

Combined Diagnostic Approach in Breast Cancer

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ABSTRACT

Background: Breast cancer is the most common cancer in females in the world. Breast aspiration cytology, histopathology and radiology have become important diagnostic tools in diagnosis of breast cancers. **Objectives:** Our aim was to conduct a combined diagnostic approach comprising of clinical examination, mammography, fine needle aspiration cytology and histopathology study in breast cancers correlate with individual diagnostic modality. **Methods:** A prospective study was done on 100 patients suspected of breast cancer. Various investigations including radiological investigations, FNAC, biopsy of the lesion was done. Clinical diagnosis, radiological, cytological and histopathology results were combined and compared with individual diagnostic modality. **Results:** Most common presenting symptom was breast lump seen in 95 cases. Out of 100 cases 47% were diagnosed malignant on radiology, 71% were malignant on Fine Needle Aspiration Cytology and 85% were diagnosed malignant on biopsy. On comparing all the three diagnostic procedures (radiology, FNAC and biopsy), the correlation came out to be highly significant. **Conclusion:** Though histopathological examination remains the gold standard for the diagnosis of these lesions, but an accurate clinical, radiological and cytological combined approach along with the histopathological examination aids in improving the diagnostic accuracy and reduce morbidity and mortality.

Keywords: Breast cancer, FNAC, histopathology, mammography.

INTRODUCTION

The increasing incidence, morbidity and mortality of breast cancer is the major concern as it is the commonest malignant tumor in females worldwide.^[1,2] The most common symptom of breast cancer is a lump or mass that is painless.^[3] Breast aspiration cytology, histopathology and radiology have become important diagnostic tools in diagnosis of breast cancers.^[4]

MATERIALS AND METHODS

The present prospective, clinical study was conducted in the Department of Surgery, Radiology and Pathology, Government Medical College and Rajindra Hospital, Patiala. One hundred patients clinically suspected of breast cancer, who presented with complaint of breast lump or pain in breast or nipple discharge or any ulcer or fungating growth on breast were included in this study. A detailed history of presenting complaint, clinical examination and

investigations including mammography, FNAC and biopsy were undertaken. Combined approach was statistically analysed using Chi square and results were noted.

RESULTS

Table 1: Distribution Of Cases According To Their Age

Age groups (in years)	Number of patients	Percentage
<30	00	0%
30-39	14	14%
40-49	38	38%
50-59	35	35%
>60	13	13%
Total	100	100%

Table 2: Distribution Of Cases According To Their Clinical Presentation (Multiple Responses) (N=135)

Clinical Presentation	Number of patients (n=100)	Percentage
Lump	95	95%
Nipple Discharge	12	12%
Pain	18	18%
Ulcer	08	08%
Fungal growth	02	02%

In the present study conducted in 100 patients, age of the patients ranged from 30-62 years. Out of these, 38% were seen in age group 40-49 years, 35% in 50-

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59 years, 14% in age group 30-39 years and 13% in more than 60 years. Mean age turn out to be 48.83 years [Table 1]. Out of 100 cases, 4 were nulliparous, 96 were multiparous and majority was Para1 to Para 3.

Majority of the patients presented with multiple complaints. Out of 100 cases, most common presenting symptom was breast lump seen in 95 cases followed by pain in breast in 18 cases. Nipple discharge was seen in 12 cases, ulcer over the breast was observed in 8 cases and fungating growth over breast in 2 cases [Table 2]. Out of 100, majority i.e. 56 were post-menopausal women.

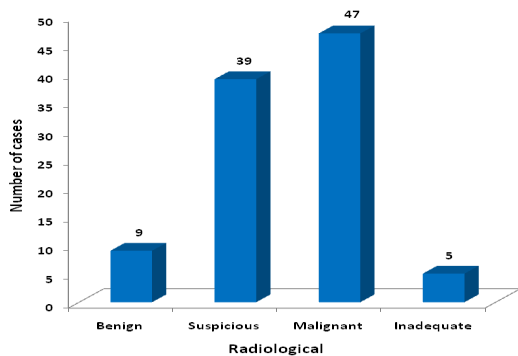


Figure 1: Distribution Of Cases According To Radiological Diagnosis

Out of 100 cases, Mammography/Sonammography was done in 95% cases. Malignancy was diagnosed in 47% patients on radiology and 9% were diagnosed benign. In 39% cases diagnosis was suspicious of malignancy. In 5% cases, mammography could not be performed due to ulcer or fungating growth. According to BIRADS categorisation 45% were categorized under BIRADS V (malignant), 2% in BIRADS VI category (malignancy proved), 39% in BIRADS IV and 8% in BIRADS III (probably benign). [Figure 1]

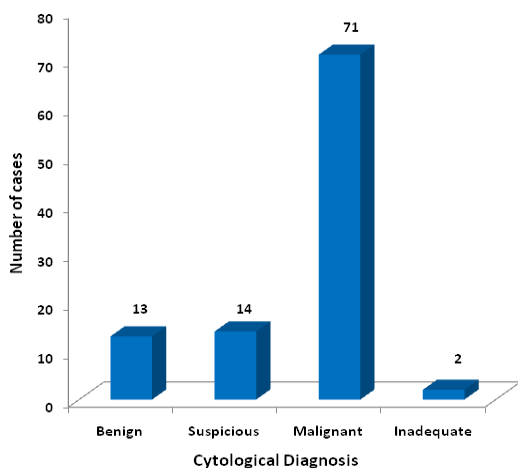


Figure 2: Distribution Of Cases According To Cytological Diagnosis

Fine Needle Aspiration Cytology of the breast lesion was done in 100 patients and majority i.e. 71% were reported as malignant. In 14% cases malignancy was suspected. Benign diagnosis of the breast lesion was reported in 13% cases and 2% cases were inadequate on cytology. Ductal carcinoma breast was reported in 61% cases on FNAC. [Figure 2]

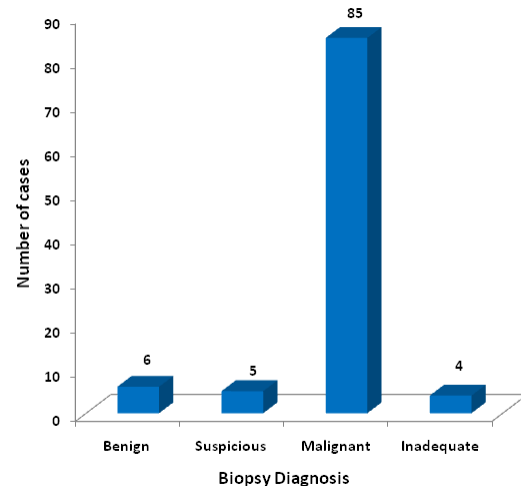


Figure 3: Distribution Of Cases According To Diagnosis By Biopsy

According to the biopsy of breast lesions, majority of cases i.e. 85% were diagnosed malignant. In 6% cases diagnosis was benign and in 5% cases it was suspicious of malignancy and in 4% cases biopsy was inadequate. Out of 100 cases, majority of cases i.e. 81% were diagnosed to be Infiltrating Ductal Carcinoma Breast. [Figure 3]

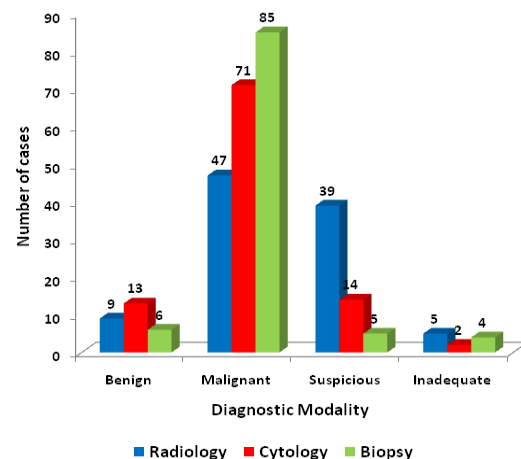


Figure 4: Comparison Between Radiology, Cytology And Biopsy Diagnosis In Breast Lesions

In the present study of 100 cases, radiology, cytology and biopsy diagnosis were compared with each other. Biopsy labelled 85 out of 100 cases as malignant, while on FNAC, 71 cases were reported malignant whereas malignancy was reported in only

47 cases on radiology. The number of breast lesions which were reported as benign on radiology, FNAC and biopsy were 9, 13 and 6 respectively. On comparing all the three diagnostic procedures, the correlation came out to be highly significant. (Chi square= 46.94; p value<0.001) [Figure 4]

Table 3: Correlation Of Radiological Diagnosis With Cytological Diagnosis In Breast Lesions

Radiological Diagnosis	Cytological Diagnosis		Total
	Benign	Malignant	
Benign	3 (8.1%) [12.5%]	34 (91.9%) [44.78%]	37
Malignant	21 (33.33%) [87.5%]	42 (66.66%) [55.26%]	63
Total	24	76	100

Statistical Analysis

Chi square	Degree of freedom	p value	Significance
8.132	1	0.0043	Significant

On correlating radiological diagnosis of breast lesions with cytological diagnosis, it was observed that 42 cases were diagnosed malignant on radiology as well as cytology, while 3 cases were diagnosed as benign on both the modalities. Statistical analysis was performed upon this correlation and p value was found to be 0.0043, suggesting that the correlation was significant. (Table 3)

Table 4: Correlation Of Biopsy With Cytological Diagnosis In Breast lesions

Cytological Diagnosis	Biopsy Diagnosis		Total
	Benign	Malignant	
Benign	5 (15.62%) [83.33%]	27 (84.37%) [28.72%]	32
Malignant	1 (1.47%) [16.66%]	67 (98.53%) [71.27%]	68
Total	6	94	100

Statistical analysis

Chi square	Degree of freedom	p value	Significance
7.73	1	0.0054	Significant

Table 5: Evaluation Of All Screening/ Diagnostic Modalities With The Final Diagnosis

Diagnostic Modality	Type of breast lesion	Final Diagnosis		Total
		Malignant	Benign	
Radiology	Malignant	45	3	48
	Benign	49	3	52
	Total	94	6	100
Cytology	Malignant	74	1	75
	Benign	20	5	25
	Total	94	6	100
Biopsy	Malignant	85	0	85
	Benign	9	6	15
	Total	94	6	100

On correlating the cytological diagnosis of breast lesions with biopsy, it was found that 67 cases were

jointly reported as malignant and 5 cases were reported as benign on both the modalities. Statistical test was done upon the correlation and p value was found to be 0.0054, suggesting that the correlation was significant. [Table 4]

All the three modalities were extrapolated in relation to the final diagnosis; in which on hysterectomy 06 were reported benign breast lesions and 94 were diagnosed malignant breast pathology. The inferences were drawn in relation to the sensitivity, specificity and positive predictive value of all three of them. [Table 5]

In case of radiological diagnosis, sensitivity was 47.87%, while specificity being 50%, while positive predictive value ranged 93.75% in comparison with the final diagnosis. However marked improvement in sensitivity as well as specificity was seen in cytological modality, being 78.72% and 83.33% respectively; whereas positive predictive value came out to be 98.66% on comparing it with the final diagnosis. Whereas, the above three parameters soured highest in case of biopsy, with sensitivity 90.42%, whilst both specificity and positive predictive value being 100% in relation to the final diagnosis.



Figure 5: Fungating growth on the breast (Gross)



Figure 6: Nipple retraction and Peau'd orange appearance over the skin (Gross)



Figure 7: Hard white area appreciated on gross examination of mastectomy specimen (Gross)

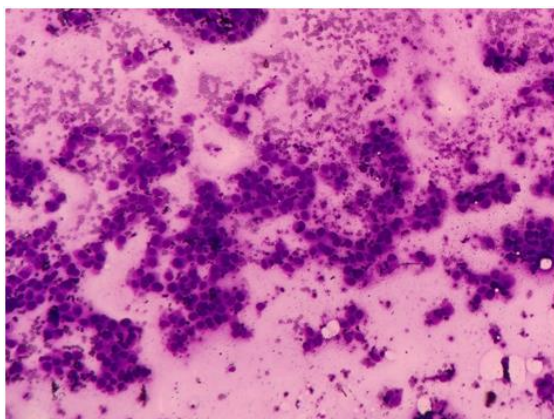


Figure 8: Photomicrograph of Infiltrating Ductal Carcinoma Breast on FNAC (MGG stain, 400x)

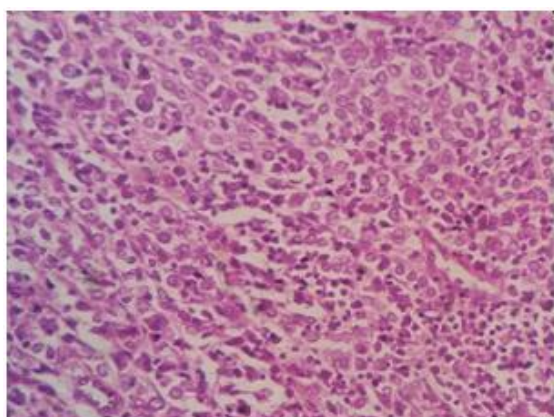


Figure 9: Photomicrograph of Infiltrating Ductal Carcinoma Breast (H&E, 400x)

DISCUSSION

In the present study, majority of the patients lie between the age group of 40-59 years, with the mean age being 48.8 years, which is in close agreement to the studies by Ajitha et al⁵(2017) and Sarangan et al⁶(2017) being 48 years and 49 years respectively.

In the present study, lump (95%) was found to be the most common presentation in suspected cases of breast cancer, which is in close congruence with the above studies, followed by pain (18%) as the second commonest feature, fall well with the studies of Ayode et al (2012) and Tiwari et al (2017).^{17,8)}

In the present study, Fine Needle Aspiration Cytology was done and in majority of the cases i.e. 71%, cytological diagnosis was malignant with maximum cases reported as IDC breast and in 14% cases diagnosis was suspicious of malignancy. The results are very close to the study conducted by Kim et al,⁹⁾ (2000) in which malignancy was diagnosed on FNAC in maximum number of cases.

In the present study, invasive ductal carcinoma was the most common breast cancer reported in 91.2% out of diagnosed malignant cases. The results are comparable to the study conducted by Rupomet al,¹⁰⁾ (2011) in which 98.18% cases were reported invasive ductal carcinoma breast.

In the present study of 100 cases, radiology, cytology and biopsy diagnosis were compared with each other. On comparing all the three diagnostic procedures, the correlation was noted to be highly significant (Chi square= 46.94; p value<0.00001). The result is similar to the study conducted by Chaudhary et al,¹¹⁾ (2017) in which correlation between radiology, FNAC and histopathology was also significant.

The output of the combined diagnostic approach in breast cancer with radiology, FNAC and biopsy was better than that of the individual diagnostic modality, making it a valid and reliable approach in diagnosing breast cancer.

In the study conducted by Tikku et al,¹²⁾ (2015) efficacy of core needle biopsy was more than FNAC and 38.31% of cases were diagnosed as suspicious on FNAC and only 2.80% cases were suspicious on biopsy. In the present study also efficacy of biopsy (90.4%) was more than FNAC (75.5%) and suspicious cases on biopsy (5%) were less as compared to FNAC (14%). In the present study 71% cases which were diagnosed malignant on FNAC were also diagnosed malignant on biopsy. Out of 14 cases which were suspicious on FNAC 13 cases were reported malignant on biopsy (93.07%). The result is very close to the study conducted by Kanhoushet al,¹³⁾ (2004) in which 83% cases suspicious on FNAC were diagnosed malignant on biopsy.

In the present study correlation of radiological diagnosis of breast lesions with cytological diagnosis was significant which is in accordance with the study conducted by Kalwaniet al,¹⁴⁾ (2016).

In the present study, correlation of cytological diagnosis of breast lesions with biopsy was found to be significant. In the studies conducted by Sreenivaset al,¹⁵⁾ (1989), Rupomet al,¹⁰⁾ (2011) and Pal and Gupta,¹⁶⁾ (2016) the correlation between the two modalities was also significant.

CONCLUSION

As Breast cancer is the most common cancer amongst the females, it is of utmost important to diagnose the positive cases as early as possible so that effective management is done. Combined diagnostic approach is followed for this comprising of clinical examination, radiology, FNAC and biopsy in suspected cases of breast cancers. Though histopathological examination remains the gold standard for the diagnosis of these lesions, but an accurate clinical, radiological and cytological combined approach along with the histopathological examination aids in improving the diagnostic accuracy and reduce morbidity and mortality.

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