Gadoxetic Acid-Enhanced Magnetic Resonance Imaging for Evaluation of Borderline Hepatocellular Nodules in Cirrhotic Livers

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Objectives: To determine the pathologic nature of hypointense hepatocellular nodules in cirrhotic liver on hepatobiliary phase imaging (HBPI) of gadoxetic acid (Gd-EOB-DTPA, Primovist®)-enhanced magnetic resonance imaging (MRI) and to describe the chronological changes of their imaging features on follow-up MRI.

Materials and Methods: Thirty-nine cirrhotic patients with 62 nodules showing iso-or hypovascularity on dynamic phases and hypointensity on hepatobiliary phase images (HBPI) (≥1 cm in diameter) of gadoxetic acid-enhanced MRI, were enrolled in this study. During the follow-up period (≥12 months after the initial MRI), 28 nodules were histopathologically confirmed (group 1) and 40 nodules were repeatedly followed up on gadoxetic acid-enhanced MR examinations (group 2). Six nodules belonged to both groups. Two, clinically experienced radiologists reviewed in consensus the initial and follow-up MR images regarding interval size changes of the nodules and their signal intensities (SI) on unenhanced T1- and T2-weighted images, dynamic phase images, and HBPI. Two, liver pathologists reviewed the pathology slides of the 28 nodules, including the H&E staining and four kinds of immunochemical staining examinations including heat-shock protein 70, glypican-3, CD-34, and glycoprotein.

Results: In the group 1 patients with histopathologic confirmation (n = 28), 24 (85.7%) nodules were histopathologically confirmed as hepatocellular carcinomas (HCC) and four (14.3%) as high-grade dysplastic nodules (HGDN). In addition, in group 2 (n = 40) with the follow-up MR examinations, 31 (77.5%) nodules showed interval changes in at least one of the following three imaging features after 11.0±3.7 months: increase of diameter by ≥3 mm (n = 23, 57.5%): arterialization (n = 12, 30.0%); and increase of T2 SI (n = 15, 37.5%). Sixteen (40.0%) nodules showed a change in only one feature, 11 (27.5%) showed change in two features, and four (10.0%) showed change in all three features.

Conclusion: Our study results demonstrate that a significant proportion of hypovascular and hypointense nodules (≥1 cm in diameter) seen on HBPI of gadoxetic, acid-enhanced MRI in patients with liver cirrhosis, showed either malignant features on pathology (85.7%) or imaging features suggesting malignant changes (77.5%). Therefore, these are clinically significant lesions which must be closely followed or which require local ablation treatment.