

G. Jin¹, N. An¹, Y. Cai¹

¹Radiology, PLA General Hospital, Beijing, China, People's Republic of

Introduction: Diffusion-weighted imaging (DWI) in breast has the disadvantages of susceptibility artifact and chemical shift artifact. DWI combined with the ASSET (array spatial sensitivity encoding technique) can benefit from shorter scan time and less distortion, but SNR will be reduced. Whether DWI combined with the ASSET (array spatial sensitivity encoding technique) can diagnosis breast lesions accurately with satisfying quality of image should be studied.

Purpose: To evaluate the diagnosis value of DWI with ASSET technique in distinguishing benign and malignant breast lesions by ADC (apparent diffusion coefficient) value and ADC map.

Methods: Forty-six female patients with histologically confirmed malignant (37 with 39 lesions) and benign (9 with 12 lesions) lesions in breasts and 14 health volunteers underwent bilateral breast MRI examination including SE-EPI with ASSET technique (GE 1.5T EXCITE HD, B=1000, 2NEX, acquisition time about 40~50s). The ADC values of breast lesions and normal breast tissues were measured on ADC map and analyzed.

Results: All lesions, except for 1 case of sclerosing adenosis, showed hyperintensity on ASSET-DWI and were detected with accurate location. The mean ADC value of malignant lesions ($1.02 \pm 0.34 \times 10^{-3} \text{ mm}^2/\text{s}$) was statistically lower than that of the benign lesions ($1.54 \pm 0.55 \times 10^{-3} \text{ mm}^2/\text{s}$) and normal breast tissues ($1.88 \pm 0.28 \times 10^{-3} \text{ mm}^2/\text{s}$) ($p < 0.001$). The sensitivity, specificity and overall accuracy of ADC value for malignant lesions with a threshold of less than $1.47 \times 10^{-3} \text{ mm}^2/\text{s}$ was 92.3% (36/39), 58.3% (7/12) and 84.3% (43/51) respectively. The main causes of false negative were 2 mucinous adenocarcinomas and 1 intraductal carcinoma with high ADC value.

Conclusion: ASSET-DWI was of sufficient sensitivity to distinguish most malignant tumors from benign lesions, but specificity is low. Mucinous adenocarcinoma and some intraductal carcinoma would be prone to misdiagnose benign lesions only rely on ADC values, ADC value is still unreliable for sclerosing adenosis. In addition, with ASSET-DWI, we could obtain satisfying images with short acquisition time about 40~50s, this satisfies the requirements for screening use.

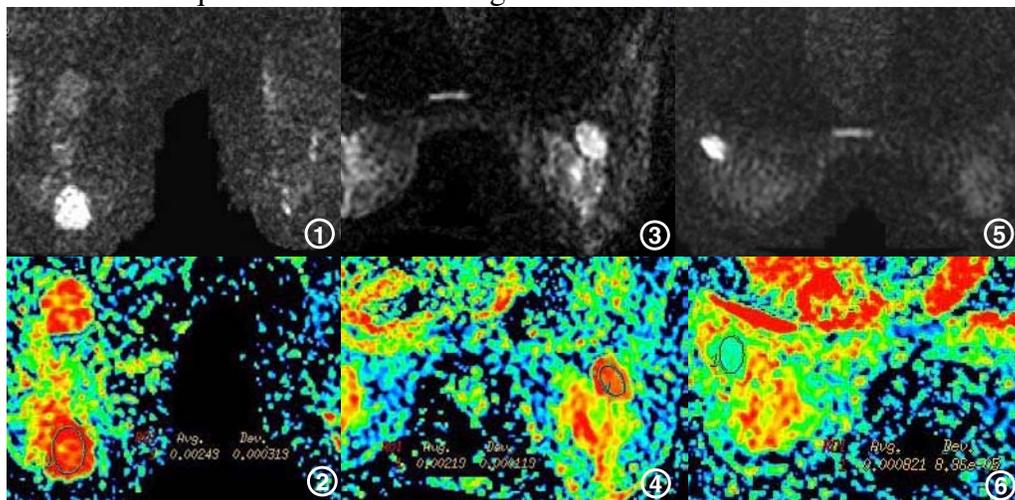


Fig1, 2. 80 years old female patient with mucinous adenocarcinoma. The tumor showed hyperintensity on DWI (Fig1) and high ADC value on ADC rainbow map (Fig2). Fig3, 4. 42 years old female patient with right breast fibroadenomatosis. The lesion displayed hyperintensity on DWI (Fig3) and high ADC value (Fig4). Fig5. 51 years old female patient with invasive ductal carcinoma. The tumor showed low ADC value on ADC map.