

Role of Sonoelastography Using 5-point Scoring Method and Strain Ratio in Improving Diagnostic Performance of Conventional Ultrasound in Indeterminate BI-RADS 3 And 4 Breast Lesions.

Abstract

Background: Breast cancer is considered the most common cancer worldwide. Finding a non-invasive method that could increase the accuracy of characterization of breast lesions and consequently decrease the unnecessary biopsies of benign lesions is pivotal. Sonoelastography could help in characterization of the indeterminate cases of ultrasound BI-RADS 3 and 4 breast lesions by upgrading or downgrading them.

Aim of the study: To evaluate the usefulness of sonoelastography (using 5-point scoring method and strain ratio) in improving the diagnostic performance of conventional ultrasound in indeterminate cases of US BI-RADS 3 & 4 breast lesions; to guide the diagnostic workup towards biopsy or follow-up.

Methods: This study is a prospective study. 90 female patients were included in our study; who presented with breast lumps and examined by ultrasound and sonoelastography (strain elastography) in the radiology department of our hospital. Initially; conventional breast ultrasonography was performed for the patients and classified according to the ultrasound 'breast imaging, report and data systems' (BI-RADS) categories. Only the patients with ultrasound BI- RADS 3 & 4 category were included in our study. Then strain sonoelastography was performed. Lesions were categorized based on Tsukuba strain scoring system (Elasticity score). Strain ratio (SR) was then calculated for all lesions. We used true cut biopsy, aspiration cytology or excision biopsy for histopathological analysis which was the standard reference.

Results: We found that when a cutoff value of 3.6 was used for the strain ratio: the sensitivity, specificity, PPV, NPV, and accuracy rates were determined as 91.7%,77.8%, 73.3%, 93.3% and 83.3%, respectively. When the cutoff value of 4 for the elasticity score used; the sensitivity, specificity, PPV, NPV, and accuracy rates were determined as 91.7%, 88.9%, 84.6%, 94.1% and 90% respectively.

Conclusion: Breast strain elastography using 5-point scoring method and strain ratio was found to be of high sensitivity, specificity and diagnostic accuracy in differentiating benign from malignant breast lesions initially categorized as US BI-RADS 3 & 4. It provides additional information on tissue stiffness to increase the diagnostic performance of conventional ultrasound in the setting of indeterminate BI-RADS 3 and 4 lesions; guiding the diagnostic workup towards biopsy or follow-up and thus reducing the rate of unnecessary biopsies.

Keywords: Breast Lesions –Conventional Ultrasound – Ultrasound Elastography – StrainRatio