio, 18±8 for E/e' ratio, 55±36ml/m<sup>2</sup> for iLAV, 20±6mm for TAPSE, 16±7% for LAS-4C and 17±8% for LAS-2C. Feasibility was 100% for LAS-4C and 93% for LAS-2C, but only 65% for TrV. RHC showed: sPAP 51±18mmHg (range 28-101), mPAP 32±11mmHg (range 15-60), PCWP 19±8mmHg. Patients with severe PH (sPAP >60mmHg) compared with those with lower pulmonary pressures had similar age, AVA, LVEF, iLVM, and iLAV, but significantly higher E/A ratio (1.6±0.7 vs 0.8±0.3, p=0.01) and E/e' ratio (23.3±8.7 vs 16.6±6.8, p=0.02), lower TAPSE (15±7 vs 22±4, p=0.01), and lower LAS-4C (9±3 vs 20±6, p=0.0001) and LAS-2C (8±4 vs 20±7, p=0.00007). sPAP correlated poorly with TAPSE and E/e', marginally with LVEF and MAG, and strongly with LAS-4C and LAS-2C (r=.72, 95% CI -2.5\_ -1.1, p<0.001).

**Conclusion** Left atrial strain measured by speckle tracking analysis is a highly feasible and simple parameter to acquire, and is a strong predictor of pulmonary artery pressure in patients with severe AS. These results suggest that the increase in sPAP is tightly linked to the decrease in left atrial reservoir function. The prognostic value of LA strain should be further assessed.