Topic 03 – Echocardiography / Cardiac imaging

January 15th, Thursday 2015

0139

Usefulness of two-dimensional longitudinal strain pattern to identify viable myocardium and in-hospital cardiac events after acute anterior myocardial infarction

Patrick Meimoun, Shirley Abouth, Sonia Martis, Jacques Boulanger, Frederic Elmkies, Hamdane Zemir, Boyan Tzvetkov, Anne Luycx-Bore, Jerome Clerc
CH Compiègne, Cardiologie USIC, Compiègne, France

Objective: to test the usefulness of two-dimensional longitudinal strain pattern (2DS) in segments with wall motion abnormalities (WMA) to predict left ventricular (LV) recovery and in-hospital cardiac events (CE) after acute anterior myocardial infarction (AMI).

Methods: 45 consecutive patients (mean age 60±14 years, 40% women) with first AMI treated successfully by primary percutaneous coronary angioplasty underwent prospectively a transthoracic Doppler-echocardiography, 24hours after angioplasty, and during follow-up (3-6 months), including 2DS analysis: duration of systolic lengthening expressed as percentage of systolic duration (SL), lengthening to shortening ratio (L/S), and post-systolic shortening index (PSSi) in segments with WMA using a 18 segment model, as well as global longitudinal strain (GLS) and left anterior descending artery territory strain (LAD-S). At follow-up, recovery was defined at segmental level by normalization of WMA, at patient level by improvement of LVEF ≥10%. CE (n=14) were defined as a composite of death, reinfarction, heart failure, LV apical thrombus.

Results: 330 of the 778 segments analyzable had WMA at the acute phase (mean 7.8±1.2 per patient), 153 recovered and 177 did not. At segmental level, SL, L/S, PSSi were correlated to recovery, whereas in multivariate analysis, only SL independently predicted recovery (threshold level 40%, sensitivity 79%, specificity 68%, p < 0. 01, AUC 0.75). At patient level, in univariate analysis, WMSI, LVEF, SL, GLS, LAD-S, and troponin peak were correlated to recovery and to CE. In multivariate analysis, SL was independently related to recovery (≤ 3 segments with SL > 40%, Se = 78%, Sp=78%, p< 0.001, AUC 0.83), and to CE (with LAD-S) (all, p < 0.05).

Conclusions: In patients with AMI treated by primary angioplasty, 2DS predict viability as well as CE independently of more traditional parameters.

0258

Prognostic value of new diastolic parameter derived from a two-dimensional speckle-tracking study in acute myocardial infarction

Amira Zaroui, Sondos Smaali, Bassem Rekik, Nadim Khedher, Manel Benhalima, Slim Boudiche, Rachid Mechmeche, Mohamed Sami Mourali
Hôpital la Rabta, Explorations fonctionnelles et reanimation, Tunis, Tunisie

Aims: Diastolic dysfunction in acute myocardial infarction (MI) reflect severe damage and adverse outcome spatially in diabetics patients. Recently, the ratio of early mitral inflow velocity (E) to global diastolic strain rate (e'sr) has been proposed as a marker of elevated LV filling pressure and perhaps a prognostic parameter. The aim of this study to evaluate the E/e'sr ratio in diabetics and its association with adverse outcome in patients with MI.

Methods and results: We prospectively included patients with MI and performed echocardiography with comprehensive diastolic evaluation including E/e'sr. 52% were diabetics. We compared the relationship between E/e'sr and the primary composite endpoint (all-cause mortality, hospitalization for heart failure (HF), stroke) in the 2 groups and with Cox models analysis. A total of 458 patients (mean age 59±12, 62% male) were included and 63 patients (13.7%) reached the primary endpoint (median follow-up 13 months). A significant prognostic value was found for E/e'sr [hazard ratio (HR) per 1unit change: 2.56, 95% confidence interval (CI): 1.2-4.55, p<0.0001] in diabetics group. After multivariable adjustment E/e'sr remained independently related to the combined endpoint (HR per 1 unit change, 1.370; CI: 1.01-6.33, P = 0.03). The prognostic value of E/e'sr was correlated to left ventricular ejection fraction on admission, < 35% (r=0.678, p=0.0002)and C reactive protein value, > 40mg/l, (r=0.589, p=0.001).

Conclusion: Deformation-based E/e'sr contributes important information about global myocardial relaxation superior to velocity-based analysis in diabetic patients and correlated with left ventricular function and inflammatory status an is independently associated with the outcome in acute MI

0304

Impact of global and segmental hypertrophy on 3D systolic deformation in hypertrophic cardiomyopathy: comparison with healthy subjects

Damien Voilliot (1), Olivier Huttin (1), Thibaud Vaugrenard (2), Etienne Aliot (1), Nicolas Sadoul (1), Yves Juillière (1), Christine Selton-Suty (1)
(1) CHU Nancy Brabois ILCV, Cardiologie, Vandoeuvre Les Nancy, France – (2) CHU Aix en Provence, Aix En Provence, France

Objectives: To study the impact of hypertrophy on global and regional 3D systolic deformation in primary hypertrophic cardiomyopathy (HCM) as compared with controls.

Methods: A comprehensive resting 2D and 3D echocardiography was performed in 40 HCM and in 107 controls comparable regarding age, gender and left ventricular ejection fraction (LVEF). LV global (G) and segmental (S) measurements of all 3D peak strain components (longitudinal: 3DGLS, 3DSLS, circumferential: 3DGCS, 3DSCS, radial: 3DGRS, 3DSRS and area: 3DGAS, 3DSAS) and 3D indexed LV end-diastolic myocardial mass (3D indexed LVED mass) were obtained from all patients. LV wall thickness (LVWT) of the 16 LV segments was assessed in short-axis views and classified in 4 quartiles (< 10.5mm, 10.5-13.0mm, 13.0-16.5mm and >16.5mm).

Results: Global deformation parameters were all decreased in HCM patients as compared to controls, except for 3DGCS. There was a significant correlation between indexed 3D LVED mass and all strains components (3DGLS: r^2=0.50; 3DGAS: r^2=0.50; 3DGRS: r^2=0.47; 3DGCS: r^2=0.40; p<0.05 for all). For segmental deformation, the absolute value of all types of strain decreased from 2nd to 4th quartile of myocardial thickness (p<0.05). As compared to controls, 3DSLS and 3DSAS were decreased for all quartiles (p<0.05), 3DSRS was lower from 2nd to 4th quartile (p<0.05) and 3DSCS was higher in 1st and 2nd quartile (p<0.05, Figure 1 next page).

Conclusion: Myocardial mass is related with all 3D strain components in HCM patients. Segmental longitudinal deformation is decreased whatever the degree of LVWT, whereas 3D circumferential strain absolute value is increased in none and poorly hypertrophied segments compared to controls suggesting that it may play a key role of in the preservation of the systolic function in HCM patients.

0308

Longitudinal 2D strain predicts severe coronary artery disease in patients with NSTEMI, normal left ventricular ejection fraction and no wall motion abnormality

Guilhem Malcles, Séverine Monzy, Romain Eschalier, Nicolas Combaret, Géraud Souteyrand, Bernard Citron, Jean-René Lusson, Pascal Motreff, Guillaume Clerfond
CHU Clermont-Ferrand, Cardiologie, Clermont-Ferrand, France

Background: In the era of high-sensitivity troponin, numerous patients are characterized with NSTEMI. Noninvasive tools are needed for early risk stratification. Longitudinal strain provided by speckle tracking echocardiography (2D-STE) has been proved to be very sensitive for diagnosing sub-

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