

Topic 04-Valvular heart disease and general cardiology

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Respective performances of FDG-PET and radiolabeled leukocyte scintigraphy for the diagnostic of prosthetic valve endocarditis

Fabien Hyafil (1), Renata Chequer (1), François Rouzet (1), Laurent Lepage (2), Walid Ghodbane (2), Xavier Duval (3), Patrick Nataf (2), Bernard Iung (4), Alec Vahanian (4), Dominique Le Guludec (1)
(1) CHU Bichat-Claude Bernard-APHP, Médecine nucléaire, Paris, France – (2) CHU Bichat-Claude Bernard-APHP, Chirurgie cardiaque, Paris, France – (3) CHU Bichat-Claude Bernard-APHP, Centre d'investigations cliniques, Paris, France – (4) CHU Bichat-Claude Bernard-APHP, Cardiologie, Paris, France

Purpose: The incremental diagnostic value of 18-fluorodeoxyglucose positron emission tomography (FDG-PET) and radiolabeled leukocyte scintigraphy (LS) has already been reported in infective endocarditis (IE) patients. The aim of this study was to compare the respective performances of FDG-PET and LS for the diagnosis of prosthetic valve (PVE)-IE in 39 patients.

Methods: FDG-PET and LS were performed in 39 consecutive patients admitted for a clinical suspicion of PVE and inconclusive echocardiography who underwent both FDG-PET and LS. FDG-PET and LS were analysed separately and retrospectively by experienced physicians blinded to the results of the other imaging technique and to patient's outcome. Final Duke-Li IE classification was performed after a 3-month follow-up period.

Results: Out of the 39 patients, 15 patients were classified after a 3-month follow-up period as definite IE, 3 as possible IE and 21 as excluded IE. Average time interval between FDG-PET and LS acquisitions was 7±7 days. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 93%, 71%, 70%, 94% and 81% for FDG-PET and 60%, 100%, 100%, 78% and 83% for LS, respectively. Discrepancies between the results of FDG-PET and LS occurred in 12 patients (31%). In patients with definite IE, 5 were identified with true positive FDG-PET but false negative LS. Out of these 5 patients, 3 presented non-pyogenic microorganism IE (*Coxiella* or *Candida*). In patients with excluded endocarditis, 6 patients were identified with true negative LS but false positive FDG-PET. These 6 patients had been imaged in the first two months following the last cardiac surgery.

Conclusions: FDG-PET offers a high sensitivity for the detection of active infection in patients with a suspicion of PVE. LS offers a higher specificity than FDG-PET for IE diagnosis and should be considered in case of inconclusive FDG-PET findings or in the first two months after cardiac surgery.

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Left atrial systolic dysfunction and prognosis in severe aortic stenosis

Elena Galli, Yvan Guirette, Vincent Auffret, Philippe Mabo, Erwan Donal
CHU Pontchaillou, Cardiologie, Rennes, France

Introduction: Left atrial (LA) size has recently emerged as a prognostic factor in patients with valvular heart disease.

Aim of the study is to determine the utility of LA systolic function in patients with aortic stenosis (AS)

Methods: we studied 178 patients (mean age 79.6±0.6 years) with severe AS who underwent 2D echocardiography for the assessment of left ventricular (LV) and right ventricular (RV) function, LA size, aortic valve morphology and gradients. Peak LA strain (pLAS) measured by 2D speckle tracking echocardiography (STE) was used to evaluate LA contractility. A pLAS ≤23% – the indicated referral limit in normal population – was considered as an index of impaired LA contractility.

Results: A pLAS ≤23% was very common in patients with AS (n=139, 79%). Patients with reduced pLAS had greater LA volume (52.9±15.7 vs 36.6±7.8ml/m², p<0.0001), reduced LV ejection fraction (54.2±12.8 vs 61.5±7.7%, p=0.001), reduced TAPSE (19.9±4.3 vs 22.3±4.0mm, p=0.003), a more severe aortic stenosis (aortic surface: 0.40±0.09 vs 0.48±0.13 cm²/m², p<0.0001) and higher lnNT-proBNP (7.6±1.3 vs 6.1±1.4, p<0.0001) levels. The main factors associated with pLAS were: left ventricular global longitudinal strain, lnNT-proBNP, indexed LA volume, and TAPSE (β=-0.58, -0.56, -0.51 and -0.43 respectively; all p<0.0001). At Kaplan-Meier analysis, a reduced pLAS was associated with increased all cause mortality and major adverse cardiovascular events (MACEs) (Log Rank test p=0.05 and P=0.008 respectively).

Conclusions: in patients with AS, LA systolic dysfunction is very common and is associated with LA dilatation and biventricular impairment. A reduced survival and a significantly higher recurrence of MACEs were also observed in these population. Further studies, exploring LA relaxation and overall dynamics are necessary to support the utility of quantitative echocardiographic assessment of LA function as an additional tool to guide management of patients with AS.

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Exercise stress echocardiography in secondary mitral regurgitation: impact of pulmonary hypertension

Julien Magne, Luc A. Piérard, Patrizio Lancellotti
CHU Sart Tilman, Cardiologie, Liège, Belgique

Background: Secondary mitral regurgitation (MR) is a serious and frequent complication of dilated cardiomyopathy and/or coronary artery disease. The impact of exercise pulmonary hypertension (ExpHT) on outcome in patients with secondary MR is unknown.

Method and results: All patients with secondary MR, sinus rhythms, narrow QRS (<120ms) and referred for exercise stress echocardiography with quantifiable exercise systolic pulmonary arterial pressure (SPAP), were included in this study (n=159, 65±11 years, 66% of male). Resting and ExpHT were defined as a systolic pulmonary arterial pressure (SPAP) >50mmHg and >60mmHg, respectively. ExpHT was more frequent than resting PHT (40% vs. 13%, p<0.0001). There was no significant difference between patients with or without ExpHT regarding demographic and clinical data, as well as medication. Using multiple linear regression, exercise SPAP was determined by resting SPAP (β=0.94±0.1, p<0.0001), exercise MR severity (β=0.58±0.1, p<0.0001), and resting e'-wave velocity (β=-1.3±0.4, p=0.004). During a mean follow-up of 35±11 months, 60 major adverse cardiovascular events occurred. The incidence of combined cardiac event was significantly higher in patients with ExpHT as compared to those without ExpHT (2-year: 11±3 vs. 28±6%; 4-year: 20±5 vs. 40±7%, p<0.0001). Similarly, patients with ExpHT demonstrated significantly reduced survival (2-year: 88±4 vs. 99±1%; 4-year: 62±8% vs. 94±2%, p<0.0001). In multivariate Cox proportional Hazard model, after adjustment for age, sex, left ventricular volumes, both resting and exercise diastolic function and resting MR severity, ExpHT remains significantly associated with high risk of combined cardiac event (Hazard ratio=3.7, 95% of CI: 1.9-7.2, p<0.0001).

Conclusion: In patients with secondary MR, ExpHT may be frequent and mainly determined by resting SPAP, LV diastolic burden markers and exercise MR severity. ExpHT is a powerful predictor of poor outcome and is associated with a 3.7-fold increase in risk of cardiac event. These results further highlight the usefulness of exercise stress echocardiography for the management and the risk stratification of these patients.

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Prognostic impact of global left ventricular hemodynamic afterload in severe aortic stenosis with preserved ejection fraction: a cardiac catheterization-based study

Julien Magne (1), Victor Aboyns (2), Cyrille Boulogne (2), Marc Laskar (2), Patrice Viot (2), Dania Mohty (2)
(1) CHU Sart Tilman, Cardiologie, Liège, Belgique – (2) CHU Limoges, Limoges, France

Background: The global left ventricular (LV) hemodynamic afterload as assessed by valvulo arterial impedance (Z_{va}), may be an independent pre-