AbstractID: 13013 Title: Quantitative analysis of elastography images in the detection of breast cancer

Purpose:
To correlate results of quantitative analysis of real time elastography images (RTEI) with ascerted diagnosis to discriminate malignant from benign breast lesions.
Method and Materials:
More than 100 images of women (median age 52 yrs) were analyzed in this study. Images in DICOM format were exported into a home-made software written in Visual Basic especially developed. A pixel by pixel substraction of B-mode images from color elasticity images was performed. The matrix of RGB values obtained from subtraction was transformed into a matrix of tone of grey (whose values vary from 0 to 255). The regions of interest (ROIs) were delineated and the color spectrum and the parameters of interest (mean value, standard deviation and softness) were calculated for each lesion. Diagnosis (gold-standard) was assessed by an expert radiologist on the basis of conventional B-mode US and/or mammography and in some cases by cytophatologic analysis. ROC analysis was used to assess sensitivity and specificity of quantitative approach.
Results:
The mean values, the standard deviation and softness calculated inside the ROIs resulted statistically different at the t test ($p=0.0015$, $p= 0.0144$ and $p< 0.0001$, respectively) between malignant and benign lesions. The shape and distribution of the color spectrum inside the ROIs resulted statistically different ($p< 0.0001$, Mann-Whitney test) between malignant and benign lesions. The ROC analysis for the mean and the softness inside the ROIs indicated sensitivity of 95.6% and 84.4% and specificity of 30.6% and 69.4%, respectively. The area under the curve resulted 0.690 ($p=0.0016$) and 0.856 ($p<0.0001$) for the mean and the softness inside the ROIs respectively.
Conclusion:
Quantitative analysis of RTEI might play an important role in the assessment of the malignancy of breast lesions with the potential to reduce unecessary biopsis.
Conflict of Interest (only if applicable): The authors hereby disclose any conflict of interest.