

Adenosine-Induced Stress Myocardial Perfusion MRI Using SW-CG-HYPR with Whole Left Ventricular Coverage: Comparison of Results with X-Ray Angiography in Patients with Suspected Coronary Artery Disease

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Introduction

Myocardial perfusion MRI with sliding-window conjugate-gradient HYPR (SW-CG-HYPR) allows increased spatial coverage (whole left ventricular coverage), resolution, signal-to-noise ratio and reduced motion artifacts (1-2). The accuracy of this technique for detecting coronary artery disease (CAD) has not been determined in a large number of patients. The purpose of this study was to prospectively evaluate the diagnostic performance of adenosine-induced stress myocardial perfusion MRI with SW-CG-HYPR in patients with suspected CAD.

Methods

Fifty consecutive patients (28 men and 22 women; mean age, 56 ± 16 years) who were scheduled for coronary angiography with suspected CAD underwent myocardial adenosine stress perfusion MRI with SW-CG-HYPR at 3.0T. Perfusion defects were interpreted qualitatively by 2 blinded observers and were correlated to x-ray angiographic stenoses $\geq 50\%$.

Results

The prevalence of CAD was 56%. In the per-patient analysis, the sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of SW-CG-HYPR myocardial perfusion imaging were 96% (95% confidence interval [CI] 82% to 100%), 82% (95% CI 60% to 95%), 87% (95% CI 70% to 96), 95% (95% CI 74% to 100%), and 90% (95% CI 82% to 98%), respectively. In the per-vessel analysis, these values were 98% (95% CI 91% to 100%), 89% (95% CI 80% to 94%), 86% (95% CI 76% to 93%), 99% (95% CI 93% to 100%), and 93% (95% CI 89% to 97%), respectively (Figures 1 and 2).

Conclusions

Adenosine-Induced stress myocardial perfusion MRI using SW-CG-HYPR allows whole left ventricular coverage and has high diagnostic accuracy in patients with suspected CAD.

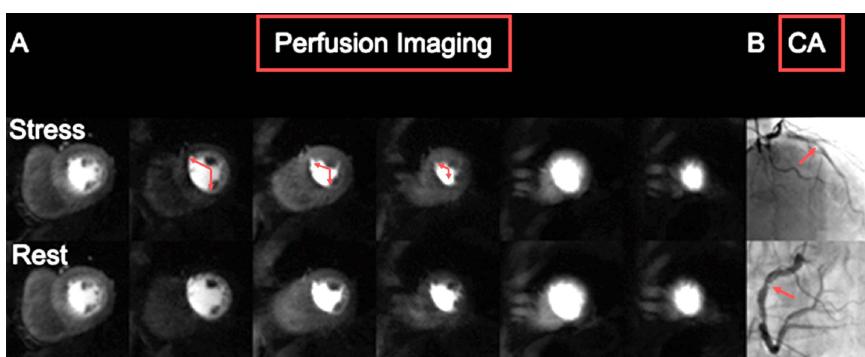


Figure 1: (A) Myocardial perfusion MRI with SW-CG-HYPR detects perfusion defects in the basal and mid septal segments, corresponding to significant stenoses in the LAD and RCA. (B) Coronary angiography reveals significant stenoses in the LAD and RCA.

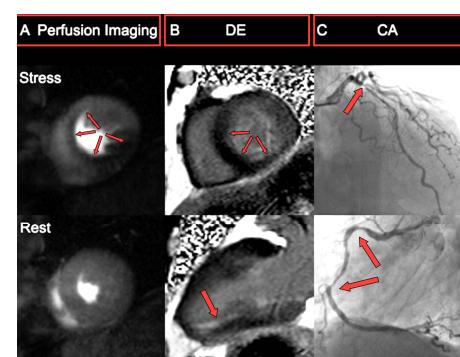


Figure 2: (A) Myocardial perfusion MRI with SW-CG-HYPR detects perfusion defects in the mid anterior, septal, and inferior segments, corresponding to significant stenoses in the LAD and RCA. (B) DE shows subendocardial hyperenhancements in the mid inferoseptal and inferior segments. (C) CA reveals significant stenoses in the LAD and RCA.

References

1. Ge L, et al. Magn Reson Med 2009;62:835-839.
2. Ge L, et al. Magn Reson Med 2010; 64:1148-1154.