Poster presentation

The cardiac magnetic resonance myocardial perfusion reserve index in the assessment of the revascularised left anterior descending artery

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Objectives
Myocardial perfusion reserve (MPR) is the ratio of maximum hyperaemic to rest myocardial blood flow, quantified with contrast-enhanced cardiac magnetic resonance (CMR) T1-weighted dynamic imaging and signal intensity-time curves of first-pass contrast. The assessment of myocardial perfusion post bypass grafting may be confounded by reduced systolic function and scar. Using a 32-channel cardiac coil array, we assessed the accuracy of the MPR index (MPRI) in the revascularised left anterior descending (LAD) artery.

Methods
Twenty-eight patients (11 females, age 65 +/- 10 years) were imaged on a 1.5 Tesla MR Scanner (Philips Achieva, Best, Netherlands) within 12 months of cardiac catheterisation demonstrating patency of left internal mammary (LIMA) grafts (14 patients), stented LAD arteries (5 patients), or the native LAD arteries (9 patients). Adenosine (140 mcg/kg/min) was administered for 3 minutes to achieve maximum myocardial blood flow. Gadoterate meglumine contrast (0.1 mmol/kg, Dotarem, Guerbet, SA) was injected as a single bolus. Three short axis slices were acquired every heartbeat using a non-slice-selective saturation recovery perfusion sequence. A 20 minute resting period allowed partial washout of contrast agent between stress and rest. LAD territory perfusion was assessed in the basal and mid-ventricular anterior and anteroseptal segments; segments with late gadolinium enhancement were excluded. Quantitative myocardial perfusion reserve was derived from a Fermi constrained deconvolution model (CMR Tools, UK). Statistical analysis was performed using Graphpad Prism, USA.

Results
Our patient population with unobstructed LIMAs had significantly lower MPRIs than patients with unobstructed native LADs (median MPRI of 1.8 vs 2.42, Kruskall-Wallis test with Dunn's multiple comparisons test, $p < 0.05$). No difference was seen with patent stented LADs. No difference was seen during stress in the mean transit time (MTT) of the contrast bolus during stress between patients with unobstructed LIMAs and native arteries. No difference in MPRI also was seen between the basal and mid-ventricular slices in the patients with unobstructed LIMAs.

Conclusion
Myocardial perfusion reserve indices were significantly reduced in patent LIMA grafts when compared to unobstructed native LAD arteries (normal ranges 2.5-5). Given the different arterial bed origin and longer course of the

LIMA, further optimisation of quantitative assessment of perfusion post-revascularisation may prove useful.