Microvascular Obstruction Assessed by Cardiac MRI in Patients with STEMI Undergoing Primary PCI

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Background: Microvascular obstruction (MVO) occurring following percutaneous coronary interventions (PCI) may lead to myocardial injury, and is an independent predictor of adverse outcome in patients presenting with ST segment elevation MI (STEMI). Cardiac magnetic resonance (CMR) became the gold standard for assessment of microvascular obstruction (MVO). Recently CMR is being performed as part of the routine evaluation of STEMI patients undergoing angiographically successful (TIMI III) primary PCI (PPCI) in Sheba Medical Center. CMR was evaluated for the amount of delayed enhancement (DE) and MVO.
Methods: Gadolinium-enhanced CMR examination was performed in 26 consecutive patients undergoing PPCI for STEMI. CMR was performed 4±1 days post PPCI, and evaluated using dedicated software for DE and MVO quantification.
Results: Ten patients had MVO > 2% (mean 6±3%) of LV mass (MVO group) and 16 patient had no or MVO extent < 2% (mean 0.56±0.66%) of LV mass (no MVO group). Patients in the MVO vs. no MVO group were more likely to be non-smokers (90% vs. 56%, P=0.074) and were two times more likely to be diabetic (30% vs. 12.5%, P=0.29). MVO was associated with larger myocardial damaged as assessed by CMR DE (24±7 vs. 11±6% of LV, P<0.005), peak CPK (4165±2242 vs. 1202±1010 IU/l, P=0.0001), peak troponin I (133±108 vs. 39±33, P=0.003) and echocardiographic left ventricular ejection fraction (38±8 vs. 49±10%, P=0.01). Thrombus in the left ventricle was found in 3 patient in the MVO group and none in the no MVO group (P=0.02).
Conclusions: Routine early CMR, in patients undergoing PPCI for STEMI,can detect MVO, predicting larger myocardial damage and lower LVEF.