AbstractID: 9698 Title: Preliminary analysis of morphological features from T1 and T2 MR images in the diagnosis of breast cancer

Purpose: To demonstrate the potential of computer-extracted morphological features of lesions on breast MRI using T1 and T2 images to distinguish between malignant and benign breast lesions. **Method and Materials:** A pilot database of 36 breast lesions: 18 malignant and 18 benign masses as determined by biopsy, was compiled. Images were acquired as coronal T1-weighted spoiled gradient echo sequence images and axial T2-weighted fast spin echo images. Lesions were segmented using fuzzy c-means clustering and features were automatically extracted. Classification performance was investigated for the T2-extracted features using receiver operating characteristic analysis (ROC). Employing stepwise selection, linear discriminant (LDA) round-robin, and ROC analysis, merged-feature performance was also assessed. Statistical Z-tests were performed to determine significance. Additionally, correlations between feature on both the T1 and T2 image were investigated. **Results:** Classification performance using three T2-extracted features (Correlation, Energy, and Irregularity) yielded an AUC value of 0.69, which was found to be statistically significance compared to an AUC of 0.5 ($p = 0.05$). While similar performance was found for morphological lesion features from T1 images, only moderate correlation was observed between T1 and T2 features, with contrast and entropy features demonstrating a moderate positive correlation. **Conclusions:** Classification performance of T2-extracted feature combinations from this preliminary dataset is significant for distinguishing between malignant and benign. Additionally, these preliminary results suggest further study of the extent to which T1- and T2-extracted feature correlation can be exploited. Further investigation is necessary to assess the effectiveness of computer-extracted morphological features in characterizing benign and malignant lesions. **Conflict of Interest:** Research supported in part by NIH. Some authors receive royalties, research funding, and/or are stock holders in Hologic.