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Ultrasonographic and Mammographic Evaluation of Breast Lesions

Authors
Dr M. Padmavathi[1], Dr D. Sudhakar Babu[2], Dr V. Sailaja[3]
[1]Government Medical College, Adilabad, Telangana, India
[2]Government Medical College Nizamabad, Telangana, India
[3]Army College of Dental Sciences, Secunderabad, Telangana, India

Abstract
The Study was done in 200 female patients with various breast lesions by using six parameters. In the study of incidence of breast lesions in relation with age it was found that the vulnerable age groups for the different lesions of breast were between 40-49, 50-59 years. Regarding the site of lesion, the author found the upper outer quadrant was vulnerable for all types of lesions especially in left side. Comparing the accuracy of diagnostic procedure of mammography and ultrasonography, the mammogram showed only 86% accuracy with some false positive cases, whereas ultrasonography showed high percentage of accuracy, and also was simplest technique, comparatively cheaper and so widely used over the mammogram.
Keywords: *Mammogram, ultrasonogram, breast lesion, incidence, diagnostic accuracy.*

Introduction

In mammals the mammary glands form a secondary sexual feature of females and in rudimentary form in males. The breast develops from ectodermal mammary ridges. Till menarche its structure in male and female is similar and rudimentary. From menarche onwards till the menopause the organ is under constant influence of hormones and the structure varies accordingly. Any aberration in this process of development leads the organ to be susceptible to a spectrum of localized pathologies like infections hyperplastic and neoplastic changes. The evaluation of breast lesions in a systemic manner can be done by 'triple assessment'. The steps being symptoms, history taking, clinical examination, investigations which include imaging (ultrasonogram+mammogram) and biopsy etc. The aims of evaluation of breast lesions are to confirm the diagnosis to see the extent of lesion and to plan for appropriate therapy. Carcinoma of the breast is the second most common cause of death among women. Early diagnosis of the breast lesion can prevent further complication in the patient both mentally and physically. Earlier the diagnosis was mainly done by self examination of breast by the patient, then clinical evaluation of the lesion by the doctor followed by invasive procedure like biopsy etc. These are time consuming and traumatic and also have a hazard of localized spread and dissemination, not cost effective, needing hospitalization. Then later with the development of non-invasive imaging procedures like mammography, ultrasonography, MRI etc the accuracy of early diagnosis has improved. Mammography though good in result, not accessible to all the patients and also not cost effective.

Ultrasonography in comparison with other imaging techniques are available and usable anywhere easily accessible to the patients and cost effective.

Materials and Methods

The study was conducted with 200 patients in and around the Hyderabad who attended to MNJ institute of Oncology, Indo American Cancer Institute, Elbit diagnostics Hyderabad. Palpable abnormalities of the breast confirmed with histopathology are included in this study. All patients had routine clinical examination, mammography of both the breast and the high resolution ultrasonography of both the breast in MNJ, Indo American cancer institute & Elbit diagnostics Hyderabad. Mammography was performed using a dedicated mammography unit with a KVp of 26-30kv commonly used for breast of average size and density with focal spot of 0.3-0.35mm. Both craniocaudal and mediolateral views of both the breasts were performed after adequate compression, followed immediately by ultrasound examination of both the breasts and axilla using 7.5mHz linear array probe. Ultrasound was performed in supine position with arms extended underneath the head.

Observations and Discussion

The author studied the diagnostic accuracy of both mammography and ultrasonography. The parameters taken are:

- Incidence of various breast lesions in the age group of 20-59years. Lesions include mastitis, cystic lesions, benign tumors (fibroadenomas) carcinomas, calcifications.
- Relative incidence of various breasts lesions in particular age group.
- Site of the lesions.
- Side of the lesions.
- Mammographic & ultrasonographic features of breast lesions.
- Diagnostic accuracy of mammogram & ultrasonogram.

Incidence of Various Breast Lesions

More number of patients that is 64/200 are seen between the age group of 40-49years. Next vulnerable group in 50-59 years, minimum in 60-69 years and rare in 20-29 years of age group. Present study coincides with the Mahesh K Shetty[2]& differs with the Sachin Prasad's[3]& Sandhya's [4]studies where the cases were more below 30years of age. (Table 1)

Table 1: Comparative figures of different Authors in different breast lesions in Various Age groups

Age group	Sandhya,et al [4] study n=500	Mahesh [2] study n=411	Sachin Prasadet Al[3] studyn=62	Present study n=200
>20years	99	-	-	-
20-29	192	28	20	24
30-39	137	106	19	40
40-49	72	166	16	64
50-59	-	82	4	63
60-69	-	21	3	9
<70	-	8	-	-

Relative incidence of various breast lesions

More cases of benign tumors were seen among 200 patients between the 40-49 yrs, 50-59yrs of age group i.e 23/69, 18/69. Malignant lesions were more in 50-59yrs i.e 21/45, mastitis in 30-39 (10/19) and calcifications 40-59yrs of age group. Regarding the incidence of malignancies in different age groups, the author's study is coinciding with previous studies i.e Sandhya[4] et al, Katsaro[5] et al, Janardhan[6] et al etc., where it is predominantly seen in the mean age of 45yrs. (Table 2)

Table 2: Comparative figures of different Authors in various Breast lesions

Various Studies	Fibrocystic disease	Benign tumors	Carcinoma
Sandhya[4] et al	-	20-40yrs	>40yrs
Katsaro[5] et al	-	-	>50yrs
Janardhan[6] et al	-	-	40yrs
Mona[7], et al	34yrs	23yrs	-
Present study	40-49yrs	40-49yrs	50-59yrs

Site of the lesion

Upper outer quadrant of breast is occupied with maximum number of lesions in all studies that coinciding with author's study. It reflects the greater amount of breast tissue in the upper outer quadrant when compared to the other quadrants. (Table 3)

Table 3: Comparative figures of different authors of site of the lesion with percentage

Site	Raafta, et al [8] study		Shozo, et al [9] study		Sachin Prasad, et al[3] study		Present study	
	n	%	n	%	n	%	n	%
UOQ	26	32.5	30	37.97	28	45.16	109	54.5
LOQ	11	14	5	6.33	22	35.48	20	10
UIQ	12	15	24	30.38	-	-	26	13
LIQ	10	12.5	6	7.59	2	3.23	35	17.5
RA	21	26	-	-	10	16.13	10	5
UO, UI	-	-	4	5.06	-	-	-	-
LO, LI	-	-	4	5.06	-	-	-	-
UO, LO	-	-	5	6.33	-	-	-	-
UI, LI	-	-	1	1.27	-	-	-	-

Side of the lesion

Maximum incidence of breast lesions were confined to left side i.e 96/200 (48%), in right side 87 cases were reported (43.5%). Minimum incidence in bilateral 17/200 (8.5%) coinciding with previous studies. (Table 4)

Table 4: Incidence of Breast lesions based on laterality

Study	Right	Left	Bilateral
Mona[7], Nazer	39.5%	45%	7%
Present Study	43.5%	48%	8.5%

Mammographic & Ultrasonographic appearance of breast lesions

In present study 200 female patients with various breast lesions the author has evaluated the ultrasonography and mammographic appearance of various confirmed breast lesions. In total 200patients ultrasound could detect 191 cases successfully (95.5%). Mammogram could detect 172 cases (86%). The Author's study is co-relating with previous studies. Ultrasound is an excellent imaging method to evaluate the various breast lesions when compared to mammography. (Table 5)

Table 5: Comparison of Mammographic & Ultrasonographic accuracy of breast lesions

Different Studies	Ultrasonogram	Mammogram
Noriyukietal [10]	100%	64.7%
Nasu et al [11]	88.76%	84.27%
Sachin Prasad et al [3]	70%	77%
Hieckenet al [12]	75%	65%
Cox BA Kelly et al[13]	100%	77.07%
Present Study	95.5%	86%

Diagnostic accuracy of ultrasonography and mammography

In detection of mastitis cases, the accuracy of ultrasonogram vs mammogram is 100% vs 74% respectively. In cystic lesions, the accuracy of ultrasonogram vs mammogram is 100% vs 78.5% and in benign tumors96% vs 88%. In carcinomas 100% vs 93%. Finally in calcifications both ultrasound and mammogram are 100% accurate. The Author's study is similar with that of previous studies. The diagnostic accuracy of ultrasound was superior when compared to diagnostic accuracy of mammogram.

Conclusions

The Author tried to evaluate the accuracy of diagnostic procedure of mammography & ultrasonography. The Mammogram showed only 86% accuracy with some false positive cases, whereas ultrasound not only showed high percentage of accuracy, but also was simple technique, comparatively cheaper and most widely used over the mammogram. This procedure is sufficient to diagnose the different types of lesions, mainly carcinomas in the early stages even in rural areas.

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