

Ultrasonography as a Diagnostic Tool in Breast Carcinoma

Soundarya Yamakanamardi¹, Nikhil Naithottu G², T Kempraj³

Author's Affiliation: ¹Assistant Professor, ²Postgraduate, ³Professor, General Surgery, Bowring and Lady Curzon Hospital and Research Institute, Bangalore, Karnataka 560001, India.

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Abstract

Introduction: Breast cancer is one of the leading causes of death among females. This necessitates a proper screening modality for early diagnosis and treatment of breast cancer. Due to limited resources in few setups it would be difficult to get an access to mammography. Hence in our study we are trying to evaluate the diagnostic accuracy of ultrasonography to use it as an alternative to mammography in breast cancer patients.

Materials and Methods: A prospective study was conducted on 80 women presenting with breast condition. All patients underwent sonomammography followed by histopathological assessment of the lump.

Results: Irregular shape with irregular margins on sonomammography was found to be significant marker of malignancy with extensive vascularity. Calcification in malignancy was 7.92 times more common than benign. The diagnostic accuracy of sonomammography was 75% with sensitivity and specificity of 72.58% and 83.33% respectively.

Conclusion: Our study concluded that sonomammography can be used as a diagnostic

modality for breast conditions in resource limited facilities.

Keywords: Breast Cancer; Sonomammography; Benign lesion of breast; Diagnostic accuracy of sonomammography; BIRADS.

Introduction

Breast cancer is one of the leading causes of death among females. In India the incidence is 25.8 per 1,00,000 individuals with mortality rate of 12.7 per 1,00,000 individuals.¹ Further, breast cancer stands first in position in terms of morbidity and mortality in Indian cities like Delhi, Mumbai, Bangalore, Pune, Kolkata and Thiruvananthapuram.² This necessitates a proper screening modality for early diagnosis and treatment of breast cancer. Mammography is considered to be gold standard in screening the patients for breast cancer.³ Whereas, USG, MRI are not considered as primary screening modality but used as an adjunct modality to assess the abnormalities in mammography.³ However, use of mammography in young patients is difficult due to risk of radiation damage and in dense tissue in breast due to limited sensitivity.⁴ Also due to limited resources in few setups it would be difficult to get an access to mammography. Hence in our study we are trying to evaluate the diagnostic accuracy of ultrasonography to use it as an alternative to mammography in breast cancer patients.

Corresponding Author: Nikhil Naithottu G, Postgraduate, General Surgery, Bowring and Lady Curzon Hospital and Research Institute, Bangalore, Karnataka 560001, India.

E-mail: nikhilmangalore99@gmail.com

Materials and Methods

A prospective study was conducted in Bowring and Lady Curzon hospital of Bengaluru. Study was conducted after obtaining ethical committee clearance and informed consent from patients. 80 patients were included in our study.

Inclusion Criteria

- Age above 30years.
- Women presenting with palpable breast lump, nipple discharge, nipple retraction.

Exclusion Criteria

- Age <30years
- Recurrent breast lump
- Pregnancy and lactating women

Ultrasonography

80 patients underwent sonomammography. Various characters observed on ultrasonography such as shape, margin, boundary, echo pattern of the lesion were used to categorize the lesion into benign and malignant.

Histopathological Examination

All the patients following ultrasonography of breast underwent trucut biopsy or excision biopsy and the sample was sent for histopathological examination for confirmation of the diagnosis.

Statistical analysis

The data were analysed using SPSS software. Version 21. Level of significance is set at 5%.

Results

Among 80 patients 18 were benign and 62 were malignant which was confirmed on histopathological examination. Most of the malignant lesions showed irregular shape, irregular margins, hypoechoic with extensive vascularity and calcification on sonomammography. Benign lesions showed oval shaped, well defined margins, hypoechoic with mild vascularity. (Table 1).

Calcification were significantly noted in malignant lesion with odds ratio of 7.92 proving that calcification on sonomammography is 7.92 times higher in malignant lesion compared to benign lesion (Table 2).

Table 1: Sonoammography findings of patients in relation to histopathology.

Sonoammography	Histopathology		Total-80	P value
	Benign - 18	Malignant - 62		
Shape				
Not commented	6	17	23	
Irregular	1	29	30	
Oval	6	7	13	0.0071
Lobulated	5	9	14	
Margin				
Not commented	5	9	14	<0.005
Well defined	9	7	16	
Ill defined	1	21	22	
Irregular	0	22	22	
Spiculated	3	3	6	
Echo pattern				0.8889
Hypoechoic	7	27	34	
Heterogenous	2	9	11	
Isodense	0	1	1	
Anechoic	3	11	14	
Mixed echoic	6	14	20	
Vascularity				<0.0001
Mild	13	8	21	
Moderate	5	21	26	
Extensive	0	33	33	

Table 2: Efficacy of calcification in differentiating malignant and benign lesions.

	Calcification		Total	P value	Odds ratio
	Present	Absent			
Benign	4	43	47	0.0003	7.92
Malignant	14	19	33		

Table 3: BIRADS score of patients in relation to histopathological findings.

BIRADS	Histopathology		Total	P value
	Benign	Malignant		
1	2	6	8	
2	10	5	15	
3	3	6	17	<0.05
4	2	12	10	
5	1	33	34	
6	0	0	0	

The relation between BIRADS score on sonomammography and histopathological examination was confirmed and was statistically significant with p value <0.0001 (Table 3). Among 80 patients 45 were tested true positive, 15 true

Table 4: Correlation of BIRADS score with histopathology findings of patients.

	TP	FP	TN	FN	Sn	Sp	PPV	NPV	Accuracy
Birads Score	45	3	15	17	72.58%	83.33%	93.75%	46.88%	75%

negative, 3 false positive, 17 false negative. Sensitivity of the test was 72.58% specificity 83.33%. Diagnostic accuracy of test was 75%. (Table 4).

Discussion

Ultrasonography has been widely accepted as diagnostic tool for evaluating breast conditions.⁵ Especially if the patients are of younger age and with small lesions ultrasonography is better imaging study.^{6,7} Studies have established the importance of ultrasonography in differentiating benign from malignant breast condition.⁸ Few studies have also shown that ultrasonography has better sensitivity and specificity compared to mammography in malignant breast diseases in women upto 45 years of age.^{9,10,11}

In our study the most common finding of a malignant lesion was irregular shape and irregular margin with hypoechogenicity. However, the echo pattern finding was not statistically significant. Most of the malignant lesions showed extensive vascularity and this finding was statistically significant. It also showed that malignant lesions had 7.92 times higher chances of calcification compared to benign lesion with P value of 0.0003 hence proving statistically significant.

Our studies showed statistical significance between BIRADS score on sonomammography when corelated with histopathological finding with p value being <0.05. However, it had 27.41% of the malignant tumors showed false negative features on sonommaography with sensitivity of 72.58% and specificity of 83.33%. Positive predictive value and negative predictive value were 93.75% and 46.88% respectively. Overall, diagnostic accuracy of sonomammography in diagnosing breast condition was 75%.

Conclusion

Our study concluded that sonomammography can be used as a diagnostic modality for breast conditions in resource limited facilities. However, one should be careful if the sonomammography reported as benign in a patient with strong clinical suspicion of malignancy. Further the ultrasound reporting is subjective and it depends on the radiologist performing ultrasonography.

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