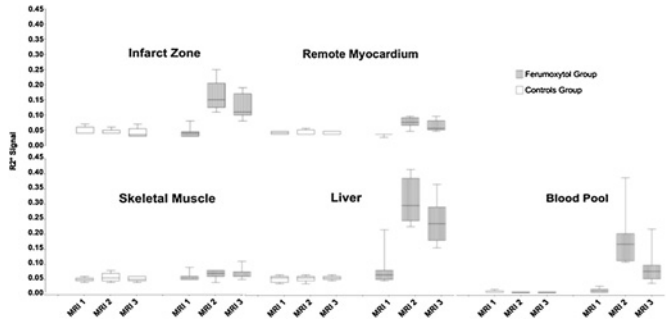
to 0.056). In the infarct zone, the R2* value increased from a baseline of 0.041 s^{-1} (95% CI 0.029 to 0.053) to 0.164 s^{-1} (95% CI 0.125 to 0.204) at 24 h and 0.128 s^{-1} (95% CI 0.097 to 0.158) at 48 h following USPIO administration ($p<0.01$; non-parametric repeated measure one-way ANOVA, Dunn's post test comparison).

Conclusion USPIO are taken up into the infarcted myocardium following acute myocardial infarction and can be quantified by MRI. This approach appears to image infarct-related cellular inflammation and represents an important novel method of assessing recovery following acute myocardial infarction.



Abstract 084 Figure 2 Comparison of R2* signal in different tissues. Highest uptake of USPIO is seen in the infarct zone, liver and blood pool. There is a small increase in R2* signal in the remote myocardium. There is no increase in R2* signal in the control group for any tissue.

085 SYSTOLIC VS DIASTOLIC ACQUISITION IN CARDIOVASCULAR MAGNETIC RESONANCE MYOCARDIAL PERFUSION IMAGING

doi:10.1136/heartjnl-2012-301877b.85

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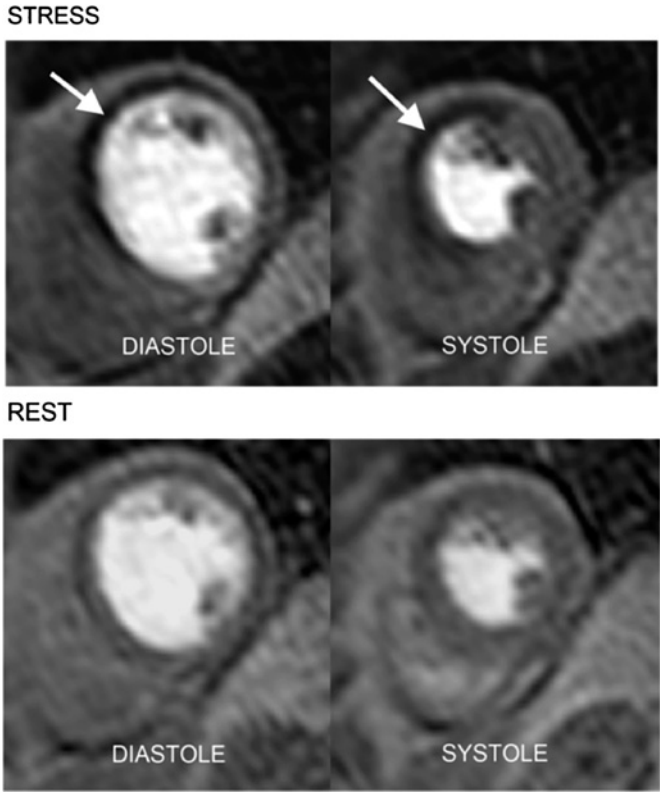
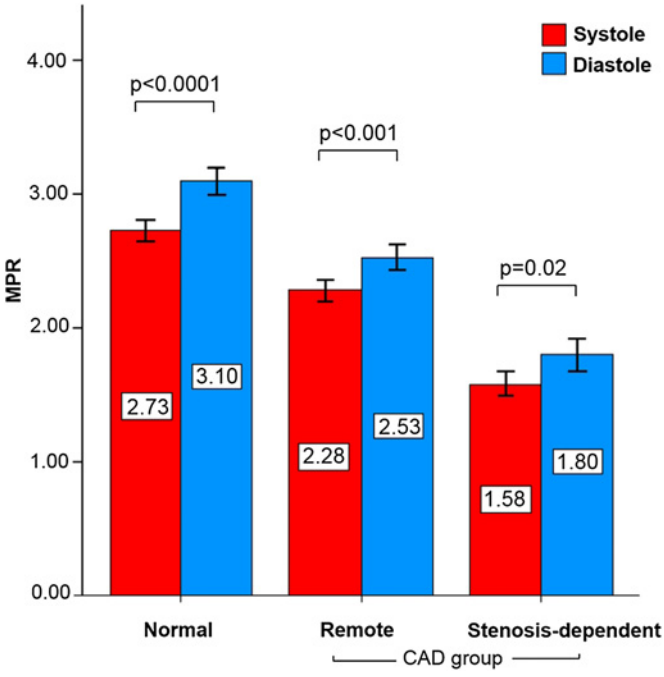
Introduction Although differences in systolic and diastolic myocardial blood flow (MBF) estimates have been shown in healthy volunteers, the impact of cardiac phase on detecting coronary artery disease (CAD) using cardiovascular magnetic resonance (CMR) myocardial perfusion imaging is unknown. The aim of this study was to compare MBF estimates in systole and diastole in patients with suspected CAD and determine if either phase has greater diagnostic accuracy.

Methods Following invasive coronary angiography, 40 patients (68% men, 64±8 yrs) underwent stress/rest perfusion-CMR (1.5T Philips) which was acquired at mid-systole and end-diastole simultaneously. Based on angiographic stenosis >70% (quantitative coronary angiography), patients were grouped as having "CAD" or "no CAD." In patients with CAD, myocardial segments were classified as "stenosis-dependent" (downstream of a significant stenosis) or "remote." For each segment, MBF (Fermi-constrained deconvolution) and myocardial perfusion reserve (MPR) were calculated. The diagnostic accuracy of each phase was determined with receiver operator characteristic analysis.

Results 21 patients (53%) had CAD. A typical example of a patient with ischaemia is shown in Abstract 085 figure 1. Resting MBF was similar in the two cardiac phases for both normal and CAD patients (all p values >0.05). MBF at stress was greater in diastole than systole in normal, remote and stenosis-dependent segments (3.75±1.5 vs 3.15±1.1 ml/g/min; 2.75±1.20 vs 2.38±0.99 ml/g/min; 2.49±1.07 vs 2.23±0.90 ml/g/min; all p values <0.01). MPR was also greater in diastole than systole in all three segment groups (all p values <0.05) (Abstract 085 figure 2). On receiver operator characteristic analysis, the optimal MPR cut-off for the detection of CAD was 1.95 for systole and 2.04 for diastole (area under curve 0.82 vs 0.79; p=0.30).



Abstract 085 Figure 1 Example perfusion-CMR images with acquisition in diastole and systole. This patient had a subtotal occlusion of the left anterior descending artery. Corresponding stress perfusion defects (white arrows) are seen in the anterior; anteroseptal and inferoseptal segments of a mid-ventricular slice acquired in both diastole and systole.



Abstract 085 Figure 2 Comparison of MPR between systole and diastole. Segmental MPR (mean±SEM) in diastole and systole for normal segments, remote CAD segments and stenosis-dependent CAD segments.

Conclusion Estimates of stress MBF and MPR by perfusion-CMR in this study were greater in diastole than systole in normal and CAD patients. Although the diagnostic accuracy of both phases was similar, the MPR cut-off values were different. These observations are relevant to any form of dynamic myocardial perfusion assessment and are of particular importance to promising developments in 3D perfusion-CMR and CT perfusion imaging where the acquisition phase may be specifically chosen. Different estimates of MBF and different MPR cut-off values between phases mean a universal standard needs to be agreed for 3D acquisitions.

086 ASSESSMENT OF ISCHAEMIC BURDEN IN PATIENTS WITH THREE-VESSEL CORONARY ARTERY DISEASE USING HIGH-RESOLUTION MYOCARDIAL PERFUSION CARDIOVASCULAR MRI

doi:10.1136/heartjnl-2012-301877b.86

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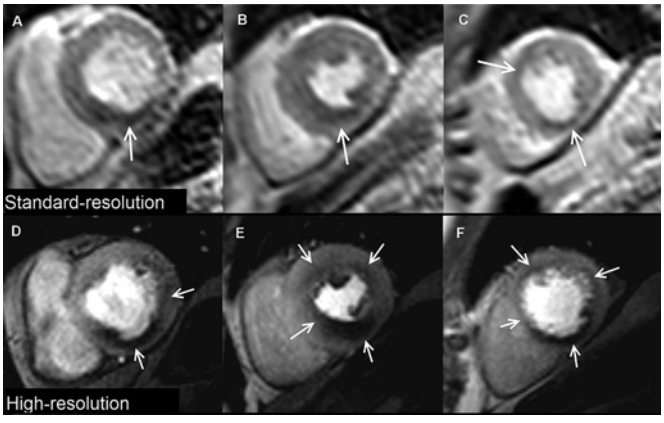
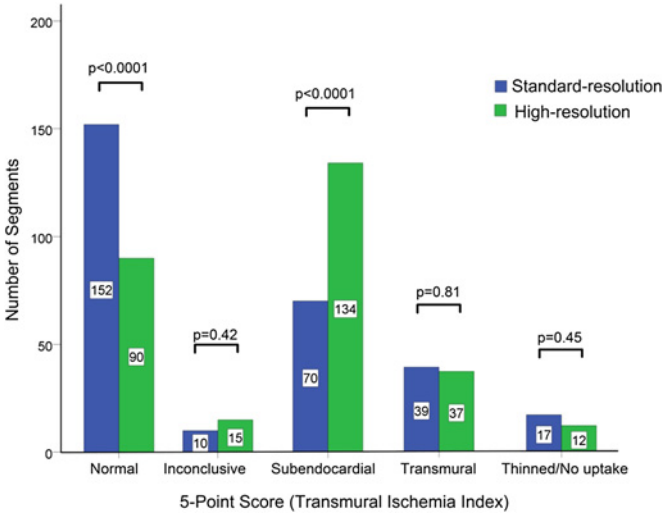
Introduction Patients with three-vessel disease (3VD) have a worse prognosis than those with less extensive disease; but detecting a 3VD pattern of ischaemia can be very challenging due to balanced hypoperfusion. However, a large ischaemic burden can also correctly stratify patients with 3VD as high-risk and prompt the appropriate management. We hypothesised that high-resolution perfusion-CMR would detect more ischaemic burden than standard-resolution due to better detection of subendocardial ischaemia. This study compared ischaemic burden detected by standard-resolution and high-resolution cardiovascular magnetic resonance (CMR) perfusion imaging in patients with 3VD.

Methods CAD was defined as coronary stenosis >70% (QCA). 48 patients (24 with 3VD; 24 with no CAD) underwent stress/rest perfusion-CMR (1.5T Philips) with standard-resolution (2.5 mm in-plane) using twofold SENSE and on a separate visit high-resolution (1.6 mm in-plane) achieved by eightfold k-t broad linear speed up technique (BLAST) acceleration (Abstract 086 figure 1). Perfusion was visually graded in each segment on a 5-point scale and summed to produce a perfusion score for each patient.



Abstract 086 Figure 1 Case example—standard-resolution shows perfusion defects (white arrows) in the basal inferior (A), mid inferior, mid inferoseptal (B), apical anterior and apical inferior segments (C), High-resolution demonstrates additional ischaemia in the basal lateral (D), mid anterior and mid anterolateral segments (E) with a circumferential defect in the apical slice (F), perfusion defects are also better delineated at high-resolution and the transmural extent of ischaemia more clearly seen.

Results In the 3VD group, high-resolution identified more abnormal segments per patient (7.3±3.7 vs 5.2±3.9; p=0.01), more abnormal territories per patient (2.0±0.9 vs 1.46±1.0; p=0.02) and a higher overall perfusion score (17.7±8.6 vs 13.9±10.2; p=0.03). The number of segments with subendocardial ischaemia was greater for high-resolution (134 vs 70 segments; 47% vs 24%; p<0.001) (Abstract 086 figure 2). The sensitivity, specificity and area under the curve (AUC) for identifying any perfusion defect were similar for both methods (high-resolution: 92%, 74% and 0.94 respectively vs standard-resolution: 79%, 84% and 0.87; p>0.05).



Abstract 086 Figure 2 Distribution of transmural ischaemia index. High-resolution perfusion CMR detected significantly more subendocardial ischaemia and fewer normal segments than standard-resolution in angiographically underperfused segments.

Conclusion In patients with 3VD, high-resolution perfusion-CMR detected more ischaemic burden than standard-resolution by identifying more segments with subendocardial ischaemia. High-resolution perfusion-CMR therefore has incremental value in correctly stratifying this high-risk patient group.

087 INCREMENTAL VALUE OF HIGH-RESOLUTION CARDIOVASCULAR MAGNETIC RESONANCE MYOCARDIAL PERFUSION IMAGING IN SUSPECTED CORONARY ARTERY DISEASE

doi:10.1136/heartjnl-2012-301877b.87

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Introduction Although accelerated high-spatial-resolution cardiovascular magnetic resonance (CMR) perfusion imaging has recently been shown to be clinically feasible, there has not yet been a direct comparison with standard-resolution methods. We hypothesised that higher spatial resolution detects more subendocardial ischaemia and leads to greater diagnostic accuracy for the detection of angiographically defined CAD. This study compared the diagnostic accuracy of high-resolution and standard-resolution CMR perfusion imaging in patients with suspected coronary artery disease (CAD).

Methods A total of 111 patients with suspected CAD were prospectively recruited. All patients underwent two separate perfusion CMR studies on a 1.5 Tesla CMR scanner (Intera CV, Philips Healthcare, Best, the Netherlands), one with standard-resolution (2.5×2.5 mm in-plane resolution) and one with high-resolution (1.6×1.6 mm in-plane resolution) acquisition. High-