DETECTION OF HEPATOCELLULAR CARCINOMA USING COMBINING GADOXETIC ACID-ENHANCED AND DIFFUSION-WEIGHTED MR IMAGING IN PRETRANSPLANT PATIENTS: EMPHASIS ON THE SEVERITY OF LIVER CIRRHOSIS

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Target audience: Gastrointestinal radiologists who are interested in detection of HCC with MR imaging.

Purpose: To evaluate diagnostic performance of combining gadoxetic acid–enhanced and diffusion-weighted (DW) magnetic resonance (MR) imaging for detection of HCCs with an emphasis on the severity of liver cirrhosis in pre-liver transplantation patients, using liver explants as the standard of reference.

Methods: Our study received institutional review board approval, and the requirement for informed consent was waived. The study included 55 patients (46 men, 9 women, mean age, 52 years; Child-Pugh A, 18 patients; Child-Pugh B, 18 patients; Child-Pugh C, 19 patients) who underwent gadoxetic acid-enhanced MR imaging and DW imaging at 3.0-T within 90 days of liver transplantation. Two independent radiologists reviewed MR imaging for HCC detection. Sensitivity and positive predictive values were calculated with respect to the lesion size and severity of liver cirrhosis.

Results: A total of 103 HCCs (size range, 0.5-6.0 cm; mean, 1.99 ± 1.21) were identified in 45 patients on liver explants (Child-Pugh A, 38 HCCs; Child-Pugh B, 33 HCCs; Child-Pugh C, 32 HCCs). With regard to the lesion size, the sensitivity for the detection of HCCs larger than 2 cm was significantly higher than that for HCCs smaller than 1 cm or for HCCs 2 cm or smaller for both observers ($P < 0.05$). There was no significant difference in sensitivity between HCCs smaller than 1 cm and HCCs measuring 1-2 cm for both observers ($P > 0.05$). For both observers, the sensitivity for HCCs was highest in Child-Pugh class B (93.9 % for observer 1, 100.0 % for observer 2), followed by Child-Pugh class A (86.8 % for observer 1, 89.5 % for observer 2), and Child-Pugh class C (53.1 % for both observers). There was no significant difference in sensitivity between Child-Pugh class A and B for both observers ($P > 0$ .05). For both observers, there was s significant difference in sensitivity for HCCs between Child-Pugh class A and C or between Child-Pugh class B and C ($P < 0.05$).

Discussion: Gadoxetic acid-enhanced MR imaging and Diffusion-weighted imaging (DWI) has recently been widely used as a comprehensive liver imaging modality including evaluation of HCC. However, it is suspected that limited sensitivity of gadoxetic acid-enhanced hepatobiliary phase imaging (HBP) and DWI in the evaluation of HCC due to restricted diffusion with lower ADC values of cirrhotic liver and reduced enhancement of liver parenchyma in the HBP. To date, only a few studies have assessed the efficacy of combined reading of gadoxetic acid-enhanced MRI and DWI for detection of HCC, particularly in severe cirrhotic liver. Our study showed acceptable diagnostic performance in the detection of HCC with combined reading of gadoxetic acid-enhanced MRI and DWI in Child-Pugh class A and B, and significantly decreased sensitivity in Child-Pugh class C. With regard to the lesion size, there was a trend toward increased sensitivity with increased lesion size.

Conclusions: Combining gadoxetic acid–enhanced and diffusion-weighted (DW) magnetic resonance (MR) imaging provided acceptable diagnostic performance in the detection of HCC in Child-Pugh class A and B.