Detection and Characterization of Hepatocellular Carcinomas£ºComparison of Gadolinium-Enhanced 3D MR imaging and Digital Subtraction Angiography in the Same Patient

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Introduction

Gadolinium-enhanced 3D MR imaging and digital subtraction angiography (DSA) have been proved effective techniques for detection and characterization of hepatocellular carcinoma (HCC). Few researches compared the efficiency of those techniques. We undertook this study to compare the efficiency of gadolinium-enhanced 3D MR imaging and DSA for detection and characterization of HCCs in the same patient.

Methods

From November 2002 to October 2005, 73 patients (69 men and 4 women, aged 32~70years, mean 51 years) with HCCs confirmed clinically or pathologically have been examined at 1.5 T or 3.0 T GE MR system. The unenhanced MR images included FSE T2WI with fat saturation, a breath-hold in phase and out of phase image. 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 0.2ml/kg, power injector 1.5~3.0ml/sec, scan delay time 18~23sec, axial and coronal scanning performed, and scan interval 5~10sec). 3D or 2D FSPGR with fat saturation was used in delayed scanning (6~10 minutes postinjection). The same patient underwent DSA (GE LCV+) examination and transcatheter arterial chemoembolization treatment 1 to 14 days later. The gadolinium-enhanced 3D MR image set (included unenhanced MR image) and DSA image set were interpreted prospectively in a blinded fashion.

Results and Discussion

The gadolinium-enhanced 3D MR image set detected 139 HCCs, which included solitary lesion in 16 patients and multiple lesions in 57 patients. The DSA image set depicted 171 HCCs, which included solitary lesion in 14 patients and multiple lesions in 59 patients. For HCCs less than 1.0cm, the gadolinium-enhanced 3D MR image set detected 5 lesions and the DSA image set depicted 37 lesions ($P < 0.01$). For HCCs larger than 1.0cm, the detection rate of gadolinium-enhanced 3D MR image set (134 lesions) was the same with that of the DSA image set.

The gadolinium-enhanced 3D MR image set diagnosed 128 HCCs correctly and 133 HCCs were diagnosed correctly by the DSA image set.

Results of this study indicate that the DSA image set detected more HCCs (≤1.0cm) than that of the gadolinium-enhanced 3D MR image set ($P < 0.01$) and there was no significantly different between the gadolinium-enhanced 3D MR image set and the DSA image set for detection HCC larger than 1.0cm ($P > 0.01$). DSA was quite difficult sometimes for characterization of HCCs, but the gadolinium-enhanced 3 D MR image set was relatively easy for those lesions. For characterization of HCC, the gadolinium-enhanced 3D MR image set (92.1%) is superior to the DSA image set (77.8%) ($P < 0.01$). Combined the gadolinium-enhanced 3 D MR image set and the DSA image set, the efficiency of detection and characterization of HCCs will be improved.

Conclusion

The gadolinium-enhanced 3D MR image set is superior to the DSA image set for characterization of HCCs. The DSA image set is superior to the gadolinium-enhanced 3D MR image set for Detection of HCCs (≤1.0cm).

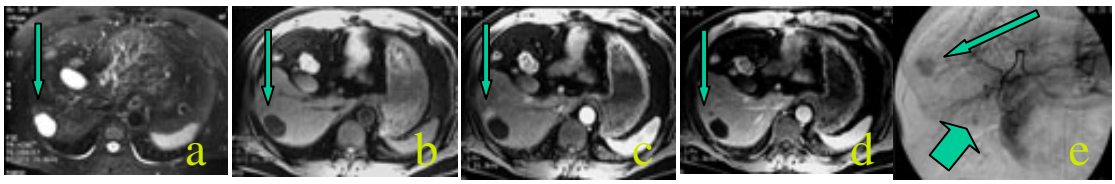

Fig A-51-year old male with pathologically proved two small HCCs (a) T2WI, (b) T1WI* with fat saturation, (c) Gd-DTPA arterial phase, (d) portal venous phase, (e) DSA The large lesion (arrow) were detected and characterized by the gadolinium-enhanced 3D MR image set. The small lesion (arrowhead) were only detected and characterized by DSA

References

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2. Lim JH, et al. AJR, 2000, 175: 693-698.