

Detection and characterization of hepatic metastases with superparamagnetic iron oxide enhanced diffusion weighted MR imaging

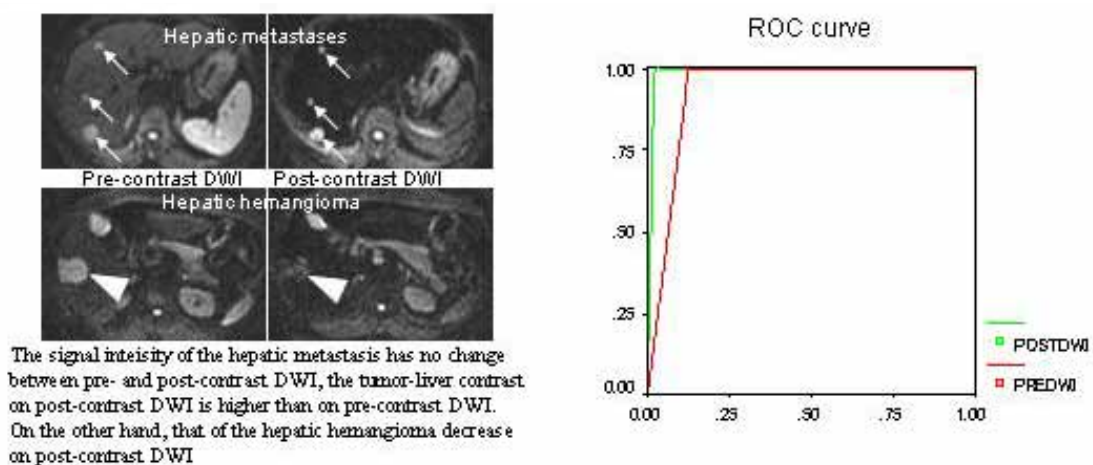
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Purpose: The purpose of this study is to determine the usefulness of superparamagnetic iron oxide (SPIO) enhanced diffusion weighted imaging (DWI) for detection and characterization of the hepatic metastasis.

Materials and methods: The subjects were 24 patients with 80 hepatic metastases (tumor size: 0.2-5.0cm, median: 1.1cm) and 19 patients with benign lesions (cysts and hepatic hemangiomas) who underwent SPIO-enhanced diffusion weighted MR imaging. Diffusion weighted MR images were obtained by single-shot EPI sequence during breath hold (on Siemens Magnetom Sonata 1.5T, TR/TE=2100/69-77, b factor=500 s/mm², PAT factor=2, Acquisition time=23sec, Slice thickness=5mm, Matrix= 128 x 96) before and 8 minutes after the injection of SPIO (ferucarbotran: 8 µmol Fe/kg). For all 43 cases, two independent off-site observers separately reviewed following 2 sets order: pre-contrast DWI set (pre-contrast heavily T2WI and DWI) and post-contrast DWI set (pre-contrast heavily T2WI, pre-contrast and post-contrast DWI) on segment by segment basis, assigning the site (Couinaud segment) and confidence level for the presence of the hepatic metastasis (1,definitive absent; 2,probably absent; 3,equivocal; 4,probably present; 5,definitive present). Observer performance was evaluated by means of sensitivity, specificity, and ROC curve analysis.

Results: Sensitivity of pre-contrast DWI set was similar to that of post-contrast DWI set (means,93.8% vs 92.5%),but specificity of post-contrast DWI was significantly superior to pre-contrast DWI (means, 87.8% vs 97.5%). Area under ROC curve (Az) value was higher with post-contrast DWI set than with pre-contrast DWI set (means, 0.937 vs 0.998).



Conclusion: Detection and characterization of hepatic metastases were improved with SPIO enhanced diffusion weighted MR images.