Detection and Characterization of Focal Liver Lesions£ºComparison of 1.5-T and 3.0-T MR Imaging in the Same Patient

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Introduction

Over the past 2 years, high-field 3.0-T MRI have been installed in many institution and have already been shown to be advantageous for various indications in the brain and musculoskeletal system compared with standard high-field 1.5-T MRI scanner. Only a few scientific studies have been published describing the use of 3.0-T MR systems in abdomen, especially in the liver. We undertook this study to compare 1.5-T and 3.0-T MR imaging for detection and characterization of focal liver lesions in the same patient.

Methods

From November 2005 to November 2006, 36 patients (29 men and 7 women, aged 28~76 years, mean 54 years) with focal hepatic lesions confirmed by ultrasound or CT have been examined at 1.5T GE MR system. The unenhanced MR images included FSE T2WI with fat saturation, a breath-hold T1WI (2D FSPGR) and out of phase sequence. For gadolinium-enhanced MR imaging, multiphase dynamic 3D FSPGR with fat-suppressed was obtained during suspended respiration (56~84 slices within 19~21sec, Gd-DTPA 0.1mmol/kg, power injector 1.5~3.0ml/sec, scan delay time 18~25sec, axial and coronal scanning performed, and scan interval 5~10sec). 3D with fat saturation was used in delayed scanning (6~10 minutes post-injection). The same patient underwent 3.0-T MR imaging 1 to 7 days later. The sequence protocol included FSE T2WI with fat saturation, a breath-hold T1WI (2D FSPGR) and out of phase sequence. Multiphase dynamic 3D FSPGR（LAVA）gadolinium-or dimeglumine-enhanced MR imaging was obtained in 21 patients. The 1.5-T image set (precontrast and gadolinium-enhanced MR imaging) and 3.0-T image set (precontrast and gadolinium-or dimeglumine-enhanced MR imaging) were interpreted prospectively in a blinded fashion.

Results and Discussion

The 1.5-T precontrast image detected 107 focal liver lesions and the lesions included 37 HCCs in 18 patients, 4 cholangiocarcinomas, 2 bile cystadenocarcinomas, 45 metastasis in 3 patients, 1 hemangiomyolipoma, 1 adenoma, 1 liver adenomatosis and 16 FNHs in 6 patients. The 1.5-T gadolinium-enhanced MR imaging detected 6 focal liver lesions more than that of precontrast image.

The 3.0-T precontrast image detected 107 focal liver lesions and the 3.0-T gadolinium-or dimeglumine-enhanced MR imaging detected 9 focal liver lesions more than that of precontrast image.

The 1.5-T image set and the 3.0-T image set diagnosed correctly 96 and 98 focal liver lesions respectively ($P > 0.01$).

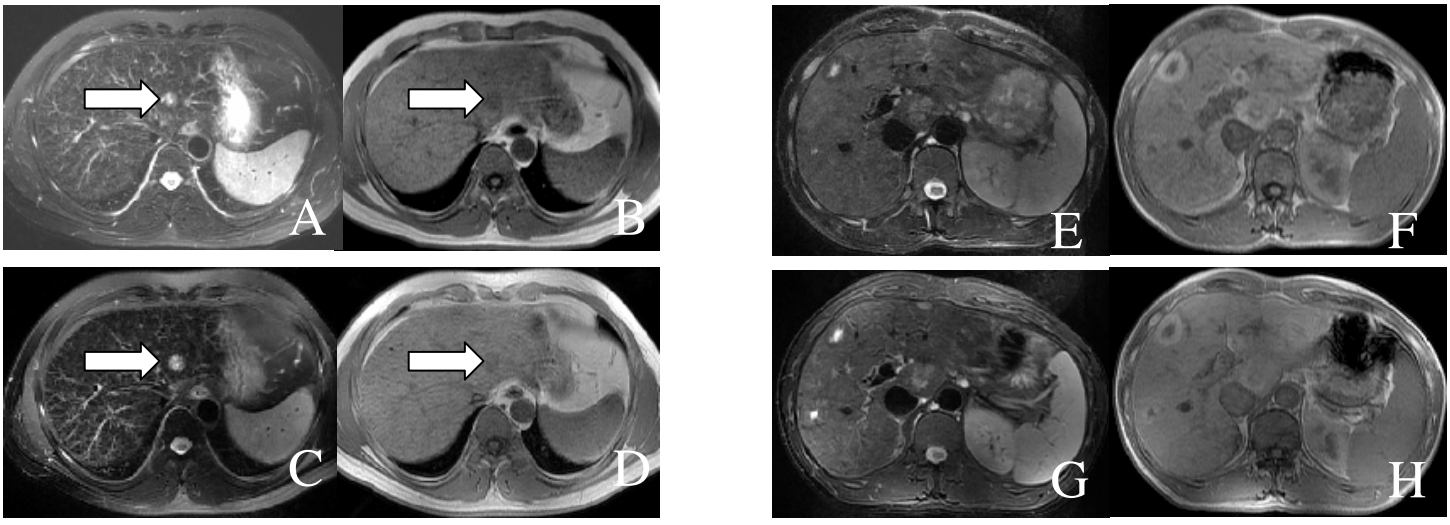
Results of this study indicate that there was no significantly difference for focal liver lesion detection and characterization between the 1.5-T image set and the 3.0-T image set ($P > 0.01$) although the 3.0-T image set provides more detail information about lesion contour and liver background.

Conclusion

The efficiency of the 1.5-T image set for detection and characterization of focal liver lesions is the same with that of the 3.0-T image set.

References

Merkle EM, Haugan PA, Thomas J, et al. AJR 2006; 186: 516-521



A-44-year old male with small HCC of left lobe confirmed pathologically: (A)~(B) 1.5T T2WI and 2D FSPGR T1WI*, (C)~(D) 3.0T T2WI and 2D FSPGR T1WI*.

A-28-year old male with multiple FNHs confirmed by dimeglumine-enhanced MR imaging and pathologically: (E)~(F) 1.5T T2WI and 2D FSPGR T1WI*, (G)~(H) 3.0T T2WI and 2D FSPGR T1WI*.