

# Accuracy of diffusion-weighted imaging for the detection of viable tumor after local treatment of hepatocellular carcinoma in cirrhotic patients

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**Purpose:** To evaluate the accuracy of diffusion-weighted (DW) magnetic resonance (MR) imaging for the detection of perilesional viable tumor after local treatment of hepatocellular carcinomas (HCC) in cirrhotic patients.

**Materials and methods:** We retrospectively analyzed twenty seven cirrhotic patients (23 men, 4 women; mean age, 61.1 years) with fifty locally treated HCCs. Two independent radiologists separately interpreted the breath-holding DW images with multiple b values (0, 500, 800, and 1000 sec/mm<sup>2</sup>) and conventional MR images including T2-weighted, T1-weighted gradient echo images, and dynamic contrast-enhanced T1-weighted images and sorted the confidence levels for the presence of perilesional viable tumor in the vicinity of treated lesions into five grades in both sessions. Reference standard for the presence of viable tumor was obtained from pathologic data (n = 5) and follow-up imaging results (n = 22). The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy of DW images and conventional MR images were compared using Mann-Whitney U test. Interobserver agreement was obtained using Cohen's kappa statistics.

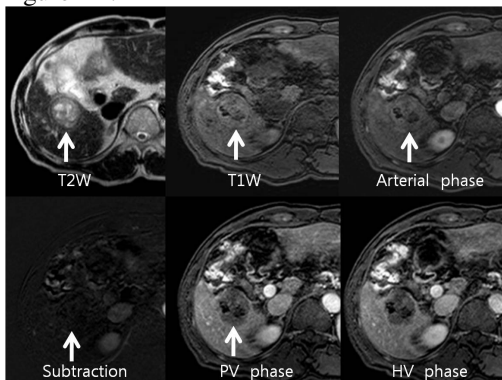
**Results:** A total of fifty HCCs (size range: 10 mm to 68 mm, mean size, 27 mm) were evaluated. Of all, twenty lesions were proved to have viable HCC. The sensitivity, specificity, PPV, NPV, and accuracy of conventional MR images for reader 1 were 80%, 90%, 84%, 87% and 86%, respectively, and for reader 2, 90%, 93%, 90%, 93%, and 92%, respectively. The sensitivity, specificity, PPV, NPV, and accuracy of DW images for reader 1 were 90%, 68%, 69%, 89% and 78%, respectively, and for reader 2, 95%, 63%, 70%, 93%, and 78%, respectively. There was a good interobserver agreement in both DW images and conventional MR images (kappa value = 0.491 and 0.540, respectively and *p* < 0.05).

**Conclusion:** Although the sensitivity and NPV of DW imaging for the detection of perilesional viable tumor after local treatment of HCCs in cirrhotic patients were better than those of conventional contrast-enhanced MR imaging, the accuracy of DW imaging alone is not good as conventional contrast-enhanced MR images.

Table 1. Comparison between DW images and conventional MR images for the detection of perilesional viable tumor after local treatment of HCC.

	Reader 1		Reader 2	
	DW images	Conventional MRI	DW images	Conventional MRI
Sensitivity (%)	90	80	95	90
Specificity (%)	68	90	63	92
PPV (%)	69	84	70	90
NPV (%)	89	87	93	92
Accuracy (%)	78	86	78	92

Figure 1A.



1B.

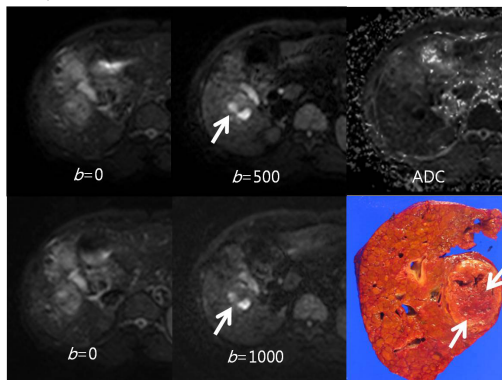


Figure 1A. Conventional MR images in a 65-year-old man with HCC treated with transarterial chemoembolization.

T2-weighted image shows heterogeneous high signal intensity mass (arrow) in the right hepatic lobe, but dynamic contrast-enhanced T1-weighted images show no significant arterial phase enhancing portion in this mass. Both readers interpreted it as a completely necrotic HCC.

Figure 1B. Single-shot echo-planar DW images (*b*= 500 and 1000 sec/mm<sup>2</sup>) demonstrate focal hyperintense lesion (arrow) within the treated HCC. Both readers interpreted it as positive for viable tumor. The patient underwent liver transplantation and focal viable HCC (arrows) was confirmed by pathology. DW images accurately detected the viable portion of HCC.