

Meeting abstract

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2023 SSFP based dipyridamole stress first pass perfusion imaging is accurate for the assessment of obstructive coronary artery disease

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Background

Cardiovascular magnetic resonance (CMR) perfusion imaging primarily uses either FLASH, GRE-EPI or steady state free precession (SSFP) imaging sequences. Compared with the other perfusion sequences, SSFP has a higher contrast to noise ratio and linearity of signal intensity; however, an intermediate temporal resolution. There are only small (< 30 subjects) studies describing the diagnostic accuracy of SSFP based vasodilator first pass perfusion for detecting obstructive coronary artery disease.

Purpose

To determine the accuracy of SSFP based vasodilator first pass perfusion CMR against a reference standard of invasive coronary angiography in human subjects.

Methods

181 consecutive subjects were referred for CMR stress testing utilizing dipyridamole (0.56 mg/kg over 4 minutes) and first pass gadolinium enhanced imaging (0.05 mmol/kg). CMR was performed on a Siemens Espree 1.5 T scanner with a phased array surface coil. A saturation recovery, SSFP sequence was utilized to obtain 3 images every heart beat. Invasive cardiac catheterization defined the presence of obstructive disease as a visual or intravascular ultrasound assessment of > 70% stenosis involving a major epicardial coronary vessel or > 50% of the left main, or a fractional flow reserve of < 0.75.

Results

Patients averaged 59 ± 9 years and 122 were men (67%). Forty-nine subjects underwent cardiac catheterization within 90 days, yielding a sensitivity of 93%; specificity 83%; positive predictive value 90%; negative predictive value 88%; and accuracy 90%. In the 132 patients that did not have coronary angiography, 14 subjects had vasodilator stress induced perfusion defects consistent with myocardial ischemia. If all of these cases are considered false positive with stress induced perfusion defects, the overall specificity is no lower than 89%. Determination of sensitivity in the remaining subjects that did not get catheterization can not be determined at this time.

Conclusion

SSFP based dipyridamole stress first pass contrast perfusion imaging is accurate for the assessment of obstructive coronary artery disease.