

Hyper acute changes of myocardial blood flow and its relationship with infarct core

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Background: Myocardial blood flow (MBF) assessed by first pass perfusion using cardiovascular magnetic resonance (CMR) is a novel imaging biomarker that allows studying the extent of microvascular dysfunction following ST-segment elevation myocardial infarction (STEMI) post percutaneous coronary intervention.(1) Infarct core by T1 mapping reflects injured myocardial tissue heterogeneity and is prognostically relevant.(2) Nonetheless, the interaction between infarct core and status of microvascular dysfunction assessed by MBF has never been studied.

Purpose: We sought to investigate the hyper acute changes of MBF and its relationship with the infarct core composition after revascularized STEMI.

Methods: Patients from the Oxford for Acute Myocardial infarction (OxAMI) study who underwent 3 CMR (3T) scans (<3 hours, 24 hours & 6 days) following STEMI were included. MBF, corrected for heart rate and blood pressure, was averaged from late gadolinium enhancement (LGE) positive segments. The infarct core was defined as the hypo-intense area in the centre of the infarct territory having a mean T1 value of at least 2 standard deviations below the T1 value of the periphery of the area at risk as previously described.(2)

Results: 29 patients were included (61 ±11 years, 86% male). Patients with infarct core demonstrated significant recovery of MBF by day 6 (0.59 ±0.13, 0.53 ±0.16, 0.70 ±0.16 ml/min/g, P= 0.002) with no changes in MBF in patients with no infarct core (0.87 ±0.18, 0.87 ±0.21 ml/min/g, 0.84 ±0.22, P= 0.75) (Figure). Interestingly, MBF was significantly lower in patients with infarct core compared with those without at 24 hours (0.54 ±0.21 vs. 0.87 ±0.14 ml/min/g, P< 0.001) but not at 6 days (0.69 ±0.20 vs. 0.86 ±0.15 ml/min/g, P= 0.06)

Conclusions: Microvascular dysfunction as assessed by MBF is more pronounced in patients exhibiting infarct core. The recovery of microvascular dysfunction to a status similar to patients without infarct core occurred within the first week following STEMI.

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