The Value of T2 Imaging in Establishing Benignancy or Malignancy of Enhancing Lesions detected by Gd-enhanced Breast MRI

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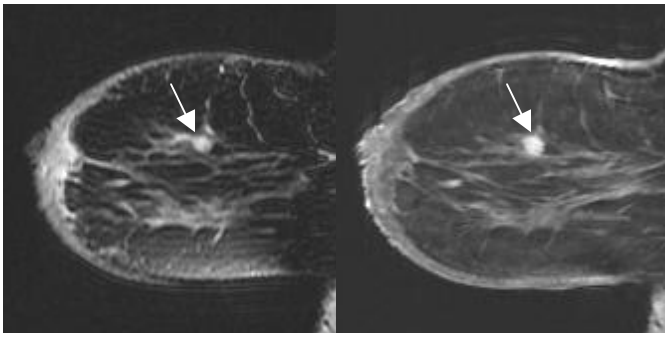
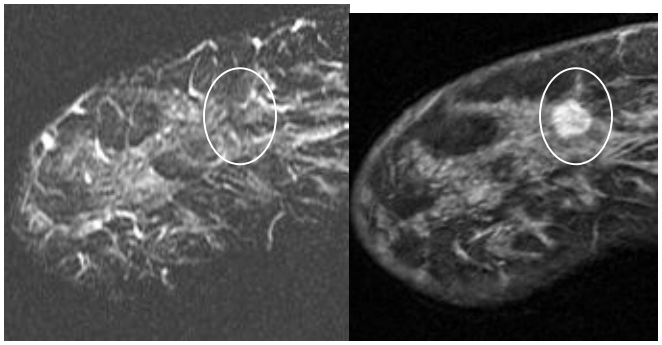
Introduction: Breast MRI has finally been accepted into the armamentarium of the radiologist practicing breast imaging, but there is still concern regarding the specificity of breast MRI which can range from 30 - 71% as sensitivity levels are varied from 98% to 86% respectively (1) Some have emphasized morphology as a method for improving differential diagnosis (2), while others have used enhancement profile (3). However, it appears that only Kuhl has extensively investigated the value of T2-weighted sequences in differential diagnosis of enhancing lesions (4). The purpose of our presentation is to further investigate the value of T2 imaging in improving specificity for lesions discovered during contrast enhanced breast MRI

Methods: T2-weighted imaging with fat saturation was added to the breast MRI protocol in late 2002 (TR=5000 - 8000 msec, TE= 128 msec, matrix = 256 x 256, slice thickness = 4 mm). Patients selected for review must have had a pathologic diagnosis or, in the absence of biopsy, Bi-Rads 1 or 2 mammography 1 year after MRI or negative clinical examination 3 years after MRI. Using ROI's ranging from 3 - 6 mm, and avoiding vessels and lesion septations, the relative signal intensity of the lesion and adjacent suppressed fat was measured. The "lesion to suppressed fat" ratio (LTF) was calculated and correlated with final diagnosis.

Results: At the time of this abstract submission, 12 patients have been reviewed, 6 diagnosed with malignancy, 6 with benign findings. The final population is expected to be at least 50 patients. The following LTF values were found:
Malignant lesions (n = 6): Mean LTF = 2.68 (range = 1.28 - 6.67)
Benign Lesions (n= 6): Mean LTF = 6.65 (range = 3.25 - 12.0).
Statistical analysis was not performed for these few lesions, but will be presented in the final presentation with a larger population. Initial results confirm that although there is significant overlap between the benign and malignant populations (7/16 lesions had LTF between 3 and 8), visually bright lesions on T2 imaging (LTF > 8) are likely to be benign, while unusually dark lesions (LTF < 3) are likely to be malignant. 2/6 benign lesions had LTF > 8, without overlap with malignant lesions, while 3/6 malignant lesions with LTF < 3 did not overlap with benign lesions.



Patient 1: Fibroadenoma T2 (LTF = 12) and Post Gd T1 Enhancement profile: plateau (type 2)



Patient 2: Invasive cancer T2 (LTF = 2) and Post Gd T1 Enhancement profile: washout (type 3)

Conclusions: Initial results show that T2-weighted fat-suppressed imaging can be an important factor in helping to classify rapidly enhancing breast lesions. Although appearance on T2 imaging is unlikely to help in classifying half of detected lesions, when lesions appear very bright on fat suppressed T2 images ("cyst-like"), they are likely benign, while dark, difficult to see, lesions are likely malignant.

References:

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