CIRCULATING MICRO-RNA 133A AS PREDICTOR OF MYOCARDIAL SALVAGE AND CLINICAL PROGNOSIS IN PATIENTS WITH ACUTE REPERFUSED ST-ELEVATION MYOCARDIAL INFARCTION

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Background: Recent studies have shown that in patients with acute coronary syndrome (ACS) some micro-RNAs are present in the systemic circulation and might be useful as potential biomarkers for infarction. Previous studies, however, were based on low patient numbers and could not assess the relation of micro-RNAs to myocardial damage and their potential prognostic value. The aim of this prospective study was to assess the relation between micro-RNA 133a and myocardial damage assessed by cardiac magnetic resonance (CMR) imaging and to evaluate the prognostic value of micro-RNAs in a high-risk ST-elevation myocardial infarction (STEMI) population.

Methods: Micro-RNA 133a concentrations were determined from plasma samples by real-time PCR in 216 consecutive patients undergoing primary percutaneous coronary intervention in STEMI <12 h after symptom onset. Patients were categorized into 2 groups defined by the median micro-RNA 133a value on admission. CMR was performed 3 days (IQR 2-4) after infarction for assessment of infarct size, myocardial salvage and microvascular obstruction. The primary clinical endpoint was the occurrence of major adverse cardiovascular events (MACE) defined as a composite of death, reinfarction, and new congestive heart failure within 6 months after the index event.

Results: The median micro-RNA 133a concentration was 33.3 AU (interquartile range 12.4 to 146.1). All prognostic clinical (symptom onset to reperfusion), electrocardiographic (ST-segment resolution) and CMR parameters (infarct size, microvascular obstruction and myocardial salvage index) showed significant correlations with micro-RNA 133a concentrations (p<0.001 for all). MACE were significantly lower in the micro-RNA 133a < median group (11 [9%] vs. 22 [20%] events, log-rank test p=0.02).

Conclusions: Elevated levels of circulating micro-RNA 133a in patients with STEMI are associated with decreased myocardial salvage, larger infarct sizes and more pronounced reperfusion injury with subsequent adverse clinical outcome. Thus our largest study in humans to date suggests that micro-RNA 133a can be used as a marker for myocardial injury and prognosis in infarction.