

## Cytological and Radiological Correlation of Breast Lesions with Histopathological Findings

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### Abstract:

**Background:** Breast tumors are most frequent tumors in females. Breast tumors are second main reason of death due to carcinoma in females. Sonomammography a digital technique has helped in early diagnosis of breast lesions for many years. Fine needle aspiration cytology, a patient approach technique has been a contentious topic in the detection of cancer. After a suspicious diagnosis surgical excision done and treatment is given based on histopathological examination. So, the study aimed to correlate the cytological and radiological findings of breast lesions with histopathological findings to find out efficacy of FNAC.

**Materials and Methods:** The present prospective observational study was conducted in the Department of Pathology, Jaipur National University Institute for Medical Sciences and Research Centre, Jaipur. Prior to the initiation of the study, Ethical and Research Committee clearance was obtained from Institutional Ethical Committee. 50 patients with breast lesion included in present study who were meeting a criterion. A comparison between cytology and radiology results done along with histopathology results.

**Results:** Total 36 benign and 14 malignant cases studied and comparison done between cytology and radiology findings. There were some variables like menopausal age, quadrant of lump, consistency and mobility of lump having significant findings. Sensitivity and specificity of cytology is respectively 78.6% and 86.1%. Sensitivity and specificity of radiology is respectively 78.6% and 77.8%. Accuracy of cytology and radiology is respectively 84% and 78%.

**Conclusion:** Though sonomammography used for screening a lesion as benign and malignant, Cytology is cost effective and better for diagnosing lesions to prevent surgical exposure. Histopathology can diagnose vast spectrum of disease based on microscopy.

**Key Word:** Breast lesions, Cytology, Radiology, Histopathology, FNAC.

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### I. Introduction

Breast carcinoma, which accounts for more than 1.7 million cases worldwide each year,<sup>1</sup> is the most prevalent malignant tumour. Breast tumours are second main reason of death due to carcinoma in females. FNAC is a relevantly significant technique to diagnose carcinoma in breast. The difference between atypical hyperplasia and in situ carcinoma and between in situ ductal carcinoma and infiltrative cancer change the patient's treatment. It is the main present limitation of FNAC.<sup>2</sup> However, technical issues like inadequate aspiration, inconsistency in smear making can limit the diagnosis. It can make false interpretation of malignancy.

Young female breast lesions differ significantly from those in adults, with the former, lesions being predominately benign. Most breast lumps that develop after puberty are benign fibroadenomas. It is uncommon for young females to develop malignant breast tumours. Infection, trauma, and cyst formation are further factors. Interventions may result in breast deformity in young females. In order to choose patients for additional treatments, radiological imaging is crucial because of this danger and the low prevalence of cancer in this age range shift to pathological investigation for suspected lesions.<sup>3</sup>

Breast lesions can be quickly diagnosed with FNAC, which also helps to calm patient worry about the possibility that an initially appeared solid mass is actually a cyst. This helps to avoid unneeded surgery's pain and morbidity. If the lesions turn out to be malignant, the patient can make quick treatment plans so that they can receive prompt care. Breast lesions, both benign and malignant, are diagnosed by FNAC. Additionally, the diagnostic accuracy of aspiration cytology needs to be assessed because the results may not always have the same significance for various individuals. It goes without saying that the reporting cytologists' experience and great interest are essential to the diagnostic accuracy and clinical acceptability of their findings.<sup>4,5</sup>

Aspiration cytology in the detection of malignancy has been a contentious topic. Although Martin and Ellis<sup>7</sup> first demonstrated the aspiration cytology method in the year 1930, it has only been in the last few years that its usage as a diagnostic and therapeutic tool has achieved widespread acceptance. From exuberant approval to nearly complete rejection, reactions to this surgery vary. The primary criticisms center on the potential for tumour dissemination through the needle track or distant embolization by blood or lymph channels.<sup>6,7</sup> So there is a need for more research on the use of FNAC. The study aimed to correlate the cytological and radiological findings of breast lesions with histopathological findings.

Aim of the study is to correlate the cytological and radiological findings of breast lesions with histopathological findings by correlating sensitivity, specificity and accuracy of cytology and radiology.

## **II. Material And Methods**

This study was prospective and carried out in department of pathology in Jaipur National University Institute for Medical Sciences and Research Centre, Jaipur, India from period of 2021 January to 2022 June. Total 50 subjects were studied meeting the criterion.

### **Inclusion criteria:**

1. Women with complaints of lump in the breast.
2. Women with age more than 20 years.

### **Exclusion criteria:**

1. Women with non-palpable breast lesions.
2. Women not consenting for fine needle aspiration.

### **Procedure:**

Total 50 subjects presenting with breast lump on Mammography/ Sonography were evaluated by FNAC and biopsy within a span of 2 years. Informed consent has been taken from the patients. Result of 50 cases with radiodiagnosis followed by FNAC and biopsy were included in the study. Mammogram/ultrasound of the breast lesions were done by a consultant radiologist in the department of radiology and reporting done with BIRADS score. These reports taken as a radiological finding in our data.

FNAC method described to patient and consent taken for same. The patient was laid in supine position and examined by pathologist for lump in bilateral breast and axilla. The lump was localized and cleaned with sterile swab. The swelling was made immobile in between thumb and finger. A 23-gauge needle used for needling. Needle fitted with 5 cc disposable syringe inserted into lump and aspiration done with negative pressure in syringe. Once the material entered the hub of needle, the needle was withdrawn. Immediate pressure was applied with sterile gauze pad over lump. In order to make smears, air was taken into the syringe. Then material expelled on to the slides to make a series of smears. With the help of another slide, smears were made with a single gentle sweep. The slides were fixed in 95% ethyl alcohol as soon as they were made for Hematoxylin & Eosin and Papanicolaou stain. A few air-dried smears were taken for the Giemsa stain. Reporting was done by pathologist.

The excision biopsy specimen and mastectomy specimens received in pathology department were grossly examined for their size, shape, color and consistency. Change in the skin and the nipple noted. Presence of lymph nodes were also noted if received. In modified radical mastectomy specimens, a serial cut made at the distance of 1 cm for fixation. Nodes were dissected out in fresh state and their number and size were noted. Any changes to skin and nipple areola complex noted. Cut surface of tumour were noted with color, size, extension and any secondary changes such as hemorrhage, necrosis and fibrosis. Specimen kept in 10% formalin for 24 to 48 hours. After that tissue sections were taken from tumour, margins, nipple areola complex and lymph nodes. Tissue processed by routine paraffin embedding technique and multiple sections were taken of 4-6 microns thickness by a microtome and stained done by routine Hematoxylin & Eosin stain. Microscopic diagnosis was done by an expert pathologist using Light Microscopy Technique.

A comparison between cytology and radiology results done along with histopathology results.

### **Data analysis**

The collected data was entered into MS Excel 2010. Software which is used for statistical analysis was SPSS version 24, used for extracting data like percentage, sensitivity, specificity and probability value. A Fisher exact test value, p-value used to decide significant level.  $P < 0.05$  is significant.

## **III. Result**

The present prospective study was carried out in department of pathology JNUIMSRC, Jaipur including 50 subjects from 2021 January to 2022 June. Four patients had bilateral breast lump. Three subjects had two different lesions in different quadrant. So, quadrant wise total number of lesions were 53. The observations of study were as follows:

**Table 1: Age distribution of breast lesions**

Age in year	Number of cases	Percentage
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21 – 30	18	36
31 – 40	12	24
41 – 50	9	18
51 – 60	5	10
61 – 70	5	10
>70	1	2
Total	50	100

**Table 2: Patient distribution according to laterality of lesions**

Side	Number of cases	Percentage
Right sided	24	48
Left sided	22	44
Bilateral lump	4	8
Total	50	100

**Table 3: Patient distribution according to mobility of breast lump**

Mobility of Lump	Benign No of cases (%)	Malignant No of cases (%)	Total No of cases (%)	Fisher's exact test value P-Value
Mobile	32 (88.88%)	8 (57.14%)	40 (90%)	6.34 0.01174
Non-mobile	4 (22.22%)	6 (42.85%)	10 (20%)	
Total	36	14	50	

**Table 4: Patient distribution according to presence of pain in the lump.**

Pain / tenderness	Benign No of cases (%)	Malignant No of cases (%)	Fisher's exact test value P-Value
Painless lump	15 (41.67%)	7 (50.00%)	0.815 0.6651
Painful lump	15 (41.67%)	6 (42.86%)	
Tender lump	6 (16.67%)	1 (7.14%)	

**Table 5: Number of cases in different quadrant**

Lesion in quadrant	No of cases	Percentage of lesions
Upper Outer	15	28.31
Upper Inner	7	13.22
Lower Outer	5	9.44
Lower Inner	5	9.44
Retro-areolar	12	22.64
Upper Outer & Upper Inner	2	3.77
Upper Inner & Lower Inner	1	1.88
Lower Outer & Lower Inner	1	1.88
Upper Outer & Lower Outer	2	3.77
Upper Outer, Upper Inner & Lower Inner	1	1.88
All Quadrant	2	3.77
<b>Total</b>	<b>53</b>	<b>100</b>

**Table 6: Patient distribution according to consistency of breast lump**

Consistency of Lump	Benign No of cases (%)	Malignant No of cases (%)	Total No of cases (%)	Fisher's exact test value P-Value
Soft	2 (5.56%)	1 (7.14%)	3 (6%)	<b>17.89</b> <b>0.0001</b>
Firm	34 (94.44%)	7 (50.00%)	41 (82%)	
Hard	0 (0%)	6 (42.86%)	6 (12%)	
Total	36	14	50	

**Table 7: Cytological diagnosis with biopsy correlation**

Cytological Diagnosis	Number of Cases	Histopathological Diagnosis		P-Value
		Benign	Malignant	
		No of cases (%)		
Benign	33 (100%)	30 (90.91%)	3 (9.09%)	<b>&lt;0.0001</b>
Suspicious	6 (100%)	5 (83.33%)	1 (16.67%)	
Malignant	10 (100%)	0 (0.0%)	10 (100%)	
Inadequate	1 (100%)	1 (100%)	0 (0.0%)	

**Table 8: Radiological diagnosis with biopsy correlation**

Radiological Diagnosis	Number of Cases	Histopathological Diagnosis		P-Value
		Benign	Malignant	
		No of cases (%)		
<b>BIRADS I</b>	2 (100%)	2 (90.91%)	0 (9.09%)	<b>0.0004</b>
<b>BIRADS II</b>	8 (100%)	7 (83.33%)	1 (16.67%)	
<b>BIRADS III</b>	21 (100%)	19 (83.33%)	2 (16.67%)	
<b>BIRADS IV</b>	15 (100%)	7 (0.0%)	8 (100%)	
<b>BIRADS V</b>	4 (100%)	1 (100%)	3 (0.0%)	

**Table 9: Number of cases in Imaging, Cytology and Histopathology**

	Radiology		Cytology		Histopathology	
	No of cases	%	No of cases	%	No of cases	%
Benign	31	62	34	68	36	72
Malignant	19	38	16	32	14	28

As the cytology test has a sensitivity of 78.6%; specificity of 86.1%; PPV is 68.75%; NPV is 91.17% and diagnostic accuracy is 84%, we can conclude that there were 3 falsely positive benign cases and 11 falsely positive malignant cases on cytology findings.

As the radiology has a sensitivity of 78.6 %; specificity of 77.8 %; PPV is 57.8 %; NPV is 90.3 % and diagnostic accuracy is 78%. There were 3 falsely negative malignant cases and 8 falsely positive benign cases found on radiology findings.

On cytology cases were fibroadenoma 24(48%), fibrocystic disease 4(8%), breast abscess 1(2%), duct ectasia 2(4%), fibroadenosis 1(2%), benign lesions 5(10%), adenomyoepithelioma 1(2%), suspicious for malignancy 1(2%), malignant lesion 5(10%), infiltrating ductal carcinoma 5(10%) and unsatisfactory smear 1(2%).

On biopsy cases were mastitis 2(4%), duct ectasia 2(4%), fibrocystic disease 6(12%), sclerosing adenosis 1(2%), fibroadenosis 1(2%), fibroadenoma 23(46%), phyllodes 1(2%), intraductal carcinoma 2(4%) and infiltrating ductal carcinoma 12(24%).

#### IV. Discussion

The majority of breast clinical presentations are due to benign lesions, yet despite their prevalence, benign pathological states have historically received less attention than malignancy. Based on symptoms and physical findings, Love and colleagues<sup>8</sup> have identified a useful category for benign breast disease. They have identified swelling and tenderness, inflammation, mastalgia, nodularity, lump and nipple discharge. In a woman with non-proliferative disease, proliferative disease without atypia and proliferative disease with atypia followed up for subsequent risk of developing carcinoma by Dupont & Page<sup>9</sup>. Proliferative disease with atypia has higher risk of developing carcinoma than proliferative lesions without atypia.

In young females, benign breast illnesses are prevalent. Typically, they manifest as a painless, mobile breast mass. The additional symptoms are nipple discharge and breast soreness. The most frequent changes in our study were fibroadenoma and fibrocystic changes. Cytology and histology were associated with clinical diagnosis. For an accurate evaluation of palpable breast lesions, the triple test—cytology in conjunction with clinical and radiographic findings—is the preferred method. The utility of FNAC has somewhat diminished across the country as a result of its limitations. Vala MT et al have compared diagnosis of cytology and histopathology in breast lesion.<sup>10</sup>

Ramesh K et al<sup>11</sup> has studied clinical and pathological correlation of breast lesions and identified a majority of cases (60%) from age group 21-30 year and a most common benign lesion fibroadenomas (57.6%). They also found that out of all benign cases 68% were mobile. Where as in this study also most common age group (36%) was 21- 30 year, most common benign lesion was fibroadenomas (46%) and out of all benign cases 88.88% were mobile. Both studies showed that benign lesions are more painless.

Saha A et al<sup>2</sup> compared FNAC with core needle biopsy in women with palpable breast lump and identified that majority of lesions were from right side breast (52%) with majority located in upper outer quadrant (50%). This study also had majority lesions from right side breast (48%) and majority lump located in upper outer quadrant (28.31%).

Mulka A et al<sup>12</sup> also correlate histopathological study of breast lesions with cytology and mammography. They identified sensitivity and specificity of FNAC and mammography as 95.9%, 98% and 84.7%, 78.5% respectively.

Saha A et al<sup>2</sup> studied cytology result accuracy 74%.Mulka A et al<sup>12</sup>studied cytology result accuracy 96.6% and radiology result accuracy 81.1%.

## V. Conclusion

Imaging of breast(Sonammography) is simple, non-invasive and convenient technique to screen breast disease. FNAC is also simple but minimally invasive procedure. So can not be used as screening purpose. But, it has good specificity, predictive values and accuracy to diagnose lesions than imaging. So FNAC can be useful to diagnose lesions in OPD patients and it prevent unnecessary surgery in patient. However, histopathology is confirmatory for breast lesion.

## References

- [1]. Juan RG, Jesse KM, Laura WL, Jeffrey LM. Breast. In: Rosai and Ackerman's Surgical Pathology. 11th ed. Elsevier 2018: 1434–1527.
- [2]. Saha A, Mukhopadhyay M, Das C, Sarkar K, Saha AK, Sarkar DK. FNAC versus core needle biopsy: a comparative study in evaluation of palpable breast lump. Journal of clinical and diagnostic research 2016 Feb; 10(2): EC05-8.
- [3]. Ellen MC, Regino C, Gregory JH. Breast masses in children and adolescents: radiologic-pathologic correlation. RadioGraphics 2009; 29: 907–931.
- [4]. Kreuzer G. and Zajicek, J. Cytologic diagnosis of mammary tumors from aspiration biopsy smears. Acta. Cytologica 1972; 16: 249-252.
- [5]. Zadjela A. The value of aspiration cytology in diagnosis of breast cancer: Experience at the Foundation Curie. Cancer 1975; 35: 499-502.
- [6]. Furnival CM, Hocking MA, Hughes HE, Reid MMW, Blumgart LH. Aspiration cytology in breast cancer its relevance to diagnosis. Lancet 1975; 2: 446-450
- [7]. Martin RE and Graham R. Office evaluation of breast tumor, with emphasis on needle aspiration therapy. Md State Med J. 1982 Sep; 31(9): 51-3.
- [8]. Sainsbury R, Williams NS, Bullstrode C. The Breast. In: Bailey and Love's Short Practice of Surgery. 26th ed. CRC 2013: 798-822.
- [9]. Dupont WD, Page DL. Risk factors for breast cancer in women with proliferative breast disease. New England Journal of Medicine. 1985 Jan 17; 312(3): 146-51.
- [10]. Vala MT, Goswami A, Suri SK. Comparative study of cytological and histopathological finding in breast lesion. IOSR Journal of Dental and Medical Sciences. 2014;13(7):05-7.
- [11]. Ramesh K, Bookya K. A study on clinical and pathological correlation of benign breast lesions. International Surgery Journal. 2017 Jul 24; 4(8): 2700-5.
- [12]. Mulka A, Kotasthane VD, Dhaka R, Kotasthane DS. Correlation of Histopathological Study of Breast Lesions with cytology and mammography as a measure of internal quality and diagnostic accuracy. Annals of Pathology and Laboratory Medicine 2017; 4(4): A397-402.

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