Survival Implication of Left Ventricular End-Systolic Diameter in Mitral Regurgitation Due to Flail Leaflets: A Long-Term Follow-Up Multicenter Study

Christophe Tribouilloy (1), Dan Rusinaru (2), Francesco Grigioni (3), Jean François Avierinos (4), Andrea Barbieri (5), Catherine Szymanski (1), Gilbert Habib (4), Maurice Enriquez-Sarano (6)

(1) Amiens University Hospital, Cardiology, Amiens, France – (2) Amiens University Hospital, Cardiac Surgery, Amiens, France – (3) University Hospital of Bologna, Cardiology, Bologna, Italy – (4) University Hospital of Marseille, Cardiology, Marseille, France – (5) University Hospital of Modena, Cardiology, Modena, Italy – (6) Mayo Clinic, Rochester, MN, Division of Cardiology, Rochester, Etats-Unis

Objectives: We analyzed the association of left ventricular end-systolic diameter (LVESD) with survival after diagnosis in organic mitral regurgitation (MR) due to flail leaflets.

Background: LVESD is a marker of left ventricular function in patients with organic MR but its association to survival after diagnosis is unknown.

Methods: The Mitral regurgitation International Database (MIDA) is a multicenter registry of echocardiographically-diagnosed organic MR due to flail leaflets. We enrolled 739 patients with MR due to flail leaflets (65±12 years; ejection fraction [EF] 65±10%) in whom LVESD was measured (36±7mm).

Results: Under conservative management, 10-year survival and survival free of cardiac death were higher with LVESD ≤40mm vs. >40mm (64±5% vs. 48±10%; p=0.001, and 73±5% vs. 63±10%; p=0.001). LVESD >40mm independently predicted overall mortality (HR 1.95[1.01-3.83]) and cardiac mortality (HR 3.09[1.35-7.09]) under conservative management. Mortality rate increased linearly with LVESD above 40mm (HR 1.15[0.84-1.27] per 1mm increment). There was no interaction between presence of symptoms or EF<60% and LVESD impact on survival (p=0.69). During the entire follow-up (including post-surgical), LVESD >40mm independently predicted overall mortality (HR 1.86[1.24-3.15]) and cardiac mortality (HR 2.14[1.29-3.56]), due to persistence of excess mortality in patients with LVESD >40mm after surgery (HR 1.86[1.11-3.15] for overall death, and 1.81[1.05-3.54] for cardiac death).

Conclusions: In MR due to flail leaflets, LVESD >40mm is independently associated with increased mortality under medical management, but also after mitral surgery. These findings support prompt surgical rescue in patients with LVESD >40mm but also suggest that best preservation of survival is achieved in patients operated before LVESD reaches 40mm.

Role of Exercise Stress Echocardiography to Predict Outcome in Asymptomatic Patients with Aortic Valve Stenosis: A Multicenter Prospective Study

Sylvestre Maréchaux (1), Zeineb Hachicha (2), Annaic Bellouin (1), Jean G Dumensil (2), Patrick Meinnoun (3), Agnes Pasquet (4), Sébastien Bergeron (2), Marie Arsenaux (2), Thierry Letourneau (1), Pierre Vladimir Enneazt (1), Philippe Pibarot (2)

(1) CHRU Lille, EFCV, EFCV et physiologie, Lille, France – (2) Institut de Cardiologie et de Pneumologie de Quebec, Laval, Canada – (3) Centre Hospitalier de Compiegne, Compiegne, France – (4) clinique st Luc, Louvain, Belgique

Background: Abnormal exercise tested defined as the occurrence of exercise limiting symptoms, fall in blood pressure below baseline, or complex ventricular arrhythmias is useful to predict clinical events in asymptomatic patients with aortic stenosis (AS). Whether exercise stress echocardiography (ESE) provides incremental prognostic information beyond that obtained from standard exercise testing remains uncertain.

Objective: This study aimed at determine if ESE adds any incremental predictive value to resting echocardiography in the subset of patients who have a normal exercise response.

Methods: In this multicenter prospective study, 186 asymptomatic patients with at least moderate AS and preserved LV ejection fraction (LVEF>50%) were assessed by Doppler-echocardiography at rest and during a maximum ramp semi-supine bicycle exercise test.

Results: Fifty one (27%) patients had an abnormal exercise test and were excluded from the present analysis. Among the 135 patients with normal exercise test, 65 had an event (aortic valve replacement or cardiovascular death) at a mean follow-up of 13±11 months. The independent predictors of events were: LV hypertrophy (hazard ratio [HR] = 2.49; 95% confidence interval [CI]: 1.46-4.31; P = 0.0008), increasing mean gradient >35 mmHg (HR = 3.39; 95%CI: 2.00-5.93; P <0.0001) and exercise-induced increase in mean gradient > 20 mmHg (HR = 2.35; 95%CI: 1.29-4.17; P = 0.005). The latter factor also remained an independent predictor (HR = 2.39; 95%CI: 1.28-4.35; P = 0.007) of events in the subset of patients with severe AS.

Conclusion: The exercise-induced increase in transvalvular gradient may be helpful to improve risk stratification in asymptomatic AS patients with normal exercise response. These results thus suggest that ESE provides additional prognostic information over that obtained from standard exercise testing and resting echocardiography.

Aortic Valve Calcification Measured by Multislice Computed Tomography in Aortic Stenosis – Correlation with Hemodynamic Severity and Clinical Implication for Patients with Low Ejection Fraction

Caroline Cuffe De Monchy, Jean-Michel Serfaty, Claire Cimadevilla, Laurent Lepege, Jean-Pierre Laissy, Dominique Himbert, Alec Vahanian, David Messika-Zeitoun

AP-HP, Bichat Hospital, Paris, France

Background: We sought to determine thresholds of aortic valvular calcification (AVC) for the diagnosis of severe aortic stenosis (AS) using multislice computed tomography (MSCT) and to test their accuracy in patients with reduced ejection fraction (EF).

Methods: 161 patients with AS underwent within 1 month TTE and MSCT. Severe AS was defined on valve area (AVA) ≤0.6 cm²/m² and mean gradient (MG) ≥40 mm Hg and stress echocardiography and surgical findings in patients with reduced EF. Our population was divided into 2 subsets. Validation set (140 patients with EF<40%): to evaluate the relationship between hemodynamic severity and AVC. Testing set (21 patients with EF≥ 40%): to evaluate the accuracy of AVC thresholds for the diagnosis of severe AS.

Results: Validation set: Mean EF was 61±6%, AVAI 0.66±0.24cm²/m² and AVC score 1926±168AU. AS was severe in 63 patients (45%) and non-severe in 77 (55%). Association between AVC and AVAI was curvilinear (r=0.66, P<0.001) and a score 2165UA provided 79% sensitivity and 86% specificity for diagnosis of severe AS. A threshold of 700UA provided high sensitivity (98%) and NPV (97%) whereas a threshold of 2000 AU provided high specificity (94%) and good PPV (89%). Testing set: Mean EF was 29±9%, AVAI 0.46±0.15cm²/m² and AVC score 3268±1930AU. Among these 21 patients, 8 had a low-gradient/low-output (AVAI<0.6cm²/m² and MG≤40 mmHg). Overall, AS was non-severe in 5 patients and severe in 16. All but one was correctly classified using the threshold of 1651 AU (93% sensitivity, 100% specificity, 100%VPP and 83%VPN). Only one patient with a severe AS (AVAI=0.53 cm²/m²) and a borderline AVC score (1436 AU) was misclassified.

Conclusions: In this large series of patients with a wide range of AS, we show that 1) hemodynamic severity and AVC quantitatively assessed using MSCT are strongly correlated and 2) we provide useful thresholds for the evaluation of AS severity for difficult cases, in particular patients with reduced EF.

Degenerative Mitral Regurgitation Severity Changes During Exercise Echocardiography

Julien Magne (1), Patrizio Lancellotti (1), Marie Moonen (1), Kim O’Connor (1), Philippe Pibarot (2), Luc A. Piérard (1)

(1) CHU Sart Tilman, Cardiologie, Liege, Belgique – (2) Centre de recherche de l’Hôpital Laval, Quebec, Quebec, Canada