

POSTER PRESENTATION

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Molecular magnetic resonance imaging (MRI) of inflamed myocardium using ferucarbotran in patients with acute myocardial infarction

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Introduction

Superparamagnetic iron oxide nanoparticle (SPIO)-based molecular imaging agents targeting macrophages have been developed and successfully applied in animal models of myocardial infarction.

Purpose

The purpose of this clinical trial was to investigate whether molecular magnetic resonance imaging (MRI) of macrophages using ferucarbotran (Resovist[®]) allows improved visualization of the myocardial (peri-)infarct zone compared to conventional gadolinium-based necrosis/fibrosis imaging in patients with acute myocardial infarction.

Methods

The clinical study NIMINI-1 was performed as a prospective, non-randomised, non-blinded, single agent phase III clinical trial. Twenty patients who had experienced either an acute ST-elevation or non-ST-elevation myocardial infarction (STEMI/NSTEMI) were included to this study. Following coronary angiography, a first baseline cardiovascular magnetic resonance (CMR) study (pre-SPIO) was performed within seven days after onset of cardiac symptoms. A second CMR study (post-SPIO) was performed either 10min, 4h, 24h or 48h after ferucarbotran administration. The CMR studies comprised cine-CMR, T2-weighted "edema" imaging, T2*-weighted cardiac imaging and T1-weighted late-gadolinium-enhancement (LGE) imaging.

Results

The median extent of short-axis in-plane LGE was 28% (IQR 19-31%). Following Resovist[®] administration the median extent of short-axis in-plane T2*-weighted hypoenhancement (suggestive of intramyocardial hemorrhage and/or SPIO accumulation) was 0% (IQR 0-9%; $p=0.68$ compared to pre-SPIO). A significant in-slice increase (>3%) in the extent of T2*-weighted "hypoenhancement" (post-SPIO compared to pre-SPIO) was seen in 6/16 patients (38%). However, no patient demonstrated "hypoenhancement" in T2*-weighted images following Resovist[®] administration that exceeded the area of LGE.

Conclusions

T2/T2*-weighted MRI aiming at non-invasive myocardial macrophage imaging using the approved dose of ferucarbotran does not allow improved visualization of the myocardial (peri-) infarct zone compared to conventional gadolinium-based necrosis/fibrosis imaging.

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