



INCIDENTAL FINDINGS ON SCREENING SONOMAMMOGRAPHY - AN UNAVOIDABLE ADJUNCT TO MAMMOGRAPHY.

Radiology

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ABSTRACT

Aims And Objectives: To assess the need for adjuvant sonomammographic evaluation of patients who undergo screening mammography. **Material And Methods:** All asymptomatic women above 40 years of age who underwent screening mammogram as a part of master health check-up package at our center from 01/04/2022 to 01/04/2024 were included in the study and were additionally subjected to sonomammography for correlative interpretation. All sonographically detected, clinically and mammographically occult breast lesions except for simple cysts and fibroadenosis were assigned a BIRADS score according to the ACR lexicon and prospectively studied. **Result:** In 1321 asymptomatic women, a total of 161 lesions were detected with combination of mammography and USG. 104 non-palpable lesions were detected on mammography alone, 57 additional lesions were picked up on sonomammography which did not have any mammographically indexed lesion. 24 malignancies were detected of which 3 malignant lesions were found exclusively on sonomammography. The p-value for comparison between mammography and ultrasound detection of malignant lesions was 0.0017 which was significant suggesting that the additional lesions detected by ultrasound, including the malignant ones, improve the detection rate when combined with mammography. **Conclusion:** Accessorizing the routine mammographic evaluation with sonomammography can positively impact the detection rates thus increasing the sensitivity of the mammographic detection of otherwise occult lesions.

KEYWORDS

Mammography, Sonomammography, BIRADS.

INTRODUCTION

Breast cancer is the most common malignancy among women globally. As per the Globocon data 2022, in India, Breast cancer accounted for 26.6% (192020) of all cancer cases and 10.7% (98337) of all deaths. Considering the present scenario it is beyond doubt that breast cancer has become a public health concern. ⁽¹⁾ Additionally, the survival rate of these patients is further poor in India owing to earlier age of onset, late stage of disease at presentation, delayed initiation of definitive management and in compliance of patient population. ⁽²⁾

Both mammography and sonomammography have their own pros and cons. While mammography alone becomes handicapped in case of dense breasts, ultrasonography alone fails to pick up microcalcifications. But combining both the modalities significantly increases the sensitivity. ⁽³⁾ Sufficient evidence-based data is still lacking in most of the recent studies critically analyzing the positive role of sonomammography. So, broad aim of our study was to explore this aspect.

Objectives:

To assess the need for adjuvant sonomammography in patients who underwent screening mammography.

Methodology:

Study Design: Prospective observational study. The hospital-based study was conducted in the Department of Radio diagnosis of Vydehi Institute of Medical Sciences and Research Centre, Bangalore.

Study Population: All asymptomatic women above 40 years of age who underwent screening mammogram as a part of master health check-up package at our center from 01/04/2022 to 01/04/2024

METHODS:

All patients who underwent screening mammogram were additionally subjected to sonomammography for correlative interpretation. All sonographically detected, clinically and mammographically occult breast lesions except for simple cysts and fibroadenosis were prospectively studied and were assigned a BIRADS score according to the ACR lexicon and followed up for histopathological examination.

Inclusion Criteria: Female patients above 40 years of age undergoing mammography as a screening test.

Exclusion Criteria:

- Pregnant patients.
- Known/treated breast cancer patients

RESULTS:

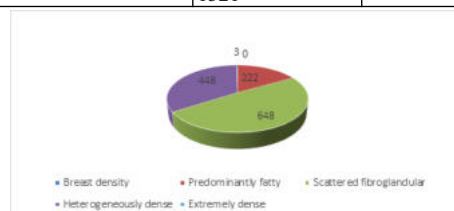
The study comprised a total of 1321 participants. The collected data was analyzed using IBM SPSS version 25. The continuous and categorical variables within the study have been presented as mean $\pm$ standard deviation and percentages respectively. Comparison of findings from USG and mammogram was done using chi-square test. A p value of <0.05 was considered significant for all analyses.

Throughout the study, the following findings were recorded.

Our patients average age ranged from 40 to 83 years, with a standard deviation of 11.8 years. Their mean age was 62.5 years. Most of the participants were 40-49 years of age (34.10%).

Table 1: shows distribution of subjects according to age at presentation.

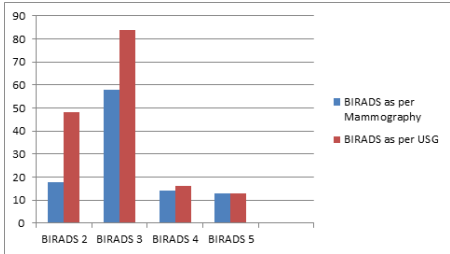
Age in years	N	%
40-49	451	34.10
50-59	377	28.50
60-69	271	20.50
70-79	146	11.05
80-89	76	5.75
Total	1321	



Graph 1: Distribution of breast density among subjects

Table 2. Incidental Findings on screening Mammography and Sonography of the Breast in clinically occult cases.

	BIRADS as per Mammography	BIRADS as per combined USG and mammography	HPE:	Benign Fibroadenoma	Benign others	Malignant	Indeterminate
BIRADS 1	1217	1160		-	-	-	-
BIRADS 2	18	48		-	-	-	-
BIRADS 3	58	84	17 cases HPE was not done	55	6	5	1
BIRADS 4	15	16		10	0	6	0
BIRADS 5	13	13		0	0	13	0



Graph 2: Distribution of positive findings on Mammography and Sonomammography among subjects

Among the 1321 patients who underwent screening mammography, 1217 patients did not show any lesion on mammography. 104 lesions were picked up, among which 18 were BIRADS 2, 58 were BIRADS 3, 15 were BIRADS 4 and 13 were BIRADS 5 lesions. A total of 21 non-palpable malignancies were detected mammographically and histologically confirmed. Among the 21 lesions that turned out to be histologically malignant, 13 lesions were reported to be BIRADS 5, 5 lesions were BIRADS 4 and 3 lesions were BIRADS 3 on initial mammography evaluation.

After mammography, these patients were subjected to correlative sonomammography and the contemporary lesions were re-evaluated. All mammographically detected index lesions showed correlative morphology on sonomammography. Additionally, we were able to pick up 57 adhoc lesions which were occult on mammography, all of which belonged to ACR C breast composition. Out of these 57 additional lesions picked up on sonomammography, 3 turned out to be malignant on subsequent histopathology. Out of the 3 malignancies picked up exclusively on USG, one lesion was assigned BIRADS 4 and 2 were assigned BIRADS 3. All 3 were Intraductal carcinoma histologically and when retrospectively re-assessed on mammography, one of the them showed fine amorphous clustered calcification which was missed on initial evaluation.

Table 3 : Correlation between Mammography and Ultrasound in BIRADS 2 lesions which turned out to be malignant.

Mammography	Ultra sound		Total	
	Malignant	Benign	N	%
Malignant	0	0	0	0
Benign	0	18	18	37.5%
No lesion	0	30	30	62.5%
Total	N	0	48	48
	%			100%

P < 0.01

Among 48 lesions in BIRADS 2 detected with combined mammography and sonomammography, none were malignant.

Table 4 : Correlation between Mammography and Ultrasound in BIRADS 3 lesions

Mammography	Ultra sound			Total	
	Malignant	Benign	HPE not done/Indeterminate HPE results	N	%
Malignant	3	0	-	3	3.6%

	Benign	2	41	-	43	51.2%
	No lesion	0	20	-	20	23.8%
	HPE not done/Indeterminate HPE results	-	-	18	18	21.4%
	Total	N	5	61	18	84
		%	6%	72.6 %	37.5%	100%

P < 0.01

Among 84 BIRADS 3 lesions detected in combined USG and mammography , 3 were malignant and 63 were benign ,1 lesion was indeterminate on HPE, 17 cases did not undergo HPE. 2 malignancies detected in ultrasound were missed on mammography.

Table 5 : Correlation between Mammography and Ultrasound in BIRADS 4 malignant lesions

Mammography	Ultra sound		Total	
	Malignant	Benign	N	%
Malignant	5	0	5	31.25%
Benign	0	10	10	62.5%
No lesion	1	0	1	6.25%
Total	N	6	10	16
	%	37.5%	62.5%	100

P < 0.01

Among 15 BIRADS 4 lesions picked up on combined Mammography and USG, 5 lesions were malignant and 10 were benign. 1 lesion completely missed on Mammography was picked up on USG and turned out to be malignant.

Table 6 : Correlation between Mammography and Ultrasound in BIRADS 5 malignant lesions

Mammography	Ultra sound		Total	
	Malignant	Benign	N	%
Malignant	13	0	13	100%
Benign	0	0	0	0
No lesion	0	0	0	0
Total	N	13	0	
	%	100	0	100%

P < 0.01

Among 13 BIRADS 5 lesions picked up both on mammography and USG, all turned out to be malignant.

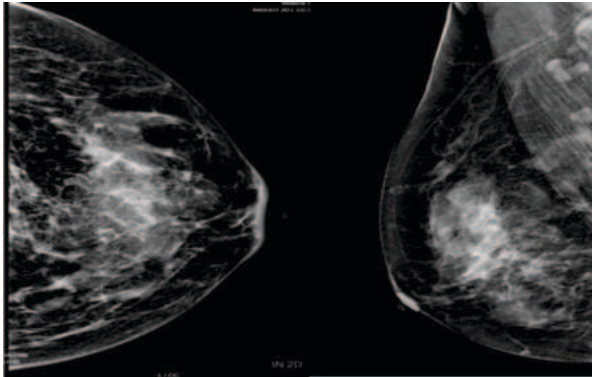
Table 7 : Correlation between Mammography and ultrasound for 1321 patients.(Positive: lesion detected; Negative: No lesions detected)

Mammography	Ultra sound		Total	
	Positive	Negative	N	%
Positive	104	0	104	92.1%
Negative	57	1160	1217	7.9 %
Total	N	161	1160	1321
	%	12.2 %	87.8%	100

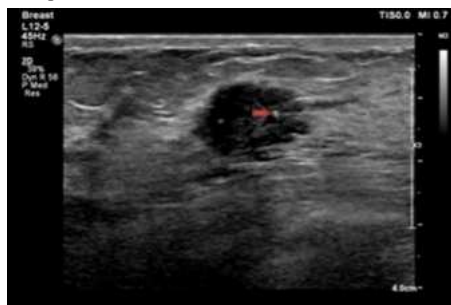
P < 0.01

The p value for the comparison between mammography and ultrasound detection of malignant lesions was approximately 0.0017.This suggests that the additional lesions detected by ultrasound, including the malignant ones, improve the detection rate when combined with mammography.

Illustrative Case:



Illustrative Case: Figure 1a and 1b: Mammography images CC and MLO view reported to BIRADS 1.



Illustrative Case: Figure 1c: Sonomammography correlation of the same patient revealed a BIRADS 3 lesion which when subjected to HPE turned out to be malignant.

Patient had no breast complaints. Underwent mammography as a part of routine master health check-up package in our institute. Mammography initially considered to be **BIRADS 1**. Non-palpable mass in left breast missed on mammography due to dense breast composition later picked up on sonomammography and histologically confirmed to be malignant.

DISCUSSION:

Our study included 1321 asymptomatic women. On screening mammography 104 non-palpable lesions were detected. Correlative ultrasonography of these patients additionally picked up 57 lesions out of which 3 were malignant. This shows the importance of using both the key modalities mammography and sonomammography in combination. This is in consensus with the studies done by Barlow et al⁽⁵⁾ and Zheng T et al⁽⁶⁾ who were of the opinion that ultrasonography in a resource poor setting can act as an un-avoidable screening tool. However, this was in contradiction to study done by Gartlehner G et al⁽³⁾ stating that there was no methodologically sound evidence to justify the routine use of ultrasonography as an adjuvant screening tool.

CONCLUSION:

Breast screening with mammography in all women above 40 years of age is absolutely necessary in view of raising incident rates of breast cancer.⁽⁷⁾ Furthermore, accessorizing the routine mammographic evaluation with a sonomammography can positively impact the detection rates thus increasing the sensitivity of the mammographic detection of otherwise occult lesions. Combined BIRADS score with a correlative consensus of both mammography and sonomammography increases the observer confidence in reporting.

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