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Prognostic Importance of Exercise Brain Natriuretic Peptide in Asymptomatic Degenerative Mitral Regurgitation
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Background: Exercise Doppler echocardiographic stress test can be of interest in the management of asymptomatic patients with primary MR. The resting BNP level is a good surrogate marker of MR consequences and is a powerful predictor of outcome. The incremental prognostic value of BNP response during exercise is unknown. We aimed to identify the determinants of exercise brain natriuretic peptide (BNP) level and to evaluate its prognostic value in asymptomatic patients with primary mitral regurgitation (MR).

Methods: Comprehensive resting and exercise transthoracic Doppler-echocardiography was performed in 113 consecutive asymptomatic patients with moderate to severe degenerative MR and preserved LV function. Blood samples were collected both at rest and exercise.

Results: The BNP level significantly increased from rest to exercise (p<0.0001). The independent determinants of exercise BNP were resting E/ Ea ratio (p=0.043), indexed left atrial volume (p=0.022) and exercise LV global longitudinal strain (p=0.001). There was a significant graded relationship between increasing BNP level at exercise (according to tertiles) and increased incidence of cardiac events (death, heart failure, mitral valve surgery driven by symptoms or LV dilatation/disfunction onset) (2-year: 21±7 vs. 40±8 vs. 67±59%; in tertiles 1, 2 and 3, respectively). On multivariable analysis, after adjustment for demographic and echocardiographic data and for resting BNP level, exercise BNP remained significantly associated with increased risk of cardiac events during the follow-up (hazard ratio= 2.8 and 3.4, p=0.041 and 0.023, for tertiles 2 and 3, as compared to tertile 1).

Conclusions: In asymptomatic patients with primary regurgitation, exercise BNP level provides important incremental prognostic value beyond what is achieved by demographic and echocardiographic data and resting BNP level. Patients with elevated exercise BNP should be considered at high risk of reduced cardiac event-free survival.

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Quantification of mitral regurgitation by calculation of regurgitant volume: 3D left ventricular echocardiography versus PISA
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Quantification of mitral regurgitation (MR) by echocardiography is well established using several echo or Doppler parameters in which effective regurgitation area (ERO) and regurgitant volume (RV) are the most commonly used. However, hemispheric assumptions allowing application of proximal isovelocity area (PIA) may be erroneous due to complex mitral valve morphology (i.e. mitral valve prolapse).

We hypothesized that 3D left ventricular echocardiography associated with pulse Doppler could obtain RV with high reliability for comparison of 2 methods (3D vs PISA) in presence of mitral regurgitation.

Methods: First, in 50 patients without MR, we compared LV ejection volumes (LVEj) from a full volume 3D echocardiographic acquisition and 2D Simpson method to the aortic stroke volume (ASV) obtained by Pulsed Doppler for validation of the 3D approach. Second, we analyzed 50 patients with different degree MR for comparison of the two approaches and verification of PISA RV values. Inter and intra observer variabilities were assessed for all techniques.

Results: Correlations and Bland&Altman methods gave high adequacy between 3D LVEj and ASV compared to 2D and ASV (respectively 3D, p=0.96, y=0.91x+4.8, mean error (ME) and 95% confidence interval of error (CIE) [-0.84±6.1] ml and 2D, p=0.81, y=0.78±5.8, [-5.41±16 ml]. Variabilities average for 3D LVEj was 6±3% and 15±7% for 2D. In patients with mitral regurgitation, RV from PISA and 3D LVEj were 23.1±12 ml and 24.5±11 ml (p=0.37) and the fractional regurgitation 32±13% and 33±12% (p=0.63). However, mean error measurement was –1.37 ml and 95% confidence interval of error was 17.90 ml showing high discrepancy between the two methods. By selecting a cut-off of 5, 10, 15 ml, numbers of patients with uncorrected measurements was 48.5, 17 and 8.5%. When using ASE 4 grades classification, 25.7% of misclassified patients was obtained with PISA.

Conclusion: 3D LVEj method is robust and reliable for calculation of mitral regurgitant volumes with significant differences compared than those obtained with PISA which seems to be less adequate for all types of MR.

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Prevalence, determinants and prognosis value of right ventricular function impairment in organic mitral regurgitation
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Objectives: Prevalence, determinants and prognosis value of right ventricular (RV) ejection fraction (EF) in organic mitral regurgitation (MR).

Methods: Two-hundred eight pts (62±13 years, 138 males, AF 57 pts) with organic MR referred to surgery underwent an echocardiography and left ventricular (LV) and RV radionuclei angiography. LV and RV regional function was assessed.

Results: Mean RV EF was 40.7±10.1%, ranging from 10 to 65%. Sixty pts (29%) had a RV EF ≤ 55%. In multivariate analysis, LV septal function (LV EF; β=0.56, p=0.0001; LV EF 9: β=0.22, p=0.0046), LV EDD index (β=–0.27, p=0.001) and PASP (r=–0.19, p=0.008) were predictors of RV EF. In the subgroup with MR quantitation (n=85) predictor of RV EF was mitral ERO (β=–0.30, p=0.007). After surgery, RV EF increased strongly (27.5±4.3 to 37.9±7.3, P=0.001) in pts with preoperative RV EF ≤ 55% while it did not change in pts with RV EF>55% (46.0±6.9 to 46.1±8.2, P=0.91). Independent predictors of postoperative RV EF were preoperative RV EF (β=0.32, p=0.013) and TR grade 2 (β=–0.22, p=0.036) while LV septal function (LV EF 8, β=0.24, p=0.069) was marginally predictive. Fifty-seven pts died during post-operative follow-up of 7.1±4.3 years. Pts with RV EF ≤ 55% compared with RVEF>55% had a similar survival rate at 10 years (63.6±8.7% vs. 68.8±5.3%; P=0.68), but cardiovascular mortality was higher (25.3±8.0% vs 8.1±3.5%; P=0.03; HR=2.67, 95% CI 1.06-6.76, P=0.037). RV EF was not a predictive factor of operative mortality. In a Cox model, NYHA class, CABG, and left atrial diameter, but not RV EF, were independent predictors of overall mortality.

Conclusion: In organic MR RV function depends not only on PASP but mainly on LV remodeling and septal function, and improves strongly after surgery. RV EF is a predictor of cardiovascular mortality in univariate but not in multivariate analysis. Hence, impaired RV EF before surgery is not a sufficient argument to deny surgery in patients with organic MR.

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Surgery of chronic functional mitral regurgitation: interest of mitral valve replacement in severe heart failure patients
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Background: Modalities (underlining annuloplasty – UA- vs mitral valve replacement – MVR-) and outcome of surgical treatment of functional mitral regurgitation (FMR) are still debated.

Objectives: Early and mid-term outcome of patients operated for symptomatic severe FMR; Comparison of respective results of UA and MVR.

Methods: Inclusion criteria: Severe FMR due to either ischemic or non ischemic cardiac disease; Heart failure symptoms despite optimal medical treatment; LVEF<40%. Primary endpoints: In-hospital mortality; Late CV mortality Secondary endpoints: Evolution of LVEF after surgery; Recurrence of MR.

Results: 59 consecutive patients included between 1997 and 2011, mean age=65±10.1 ischemic disease in 41 (70%),heart failure symptoms in all, LVEF=36±6%,ERO=41±17 mm²/Surgical procedures included 12UA and 47 MVR with only 8 (13%)concomitant CABG. MVR and UA groups were comparable for age, ischemic etiology, LVEF, ERO and sPAP (all p>0.5). In-hospital mortality: 3.3% overall, 8.3% in UA group and 2.1% in MVR group (p=0.36). Eight-year survival free from CV death: 58±13% in the total population, 60±18% in the UA group and 72±10% in the MVR group (p=0.48). By multivariable analysis, older age (1.22 [1.05-1.42], p=0.008) and LV end-diastolic diameter (1.25 [1.05-1.49], p=0.01) independently predicted late mortality with borderline effect of pre-op LVEF (1.09[1.02-1.2], p=0.08) whereas type of surgery did not (1.7 [0.38-7.55], p=0.48). LVEF did not change between pre-op and late FU echo in the MVR group (36±6% vs 36±10%, p=0.68) but tended to decrease in the UA group (37±5.8% vs 31±12%, p=0.1). In the UA group, 50% of patients experienced recurrence of significant MR (mean post-op ERO=19±4 mm²) whereas no patients in the MVR group presented with post-op MR.

Conclusions: Despite severe clinical and echocardiographic presentation, surgical treatment of FMR can be performed with an acceptable operative risk and mid-term survival. MVR is a reasonable approach, which does not expose patients to MR recurrence, particularly frequent after UA.

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Minimal invasive approach for mitral valve surgery, as safe and as reliable than sternotomy. Does it should be the standard approach? Experience in 368 patients

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To assess the reliability of minimally invasive approach, as this approach is contest in France we review part of our experience in one center.

Methods: From January 2009 to April 2012, 368 patients were operated of isolated mitral surgery in a single center. In a retrospective study we analyze part of our experience in one center.

Results: On different parameters are analyzed, we report no difference in mortality, in-hospital stay length, stroke, bleeding, use of catecholamine between the two groups. Cross clamping, ECC times were longer in minimally invasive group. ICU time was longer in standard sternotomy group. In terms of results in efficiency upon plasty results, results were better in the minimally invasive group with 90,4% success of plasty when planned.

All parameters are detailed in the study.

Reliability of the procedure is modulated by experience of surgeon, two surgeons are mainly involved in minimally invasive program, they are more experienced in mitral plasty so that explain good repair vs replacement rate in this group.

Conclusion: On the basis of this retrospective study we conclude that minimally invasive approach is as safe as standard approach for mitral surgery and as reliable on repair rate in mitral regurgitation.

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Preoperative atrial fibrillation predicts outcome after valve repair for mitral valve prolapse

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Background: The aim of this study is to assess the impact of preoperative AF on outcome in patients undergoing MVR for mitral valve prolapse (MVP).

Methods: Between 1991 and 2009, 548 consecutive patients underwent MVR for MR due to MVP (follow-up: mean duration 105±50 months). Echocardiography was performed preoperatively and 9 to 12 months after surgery. Post operative left ventricular dysfunction (LVD) was defined as ejection fraction (EF) < 50%. Results: There were 51 patients (23.3%) in AF at baseline. Preoperative EF decreased from 56.2±3.6% to 58.9±10.1% post operatively (p<0.0001). Patients in AF were older (70±9 vs. 64±11 years, p=0.0001), more often in NYHA III – IV class (p=0.028), had a significantly higher EuroSCORE (4.4±5.7 vs. 2.8±2.4, p=0.0001). At baseline, patients in AF had a lower preoperative EF (64±11 vs. 66±9%, p=0.001). Early mortality was 4.9% in patients with preoperative AF vs. 1.9% in sinus rhythm (n=5, p=0.13). Multivariated analysis did not identify AF as a predictor of early mortality whereas EuroSCORE (p=0.001) and low pre-operative EF (p=0.001) were independent risk factors for early mortality. On multivariate analysis adjusted for EuroSCORE, NYHA III – IV class and preoperative LVEF, preoperative AF was identified as an independent predictor of overall mortality (OR 1.9; p=0.03) and of occurrence of heart failure (OR 2.2, p=0.054). After adjustment for gender, EuroSCORE, NYHA III-IV class and preoperative EF, preoperative AF and pre-operative EF were the 2 predictors of post-operative LVD (OR 2.2 p=0.025 and OR 1.04, p=0.03 respectively).

Conclusion: Preoperative AF is an independent predictor of long term mortality and post-operative LVD after MVR for MVP.

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What are long-term results of percutaneous mitral commissurotomy in patients with few or no symptoms?

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Purpose: Percutaneous mitral commissurotomy (PMC) has enabled patients (pts) to be treated at an earlier stage of their disease than by surgery. However, very long-term results have not been specifically studied in this context.

Methods: From 1986 to 1995, 237 patients in NYHA class I or II underwent PMC in our department. Mean age was 46±12 years; 74 patients (31%) had atrial fibrillation and 22 (9%) had a history of commissurotomy. Most patients were in NYHA class II (232 pts, 98%). As assessed by echocardiography, mean valve area was 1.1±0.2 cm² (1.5±1.7 cm² in all cases); 40 patients (17%) had pliable valves and mild subvalvular disease, 145 (61%) had severe subvalvular disease, and 52 (22%) had calcified valves. PMC used a single-balloon in 5 pts, a double-balloon in 93 and the Inoue balloon in 139.

Results: After PMC, valve area increased to 1.9±0.3 cm² as assessed by 2D echo. Severe mitral regurgitation (grade ≥3/4) occurred in 4 patients (1.7%). There were no other severe immediate complications. Good immediate results (valve area ≥1.5 cm² without mitral regurgitation ≥2/4) were obtained in 223 patients (94%). The 20-year actuarial rate of survival without surgery or repeat PMC and in NYHA class I or II was 41±4% in the whole population.

After good immediate results, the 20-year rate of good functional results was 42±3%. A Cox multivariate model identified 2 predictors of good late functional results after good immediate results: young age (p=0.05) and a large valve area after PMC (p=0.002). In the 142 patients aged ≤50 years, the 20-rate of good functional results was 50±6%.

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