

Determination of Optimal Scan Timing of Contrast-enhanced Gd-EOB-DTPA (SH L 569 B) MR Images during Hepatobiliary Phase for Detecting Hepatocellular Carcinoma

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PURPOSE: The purpose of this study was to determine optimal scan timing of contrast-enhanced Gd-EOB-DTPA MR Images during hepatobiliary phase for detecting hepatocellular carcinoma (HCC).

MATERIALS AND METHODS: 24 patients having 34 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. All MR examinations were performed with a 1.5-T MR unit (Signa CV, GE, Milwaukee, WI). Sequential contrast-enhanced T1W MR images (TR/TE/FA=160-170/1.8/90) during hepatobiliary phase were obtained at 4, 10, and 20 min after the beginning of bolus injection of Gd-EOB-DTPA. Dose of Gd-EOB-DTPA used in this study was 0.1ml/kg (25 μ mol/kg). To evaluate quantitative image quality, both signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) of each set of MR images obtained at different scan timing were by following equations; SNR= signal intensity of liver / signal intensity of background , CNR= (signal intensity of liver - signal intensity of lesions)/standard deviation of signal intensity of background.

For the detectability of HCC, all MR images were interpreted for each patient independently by two radiologists in a retrospective, blinded fashion without knowledge of clinicopathological findings. In cases of interobserver disagreement, final decisions were reached by consensus.

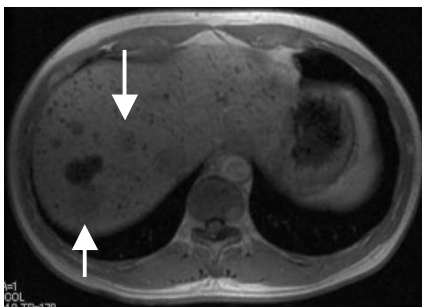
RESULTS: Both mean SNR and CNR were the highest on MR images obtained at 20 min (16.3 \pm 2.99 and 11.1 \pm 6.38, respectively) followed by MR images obtained at 10 min (15.5 \pm 3.59 and 9.21 \pm 5.52) and 4 min (10.2 \pm 2.47 and 5.83 \pm 3.50). There were significant differences in both SNR and CNR between any two different sets of MR images ($p < .01$).

There was a tendency that the detectability of HCC was significantly lower on MR images obtained at 4 min (30/34, 88%) than those on MR images obtained at 10 min (32/34, 94%) and 20 min (33/34, 97%) ($p < .01$). There was no significant difference in the detectability of HCC between MR images obtained at 10 min and 20 min.

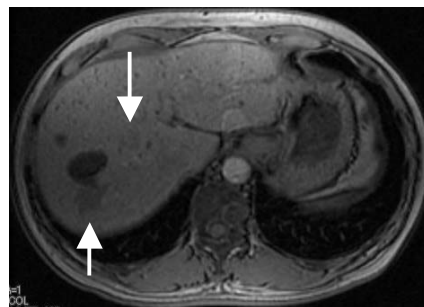
CONCLUSION: For the purpose of detecting HCC, optimal scan timing of contrast-enhanced Gd-EOB-DTPA MR images during hepatobiliary phase may be considered at least 10 min based on the results of lesion detectability, and may be recommended 20 min after the beginning of injection of Gd-EOB-DTPA based on the results of SNR and CNR of the images.

Case. A 53-years-old male with hepatocellular carcinoma

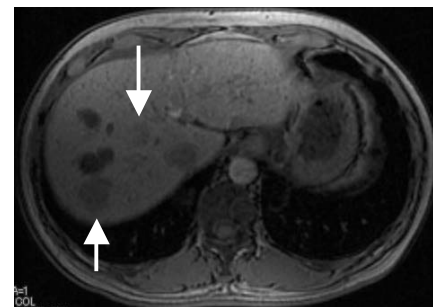
Gd-EOB-DTPA MR images



Delayed time= 4min



Delayed time= 10min



Delayed time= 20min