Accuracy of Gadoxetic Acid-Enhanced Magnetic Resonance Imaging for the Diagnosis of Sinusoidal Obstruction Syndrome in Patients with Chemotherapy-Treated Colorectal Liver Metastases

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Objective: To assess whether reticular hypointensity on hepatobiliary phase images of gadoxetic acid-enhanced magnetic resonance imaging (EOB-MRI) is a diagnostic finding of sinusoidal obstruction syndrome (SOS) in patients with hepatic metastases who have undergone chemotherapy.

Methods: We retrospectively analysed EOB-MRI of 42 patients who had undergone chemotherapy before hepatic resection of colorectal hepatic metastases. Two radiologists, who were unaware of whether or not the patients had SOS, reviewed the hepatobiliary phase images to determine the presence of hypointense reticulation in the liver using a 5-point scale (Figure 1). The sensitivity, specificity and area (A_z) under the receiver operating characteristics curve were calculated for each reviewer.

Results: The sensitivity, specificity and A_z for the diagnosis of SOS were 75%, 100% and 0.957 for reader 1 and 75%, 96.2% and 0.936 for reader 2 (Table 1). In one patient who received a false positive diagnosis by one reader, there was sinusoidal fibrosis on histological examination, but not diagnostic for SOS. False negative diagnosis occurred in four patients for both readers; histology of these patients showed minimal and localized sinusoidal congestion and fibrosis.

Conclusions: Reticular hypointensity on hepatobiliary phase images of EOB-MRI is highly specific for the diagnosis of SOS in patients with treated colorectal hepatic metastases.
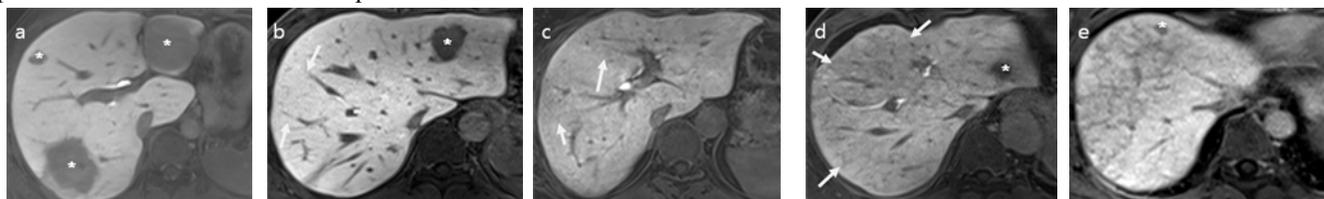

Figure 1. Various degrees of sinusoidal obstructive syndrome on hepatobiliary phase images of EOB-MRI. (a) The liver shows homogeneous high signal intensity (confidence level = 1). (b) Subtle hypointense reticulations (arrows) in only few sections, but not definite (confidence level = 2). (c) Fine hypointense reticulations in limited areas (arrows; confidence level =3). (d) More prominent reticulations in all sections (arrows; confidence level = 4). (e) The liver parenchyma shows marked hypointense reticulations (confidence level = 5). Nodular lesions with hypointensity are metastatic lesions (asterisks).

Table 1. A_z, sensitivity, specificity, and positive and negative predictive values for each observer

	Observer 1	Observer 2	Weighted kappa
A_z	0.957 (0.845–0.995)	0.936 (0.816–0.988)	0.765
Sensitivity (%)	75 (47.6–92.7)	75 (47.6–92.7)	
Specificity (%)	100 (86.8–100)	96.2 (80.4–99.9)	
PPV (%)	100 (73.5–100)	92.3 (64.0–99.8)	
NPV (%)	86.7 (69.3–96.2)	86.2 (68.3–96.1)	

Abbreviations: A_z, area under the receiver operating characteristic curve; PPV, positive predictive value; NPV, negative predictive value

Numbers in parentheses are 95% confidence intervals