STUDY OF BREAST DISEASES ON ULTRASONOGRAPHY WITH FNAC CORRELATION IN A TERTIARY CARE CENTRE

Dr Abhishek Agrawal,[1] Dr Zeeshan Siddiqui,[2] Dr Lavan Saxena,[3] *Dr Megha Agrawal[4]

1,2 Assistant Professor, Department of Radiodiagnosis, IIMS&R, Integral University, Lucknow

3 Associate Professor, Department of Radiodiagnosis, IIMS&R, Integral University, Lucknow

*Corresponding Author: 4 Associate Professor, Department of Pathology, IIMS&R, Integral University, Lucknow,

mailid- drmeghagarg07@gmail.com

ABSTRACT

BACKGROUND: Detection of breast cancer in its earliest possible stage is ultimate goal in breast imaging & role of radiologist is therefore vital.

OBJECTIVE: The aim of USG as a diagnostic tool for breast diseases is to study the mode of presentation, nature of the lesion, USG features, and their correlation with clinical sign and symptoms, and cytological study.

MATERIAL & METHODS: Study Design: Prospective study. **Study Period:** September 2014 to August 2015(1 year). **Work Place:** Department of Radiodiagnosis G.R. Medical College & Jayarogya Hospital, Gwalior. Using USG machine Aloka prosound alpha-6 (Aloka triviton pvt ltd Tokyo, Japan.) Linear 6-12 MHz probes will be used for real time B-scan. **Study Group:** 106 patients with complaints of breast pain, local breast tenderness, breast lump, discharge or skin changes. (irrespective of age/marital status/ breastfeeding). Correlation of USG findings along with cytological findings.

RESULT: The Sensitivity, Specificity, Positive predictive value, Negative predictive value of Ultrasonography in diagnosing carcinoma breast are 55.55%,97.72%, 83.33% and 91.48% respectively. The Chi square test of USG correlation with FNAC was performed which was found to be statistically significant.

CONCLUSION: USG is an individually effective diagnostic modality for detection of breast lesions. Thus sonography plays an important role in management of breast lesions. Sonography is highly sensitive and specific in diagnosing breast mass, breast abscess, differentiating b/w solid and cystic lesions, characterization of the lesions.

KEY WORDS: Sonography, FNAC, breast mass.

INTRODUCTION

Breasts are a secondary sexual organ in females. This tender, sensitive & delicate complex structure is constantly under the influence of hormones. After menarche, the young virgin breast contains more dense connective tissue. With progression in age the dense breast becomes mixed glandular pattern tissue and with further progression in age, breast begins to involute into fatty tissue. Any aberration in this process leads to susceptibility of a spectrum

of localised pathologies like hyperplasia and neoplastic changes. Detection of breast cancer in its earliest possible stage is ultimate goal in breast imaging & role of radiologist is therefore vital.

The clinical use of breast radiography was pioneered by Stafford Warren in 1930, and it remains the single most important innovation in breast cancer control since the introduction of radical mastectomy in 1898[1]. The technique of breast radiography described by Leborgne[2] in 1953 provided a basis for future developments. Leborgne was the first to show the importance of two fundamental factors in soft tissue radiography of breast. The first was marked improvement in contrast with non-screen films when exposed by low KV X-rays. The second was the association of micro-calcifications with CA breast.

The first reference to the application of sonography for the diagnosis of breast disease was in 1951 when Wild & Neal described the acoustic characteristics of two breast tumours, one benign and one malignant[3] .They demonstrated three different acoustic tissue textures based on acoustic impedence for normal breast tissue and for benign and malignant breast tumours.

Diseases of breast, with their uncertain causes and confusion of treatments, have intrigued physicians and medical historians throughout the ages. Of the various pathologies that afflict the breast, cancers are most often encountered and are the most dreaded[4,5]. Breast cancer is the second most common cancer in Indian women[6,7]. The crude incidence rate of Breast cancer at India level is about 85 per 100,000 women per year and about 52000 females develop breast cancer in India per year[6,7]. Screening and diagnostic efforts for breast cancer are critical because the disease has a high rate of successful outcomes with early identification and treatment[8]. Mammography is the most commonly used imaging method and is the only currently known means of proven effectiveness especially in patients with non palpable carcinoma.[9,10]

This is because breast changes like asymmetry, neodensity, distortion of fibro glandular architecture and micro calcifications are picked up earlier than lesions that become clinically palpable, or are sometimes detected by self-examination. [11,12].

OBJECTIVES

Aim is to prospectively evaluate breast lesions using Ultrasonography(USG) in combination with FNAC correlation.

USG as a diagnostic tool for breast diseases is to study the mode of presentation, nature of the lesion, USG features, and their correlation with clinical sign and symptoms, and cytological study.

MATERIAL & METHODS

- **Study Design:** Prospective study
- **Study Period:** September 2014 to August 2015(1 year)
- **Work Place:** Department of Radiodiagnosis G.R. Medical College & Jayarogya Hospital, Gwalior, Using USG machine Aloka prosound alpha-6 (Aloka triviton pvt ltd Tokyo, Japan.) Linear 6-12 MHz probes will be used for real time B-scan.
- **Study Group:** 106   patients with complaints of breast pain, local breast tenderness, breast lump, discharge or skin changes. (irrespective of age/marital status/ breastfeeding.)

OBSERVATIONS

Table 1 - Age distribution of patients

Age of the patient	Number of the patient	%
<40yrs	32	30
41-50yrs	32	30
51-60yrs	24	23
>60yrs	18	17

Table 2- Findings of cases diagnosed by USG

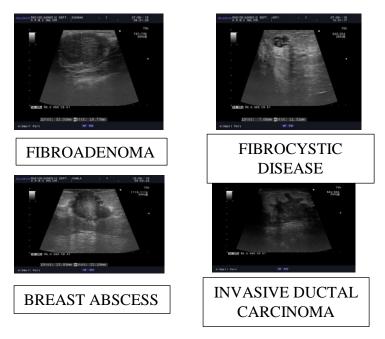| Cytology	Fibrocystic disease	Fibroadenoma	Cyst	Infection	Lipoma	Malignancy
No. of cases	42	10	6	4	2	12
Bi/unilateral	Bilateral	Both	Unilateral	Unilateral	Unilateral	Unilateral
Echogenicity	Hypoechoic	Hypoechoic	anechoic	Anechoic - hypoechoic	Isoechoic	Herogeneous
Margins	Diffuse, ill defined	Well defined	Well defined	Well defined	Ill definfed	Irregular
Calcifications	4	6- coarse	-	-	-	6- micro
Single or multiple	Diffuse	Single/multiple	Single	Single	Single	Single
Skin infiltration	-	-	-	Focal thickening in 1 case	-	6 cases- skin thickening
With internal echos	-	Homogenously filling up when gain raised	Central area persistently anechoic	With internal moving echos	-	-
Posterior enhancement	-	4	++	+	-	-
Posterior shadowing	-	4	-	-	-	10

Table 3- Comparative analysis of cytology, USG & combined study in   detection of different breast lesions

	Cytology	USG alone	Combined
Fibrocystic disease	44	42	44
Infection	4	4	4
Fibroadenoma	32	10	32
Cyst	6	6	6
Carcinoma	18	12	18
Lipoma	2	2	2
Total	106	76(71.6%)	106(100%)

Table 4- correlation of USG & FNAC for diagnosis of Carcinoma

Carcinoma	FNAC positive	FNAC negative	Total
USG positive	10	2	12
USG negative	8	86	94
Total	18	88	106

FIBROADENOMA

FIBROCYSTIC DISEASE

BREAST ABSCESS

INVASIVE DUCTAL CARCINOMA

DISCUSSION

In our study we examined every breast lesions by USG independently & then compared its result with FNAC result. In our study 106 female patients having breast symptoms were evaluated with USG breast & subsequently by FNAC. USG independently detected 10 patients as suspicious of breast carcinoma & missed 8 lesions, which were subsequently proved as carcinoma. USG falsely detected 2 patients as suspicious lesion, which proved benign in FNAC.

4 malignant lesions in dense breast parenchyma were detected in USG. 8 cases of carcinoma breast which could not be picked up in USG were diagnosed by cytology.

In 44 FNAC proven cases of fibrocystic diseases, USG detected 42 cases.

In 32 FNAC proven cases of fibroadenomas, USG detected 10 cases.

Out of 6 benign cysts, USG detected all correctly. In 4 cases of ineffective pathology, USG correctly diagnosed all the cases.

In our study population 83.01% are benign & out of them 72.72% are diagnosed by USG alone.

The chi square test of USG correlation with FNAC is $X^2=44.309$ & P=<0.001 which was found to be statistically significant which signify that USG is an effective diagnostic procedure of detecting breast malignancy, but on combination of ultrasonography with cytology shows strongest correlation.

Mahesh K. Shetty, et al[13] has conducted a study to evaluate the role of combined mammographic & sonographic imaging in patients with palpable abnormalities of the breast in four hundred eleven consecutive cases. 40.1% had a benign assessment; 58.7% of the benign lesions were visible on both mammography & sonography; 40% of benign lesions were mammographically occult & identified at sonographic evaluation. In 14.6% of the 411 cases, imaging evaluation resulted in a suspicious assessment; 49 (81.7%) of the 60 lesions categorized as suspicious underwent biopsy; 14(28.5%) of 49 lesions were histologically proved to carcinoma. 19 (31.6%) of the 60 lesions categorized as suspicious were mammographically occult & identified only on sonography; 14 (73.7%) of these 19 lesions underwent biopsy; 12(63.1%) of 19 were benign, & 2(10.5%) were malignant. 186 (45.2%) of the 411 palpable abnormalities had negative imaging assessment findings; 12 patients with negative imaging findings underwent biopsy, & all had benign findings. The sensitivity (14 of 14) & negative predictive value (186 of 186) for a combined mammographic & sonographic assessment were 100%.

In our study, 83.01% are benign lesions among 106 patients & out of which 72.72% of the lesions are diagnosed by USG alone. Out of malignant lesions, USG detected 10. But when cytological correlation was done, there was 100% detection of the cancer. Combined mammographic & sonographic assessment was shown to be very helpful in identifying benign as well as malignant lesions causing palpable abnormalities of the breast.

Skaana P et al[14] evaluated ultrasound findings of 355 malignant breast tumors among 2985 consecutive patients who underwent breast ultrasound were compared with clinical findings and pathologic subtypes of the tumours. They found a total of 97.5% of the palpable and 67.9% of the non palpable malignant neoplasms were detected as tumours on ultrasound. A negative predictive value of 100% in palpable and 96% in non palpable tumours was achieved using strict ultrasound criteria. In our study, the sensitivity of USG to detect the malignant lesion is 55% in both palpable and non palpable breast lesion and specificity is 97.7%. The negative predictive value is 91.4%.

Thomas M. Kolb et al[15] Studied 221 women, among them 246 cancers were found. Sensitivity, Specificity , negative and positive predictive values and accuracy of USG were 75.3%, 96.8%,99.7%,20.5% and 96.6% respectively. In our study, the sensitivity, specificity, NPV, PPV values of USG are 55%, 97.7%, 91.4% & 83.3% respectively. Sonography therefore is a superior modality in patients with palpable abnormalities; its superiority over mammography is in being able to show lesions obscured by dense breast tissue and in characterizing palpable lesions that are mammographically visible or occult.

In our study we estimated chi square test which was found to be statistically significant & this leads to the conclusion that with the use of combination of USG & FNAC we can achieve the accuracy of 100% in detecting breast malignancy.

CONCLUSION

It was found from the literatures that USG is well established diagnostic modality for the breast. It has high diagnostic yield, but is not 100% sensitive & specific. Cytology when combined with USG can yield very significant improvement in sensitivity & specificity for diagnosing different breast lesions & our study strongly supports this evidence.

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