January 13th, Friday 2012

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Logistic EuroSCORE by longitudinal global strain in predicting outcome after cardiac surgery

Matthieu Berry [Orateur], Julien Nahum (2), O. Zaghdene (2), Jean-Luc Monin (2), Jean-Paul Couetil (2), Laurent Macron (2), Olivier Lairez (1), Jean-Luc Dubois-Randé (2), Pascal Gueret (2), Pascal Lim (2)

CHU Rangueil, Cardiologie, Toulouse, France – (2) AP-HP, Hôpital Henri Mondor, Cardiologie, Créteil, France

Aims: Longitudinal strain by speckle tracking appears more accurate than left ventricular ejection fraction (LVEF) to characterize myocardial dysfunction. We hypothesize that longitudinal global strain may be used in alternative to LVEF to compute EuroSCORE for better predicting outcome after cardiac surgery.

Methods: LVEF by Simpson biplane and longitudinal global strain by speckle tracking was computed in 306 patients (65±13 years, 75% of male, LVEF=48±15%) referred for cardiac surgery [104 CABG alone, 141 valve surgery alone, 54 combined surgery and 7 others]. To compute logistic EuroSCORE from strain and LVEF, LV risk was graded as normal (LVEF >50%, global strain >–15%), moderate (LVEF between 30% to 50%, global strain between –7 and –15%) or severely impaired (LVEF<30%, global strain<–7%). The two logistic EuroSCORE models were compared to postoperative death.

Results: Despite a correlation between LVEF and global strain (r=–0.73, p<0.0001), reduced global strain (>–15%) was observed in 30% (47/158) of patients with preserved LVEF and only 36% (n=13/36) of patients with LVEF<30% had a severe reduced global strain>–7%. Importantly, patients with severe reduction in global strain>–7% were associated to postoperative death (n=28, 9.1%) (26% vs. 8%, p=0.007), while no correlation was observed between dead group and LVEF. In addition, in death group, EuroSCORE by strain (28±24%) was greater than EuroSCORE by LVEF (26±24%, p=0.02). Finally, Euroscore by strain (OR=1.035, p<0.0001, AUC=0.79) and not by LVEF remained independently associated to postoperative death by stepwise multivariate logistic regression.

Conclusion: EuroSCORE computed using longitudinal global strain by 2D speckle tracking better predicts postoperative outcome than conventional logistic EuroSCORE using 2D LVEF.

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Outcome of severe Isolated tricuspid regurgitation in patients without LV dysfunction

Aurélien Seemann [Orateur], Pascal Lim, Julien Nahum

AP-HP, CHU Henri Mondor, Fédération de Cardiologie, Créteil Cedex, France

Background: Limited data has been addressed to evaluate the clinical characteristics and outcome of patients with isolated tricuspid regurgitation and preserved left ventricular function.

Methods: From November 2008 to November 2010, 328 patients were referred to echocardiography laboratory for assessment of a severe tricuspid regurgitation. Patients with left ventricular dysfunction (LVEF<50%) or other significant valvular diseases or history of valvular surgery were excluded (n=185). Clinical and echocardiography baseline characteristics of the 143 remaining patients (77±13 years, 64 men) with isolated severe tricuspid regurgitation and preserved left ventricular function (57±6%, 50–70%) were compared to primary outcome defined by death and recurrent heart failure (follow up period n=31±22±22 days).

Results: Of the whole, 54% (77/143) of patients were in atrial fibrillation, 15% (n=21) had history of pulmonary diseases and 17% (n=24) had implanted pacemaker device. The majority of patients (52%, n=75) had moderate symptoms (NYHA II-I) and preserved right ventricular function (TAPSE>15 mm). However, 90% of patients had elevated NTpro-BNP level>500 pg/mL and 68% had inferior vena cava (IVC) dilatation (≥20mm). Death and recurrent heart failure occurs more in severely symptomatic patients (46% vs. 28%, p=0.05), in those with impaired RV function (53% vs. 28%, p=0.03) and dilated IVC (49% vs. 10%, p=0.002). In addition, elevated NT-proBNP level and RV fibrillation was more observed in patients with adverse outcome. Finally, multivariate analysis demonstrated that only inferior vena cava dilatation (OR=11, p=0.02) and BNP levels (OR=1.4, p=0.05) remained associated to outcome.

Conclusion: In patients with a preserved left ventricular function, clinical symptoms and right ventricular function may underestimate the outcome of isolated severe tricuspid regurgitation. Inferior vena cava dilatation and BNP level appears more sensitive and accurate to identify high risk patients.

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Benefit of atrial septal defect closure in adults: right ventricular remodeling

Rachid Mechmeche, Amira Zarouzi [Orateur], Rafik Boussaid, Abdeljelil Farhati, Mohamed Sami Mourali

Hospital La Rabta, Cardiologie, Tunis, Tunisia

To study the effect of the atrial septal defect (ASD) closure in adults on right ventricular function and remodeling.

We studied in 45 consecutive patients older than 40 years undergoing transcatheter ASD closure. RV function was assessed by tricuspid annulus S-wave velocity (Tric-S) and tricuspid annular plane systolic excursion (TAPSE) and the RV remodelling were studied by the size and the systolic and diastolic volumes of the RV.

We have 36 females, mean age 50±8 years, 71% in sinus rhythm and 67% patients were in class III of New York Heart Association (NYHA) functional class.

Defect size has a median of 19±6.5mm, the shunt ratio was 2.6, pulmonary arterial pressure (PAP) before intervention was 40±10mmHg, and the ballon-stretched defect diameter was 29±6.5mm. The closure was performed with success in all patients without complications.

6 to 13 months after the procedure, the clinical and echographic assessment of this patients referred a NYHA functional class improvement, 90% of patients were in class II. One patient developed atrial fibrillation with a rapid restoration of the sinus rhythm one month after ASD closure. We objective a significant decrease of the right ventricular (RV) size and volumes: telediastolic diameter pass from 30±6 mm to 25±4mm (p=0.03), and the telediastolic volume from 67±14 to 44±11ml (p=0.02). An increase of the RV function were noted with a statistically significant improvement of the RV ejection fraction (34±9% vs 43±10%, p=0.04), and of the TAPSE (14±4mm vs 18±3±3.4 mm, p=0.003). The Tric-S was better after the procedure but the difference isn’t significant statically. The PAP did not significantly differ before and on the control (34±14mmHg). We observed a less marked improvement of the left ventricular (LV) function (LV ejection fraction pass from 50±8% to 57±7%).

Conclusion: In adults, the ASD closure is followed by symptomatic improvement, a regression of PAP, a rapid RV functional and remodeling improvement.

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Relationship of tricuspid annulus dimensions and right ventricular volumes in cardiac magnetic resonance

Julien Dreyfus [Orateur], Alban Redheuil, Eric Bruguier, Arshid Azarine, Golmehr Ashrafpoor, Elie Mousseaux

AP-HP, Hôpital Européen Georges Pompidou, Radiologie, Paris, France

Purpose: Cardiac Magnetic Resonance (CMR) is considered as the reference method to assess right ventricular volumes (RVV) but delineating the boundary of the RV remains time consuming and difficult. The tricuspid annulus (TA) is a component of the RV whose measurements are fast, simple and independent from anatomic variants of RV morphology. TA measurements could serve as potential surrogates of RV volume, but the relationship between RVV and TA diameters (TAD) has not been previously described in CMR.

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