Association of dysglycaemia with persistent infarct core iron in patients with acute ST-segment elevation myocardial infarction

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Background: Dysglycaemia increases the risk of myocardial infarction and subsequent recurrent cardiovascular events. However, the role of dysglycaemia in ischemia/reperfusion injury with development of irreversible myocardial tissue alterations remains poorly understood.

Objectives: To investigate the association of dysglycaemia with persistence of infarct core iron and their longitudinal changes over time in patients undergoing primary percutaneous coronary intervention (PCI) for acute ST-segment elevation myocardial infarction (STEMI).

Methods: We analyzed 348 STEMI patients treated with primary PCI between 2016 and 2021 that were included in a prospective observational study. Peripheral venous blood samples for glucose and glycated hemoglobin (HbA1c) measurements were drawn on admission and 4 months after STEMI. Cardiac magnetic resonance (CMR) imaging including T2* mapping for infarct core iron assessment was performed at both time points. Associations of dysglycaemia with persistent infarct core iron and iron resolution at 4 months were calculated using multivariable regression analysis.

Results: Persistent infarct core iron was present in 89 (26%) patients (HbA1c <5.7%: 16%, 5.7-6.4: 37%, ≥6.5: 34%) and was independently associated with HbA1c levels (OR: 1.64 [95% CI: 1.11-2.42]; p=0.01), but not glucose levels on admission. The independent association was present even after exclusion of patients with diabetes (pre- and newly diagnosed, n=42). Infarct core iron resolution was observed in 34 (14%) patients and was independently associated with HbA1c levels at 4 months (OR: 0.51 [95% CI: 0.28-0.93]; p=0.03).

Conclusions: In STEMI patients treated with primary PCI, dysglycaemia is independently associated with persistent infarct core iron and impaired iron resolution at 4 months. Persistent infarct core iron might represent a mechanistic driver for adverse outcome and a potential therapeutic target in patients with altered glycemic status suffering acute STEMI.