

Moderated poster presentation

Reperfusion hemorrhage is a marker for the severity of tissue injury in patients with acute ST-elevation myocardial infarction

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Background

T2*-weighted cardiovascular magnetic resonance (T2*-CMR) accurately quantifies myocardial reperfusion hemorrhage *in vivo*. The aim of this study was to assess the relationship of hemorrhage to microvascular obstruction (MO), infarct size and functional parameters in patients with acute myocardial infarction.

Methods

In 19 patients (age 57 ± 11), a CMR study was performed 6 ± 1 days after reperfusion therapy for acute ST-elevation myocardial infarction. In a short axis orientation, covering the entire left ventricle (slice thickness 10 mm/0 mm), the following sequences were obtained: cine SSFP images for functional and volumetric analyses, T2*-weighted GE-EPI for hemorrhage; after injection of 0.1 mmol/kgBW early post-contrast IR-GE images were obtained for MO, and after 10 min, late gadolinium enhancement images were obtained for infarct size. Images were analyzed semi-quantitatively using a threshold-based signal detection.

Results

Myocardial infarction occurred without microvascular injury in 6 patients (group MO-), 3 patients had microvascular obstruction but no hemorrhage (group MO+H-), and hemorrhage within the microvascular obstruction zone was observed in 10 patients (group MO+H+). Hemorrhage was associated with larger infarct size (MO- 12.6 ± 1.8 g, MO+H- 14.9 ± 5.0 g, MO+H+ 61.9 ± 7.8 g; $p < 0.01$), greater amount of microvascular obstruction

(MO+H- 2.2 ± 1.2 g, MO+H+ 12.2 ± 2.2 g, $p < 0.05$), and lower LV ejection fraction (MO- $61 \pm 6\%$, MO+H- $63 \pm 1\%$, MO+H+ $35 \pm 5\%$; $p < 0.05$). There was a linear relationship between infarct size and the amount of microvascular obstruction ($R = 0.80$; figure 3), infarct size and amount of hemorrhage ($R = 0.77$), as well as amount of microvascular obstruction and amount of hemorrhage ($R = 0.84$). An infarct mass of 25 g and microvascular obstruction of more than 5 g predicted hemorrhagic infarcts with 100% accuracy.

Conclusion

T2*-CMR accurately quantifies hemorrhage *in vivo* as a novel diagnostic target in myocardial reperfusion injury. Hemorrhage may be a complication of reperfusion at an advanced stage of ischemic injury.