

Direct Comparison of 3.0 Tesla MRI and 64-Slice CT for Detection of Coronary Artery Stenosis: A Prospective Two Center Study

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Background: Magnetic resonance imaging (MRI) and multislice computed tomography (CT) have emerged as potential noninvasive coronary imaging modalities. The objective of the present study was to directly compare the diagnostic accuracy of the two modalities for detection of clinically relevant coronary artery lesions compared to conventional coronary angiography as the gold standard.

Methods and Results: One hundred twenty consecutive patients (65.1 ± 8.2 years) with suspected or known coronary artery disease (CAD) prospectively underwent 3.0 Tesla MRI and 64-slice CT at two different centers before elective x-ray angiography. The diagnostic accuracy of the two modalities for detecting clinically relevant coronary stenosis (≥ 50% luminal diameter stenoses) was compared using invasive coronary angiography as the reference standard. MRI and CT angiography were successfully completed in 110 patients. In the patient-based analysis MRI and CT angiography showed similar diagnostic accuracy 82% (95% CI, 73 to 88) and 88% (95% CI, 80 to 93); P = 0.18, sensitivity 84% (95% CI, 73-90) vs. 88% (95% CI, 78-93); P = 0.55, specificity 79% (95% CI, 64-88) vs. 88% (95% CI, 75-95); P = 0.34, positive predictive value 86% (95% CI, 75-92) vs. 92% (95% CI, 82-96); P = 0.39 and negative predictive value 76% (95% CI, 61-85) vs. 83% (95% CI, 69-90); P = 0.45, for a disease prevalence of 61%. In the patient-based analysis MRI and CT angiography were similar in their ability to identify patients who subsequently underwent revascularization: the area under the receiver operating characteristic curve was 0.76 (95% CI, 0.67 to 0.85) for MRI and 0.81 (95% CI, 0.73 to 0.90) for CT angiography.

Conclusions: The present study demonstrates the ability of MRI and CT angiography to similarly identify clinically relevant coronary stenosis and to predict subsequent revascularization in patients with suspected or known CAD scheduled for elective coronary angiography.