

MR Imaging of Fibrocystic Changes of the Breast

J-H. Chen^{1,2}, H. Liu¹, H-M. Baik¹, O. Nalcioglu¹, and M-Y. Su¹

¹Tu & Yuen Center for Functional Onco-Imaging, University of California Irvine, Irvine, CA 92697, United States, ²Department of Radiology, China Medical University Hospital, Taichung 404, Taiwan

Purpose

Fibrocystic change is a common, non-cancerous condition that affects more than 50% of women in their reproductive age. Fibrocystic change might simulate or make it more difficult to detect a breast cancer by physical examination. In this situation, further examination using imaging modalities will be needed. Sonography and mammography, although very popular, are not adequately specific for diagnosing this benign disease from malignancy. Dynamic contrast enhanced MRI has evolved into a standard procedure for detection and diagnosis of breast lesions. Studies specifically reporting MR imaging of fibrocystic changes are very few, also with limited case number. The MRI features of fibrocystic breast are not clearly understood. The purpose of this study is to analyze the MR imaging features of fibrocystic change of breast. In selected patients, MR spectroscopy for choline detection was also performed. When evaluating patients with suspicious breast lesions, familiarity and understanding of the MRI characteristics of fibrocystic changes would be useful to decrease the rate of false-positive findings, and also to avoid unnecessary biopsies.

Methods

Thirty patients with pathologically proved fibrocystic change of breast were studied. Twenty patients received mammography and eighteen patients received sonography prior to the MR examination. Five patients were directly referred to MRI based on physical examination and clinical history. The MRI study was performed using a 1.5 T Phillips Eclipse MR scanner with a standard bilateral breast coil. The imaging protocol consisted of high-resolution pre-contrast imaging and dynamic contrast-enhanced axial imaging. After the dynamic scan was completed, subtraction images were generated by subtracting the pre-contrast images from the 1 min post contrast enhanced images. The enhancement kinetics was analyzed from pixels of the brightest enhancement region in the lesion and the percent-enhancement time course was calculated for the 12 post-contrast imaging frames. The diagnosis was based on the morphologic and enhancement kinetic features of ACR BIRADS-MRI lexicon. The morphologic criteria included mass type lesion including focus/foci (smaller than 5mm) or mass (greater than 5 mm), as well as non-mass lesions (enhancement from focal area, linear, ductal, segmental, regional, multiple regions, or diffuse enhancement). The evaluation of enhancement kinetic curve was based on initial (within the first 2 minutes or when the curve starts to change), and late phases. The initial enhancement phase is categorized into fast, medium, and slow. The delayed enhancement phase is described as persistent, plateau, and washout. Eleven patients had also choline estimation by MR on the suspicious tumor region.

Results

Of the thirty patients, two had bilateral proved fibrocystic lesions and four had one side of fibrocystic lesion and contra-lateral side of malignant lesions. On MRI, fifteen patients (15/30, 50%) presented as non-mass lesion, including twelve patchy enhancement, two linear enhancement and one diffuse heterogeneous enhancement. Nine of the twelve patch enhancement patients showed low enhancement magnitude. Five patients (5/30, 17%) showed mass lesion with size smaller than 2cm. Four patients showed focus lesion (4mm). In six patients, breast MRI did not show definite evidence of abnormal enhancement in the affected breast. Fig. 1 illustrates various types of MR features for fibrocystic breast. Kinetic curves were created in sixteen patients, including nine non-mass lesions and seven mass or focus lesions. Eight non-mass lesions showed medium or slow up-slope and persistent enhancement. One non-mass lesions and six mass or focus lesions showed rapid up-slope followed by wash-out (n=4) or reaching plateau (n=3) mimicking a malignancy. Table 1 summarizes the morphological features related to enhancement kinetics in 16 patients. Regarding choline quantification, two of the eleven patients showed positive choline levels. These two patients showed diffuse and patch enhancement after contrast agent injection. Of the thirty patients, twelve patients had lumpectomy and five patients had mastectomy eventually.

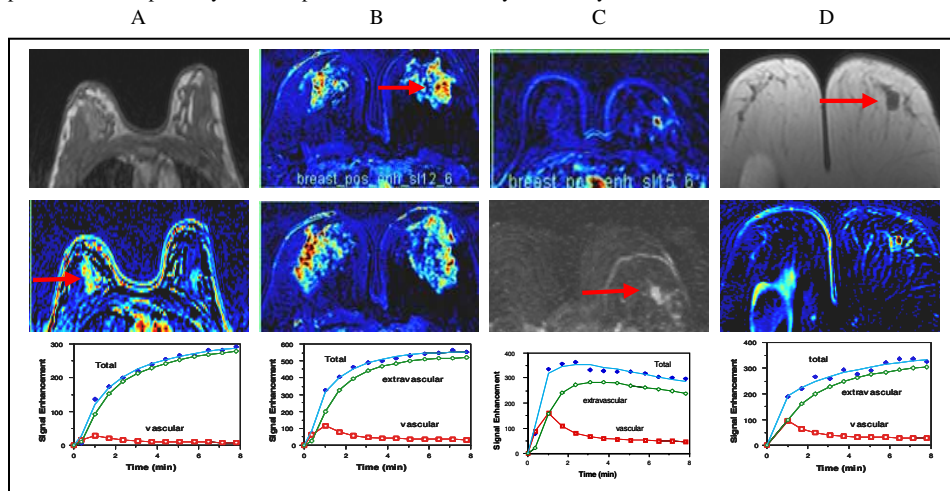


Fig. 1. Different MR imaging features of fibrocystic change of the breast. A: Light patchy enhancement. B: Diffuse heterogeneous enhancement. C: Small mass lesion with washout kinetics mimicking malignancy. D: Small mass with benign enhancement kinetics.

Discussion

Understanding MR imaging features of fibrocystic changes of the breast is very important to exclude malignancy and avoid unnecessary biopsy and decrease patients' anxiety. The result of our study has shown that although fibrocystic breast has a wide spectrum of morphologic and kinetic features on MRI, the majority (50%) of fibrocystic change of breast presented as non-mass lesion in MRI. Kinetic enhancement curve may suggest it either as a benign or malignant feature, rendering it to be non-specific. Our findings were consistently with the previously published results in a few studies. Although non mass enhancement is also encountered in infiltrating lobular cancer (our unpublished data), the enhancement in ILC is usually strong, unlike that of fibrocystic breast with mild enhancement. When a non-mass patchy enhancement pattern is found, demonstrating medium early phase kinetic enhancements, fibrocystic disease of the breast is highly suggested.

Acknowledgement: This work was supported in part by NIH/NCI CA90437 and California BCRP # 9WB-0020.

Table 1. Morphology related to kinetics in 16 patients

	Fast-washout	Fast-plateau	Medium-persistent
Mass type (N= 7)	4	2	1 (14%)
Non-mass (N= 9)	0	1	8 (89%)