FRACTIONAL FLOW RESERVE CORRELATES WITH BLOOD OXYGEN LEVEL-DEPENDENT (BOLD) MAGNETIC RESONANCE IMAGING IN CORONARY ARTERY DISEASE

ACC Oral Contributions
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Background: Blood oxygen level-dependent (BOLD) cardiac magnetic resonance imaging (CMR) has the potential to evaluate myocardial ischemia due to different T2* relaxations of oxyhemoglobin and deoxyhemoglobin. Aim of our prospective study was to evaluate its diagnostic ability in comparison to invasively measured fractional flow reserve (FFR) in coronary artery disease.

Methods: BOLD T2-prepared steady-state free-precession sequences were acquired in three short axes (apical, midventricular and basal) at rest and after three minutes of adenosine-infusion at a constant rate of 140 μg/kg/min in a 1.5T whole-body CMR scanner. In each patients 16 myocardial segments were analyzed for relative BOLD signal intensity increase during adenosine in comparison to rest. Invasive FFR measurements were performed in all patients in the major three coronary arteries during adenosine infusion (140 μg/kg/min for three minutes). A FFR ≤0.8 was regarded significant. FFR was compared to BOLD results.

Results: Thirty-four patients were included into the study. BOLD signal intensity increase was significantly lower in myocardial segment supplied by coronary arteries with a FFR ≤0.8 (1.11 ± 0.22 vs. 1.54 ± 0.22, p<0.05). Sensitivity yielded 88.2%, specificity 89.5%.

Conclusions: BOLD CMR reliably detects hemodynamic significant coronary artery disease and offers an alternative to contrast-enhanced perfusion studies.