The aim of this study was to compare the contrast-to-noise ratio (CNR) values of infarct and remote myocardium as well as infarct and blood after application of 0.1 mmol/kg gadobutrol and 0.1 mmol/kg gadobenate dimeglumine on late gadolinium enhancement magnetic resonance (MR) images. The study was a prospective randomized controlled clinical study. After informed consent was obtained, 20 patients (12 men, 8 women; mean age, 67 ± 11 years) with known chronic myocardial infarction were included for an intraindividual comparison of a single-dose gadobutrol and a single-dose gadobenate dimeglumine. Two MR imaging examinations were performed within a period of 28 days in a crossover design. Late gadolinium enhancement imaging was performed 10 minutes after gadolinium administration using a 2-dimensional phase-sensitive inversion recovery gradient echo sequence at 3 T. Infarct size, signal intensities (SIs), signal-to-noise ratio, and CNR were determined on phase-sensitive MR images. Values for CNR were calculated as CNRinfarct/myocardium = (SInfarct - SMyocardium)/SDnoise and CNRinfarct/blood = (SInfarct - Sblood)/SDnoise. In addition, the areas of myocardial infarction were...
determined on single slices. The entire infarct volumes were calculated by adding the areas with hyperenhancement multiplied by the slice thickness. Late gadolinium enhancement was present in all patients. Median values of the infarct area, infarct volume, and transmurality for gadobutrol and gadobenate dimeglumine showed good to excellent concordance (rc = 0.85, rc = 0.95, and rc = 0.71, respectively). The mean signal-to-noise ratio values for infarct, remote myocardium, and ventricular blood were 18.6 ± 6.5, 4.1 ± 3.7, and 14.6 ± 7.5, respectively, for gadobutrol and 18.8 ± 8.9, 4.9 ± 4.5, and 17.8 ± 10.1, respectively, for gadobenate dimeglumine (P = 0.93, P = 0.48, and P = 0.149, respectively). The mean values of CNRinfarct/myocardium and CNRinfarct/blood were 14.5 ± 5.9 and 4.0 ± 4.6, respectively, for gadobutrol and 13.9 ± 6.1 and 0.9 ± 4.5, respectively, for gadobenate dimeglumine (P = 0.69 and P = 0.02, respectively). Both gadobutrol and gadobenate dimeglumine allow for successful late gadolinium enhancement imaging of chronic myocardial infarction after a single-dose application (0.1 mmol/kg) at 3 T. Gadobutrol provides a higher CNR between infarct and blood. The CNRs between infarct and normal myocardium, infarct size, and transmural extent were similar for both contrast agents.