

Cardiac magnetic resonance T1 mapping allows for predicting adverse left ventricular remodeling post-reperfusion in ST-elevation myocardial infarction

L. Zhang¹, Y.K. Guo¹, Z.G. Yang², M.X. Yang², K.Y. Diao², X.Y. Zhou³

¹West China Second University Hospital, Sichuan University, Chengdu, China; ²West China Hospital, Sichuan University, radiology, Chengdu, China; ³Siemens Healthineers Ltd, Shanghai, China

Funding Acknowledgement: Type of funding source: Public hospital(s). Main funding source(s): 1-3-5 project for disciplines of excellence, West China Hospital, Sichuan University

Background: Cardiac magnet resonance (CMR) T1 mapping allows the quantitative characterization of the severity of tissue injury and predict functional recovery in acute myocardial infarction (AMI).

Purpose: The study aimed to investigate whether native T1 and ECV of infarct myocardium are influenced by microvascular obstruction (MVO) and have predictive value for adverse left ventricular (LV) remodeling post-infarction.

Method: A cohort of 54 patients with successfully reperfused STEMI underwent CMR imaging at a 3T scanner in AMI and 3 months post-infarction. Native T1 data was acquired using a modified Look-Locker inversion recovery (MOLLI) sequence, and ECV maps were calculated using blood sampled hematocrit. Manual regions-of-interest were drawn within the infarct myocardium to measure native T1 and ECV (native T1infract and ECVinfract, respectively). MVO identified as a low-intensity area within the infarct zone on LGE was eliminated.

Results: MVO was present in 36 patients (66.67%) in AMI. ECVinfract

in patients with MVO was different from those without (58.66±8.71% vs. 49.64±8.82%, P=0.001), while no significant difference in T1infract was observed between patients with and without MVO (1474.7±63.5ms vs. 1495.4±98.0ms, P=0.352). ECV correlated well with the change in end-diastolic volume (all patients: r=0.564, P<0.001) and predicted LV remodeling in patients with and without MVO (rMVO absent = 0.626, P=0.005; rMVO present = 0.686, P<0.001; all patients: r=0.622, P<0.001); Native T1 was only associated with a 3-month change in LV end-diastolic volume (rMVO absent= 0.483, P=0.042) and predicted LV remodeling in patients without MVO (rMVO absent = 0.659, P=0.003). Furthermore, ECV had an association with LV remodeling (β =0.312, P=0.007) in multivariable logistic analysis.

Conclusion: Absolute native T1 in infarct myocardium might be affected by MVO but ECV isn't. ECV could predict LV remodeling in MI patients with and without MVO, while native T1 predict it in MI with MVO absent.