MISCELLANEOUS

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Intensity of the cell inflammatory response and myocardial perfusion pattern by myocardial contrast echocardiography post acute coronary syndrome

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Background: The intensity of the cell inflammatory response after an acute coronary syndrome (ACS) is a consequence of the extension of the left ventricular (LV) myocardial ischemic area and the area at risk, which can be assessed by myocardial contrast echocardiography (MCE).

Results: We studied a population of 56 ACS patients (pts), 52.7% (n=29 pts) STEMI, 25% (n=14 pst) NSTEMI, and 23.2% (n=13 pts) with unstable angina, between the first (D1) and third (D3) days post ACS.

Methods: In each case, we collected blood samples to determine the levels of high sensitivity C-reactive protein (hs-CRP-ng/ml) and cell membrane receptors CD4 and CD40 (n/mm3), and its variation gradients (CD4/CD40, D50, D50, D70, D100) as an estimation of the intensity of the cell inflammatory response. For each laboratorial parameter the increasing A values were graded in 50%. MCE study was performed at D3 post ACS with a C256 and 512 Sequioa (Acuson Siemens, Germany) ultrasound machines after intravenous SonoVue® (Bracco, Rovigo) continuous infusion during 3’, intermittent digital MCE imaging acquisition, Δt=175 ms, Tec imaging condition, and PCI software, with the acquisition of destruction/perfusion sequential images. The MCE pattern was classified in 16 LV wall segments as normal (P0), late filling (P1), heterogeneous (P2) and absence of perfusion (P3), the mean value/pt, per-segment (P0, P1, P2, P3) and the segmental myocardial perfusion index (SPI) were calculated.

Results: We observed a direct relationship between SPI and hs-CRP (r=0.44; p=0.01) and between CD4 and CD40 (r=0.51; p<0.01), and its variation gradients (CD4/CD40, D50, D50, D70, D100) as a significant relationship with infra-vascular studies.

Conclusions: In this study we obtained a direct relationship between the intensity of the cell inflammatory response post ACS evaluated by serum markers and the extension of the LV myocardial ischemic area by MCE. This relationship was more significant for the late filling and patchy MCE pattern, revealing the presence of a greater myocardial area at risk post ACS by this non invasive technique.

CORONARY FLOW

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Comparison between noninvasive transthoracic coronary flow reserve and contrast cardiac magnetic resonance to identify myocardial recovery after anterir reperfused myocardial infarction

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Previous studies showed that coronary flow reserve (CFR) measurement after recanalization of the infarct-related coronary artery has predictive value of myocardial viability. Gadolinium contrast enhanced cardiac magnetic resonance (GE-MRI) is a non invasive technique able to assess myocardial function and irreversible myocardial damage. Aim of this study was to compare CFR and GE-MRI to assess myocardial viability and to predict myocardial recovery after primary PCI.

Methods: Forty three patients (66 male, aged 60±12 years) with first anterior AMI treated with primary PCI underwent CFR echocardiogram on the left anterior descending coronary artery with adenosine transthoracic echocardiography and GE-MRI 3±3 days after PCI and two-dimensional echocardiography at admission and at 6 month follow-up. A 17-segment model of the left ventricle was used to analyze both wall motion abnormalities and trasmural extent of necrosis at GE-MRI as assessed by hyperenhancement (HE) extent.

A necrosis score was derived for each segment in the risk area considering HE thickness extent (1: non HE, 2: HE less than 25%, 3: HE grater than 25% - less than 50%, 4: HE greater than 50% - less than 75%, 5: HE trasmural greater than 75%). In each patient a wall motion score index (WMSI) and a necrosis score index (NSI) and a trasmurality score index (TSI) were calculated in the risk area. A satisfactory recovery was defined as wall motion improvement in at least two contiguous dysfunctioning segments for >1 grade.

Results: At univariate analysis predictors of recovery of function at follow-up were peak CPK value (r=0.36, p=0.02), CFR value (r=-0.81, p<0.0001), NSI (r=-0.37, p=0.02) and TSI (r=0.56, p=0.0001), microvascular obstruction at GE-MRI (r=0.45, p=0.002). At multivariate analysis the significant predictor of recovery at 6 month follow-up were TSI at GE-MRI (coefficient 0.51; p=0.006), and CFR value (coefficient 0.48, p=0.001). Using receiver operating characteristics ROC curve analysis the optimal CFR cutoff identified was <2.4, with 73% of sensitivity and 92% of specificity (p=0.0001), in identifying patients with significant recovery at follow-up. Moreover, the optimal TSI cutoff identified was <0.25. Thus TSI cutoff was 73% sensitive and 88% specific (p=0.0001).

Conclusions: CFR and GE-MRI after AMI predict myocardial viability and LV functional recovery at follow-up. Our study showed that noninvasive CFR and GE-MRI have the same sensibility and specificity to assess regional ventricular recovery after AMI.
622 Noninvasive assessment of coronary flow reserve after elective stenting in patients with previous myocardial infarction: Relation to left ventricular recovery

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Background: Analysis of coronary flow reserve dynamics after revascularization of infarct related artery (IRA) may provide informations about microvascular integrity and recovery of infarcted region.

Objective: The aim our study was to evaluate the coronary flow reserve (CFR) in the IRA, before and after the effective percutaneous coronary intervention (PCI), in relation to left ventricular recovery in patients with previous myocardial infarction.

Methods: Measurement of CFR was performed with Transthoracic Doppler Echocardiography (TDE) before stenting. 24hr after and three months later, in 39 patients with previous (>1 month) myocardial infarction, during dipyridamole vasodilatation. CFR was defined as the ratio of peak hyperemic to basal averaged peak velocity in the distal part of IRA. Ventricular recovery was determined by improvement in resting WMSI >0.20 at third month follow-up comparing to values before PCI.

Results: According to the improvement in resting WMSI at third month, patients were divided in two groups: group I recovered (n=27) and group II nonrecovered (n=12). Before PCI, no differences were observed in WMSI (1.41±0.22 group I vs 1.50±0.17 group II, p=ns) and in CFR between these two groups (1.50±0.32 in group I and 1.51±0.28 in group II, p=ns). In both groups CFR increased significantly after 24h (2.74±0.78 in group I and 2.33±0.52 in group II, p<0.0001 comparing to CFR before PCI), with further significant improvement after third month (2.88±0.79 in group I and 2.28±0.66 in group II; p=ns comparing to CFR after 24h). CFR value of 2.46 discriminates patients with LV recovery with sensitivity of 68% and specificity of 53% (CI 95%; 0.61-0.81) as first cutoff value. CFR value of 2.67 discriminates patients with LV recovery with sensitivity of 68% and specificity of 66% (CI 95%; 0.59-0.73) as second cutoff value. The best multivariable model to predict cardiac events included new WMA (HR 1.4, 95% CI 1.1-1.6) at recovery phase of DSE.

Conclusion: CFR in the IRA before PCI is related to LV recovery at 3 months follow-up. CFR value of 2.67 or more could predict LV recovery. CFR assessed by TDE is useful tool to identify restenosis after LAD stenting, even in unselected patients with previous anterior MI and taking ß-blockers.

623 Extension and transmurality of myocardial necrosis are mayor determinants of diastolic deceleration time impairment after acute myocardial infarction treated with primary angioplasty

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Background: Previous studies using a Doppler guide wire and transthoracic Doppler echocardiography (TTDE) showed that deceleration time of diastolic flow velocity (DDT) measurement after coronary reperfusion was useful in predicting recovery of left ventricular function. The relationship between DDT measurement and the extension and transmurality of myocardial necrosis after acute myocardial infarction (AMI) has not been established. This study aimed to verify the relationship between DDT and the entity of necrosis as assessed by gadolinium contrast enhanced cardiac magnetic resonance (GE-MRI) after reperfused AMI.

Methods: 40 consecutive patients with anterior AMI underwent DDT assessment in the left anterior descending coronary artery (LAD) with TTDE an GE-MRI 5-3 days after primary coronary angioplasty. A 17-segment model of the left ventricle was used to analyze both wall motion abnormalities and transmural extent of necrosis at GE-MRI as assessed by hyperenhancement (HE) extent. A necrosis score was derived for each segment in the predicted risk area (myocardial segments supplied by LAD) considering HE thickness extent (1: non HE; 2: HE less than 25%; 3: HE greater than 25% - less than 50%; 4: HE greater than 50% - less than 75%; 5: HE transmural greater than 75%). In each patient a wall motion score index (WMSI) and a necrosis score index (NSI) were calculated in the two groups (2.23±0.32 vs 2.0±0.39, p=ns) and no correlation was found between DDT and WMSI in the acute phase (r=-0.19, p=ns) whereas it improved in preserved DDT patients at follow-up echo (r=0.52±0.33 vs 2.06±0.37, p=0.0001). Finally, an inverse correlation between DDT and WMSI at follow-up echo (r=-0.41, p=0.008) was found.

Conclusion: After reperfused AMI, DDT is inversely correlated with myocardial necrosis extent detected by GE-MRI. Thus non-invasive assessment of DDT using TTDE is expression of extent and transmurality of myocardial necrosis after successful coronary angioplasty in patients with anterior AMI and could be useful in predicting recovery of left ventricular function.

624 Long term prognostic value of wall motion abnormalities during the recovery phase of dobutamine stress echocardiography

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Objective: To estimate the additional prognostic value of the wall motion abnormalities (WMA) of the recovery phase of dobutamine stress echocardiography (DSE) compared to WMA at peak stress.

Methods: WMA as an index of ischemia at peak and during the recovery phase of DSE were scored in 187 consecutive patients, with suspected or known coronary artery disease (CAD), and who underwent冠状动脉造影. In each patient a wall motion score index (WMSI) and a necrosis score index (NSI) were calculated from coronary angiography. WMSI was defined as the ratio of peak hyperemic to basal averaged peak velocity in the distal part of IRA.

Results: According to our results only increase in CFR above 2.46 after successful coronary angioplasty in patients with anterior AMI and could be expressed in DDST. Thus non-invasive assessment of DDT using TTDE is expression of extent and transmurality of myocardial necrosis after successful coronary angioplasty in patients with anterior AMI and could be useful in predicting recovery of left ventricular function.

LV FUNCTION – OTHER

625 Perfusion assessment by myocardial contrast echocardiography and parametric imaging after primary angioplasty predicts late left ventricular remodelling after primary angioplasty

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Myocardial contrast echocardiography (MCE) allows the assessment of myocardial perfusion and viability, which is associated to microvascular pres-