An Ability of Contrast-enhanced Gd-EOB-DTPA (SH L 569 B) MR Images for Detecting Hepatocellular Carcinoma in Hepatic Arterial-dominant Phase: Comparison with Contrast-enhanced Gd-DTPA MR and CT Images

T. Kitamura[1,2], T. Ichikawa[2], K. Ohtomo[3], H. Nakajima[2], T. Araki[2], N. Enomoto[1], T. Tsukamoto[2], H. Sou[2], U. Motosugi[2], K. Uozumi[3]

[1]1st Department of Medicine, University of Yamanashi, Nakakoma, Yamanashi, Japan, [2]Department of Radiology, University of Yamanashi, Nakakoma, Yamanashi, Japan, [3]Department of Radiology, University of Tokyo, Bunkyo, Tokyo, Japan

PURPOSE: The purpose of this study was to compare sensitivity of hepatocellular carcinoma (HCC) with contrast-enhanced Gd-EOB-DTPA (SH L 569 B) MR images with those of contrast-enhanced Gd-DTPA MR images and MDCT images in hepatic arterial-dominant phase (HAP).

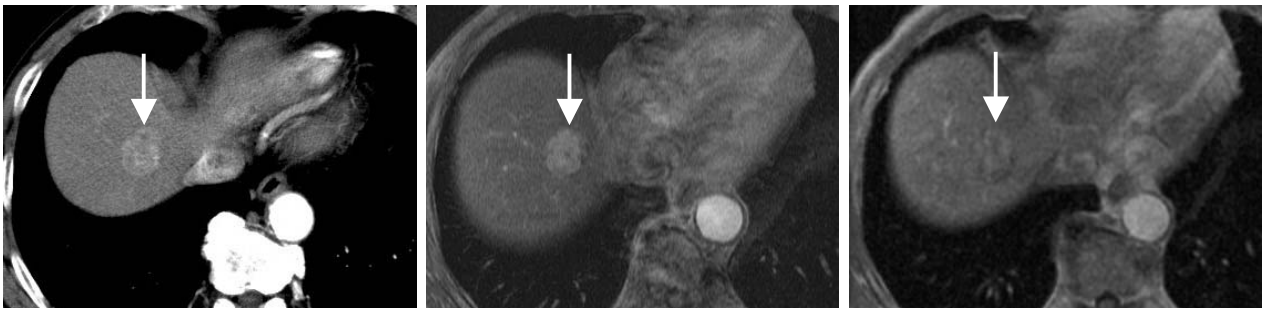
MATERIALS AND METHODS: 40 patients having HCC with surgical treatment were reviewed retrospectively. The diagnosis of HCC was determined by a combination of pathological proof and the findings of intraoperative ultrasound. Contrast-enhanced images included Gd-EOB-DTPA MR images in 39 patients, Gd-DTPA MR images in 23 patients, and MDCT images in all patients. All MR examinations were performed with a 1.5-T MR unit (Signa CV, GE, Milwaukee, WI) and all MDCT examinations were with a MDCT scanner (Aquilion, TOSHIBA, Tokyo, Japan). Contrast-enhanced T1W MR images (TR/TE/FA=160-170/1.8/90) during HAP were obtained at 20 sec after the beginning of bolus injection (3ml/sec) of Gd-EOB-DTPA (25 μmol/kg) or Gd-DTPA (0.1 mmol/kg). Contrast-enhanced MDCT images for HAP were obtained at 40sec after the beginning of bolus injection (3ml/sec) of 100 ml of ioversol (320 mgI/ml). Three radiologists blindly interpreted contrast-enhanced Gd-EOB-DTPA MR images alone, Gd-DTPA MR images alone, and MDCT images alone. Diagnostic ability of each technique was compared based on the results of receiver operating characteristic (ROC) analysis. To evaluate quantitative image quality of MR imaging, contrast-to-noise ratio (CNR) of each MR technique was calculated by a following equation; CNR= (signal intensity of liver - signal intensity of lesions)/standard deviation of signal intensity of background.

RESULTS: There was a tendency that both mean sensitivity and mean Az value of contrast-enhanced Gd-EOB-DTPA MR images (31/59 (52%), 0.87, respectively) were inferior to those of contrast-enhanced Gd-DTPA MR (22/33 (67%), 0.93) and MDCT (46/60 (76%), 0.92) images. Mean CNR on contrast-enhanced Gd-EOB-DTPA MR images (6.25±3.90) was significantly lower than that on contrast-enhanced Gd-DTPA MR images (12.01±5.83) ($p<0.01$).

CONCLUSION: For HAP imaging, ability of Gd-EOB-DTPA MR images may be only limited based on our results of detectability of HCC and CNR of the images, which may be caused by insufficient dose (25μmol/kg) of Gd-EOB-DTPA.

Case. A 66-yaers-old male with hepatocellular carcinoma

Hepatic arterial-dominant phase images



MDCT images Gd-DTPA MR images Gd-EOB-DTPA images