

Clinical Evaluation of Combining Dynamic Contrast Enhancement MRI and Diffusion Weighted MR Imaging for Diagnosis of Breast Lesion

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Objective To evaluate the clinical value of the combination of dynamic contrast enhancement MRI and diffusion weighted MRI for the diagnosis of breast lesion.

Methods 41 lesions from 35 patients were acquired with histopathological demonstration, of which 28 were malignant and 13 were benign. All lesions were examined with dynamic contrast enhancement MRI and diffusion weighted imaging. The sequences used were 3D FSPGR and SSEPI, $b=1,1000s/mm^2$. The images were reviewed by two radiologists blindly at AW4.2 workstation, and consensus on the shape, margin and the type of time-signal intensity curve were made. The suspicious malignant aspect of morphology and types of time-signal intensity curve was given a point. All the lesions were classified as malignant, suspicious or benign according to the scores summed up. Apparent diffusion coefficient (ADC) of the lesion was acquired using ROI technique correlated with the location of enhanced lesion by Functool II software on the workstation. Threshold of ADC for diagnosis was acquired by ROC analysis, and lesions were then classified as benign and malignant. The validities of dynamic contrast enhancement imaging, ADC value and combination of the two were evaluated.

Results The sensitivity, specificity and accuracy of dynamic contrast enhancement imaging were 96.4%(26/27), 61.5%(8/13) and 85.4%(35/41). Area under the curve for ADC was 0.690 by ROC analysis (Figure 1), and the threshold was 0.00142mm²/s. The sensitivity, specificity and accuracy of ADC were 89.3%(25/28), 61.5%(8/13) and 80.5%(33/41). The combination of morphology, time-signal intensity curve and ADC value of breast lesions had a sensitivity, specificity and accuracy of 89.3% (25/28), 76.9%(10/13) and 85.4%(35/41). due to combination of morphology, types of time-signal intensity curve with ADC value, half of malignant lesions which manifest atypically on dynamic contrast enhancement MRI achieve a definite diagnosis for malignance instead of suspicious diagnosis, and two benign lesions which was suspicious for malignant got a diagnosis of benign (table 1).

Conclusion The combination of dynamic contrast enhancement MRI and diffusion weighted MRI is useful to increase specificity, and give valuable information for the diagnosis of those lesions suspicious in dynamic contrast enhancement MRI.

Key words Breast, MRI, Dynamic, Contrast Enhancement, Diffusion Weighted, ADC

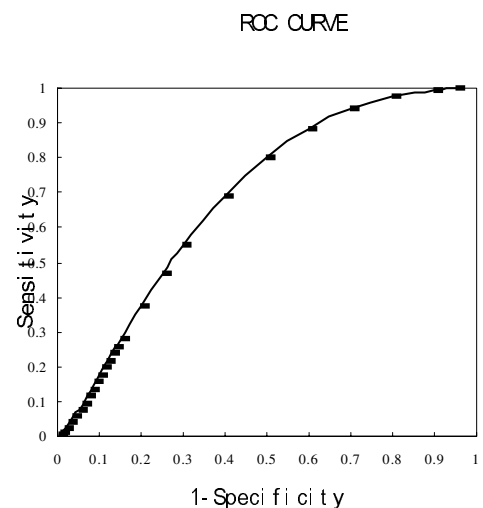


Figure 1. ROC curve defined for ADC value (Az=0.690, SE=0.093)

Table 1. Diagnosis of breast lesion: DEC, DWI ADC and the combination correlated with pathological diagnosis

MRI evaluation			Pathology diagnosis		total (n)
DEC(scores)	ADC(scores)	combination(scores)	Malignant(n)	Binagn(n)	
malignant(3)	malignant(1)	malignant(4)	10	1	11
malignant(3)	Benign(0)	malignant(3)	1	0	1
suspicious(2)	malignant(1)	malignant(3)	14	2	16
suspicious(2)	Benign(0)	benign(2)	2	2	4
benign(1/0)	malignant(1)	benign(1/2)	1	2	3
benign(1/0)	Benign(0)	benign(0/1)	0	6	6
Total(n)			28	13	41