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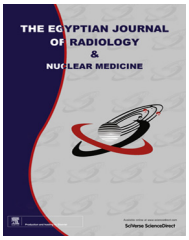

REVIEW

Value of mammography and combined grey scale ultrasound and ultrasound elastography in the differentiation of solid breast lesions

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KEYWORDS

Breast carcinoma;
Mammography;
US;
Ultrasound elastography, UE

Abstract *Aim of the work:* The aim of this work was to evaluate the value of ultrasound elastography (UE) in differentiating benign versus malignant solid breast lesions discovered in mammography and compare it with grey scale ultrasound (US) and mammography.
Methods: From May 2011 to May 2013, 114 solid lesions from 100 consecutive patients discovered during mammography were categorized into benign or malignant by mammography and US and further analyzed with UE. The diagnostic results of the cases were compared with histopathologic findings.
Results: Of 114 lesions, 33 were histologically malignant, and 81 were benign. UE was the most specific (95.1%) of the 3 modalities. The accuracy (81.7%) of UE was equal to mammography and was higher than those of US (82.5% and 71.9%, respectively). A combination of UE and US had the best sensitivity (90.9%) and accuracy (93.8%).
Conclusions: Ultrasound elastography is useful for breast lesion characterization and is an easier and cheaper method and more specific than mammography or US alone, but it is operator dependent. When combined with US, detection accuracy can be greatly improved and the combination potentially could reduce unnecessary biopsy.

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Contents

1. Introduction

Breast cancer is the most common malignancy in women and the second most common cause of cancer-related mortality (1). Most breast masses are benign (2). Breast masses have a variety of etiologies, benign and malignant. Fibroadenoma is the most common benign breast mass; invasive ductal carcinoma is the most common malignancy (3). Ultrasonography can effectively distinguish solid masses from cysts, which account for approximately 25% of breast lesions. Also it differentiates benign from malignant lesions if their criteria of diagnosis are fulfilled (4).

Sonoelastography is an imaging modality that can quantitatively measure tissue elasticity with the use of sonography (5). Several clinical studies showed that sonoelastography was useful for differentiation benign and malignant breast lesions, with a sensitivity of 78.0–100% and a specificity of 91.0–98.5%. A discrepancy in lesion sizes between the use of B-mode sonography and sonoelastography in comparison with gold standard pathology dimensions was a key factor for the diagnostic criteria in several studies as the UE measurements were more similar to the gold standard pathology dimensions than B-mode alone (6–8). Real-time tissue elastography may provide additional characterization of breast lesions, improving specificity, particularly for low-suspicion lesions (9).

Ultrasound elastography is a new imaging mode that displays tissue softness or hardness in real time as a colour map that translucently overlays the conventional B-mode image. Because malignant tumors predominantly are harder than benign tissues, this technique significantly improves the differentiation between benign and malignant tissues. Itoh et al. (11) reported a good correlation between real-time ultrasound elas-

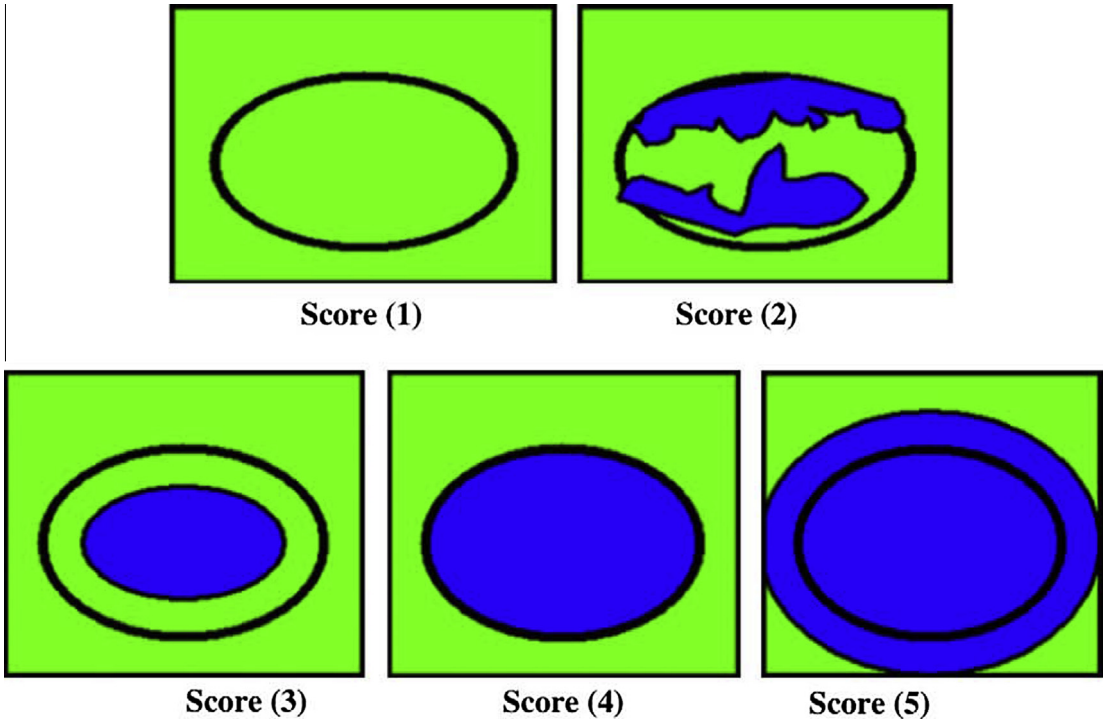

Fig. 1 Elasticity scores, quoted from Itoh et al. (11).