

# Ultrasound Evaluation of shape and margins of the breast lesions in determining malignancy

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## Abstract

The purpose of this prospective study done over a period of two years was to evaluate breast lesions in ultrasound using shape and margins as factors in determining malignancy. Also we tried to determine sensitivity and specificity of these features in differentiating malignant from benign lesions. Results of the study concluded that the characteristic sonographic findings of breast malignancy include irregular shape, hypoechogenicity, posterior acoustic shadowing, taller than wide, presence of microlobulation, calcification, duct extension, spiculated and angular margin. The typical features of benign tumors include oval and ellipsoid, hyperechoic lesion with gentle bi- or tri-lobulations, a thin echogenic pseudocapsule and through transmission. In the present study, irregular shape was seen in 86.3% of malignant lesions and 10.71% of benign lesions. Round shape was found in 21.4% of benign lesions and 4.4% of malignant lesion. Spiculation was seen in 63.6% of malignant lesions and none of the benign lesions.

**Key Word:** breast lesions, malignancy.

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## INTRODUCTION

With recent advances in ultrasound, sonography is now an established tool in breast imaging, allowing identification of breast masses that are often occult on mammography, especially in women lesser than 50 years of age. The ACR recently developed a BI-RADS lexicon for breast sonography in order to standardize the characterization of sonographic breast lesions. High frequency ultrasound helps in women with dense breast tissue where it is useful in detecting small cancers that can be missed on mammography. Several studies in the past have been done to differentiate benign from malignant lesions in the breast.

The American College of Radiology has also brought out a BIRADS-US classification system in order to categorize breast lesions. The breast imaging reporting and data system (BI-RADS) was developed by the American College of Radiology (ACR) to standardize the reporting of mammographic findings, to clarify its interpretation and to facilitate communication between clinicians. Studies investigating the sensitivity and specificity of mammographic features in mammography BI-RADS lexicon have found it to be useful in differentiating between benign and malignant breast lesions.

This lexicon includes descriptors of features such as shape, orientation, margin and posterior acoustic transmission of the mass lesions. Although some of this variability may rest with operator technique, which presents challenges for ultrasound as a modality in general, some of this disparity also arises from differences in lesion interpretation.

The characteristic sonographic findings of breast malignancy include irregular shape, hypoechogenicity, posterior acoustic shadowing, taller than wide, presence of microlobulation, calcification, duct extension, spiculated and angular margin. The typical features of benign tumors include oval and ellipsoid, hyperechoic lesion with gentle bi- or tri-lobulations, a thin echogenic pseudocapsule and

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through transmission. In this study, we tried to find the significance of shape and margins in differentiating benign from malignant lesions.

**OBJECTIVE**

To evaluate breast lesions using ultrasonography and classify them using Ultrasound BI -RADS categorization based on shape and margins

To evaluate sensitivity, specificity, Positive Predictive Value, Negative Predictive Value and Accuracy of Sonography in differentiating Malignant from benign lesions

To correlate ultrasound features of breast lesions with FNAC / histopathology

**MATERIALS AND METHODS**

**Source of data:** Hospital attached to Father Mullers Medical college, Mangalore Department of Radiology  
**Methods of collecting data:**

**Duration of the study:** October 2015 to September 2017  
**Sample size:** 50 cases.

**Inclusion criteria:** All patients with clinically palpable breast lesions or with suspicious lesions on mammography above 18 years of age. Follow up of tissue diagnosis done during the duration of my study in this hospital

**Exclusion criteria:** All patients with inflammatory breast lesions on sonomammography.

Patients whose sonological examination is inadequate or tissue diagnosis not available and those lost for follow up

**Procedure -** Patients were selected according to the inclusion criteria. Informed written consent and Ethical clearance was taken from the institute. A thorough clinical history was taken followed by physical examination for each patient

Ultrasonography of the breast was done in Philips IU-22 equipment, using a high frequency (12MHz) linear probe. Finally Core biopsy / FNAC of the lesion was done and the report assessment was done.

**RESULTS**

**Table 1: Shape of the Index mass lesion on Ultrasonography (n=50)**

Shape	Frequency in all masses	Frequency in benign masses	Frequency in malignant masses
Irregular	22/50(44%)	3/28 (10.71%)	19/22(86.3%)
Oval	8/50(16.0%)	7/28(25.0%)	1/22(4.54%)
Lobulated	13/50(26.0%)	12/28(42.9%)	1/22(4.54%)
Round	7/50(14.0%)	6/28(21.4%)	1/22(4.54%)

**Table 2: Margins of the index lesion on ultrasonography(n=50)**

Margins	Frequency in all masses	Frequency in benign masses	Frequency in malignant masses
Microlobulated	7/50(14.0%)	5/28 (17.8%)	2/22(9.1%)
Angular	8/50(16.0%)	2/28(7.1%)	6/22(27.3%)
Spiculation	14/50(28.0%)	0/28(0%)	14/22(63.6%)
Smooth	21/50(42.0%)	21/28(75.0%)	0/22(0.0%)

**Table 3: Pseudocapsule of index lesion(n=50)**

Pseudocapsule	Frequency in all masses	Frequency in benign masses	Frequency in malignant masses
Present	7/50(14.%)	7/28 (25.0%)	0/22(0%)
Absent	43/50(86.0%)	21/28(75.0%)	22/22(100%)

**DISCUSSION**

Shape can be an important predictor of malignancy if irregularity is present, but an oval or ellipsoid shape is an inconclusive finding. In the present study irregular shape was seen in 86.3% of malignant lesions and 10.71% of benign lesions. Round shape was found in 21.4% of benign lesions and 4.4% of malignant lesion. Twelve benign lesions were having lobulated shape One malignant lesion showed lobulated shape and only one malignant lesion showed oval shape. Stavros *et al.*<sup>3</sup> have reported ellipsoid shape to have sensitivity of 97.6% and specificity of 51.2% for association with benign lesions. Skaane *et al.*<sup>4</sup> reported round or oval shape in 85.6% of fibroadenomas and 28.9% of intra-ductal carcinoma. A few gentle well circumscribed lobulations (macrolobulation) were considered a benign

feature, whereas many small lobulations ( microlobulation ) of 1-2 mm were considered a malignant characteristic by Stavros *et al.*<sup>3</sup> They observed microlobulation to have a sensitivity, specificity and accuracy of 75.2%, 83.8% and 82.4% respectively for association with malignancy. Skaane *et al.*<sup>4</sup> reported 10.6% of fibroadenoma 27.3% of carcinomas to have microlobulation. In the present study, microlobulation was seen in the two malignant cases and 18% (n=5) of benign lesions. Stavros *et al.*<sup>3</sup> reported angular margins to have highest sensitivity (83.2%) of all malignant features and specificity of 92%. In the present study, angular margins were seen in 27.3% of malignant and 7% of benign lesions. One benign lesion having angular margin was fibroadenoma. It consists of alternating hypoechoic and hyperechoic straight lines that

radiates perpendicularly from the surface of the solid nodule. A “thick, echogenic halo” also represents spiculation. Stavros *et al.*<sup>3</sup> have reported a sensitivity of 36% and specificity of 99.4% for association with malignancy. In the present study, spiculation was seen in 63.6% of malignant lesions. No benign lesion showed spiculated margin. In our study, margins of the index mass lesions were spiculated (n=14) and smooth (n=21) in majority of the patients. Microlobulated margins were the least common (n=7). Five benign lesions showed microlobulated margins. Six malignant lesions showed angular margins. Two benign lesion showed angular margins. Spiculated margins were only seen in malignant lesion and most of the benign lesions were having smooth margins. Rahbar *et al.*<sup>4</sup> reported frequency of 91% in benign masses and 9% in malignant masses. In the present study, circumscribed or smooth margins were seen in none of the malignant lesion and 75% of benign lesions. Chala *et al.*<sup>5</sup> reported frequency of 44.6% in benign masses and 0.0% in malignant masses for malignancy. Rahbar *et al.*<sup>4</sup> reported frequency of 93% in benign masses and 7% in malignant masses. In the present study, Pseudocapsule was seen in 25% of benign lesion. No malignant lesion was showing pseudocapsule. All the masses with presence of pseudocapsule were benign (fibroadenomas) in this study and absence was considered a non-specific finding.

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