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Ferucarbotran Enhanced Hepatic MR Imaging at 3T Unit: Quantitative and Qualitative Comparison of Fast Breath-Hold Imaging Sequences for Detection of Solid Focal Lesions

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Purpose: To evaluate the relative usefulness of various fast breath-hold imaging sequences for superparamagnetic iron oxide (SPIO) enhanced hepatic MR imaging for detection of solid focal lesions at 3T unit.

Materials and Methods: 00 consecutive patients with one or more solid hepatic lesions evaluated by spoiled gradient echo (GRE) sequences with three different echo time (2.4 msec [GRE_2.4], 5.8 msec [GRE_5.8], and 10 msec [GRE_10]) and one fat-suppressed fast spin echo (FSE) sequence after intravenous SPIO injection were subjected. Their image quality of hepatic contour, vascular landmarks, and artifacts were rated with 4-point scale by two readers. Contrast-to-noise ratio (CNR) was measured for 000 focal lesions larger than 1 cm (hepatocellular carcinomas, n = 00; cholangiocarcinomas, n = 0; metastases, n = 00) on each imaging sequence for quantitative analysis.

Results: Mean CNR was significantly higher ($p < .001$) on the following order: GRE_10 (24.4 ± 14.5), GRE_5.8 (14.8 ± 9.4), FSE (9.7 ± 6.3) and GRE_2.4 (7.9 ± 6.4). There was no significant CNR difference between FSE and GRE_2.4 ($p = .085$). For the qualitative points of hepatic contour and imaging artifact, those of GRE_10 were worst among the four different sequences ($p < .03$). Intrahepatic vascular delineation was more difficult in FSE than in all of the GRE sequences ($p < .001$). GRE_2.4 showed highest mean point on hepatic contour and imaging artifact among the all of the subjected sequences ($p < .02$), and comparable ($p = .414$) with GRE_5.8 on vascular anatomy. GRE_5.8 was firstly ranked on vascular anatomy, and secondly ranked on quality of hepatic contour and imaging artifact in addition to CNR comparison.

Conclusion: Regarding the overall quantitative and qualitative performances of the fast breath-hold SPIO-enhanced hepatic MR imaging sequences, GRE_5.8 can be recommended depending on the relatively high combined value at 3.0T unit.