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Meeting abstract

1003 TIMI myocardial perfusion grade predicts infarct size, perimeter and border zone following STEMI

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Background

Impaired TIMI Myocardial Perfusion Grade (TMPG) frequently occurs in STEMI patients, and predicts ventricular arrhythmias and mortality following reperfusion. The mechanism by which microvascular function influences the substrate for these events remains uncertain. Using cardiovascular magnetic resonance (CMR), we sought to examine differences in infarct morphology and border zone that may exist between normal and abnormal TMPG.

Methods

We studied 21 consecutive subjects presenting with their first acute STEMI treated by primary PCI. Contrast-enhanced CMR was performed 4–7 days after presentation and repeated at 3 months using standard techniques (0.1 mmol/kg gadolinium-DTPA). CMR infarct size (% LV), infarct perimeter (cm^2) and border zone (peri-infarct tissue heterogeneity defined by the difference between 2 and 3 standard deviations above the mean of remote myocardium) were measured by a blinded reader. Coronary angiograms were assessed at an independent core laboratory.

Results

Patients were 80% male, mean age 58 ± 14 yrs with 52% anterior and 48% inferior infarcts. 90% of patients had TIMI Grade 3 flow at the end of PCI. Abnormal post-PCI TMPG (0–2) was associated with larger baseline and follow-up CMR infarct size (20.1% ± 5.2% (TMPG 0–2) vs 8.8% ± 6.0% (TMPG 3) at baseline and 17.3% ± 4.2% vs 5.2% ± 3.6% at follow-up, $p < 0.001$ for both), larger infarct perimeter (40.4 ± 10.5 cm^2 vs 17.5 ± 15.7 cm^2, $p = 0.001$ and 37.0 ± 15 cm^2 vs 18 ± 3 cm^2, $p = 0.01$) and larger border zone at baseline (10.0 ± 3.0 g vs 6.1 ± 4.0 g, $p = 0.049$) but not at follow-up (8.8 ± 3.9 g vs 6.7 ± 2.7 g, $p = 0.2$). Normal post-PCI TMPG (3) was associated with a greater decrease in overall infarct size (relative decrease of 41% for TMPG 3 vs 14% for TMPG 0–2, $p < 0.001$), however there was no significant change in perimeter (decrease of 15% (TMPG 3) vs18% (TMPG 0–2), p = NS) or border zone (decrease of 20% vs increase of 9% $p = 0.06$).

Conclusion

Post-PCI TMPG is highly correlated with infarct size, perimeter and border zone. These architectural differences suggest that microvascular function may influence infarct remodeling following reperfusion. The independent prognostic power of CMR infarct morphology following reperfused STEMI warrants further study.