Myocardial viability assessment after primary angioplasty in patients with acute myocardial infarction: comparison of contrast-enhanced MR imaging with myocardial contrast echocardiography

R. J. van Geuns[1], E. Biagini[1], T. Baks[1], F. ten Cate[1], P. J. de Feyter[1], P. A. Wielopolski[2]
[1]Cardiology, ErasmusMC, Rotterdam, Zhl, Netherlands, [2]Radiology, ErasmusMC, Rotterdam, Zhl, Netherlands

Background. The assessment of reversible myocardial dysfunction after primary coronary intervention (PCI) is important for clinical decision-making. The aim of this study was to compare the merits of myocardial contrast echocardiography (MCE) and contrast enhanced magnetic resonance (MR) imaging to predict functional recovery after PCI.

Materials and methods. Twenty-five consecutive patients with acute myocardial infarction (AMI) were studied after PCI. MCE images were obtained using low mechanical index (MI: 0.1) real time perfusion imaging (power modulation). MR was performed with first-pass perfusion (hypo-enhancement) and late contrast-enhancement imaging (hyper-enhancement). A 16-segment model of the left ventricle was used to analyze MCE and MR images. Recovery of regional contractile function was evaluated at sixty days follow-up in all patients.

Results. In 181 segments related to acute infarct territory, wall motion and perfusion were analyzed. Dysfunctional myocardium was present in 152 segments. Fifty-six (31%) and 58 (32%) segments were respectively hypokinetic, and 87 (48%) and 83 (46%) akinetic (agreement between MCE and MR 93%, kappa 0.88)

Method	**Recovery at 60 days follow-up in 143 dysfunctional segments**
MCE	
Normal Perfusion	38 (93%)
Partial Perfusion	36 (59%)
No Perfusion	4 (10%)
MR: hypo-enhancement	
Normal Perfusion	48 (76%)
Non Transmural Defect	27 (61%)
Transmural Defect	3 (8%)
MR: hyper-enhancement	
0% of the wall thickness	29 (97%)
0-25% of the wall thickness	18 (95%)
25-50% of the wall thickness	22 (88%)
50-75% of the wall thickness	5 (20%)
75-100% of the wall thickness	4 (9%)

The sensitivity of MCE and MR imaging with hypo- and hyper-enhancement to identify reversible dysfunction was respectively 95%, 96% and 86% (P=NS). Specificity was respectively 57%, 50% and 92% (P<0.05). Accuracy was respectively 78%, 90% and 75%.

Conclusions. Identification of potential reversible dysfunctional myocardium can be determined both by MCE and MR imaging after AMI and PCI, although MR has a better specificity for the identification of reversible myocardial dysfunction (stunned myocardium).