

Diffusion-weighted MRI for detecting liver metastases: importance of the *b*-value

Thomas C. Kwee · Taro Takahara

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Dear Sir,

We read with interest the recent work by Shimada et al. [1], who compared gadolinium ethoxybenzyl-diethylenetriamine pentaacetic acid (Gd-EOB-DTPA)-enhanced MRI to diffusion-weighted MRI (DWI) in the detection of small (≤ 2 cm) liver metastases. The authors of this study concluded that Gd-EOB-DTPA-enhanced MRI showed higher accuracy in the detection of small metastases than DWI [1]. However, we believe this conclusion maybe misleading because the applied DWI protocol had an important limitation that has not been emphasized. Shimada et al. [1] performed DWI with *b*-values of 0 and 500 s/mm². Seven liver metastases (five in the lateral segment, two in the upper edge of the right liver) were clearly visualised at Gd-EOBDTPA-enhanced MRI, but were difficult to detect at DWI [1]. The false negatives in the left liver lobe can be explained by cardiac motion-induced signal loss [2]. Furthermore, susceptibility artefacts at the boundary between the lung and the liver parenchyma can reduce the sensitivity in the upper edge of the liver. These problems can in part be mitigated by applying a proper degree of diffusion weighting: if DWI is used with the aim to detect liver lesions, it is highly recommended to apply a lower *b*-value (e.g. a *b*-value between 10 and 50 s/mm²) instead of a *b*-value of 500 s/mm². Both low and high *b*-value DWI are effective in suppressing vascular structures that may mimic or obscure liver lesions, but low *b*-value DWI provides a higher signal-

to-noise ratio, is less prone to cardiac motion-induced signal loss, and suffers less from eddy current-induced distortions. Previous studies have already shown that low *b*-value DWI is more sensitive than high *b*-value DWI in detecting malignant liver lesions [3, 4]. In conclusion, it is still unproven that Gd-EOB-DTPA-enhanced MRI is more accurate than DWI in detecting small liver metastases.

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T. C. Kwee (✉) · T. Takahara
Department of Radiology, University Medical Center Utrecht,
Heidelberglaan 100,
3584 CX Utrecht, The Netherlands
e-mail: thomaskwee@gmail.com