Small (≤ 2 cm) Enhancing Lesions Seen Only during the Hepatic Arterial Phase: Evaluation with Gadobenate Dimeglumine (Gd-BOPTA) enhanced MR Imaging during the Hepatobiliary Phase

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PURPOSE: To retrospectively assess whether gadobenate dimeglumine (Gd-BOPTA) enhanced MR imaging during the hepatobiliary phase can improve the characterization of small (≤20 mm in diameter) hepatic arterial phase-enhancing (HAPE) lesions that are occult during portal and equilibrium phases and at unenhanced T1- and T2-weighted MR images.

METHOD AND MATERIALS: This study was approved by the institutional review board and a waiver for informed consent was obtained. Two-hundred and fifty patients who underwent Gd-BOPTA (MultiHance, Bracco®) enhanced MR imaging were evaluated with breath-hold T2-weighted images and volumetric three-dimensional Gd-BOPTA-enhanced T1-weighted GRE MR images acquired in the arterial (25s), portal venous (60s), equilibrium (180s), and hepatobiliary phase (90min). Two readers retrospectively reviewed the MR images in consensus for small HAPE-only nodules. The final study group included 38 patients (27 men and 11 women) aged 23-82 years (median age, 64.2 years) with a total of 65 HAPE-only lesions. Qualitative analysis of MR enhancement features during the hepatobiliary phase was related to pathology reports or imaging follow-up (at least 1 year). Sensitivity, specificity, and positive and negative predictive values with corresponding 95% confidence intervals (CIs) were determined.

RESULTS: Of the 65 HAPE-only lesions, 30 (46%) were hepatocellular carcinomas (HCCs). The remaining 35 (54%) lesions were considered definite pseudolesions. The sensitivity and specificity of Gd-BOPTA MR imaging during the hepatobiliary phase for Adepicting HCCs was 70% (21 of 30) and 86% (30 of 35), respectively. The positive and negative predictive values of Gd-BOPTA MR imaging were 80.7% (21 of 26) and 76.9% (30 of 39), respectively.

CONCLUSION: Gd-BOPTA-enhanced MR imaging during the hepatobiliary phase has high specificity and sensitivity for the characterization of small HAPE-only lesions in patients with cirrhosis.

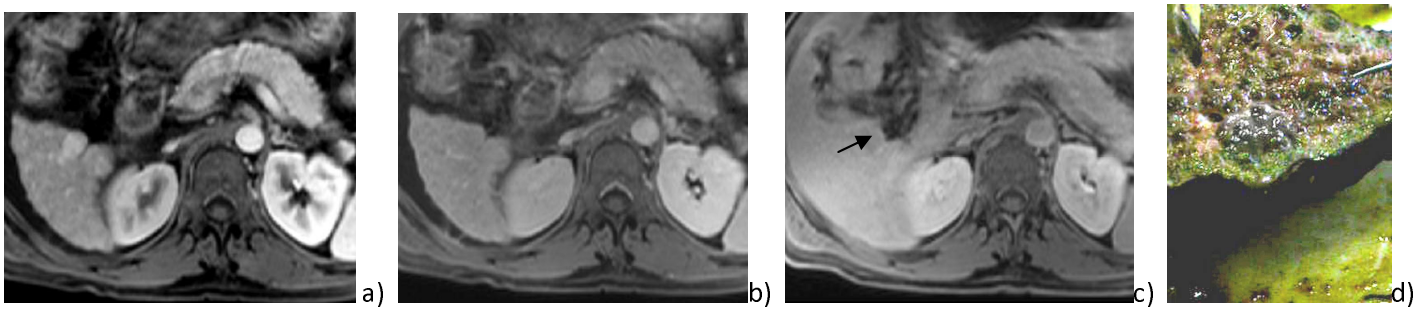

Figure1. Images obtained in a 58-year-old male with Child-Pugh C alcoholic cirrhosis who underwent liver transplantation. T1-weighted 3D spoiled gradient-echo gadobenate dimeglumine enhanced MR images (5.7/2.8) obtained during the hepatic arterial dominant and equilibrium phases reveal (a) a 0.9-cm hypervascular lesion in the right liver lobe, which becomes (b) isointense compared with the liver during the equilibrium phase. (c) On T1-weighted 3D spoiled gradient-echo MR image obtained during the hepatobiliary phase (90 minutes after contrast administration) at the same level, the lesion becomes hypointense (arrow) against the highly enhanced background liver. (d) The analysis on the explanted liver confirmed the malignant nature of this lesion as a well differentiated hepatocellular carcinoma (G1)