Dokumenttyp: journal article

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Titel des Beitrags: Assessment of coronary flow reserve: comparison between contrast-enhanced magnetic resonance imaging and positron emission tomography.

Abstract: OBJECTIVES: The study compared flow reserve indices by magnetic resonance imaging (MRI) with quantitative measures of coronary angiography and positron emission tomography (PET). BACKGROUND: The noninvasive evaluation of myocardial flow by MRI has recently been introduced. However, a comparison to quantitative flow measurement as assessed by PET has not been reported in patients with coronary artery disease (CAD).

METHODS: Two groups of healthy volunteers and 25 patients with angiographically documented CAD were examined by MRI and PET at rest and during adenosine stress. Dynamic MRI was performed using a multi-slice ultra-fast hybrid sequence and a rapid gadolinium-diethylenetriamine penta-acetic acid bolus injection (0.05 mmol/l). Upslope and peak-intensity indices were regionally determined from first-pass signal intensity curves and compared to N-13 ammonia PET flow reserve measurements. RESULTS: In healthy volunteers, the upslope analysis showed a stress/rest index of 2.1 plus minus 0.6, which was higher than peak intensity (1.5 plus minus 0.3), but lower than flow reserve by PET (3.9 plus minus 1.1). Localization of coronary artery stenoses (> 75%, MRI < 1.2), based on the upslope index, yielded sensitivity, specificity and diagnostic accuracy of 69%, 89%
and 79%, respectively. Upslope index correlated with PET flow reserve ($r = 0.70$). A reduced coronary flow reserve (PET < 2.0, MRI < 1.3) was detected by the upslope index with sensitivity, specificity and diagnostic accuracy of 86%, 84% and 85%, respectively. CONCLUSIONS: Magnetic resonance imaging first-pass perfusion measurements underestimate flow reserve values, but may represent a promising semi-quantitative technique for detection and severity assessment of regional CAD.