1117-36 Strain Rate Imaging Can Evaluate Nontransmural Myocardial Infarction: An Experimental Study in Dogs

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Background: Non-transmural myocardial infarction is a common finding in patients with acute myocardial infarction (AMI) and is still under discussion. In particular, no data are available on the effects of late infarct-related artery (IRA) reopening on microvascular perfusion. 

Methods: We studied 48 dogs which underwent reperfusion after 6 hours of ischemia. Doppler myocardial imaging (Doppler strain rate and strain) and transmural Doppler imaging (Vivid 5. GE medical systems) can provide quantitative analysis of regional contractile function.

Our aim is to examine whether strain rate imaging can evaluate nonuniform change of transmural contractile function by the experimental model in dogs.

Results: In 5 open chest dogs we injected microspheres which were 600μm in diameter to the left anterior descending artery via the diagonal branch (n=2) or to the left circumflex artery via the posterolateral branch (n=3) by several times, which were able to make persistent subendomyocardial embolization. Embolization was continued until regional coronary blood flow was reduced approximately 30% of baseline. Echocardiography which contained tissue Doppler imaging in the long axis view was performed during embolization. To evaluate embolized area, we performed myocardial contrast echocardiography (MCE) at baseline and after final embolization in 3 dogs. Data were recorded digitized, and strain rate and strain were calculated by offline analysis. Sample length was set at 2.8-3.2 mm, and placed at inner and outer half sides to analyze the regional contractile function in each inner and outer layer separately.

Conclusions: Continuous strain rate and strain of inner layer of myocardium were reduced by transmural infarct-related artery (IRA) reopening on microvascular perfusion. Strain rate imaging has a potential to evaluate subendomyocardial infarction.

1117-37 Diagnosis of Viable Myocardium Using Velocity Information of Doppler Myocardial Imaging: Comparison With Positive Emission Tomography

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To test whether velocity data of doppler myocardial imaging (DMI) is useful for diagnosis of myocardial viability (MV), 25 consecutive patients (16 male, 63±10.1 years) with regional wall motion abnormalities at the left anterior descending artery (LAD) territory were studied by LV function (EF = 32±7.3%) and late enhancement from positron emission tomography (PET).

Results: Peak systolic velocity (Vmax) and postcontrast systolic thickening velocity (PST) were measured in anterior septum, apical inferior and anterior wall. Among 75 ischemic segments of LAD, analysis of DMI data were not feasible in 4 segments. Vmax was normal in 57 segments and 18 segments showed non-viable myocardium in PET and was normal in 4 segments, while 27 segments showed mismatch in PET. Vmax (1.6±1.7 Versus 1.3±1.0 cm/s, p=0.03) and wall motion score index (2.9±0.4 Versus 2.8±0.3, p=0.13) were lower in segments with MV and those without, PST was higher in segments with MV (2.7±1.5 Versus 0.9±0.7 cm/s, p=0.002). ROC curve of PET showed the best cut-off value for MV is 0.2 cm/s (area under the curve 0.833, p=0.001). PET showed sensitivity of 58% (19/34) for MV, and in segments with (+) PET, Vmax<2.0 cm/s was another useful index for MV. This algorithm using DMI showed diagnostic sensitivity and specificity of 79% and 60%, respectively. Velocity data of DMI at real time provides useful information regarding MV, and no need of any stress can be an advantage of this technique.