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Diagnostic performance of perfusion cardiovascular magnetic resonance compared with gated myocardial perfusion spect in patients with known or suspected coronary artery disease

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Introduction/background

Perfusion cardiac magnetic resonance (CMR) is emerging as a valuable imaging technique in patients with known or suspected coronary artery disease (CAD) and it has some potential advantages over myocardial myocardial perfusion scintigraphy.

Purpose

To evaluate the diagnostic performance of adenosine perfusion CMR vs gated single-photon emission computed tomography (SPECT) compared with the anatomical standard of quantitative coronary angiography (QCA) in patients with known or suspected CAD.

Methods

Ninety-five patients scheduled for coronary angiography underwent both adenosine perfusion CMR and adenosine technetium-99 m tetrofosmin SPECT. Stress CMR perfusion imaging was performed with a hybrid-EPI sequence after 4 minutes of 140 μg/kg/min adenosine and 0.1 mmol/kg of gadolinium, and followed by late enhancement imaging. Rest CMR perfusion images were acquired >20 minutes after stress perfusion imaging. Tc-99 m SPECT was performed with a 1 day stress-rest protocol. CAD was defined as diameter stenosis ≥50% on QCA. Two blinded observers per modality analyzed the images both qualitatively (presence/absence of inducible ischemia) and quantitatively: myocardial perfusion reserve index (MPRI) by CMR and sum difference score (SDS) by SPECT. An MPRI ≤ 2 by CMR was considered abnormal. The comparison of CMR vs SPECT was based on receiver operating characteristic (ROC) analysis.

Results

Analysis of all patients showed that perfusion CMR had similar diagnostic performance to SPECT: area under ROC curve (AUC): 0.74 +/- 0.050 vs 0.683 +/- 0.052 for SPECT, p = 0.29 based on qualitative assessment and 0.675 +/- 0.054 vs 0.583 +/- 0.024 for SPECT, p = 0.10 based on MPRI and SDS.

Similar results were observed in the subgroup of patient with previous myocardial infarction. (n = 34, 38% - defined as the presence of late myocardial enhancement by CMR).

However, in the subgroup of patients without previous myocardial infarction, CMR MPRI had significantly better diagnostic performance than SPECT SDS: AUC 0.695 +/- 0.063 vs 0.552 +/- 0.029, respectively, p = 0.027.

Conclusion

In patients with known or suspected CAD, perfusion CMR has a similar diagnostic performance to Tc-99 m gated SPECT and has particular advantage in patients without previous infarction. CMR represents a valuable alternative imaging modality to assess CAD.