

3 Tesla MR Imaging Provides Improved Contrast in First-Pass Myocardial Perfusion Imaging Over a Range of Gadolinium Doses

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Abstract

Purpose: To compare myocardial enhancement during first-pass myocardial perfusion imaging in normal volunteers scanned at both at 3.0 Tesla (T) and 1.5 T

Materials and Methods: First pass myocardial perfusion imaging was performed on thirteen normal subjects at 3T and 1.5T. Subjects were divided into three groups depending on the concentration of contrast material. In group 1 (n=4), subjects received 0.075mmol/kg of Gd-DTPA for the 3T scan and also for the 1.5T scan. In group 2, (n=5) subjects received 0.10 mmol/kg for both scans. In group 3, (n=3) subjects received 0.075 mmol/kg for the 3T scan and 0.10 mmol/kg for the 1.5T scan.

Results: At matched concentrations of Gd-DTPA of either 0.10 or 0.075 mmol/kg, enhancement was significantly greater at 3T. At 0.075mmol/kg, the increase in myocardial enhancement was approximately double at 3T compared to 1.5T. At 0.10mmol/kg, the enhancement fell short of the expected doubling but was still significantly greater than at 1.5T. For the unmatched group, perfusion imaging at 3T with 0.075mmol/kg of Gd-DTPA produced enhancement that was significantly greater than imaging at 1.5T using 0.10mmol/kg of Gd-DTPA.

Conclusion: Imaging at 3T improves contrast in MR first-pass myocardial perfusion imaging, when using either 0.10 mmol/kg or 0.075 mmol/kg.

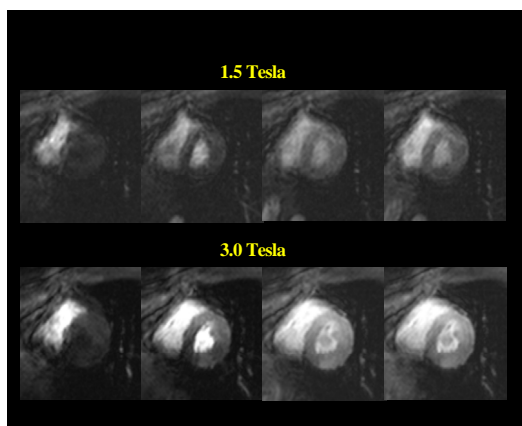


Figure 1. Perfusion images at 1.5T and 3T

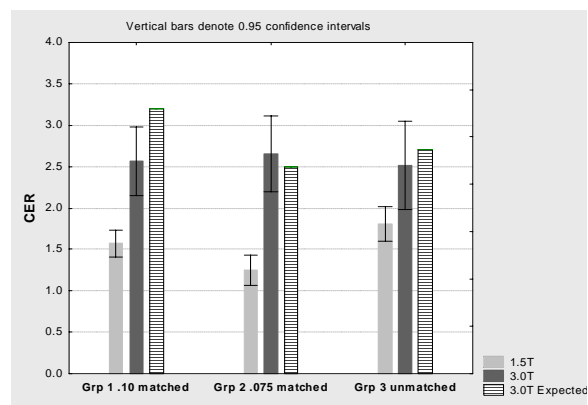


Figure 2. CER – contrast enhancement ratio = (peak signal intensity – baseline signal intensity)/baseline signal intensity