



CORRELATION BETWEEN RADIOLOGICAL AND CYTOLOGICAL AS WELL AS HISTOPATHOLOGICAL FINDINGS OF BREAST LUMP/MASS

General Surgery

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ABSTRACT

Background: Carcinoma of breast is the most common malignancy diagnosed in women worldwide. Pathological diagnosis of the breast lump is established using fine needle aspiration cytology (FNAC), core needle biopsy or surgical biopsy. Ultrasonography (USG) and mammography are the important tools in early detection, prompt treatment and favourable outcome leading to increased survival rate in younger females. FNAC is safe, least invasive and inexpensive. However, it is plagued by high false negative rates and insufficiency rates. Correlation of the pathologic result with the imaging findings after biopsy is found to be useful to validate the biopsy result and to offer subsequent management. **Aim:** To correlate radiological, cytological as well as histopathological finding of breast mass/lump. **Material And Methods** A total of 74 patients with suspicious breast mass were evaluated with cytology and sonomammography. A correlation was done between cytology, sonomammography and histopathology results individually and combined, taking histopathology as gold standard with findings recorded as benign, suspicious or malignancy. Suspicious cases were those, which fell in BIRADS IV category. **Results:** Correlation that was established between FNAC, BIRADS by USG and Mammography there was Near Perfect agreement between these methods, and this agreement was statistically significant ($p = <0.001$). A near perfect agreement was also established between BIRADS established by USG and Mammography complementing each other. **Conclusions:** Through our study it has been well established that the FNAC, Mammography BIRADS and USG BIRADS can very well complement the Biopsy findings of the breast mass which is considered to be the gold standard.

KEYWORDS

FNAC, BIRADS, Mammography, correlation

INTRODUCTION

Carcinoma of breast is the most common malignancy diagnosed in women worldwide. An estimated 1.67 million women across the world were diagnosed with breast cancer in 2012, accounting for 25 per cent of all cancers diagnosed in women.⁽¹⁾ Pathological diagnosis of the breast lump is established using fine needle aspiration cytology (FNAC), core needle biopsy or surgical biopsy. The early diagnosis, by a meticulous clinical examination, staging of the disease by radiology and histopathological analysis at the time of disease presentation play an important role in deciding type of surgery and fair outcome for these patients.⁽²⁾ The two non-invasive radiological investigations; Ultrasonography and mammography are the important tools in early detection, prompt treatment and favorable outcome leading to increased survival rate in younger females.^(3,4) FNAC is safe, least invasive and inexpensive. However, it is plagued by high false negative rates and insufficiency rates.⁽⁵⁾ Further, FNAC cannot distinguish *in situ* from invasive cancer. Core needle biopsy provides adequate sample for histological analysis and compared to open surgical biopsy, it has several advantages like better patient tolerance, better cosmetic outcome and low cost.⁽⁶⁾

A strong working relationship between the radiologist and pathologist is important for imaging-pathology correlation. The pathologist is critical in assessing and communicating the quantitative and qualitative aspects of the biopsy.⁽⁸⁾

Given that up to 24% of discordant cases may harbor carcinoma,⁽⁷⁾ the pathologic findings must adequately explain radiologic impressions to ensure appropriate sampling and to prevent diagnostic delay and treatment. The objectives of this study were to evaluate the rates of radiologic and pathologic correlation in breast needle core biopsies, evaluate laboratory and radiology practices associated with greater correlation rates, and the rates at which the lack of radiologic-pathologic correlation is documented in pathology reports.

AIMS AND OBJECTIVES

- To correlate radiological and cytological as well as histopathological finding of breast mass/lump
- To evaluate the role of radiology and cytology in diagnosis of breast mass/lump

MATERIAL AND METHODS

Study Design:

Prospective comparative clinical study titled as 'Correlation Between Radiological And Cytological As Well As Histopathological Findings Of Breast Lump/Mass.

Study Duration: 2021 to 2022

Inclusion Criteria:-

All the patients presenting with breast mass/lump

Exclusion Criteria:-

- 1) Inflammatory breast diseases
- 2) Traumatic fat necrosis
- 3) Patients who have not consented for the study or lost to follow up or withdrawn from the study

Methodology

A total of 74 patients with suspicious breast mass were evaluated.

Clinical evaluation included the patient's history and physical examination.

Ultrasound examination was done in the Department of Radiodiagnosis and reported according to BIRADS protocol.

Mammography was also done on similar lines of USG of bilateral breast tissue and axillae and reported according to BIRADS protocol.

FNAC was aseptically taken from the lesion using 23 G needle and 5 ml syringe.

Cytological categories for reporting of breast mass are described as follows.

1. Benign
2. Suspicious
3. Malignant

Histopathology diagnosis which was done by an expert pathologist in the department of pathology.

Ultrasonography, mammography and Fine needle aspiration cytology diagnoses were respectively being recorded as benign, suspicious or malignancy. Suspicious cases were those, which fell in BIRADS IV category and showed atypical cells without frank malignancy on fine needle aspiration cytology.

RESULT AND OBSERVATION

A total of 82 patients were included in our study

Table 1: Distribution of the Participants in Terms of Age (Years) (n = 74)

Age (Years)	
Mean (SD)	39.04 (6.63)
Median (IQR)	38 (33-42)
Range	30 - 61

Table 2: Distribution of the Participants in Terms of Duration of Symptoms (Months) (n = 74)

Duration (Months)	
Mean (SD)	3.64 (2.64)
Median (IQR)	3 (1-5)
Range	0.5 - 12

Table 3: Distribution of the Participants in Terms of Associated Complaint (n = 74)

Associated Complaint	Frequency	Percentage
None	48	64.9%
Pain	14	18.9%
Discharge	8	10.8%
Pain+Discharge	4	5.4%
Total	74	100.0%

Table 4: Distribution of the Participants in Terms of Number of Masses (n = 74)

Number of Masses	Frequency	Percentage
Solitary	71	95.9%
Multiple	3	4.1%
Total	74	100.0%

Table 5: BIRADS scoring of breast lump according to USG and Mammography (n = 74)

BIRADS	Grade 2	Grade 3	Grade 4	Grade 5
USG BIRADS	19 (25.7%)	6 (8.1%)	9 (12.2%)	40 (54.1%)
Mammography BIRADS	18 (24.3%)	7 (9.5%)	5 (6.8%)	44 (59.5%)

Table 6: Distribution of the Patients in Terms of FNAC findings (n = 74)

FNAC	Frequency	Percentage
Carcinoma Breast	40	54.1%
Fibroadenoma	21	28.4%
Suspected Malignancy	10	13.5%
Fibrocystic Disease	3	4.1%
Total	74	100.0%

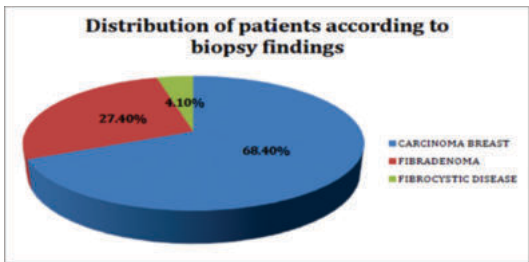


Fig 1: Distribution of the Participants in Terms of Biopsy (n = 74)

The grade 2 and 3 of BIRADS score both on US and mammography is considered in under benign heading and grade 4 and 5 is regarded as malignancy.

Table 7: Summary of Impression

Impression	Benign	Malignancy
FNAC	24 (32.4%)	50 (67.6%)
USG BIRADS	25 (33.8%)	49 (66.2%)
Mammography BIRADS	25 (33.8%)	49 (66.2%)
Biopsy	23 (31.1%)	51 (68.9%)

Table 8: Correlation between USG BIRADS with Biopsy (n = 74)

		Biopsy			Cohen's Kappa	
		Benign	Malignancy	Total	k	P Value
USG BIRADS	Benign	23 (31.1%)	2 (2.7%)	25 (33.8%)	0.938	<0.001
	Malignancy	0 (0.0%)	49 (66.2%)	49 (66.2%)		
	Total	23 (31.1%)	51 (68.9%)	74 (100.0%)		

There was Near Perfect agreement between the two methods, and this agreement was statistically significant (Cohen's Kappa = 0.938, p = <0.001). The diagnostic performance of USG BIRADS in reporting Biopsy as Malignancy was as follows: Sensitivity: 96%, Specificity: 100%, PPV: 100%, NPV: 92%, Diagnostic Accuracy: 97%.

Table 9: Correlation between Mammography BIRADS with Biopsy (n = 74)

		Biopsy			Cohen's Kappa	
		Benign	Malignancy	Total	k	P Value
Mammography BIRADS	Benign	23 (31.1%)	2 (2.7%)	25 (33.8%)	0.938	<0.001
	Malignancy	0 (0.0%)	49 (66.2%)	49 (66.2%)		
	Total	23 (31.1%)	51 (68.9%)	74 (100.0%)		

There was Near Perfect agreement between the two methods, and this agreement was statistically significant (Cohen's Kappa = 0.938, p = <0.001). The diagnostic performance of Mammography BIRADS in predicting Biopsy: Malignancy was as follows: Sensitivity: 96%, Specificity: 100%, PPV: 100%, NPV: 92%, Diagnostic Accuracy: 97%.

Table 10: Correlation between FNAC with Biopsy (n = 74)

		Biopsy			Cohen's Kappa	
		Benign	Malignancy	Total	k	P Value
FNAC	Benign	23 (31.1%)	1 (1.4%)	24 (32.4%)	0.969	<0.001
	Malignancy	0 (0.0%)	50 (67.6%)	50 (67.6%)		
	Total	23 (31.1%)	51 (68.9%)	74 (100.0%)		

There was Near Perfect agreement between the two methods, and this agreement was statistically significant (Cohen's Kappa = 0.969, p = <0.001). The diagnostic performance of FNAC in predicting Biopsy: Malignancy was as follows: Sensitivity: 98%, Specificity: 100%, PPV: 100%, NPV: 96%, Diagnostic Accuracy: 99%.

Table 11: Correlation between USG BIRADS and Mammography BIRADS (n = 74)

		Mammography BIRADS					Weighted Kappa	
		Grade 2	Grade 3	Grade 4	Grade 5	Total	k	P Value
USG BIRADS	Grade 2	13 (17.6%)	6 (8.1%)	0 (0.0%)	0 (0.0%)	19 (25.7%)	0.922	<0.001
	Grade 3	5 (6.8%)	1 (1.4%)	0 (0.0%)	0 (0.0%)	6 (8.1%)		
	Grade 4	0 (0.0%)	0 (0.0%)	3 (4.1%)	6 (8.1%)	9 (12.2%)		
	Grade 5	0 (0.0%)	0 (0.0%)	2 (2.7%)	38 (51.4%)	40 (54.1%)		
	Total	18 (24.3%)	7 (9.5%)	5 (6.8%)	44 (59.5%)	74 (100.0%)		

There was Near Perfect agreement between the two methods, and this agreement was statistically significant (Weighted Kappa = 0.922, $p = <0.001$).

DISCUSSION

In our study a total of 74 patients were undertaken into sample and were evaluated clinically, radiologically using USG and Mammography along with FNAC of breast lump and histopathological evaluation of biopsy tissue after biopsy of the breast lump

The mean Age (Years) of the patients was 39.04 ± 6.63 with Median (IQR) being 38.00 (33.00-42.00) ranging from 30 years to 61 years. This was found to be comparable to the study done by Arafah et al⁽¹⁰⁾ the mean age was 42.3 years. Alhamani et al⁽¹¹⁾ conducted a similar study where the mean age was 42.3 years.

Our study was comparable to the one done by Idowu et al (2012)⁽¹²⁾ who reported that a radiologic-pathologic correlation was found in 94.9% (1328 of 1399) of the cases reviewed. Similarly Seema Prakash et al (2016)⁽¹³⁾ also stated that breast radiology-pathology correlation conference impacted patient management in up to 5.3% of cases.

Our study was also comparable to Sunita Mistry et al. in 2018⁽¹⁴⁾ who concluded that FNAC is a simple and reliable method for diagnosis of breast lump with quite accuracy and avoiding unnecessary surgery. The results of FNAC show high degree of correlation with histopathology reports. Similarly A Khemka et al. in 2008⁽¹⁵⁾ in their prospective study found the correlation between diagnostic accuracy of FNAC and histopathology in palpable breast lumps including 50 female patients and concluded that FNAC is a cheap, rapid, reliable and accurate test of diagnosing a palpable breast lump if done by an expert and trained pathologist. It gives a good histological correlation. It may obviate the need for another surgical biopsy prior to definitive surgery for malignancy.

CONCLUSION

Through our study it has been well established that the FNAC, Mammography BIRADS and USG BIRADS can very well complement the Biopsy findings of the breast mass which is considered to be the gold standard.

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