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Myocardial salvage and infarct size in acute myocardial infarction assessed by magnetic resonance imaging - Influences by prehospital initiated facilitated PCI versus primary PCI in early infarct presenters

Holger Thiele*, Ingo Eitel, Claudia Meinberg, Matthias Gutberlet and Gerhard Schuler

Address: University of Leipzig - Heart Center, Leipzig, Germany
* Corresponding author

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Introduction

Myocardial salvage (MS) can be assessed retrospectively by T2-weighted and delayed enhancement images as shown in animal studies. Currently there is limited data in humans and this technique has not been used for the assessment in multicenter trials comparing different reperfusion regimens in STEMI. Facilitated PCI with fibrinolysis did not show a benefit in comparison to primary PCI in recently published trials. However, a subgroup of high-risk STEMI patients presenting early after symptom onset, treated with optimal antiplatelet co-medication, and with long transfer times might benefit from a fibrinolytic-based facilitated PCI.

Purpose

Aim of this trial was to establish MS imaging as a surrogate endpoint in a randomized multicenter trial and to show that facilitated PCI versus primary PCI in a STEMI network with long transfer distances up to 70 km is beneficial with respect to infarct size (IS) and MS.

Methods

Patients with STEMI (<3 h after symptom onset) were randomized to either prehospital initiated facilitated PCI using tenecteplase (group A; n = 81) or primary PCI (group B; n = 81). Optimal prehospital co-medication consisted of 600 mg clopidogrel loading-dose plus aspirin. The primary endpoint was IS assessed by delayed enhancement. Secondary endpoints were microvascular obstruction and MS assessed by MRI, ST-resolution at 90 min., and a composite of death, re-MI, and congestive heart failure at 30 day follow-up.

Results

All images were assessable for the calculation of the MS index. The median time from symptom-onset to randomization was 64 min (IQR 42;103) in group A versus 55 min in group B (IQR 27;91; p = 0.26). Despite better preinterventional TIMI-flow in group A (76% versus 28% TIMI 2 or 3; P < 0.001) IS size was similar in group A versus B (14.1% of left ventricle [IQR 5.3;26.7] versus 15.1% [IQR 7.5;23.3]; p = 0.75). There was also no difference in microvascular obstruction, MS (p = 0.65 and 0.71) and a trend towards worse ST-segment resolution (p = 0.07). The combined clinical endpoint showed a trend towards higher event rates in group A (18.9% versus 8.1%; p = 0.09, relative risk 2.33, 95% confidence interval, 0.98-5.63).

Conclusion

MRI can reliably measure MS retrospectively and served as a surrogate endpoint in this randomized multicenter clinical trial. This trial failed to show that in patients with STEMI - presenting early after symptom onset with rela-

tively long transfer times - a fibrinolytic-based facilitated PCI approach with optimal antiplatelet co-medication offers any benefit over primary PCI with respect to IS and tissue perfusion.