IN VIVO ASSESSMENT OF CELLULAR INFLAMMATION FOLLOWING ACUTE MYOCARDIAL INFARCTION

ACC Moderated Poster Contributions
McCormick Place South, Hall A
Saturday, March 24, 2012, 9:30 a.m.-10:30 a.m.

Session Title: Imaging: MRI in Coronary and Non-coronary Disease States
Abstract Category: 21. Imaging: MRI
Presentation Number: 1086-5

Authors: Shirjel Alam, Gareth Barnes, Nikhal Joshi, Jennifer Richards, Ninian Lang, Tom MacGillivray, Scott Semple, Peter Henriksen, David Newby, Edinburgh University, Edinburgh, United Kingdom

Background: Inflammation following myocardial infarction has detrimental effects on reperfusion, myocardial remodelling and function. Magnetic resonance imaging (MRI) using Ultrasmall Superparamagnetic Particles of Iron Oxide (USPIO) can be used to detect cellular inflammation in tissues.

Methods: Fifteen patients were recruited up to five days after ST-segment elevation myocardial infarction. Nine patients underwent cardiac MRI (3 Tesla) at baseline, and at 24 and 48 hours following infusion of USPIO (4 mg/kg; Ferumoxytol, AMAG). Six control patients underwent the same scanning protocol without infusion of USPIO. The infarct zone was defined on Gadolinium-enhanced T2-weighted images. T2*-weighted multi-gradient-echo sequences were acquired and R2* maps were generated to assess USPIO accumulation.

Results: In the control group, the R2* value in the infarct zone remained constant: baseline, 0.047 s⁻¹ (95% CI, 0.034 to 0.059); 24 hours, 0.043 s⁻¹ (95% CI, 0.035 to 0.052) and 48 hours, 0.040 s⁻¹ (95% CI, 0.024 to 0.056). Following USPIO infusion, the R2* value in the infarct zone increased from a baseline of 0.041 s⁻¹ (95% CI, 0.029 to 0.053) to 0.164 s⁻¹ (95% CI, 0.125 to 0.204) at 24 hours and 0.128 s⁻¹ (95% CI, 0.097 to 0.158) at 48 hours (p<0.01; non-parametric one-way repeated measures ANOVA, Dunn’s post test comparison).

Conclusions: USPIO are taken up into the infarcted myocardium following acute myocardial infarction and can be quantified by MRI to image infarct-related cellular inflammation.