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POSTER PRESENTATION Open Access

Myocardial haemorrhage after acute reperfused ST-elevation myocardial infarction evolves progressively and contributes to the early bimodal pattern in T2-relaxation time: advanced imaging and clinical significance

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Background

The time-course and relationships of myocardial haemorrhage and oedema in survivors of acute ST-elevation myocardial infarction (STEMI) are uncertain.

Methods

30 STEMI patients (mean age 54 years; 25(83%) male) treated by primary percutaneous coronary intervention underwent serial cardiac magnetic resonance imaging: 4 - 12 hours, 3 days, 10 days and 7 months post-reperfusion. Native T2 and T2* were measured in regions-of-interest in remote and injured myocardium. Myocardial haemorrhage was taken to represent a hypointense infarct core with a T2* value <20 ms. Public registration: NCT02072850.

Results

Myocardial haemorrhage occurred in 7(23%), 13(43%), 11 (33%), and 4(13%) patients at 4 - 12 hours, 3 days, 10 days and 7 months, consistent with a unimodal pattern. The corresponding amounts of myocardial haemorrhage (% LV mass) during the first 10 days post-MI were (median, IQR): 2.7(0.0, 5.6), 7.0(4.9, 7.5), 4.1(2.6, 5.5); $p < 0.001$). Myocardial oedema (% LV mass) had a unimodal evolution in all patients (p=0.001). In patients without hemorrhage, infarct zone T2 values (ms) increased progressively during the first 10 days (62.1(2.9), 64.4(4.9), 65.9 (5.3) ($p < 0.001$). Alternatively, in patients with myocardial haemorrhage, infarct zone T2 was reduced at day 3 (51.8 (4.6) ms) ($p < 0.001$), depicting a bimodal pattern.

LV end-diastolic volume increased from baseline to 7 months in patients with myocardial haemorrhage (p=0.001), but not in patients without haemorrhage (p=0.377).

Conclusions

The temporal evolutions of myocardial haemorrhage and oedema are unimodal, whereas infarct zone T2 (ms) has a bimodal pattern in haemorrhagic infarction. Myocardial haemorrhage is prognostically important. Further studies are warranted.

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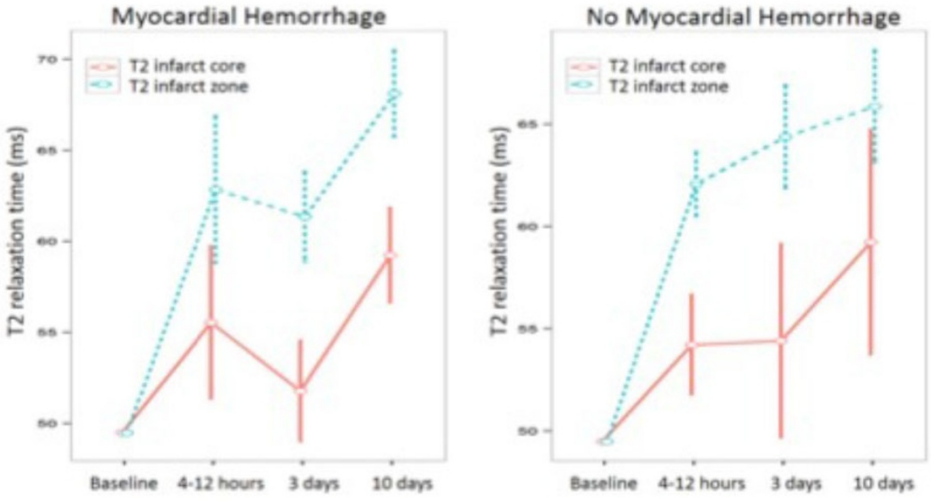
A. T2 (ms) evolves with a bimodal time-course in patients with myocardial haemorrhage but a unimodal time-course in patients without myocardial haemorrhage.



B. Amount of haemorrhage in the sub-group of patients with haemorrhage

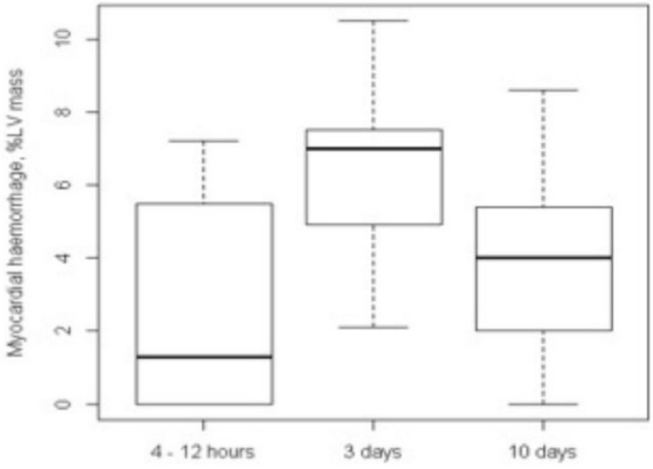


Figure 1

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