

Echocardiographic Index of Myocardial Stunning Predicts Recovery of Left Ventricular Systolic Function after Primary Coronary Angioplasty

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Background:

Primary coronary angioplasty (PPCI) may save myocardium at risk in the setting of acute ST elevation myocardial infarction (STEMI). Myocardium that recovers its functions later after resumption of coronary artery patency is considered to be stunned. Thus, immediately after PPCI, flow contraction mismatch is present at regions of myocardial stunning.

Aim:

Evaluation of coronary artery flow and flow/contraction stunning index in the prediction of recovery of left ventricular (LV) function after PPCI.

Methods:

Velocities in the left anterior descending coronary artery (LAD) were recorded within 6 hours after PPCI and 1 week later in 36 patients presenting with acute anterior STEMI. A control group of 96 normal subjects was used as a reference of normal LAD flow. Sampling of LAD velocity was obtained from trans-thoracic Doppler. Diastolic deceleration time < 600 msec, indicating impaired microcirculation was found in 16 subjects. Flow in the LAD was estimated using heart rates, Doppler time velocity integrals and LAD color Doppler diameters.

Results:

Diastolic LAD flow immediately after PPCI in subjects with microcirculatory impairment, 29±21 ml/min was lower than in those without, 35±11ml/min, p<0.05, and lower than normal 36±22, p<0.05. One week after PCI, diastolic flow in the LAD increased to 59±38 ml/min in patients with microcirculatory impairment, p<0.03, and to 50±13 ml/min in those without, p<0.04. Diastolic LAD flow pre-discharge in both post-MI groups, were higher than normal, p<0.05. Coronary flow contraction matching index in the whole group of patients was 0.96±0.45 at admission and 1.1±0.5 at discharge. In patients with stunning and recovery of LV contraction, Flow/LV contraction matching index was 1.1±0.34, similar to normal, and at discharge remained without change 1.0±0.39. In patients without stunning and without recovery of LV contraction, LAD Flow/LV contraction matching index at baseline 0.82±0.5 was significantly lower than normal, p<0.05, and increased significantly at discharge to 1.2±0.7, p<0.05.

Conclusions:

After PPCI coronary flow is dynamic, and coronary artery flow/contraction stunning index predicts recovery of left ventricular systolic function.