

Research Article

Cyto-histopathological correlation in palpable breast lesions

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ABSTRACT

Background: Breast lesions are one of the most commonly encountered lesions in women which require prompt pathological confirmation by fine needle aspiration cytology (FNAC) and histopathological examination.

Methods: We conducted a prospective study from January 2015 to December 2015. A total 98 cases included presenting with palpable breast lump in which 80 cases were also subjected to surgical biopsy or mastectomy.

Results: Out of 98 cases, 34.7% benign cases, 59.2% malignant cases, and 6.1% non-neoplastic case were diagnosed cytologically in which 7 (7.1%) cases of mastitis, 2 cases (2%) of granulomatous mastitis, 22 cases (22.4%) of fibroadenoma, 11 cases (11.2%) of benign breast disease or fibrocystic disease, 10 (10.2%) cases of dyskaryotic changes, 45 cases (45.9%) carcinoma. Mean age was 46.4 ± 14.2 years. Majority of cases 29 (29.6%) belonged to 41-50 years age group. Majority of the masses were situated in the left breast (57.2%) in the upper outer quadrant (40.8%). In addition to breast lump, pain in 22 cases, bloody discharge in 5 cases, ulceration in 8 cases and nipple retraction in 11 cases were present. Histology was available for 80 cases in which 5 (6.3%) cases of non-neoplastic, 27 cases (33.7%) benign and 48 cases (60%) of malignant histology. FNAC proved to be 91.25% sensitivity in the diagnosis of all breast lesions in our study.

Conclusions: So we concluded that breast lesions are easily accessible to FNAC, which is an easy, cost effective and less time-consuming procedure. FNAC is used to diagnose both benign and malignant lesions.

Keywords: Breast, Cyto-histological correlation, Ductal carcinoma, FNAC Breast

INTRODUCTION

Breast lesions are one of the most commonly encountered lesions in women. All physicians accept the necessity of obtaining prompt pathological confirmation of the nature of any mass in the breast suspected as benign or malignant. Since the most important prognostic factor at the time of presentation is the extent of the disease, it is imperative that a reliable preoperative diagnosis is established as early as possible with a view to institute proper treatment and reduce the mortality rates. In recent years, mammary cytology has been considered as an effective means of early diagnosis of breast masses.¹ It is a minimally invasive yet maximally diagnostic method, often obviating an open biopsy. It is simple, fast, and can be performed as an OPD procedure, since it requires no special equipment, causes minimal morbidity, and has

high patient acceptance. It is commonly used as part of the diagnostic triad, which in addition to the FNA include clinical breast examination and mammography. The main purpose of Fine Needle Biopsy of breast lumps is to confirm cancer preoperatively and to avoid unnecessary surgery in specific benign conditions.²

The advantage of these cytological procedures lies in the fact that they are simple to perform, cost-effective, rapidly accepted by the patient, and cosmetically least disfiguring. This more rapid diagnostic approach helps to allay the anxiety caused by delays in scheduling, performing, and interpreting an open biopsy.

So, the purpose of this study is to evaluate and to check the accuracy of Fine-needle aspiration cytology in the diagnosis of palpable breast lumps.

METHODS

The study was carried out in the department of Pathology, Sardar Patel medical college and associated group of hospitals, Bikaner. This study included 98 cases presenting with palpable breast lump from January 2015 to December 2015. Comparison between cytology and histology was done according to availability of samples. FNA was performed on all the palpable lumps without local anaesthesia.

FNA was carried out using 10 ml plastic disposable syringe and disposable needles of 22-23 gauge on all of them, stained with H & E and Giemsa stain and the material studied in the Department of pathology.

80 cases were also subjected to surgical biopsy or mastectomy. All biopsy specimens were processed by fixation, dehydration, and clearing followed by impregnation with wax.

The wax blocks were cut in 5-6 μ sections & stained by hematoxylin and eosin stain. The diagnoses in all the cases were made on histopathological examination of routinely processed tissue. All cases were reviewed by the authors and diagnosis was confirmed. The relative frequency of tumors and the distribution of age, sex and location were analyzed.

Inclusion criteria

All females with clinically palpable breast lumps.

Exclusion criteria

Autolysed/necrosed tissue specimen, Inadequate biopsy were excluded from study.

RESULTS

In the present study, 98 subjects with breast lesions with lump were studied, out of which 80 cases had histological biopsies also. Following observations and inferences were arrived at.

Cytologically, most common diagnosis was Carcinoma 45.9% (45 cases) (Figure 10), followed by Fibroadenoma 22.4% (22cases) (Figure 8) along with Fibrocystic disease 11.2% (11 cases) (Figure 1) (Figure 9).

In the present study 80 cases were studied histologically. Out of which most common diagnosis was Carcinoma 57.5% (46 cases), followed by Fibroadenoma 22.5% (18cases) along with Fibrocystic disease 11.2% (9 cases). (Figure 2)

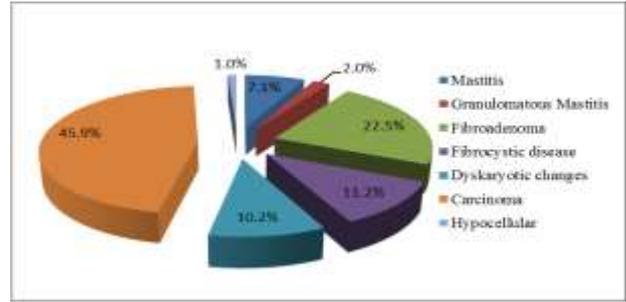


Figure 1: Distribution of 98 cases according to cytological diagnosis.

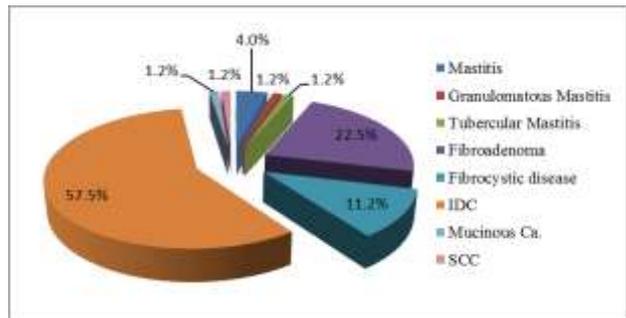


Figure 2: Distribution Of 80 Cases according to Histological Diagnosis.

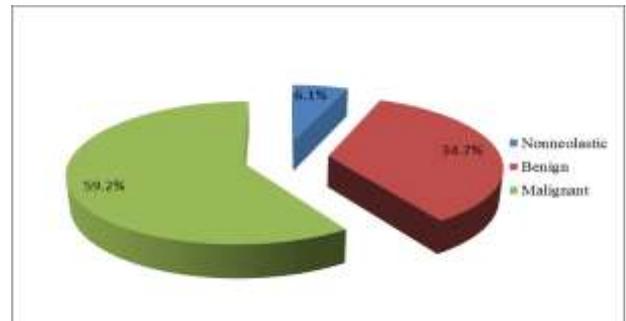


Figure 3: Distribution of cases according to nature of lesions.

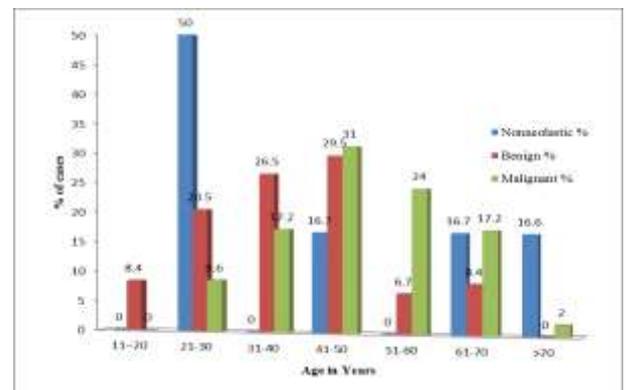


Figure 4: Distribution of cases according to age group.

Non-neoplastic lesions were found in 6 cases (6.1%). Major bulk 92 (93.2%) of cases revealed neoplastic in

which 34 cases (34.7%) were benign and 58 cases (59.2%) were malignant (Figure 3).

Table 1: Comparison of cases of cytological and histological diagnosis.

	Cytological Diagnosis							Total	
	Mastitis	Granulomatous Mastitis	Fibroadenoma	Fibrocystic disease	Dyskaryotic changes	Carcinoma	Hypocellular	No. of cases	%
	Cases	Cases	Cases	Cases	Cases	Cases	Cases		
Histological Diagnosis	Mastitis	3	0	0	0	0	0	3	3.75
	Granulomatous Mastitis	0	1	0	0	0	0	1	1.25
	Tubercular Mastitis	0	1	0	0	0	0	1	1.25
	Fibro-adenoma	0	0	18	0	0	0	18	22.5
	Fibro-cystic disease	3	0	0	6	0	0	09	11.25
	IDC	0	0	0	2	7	36	46	57.5
	Mucinous Ca.	0	0	0	0	1	0	1	1.25
	SCC	0	0	0	0	1	0	1	1.25
Total	No. of cases	6	2	18	8	9	36	80	100
	%	7.5	2.5	22.5	10	11.25	45	100	

In the present study, the age of patients ranged from 11 years to 70 years and above. The mean age was 46.4 year with a standard deviation of 14.2. Majority of cases 29(29.6%) belonged to 41-50 years age group followed by 19 cases (19.5%) in 31-40 years age group (Figure 4).

in 18 aspirates and lower outer quadrant in 4 aspirates. Most common location for malignant lesions and benign lesions was upper outer quadrant (38% and 50% respectively). Inflammatory lesions were most commonly located at upper inner quadrant (50.5%) (Figure 6).

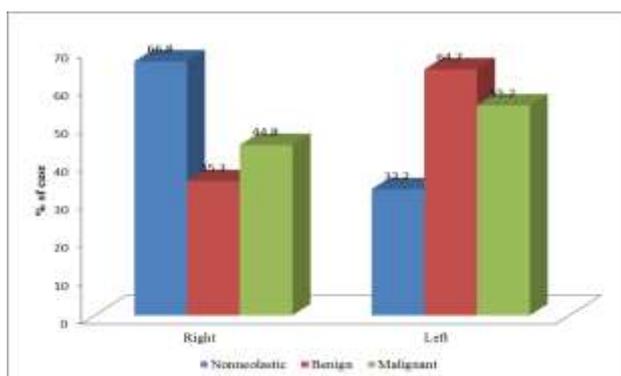


Figure 5: Distribution of cases according to side of breast involved.

In the present study out of 98 cases 56 cases (57.2%) presented with lesion in left breast and 42 cases (42.8%) presented with lesion in right breast (Figure 5).

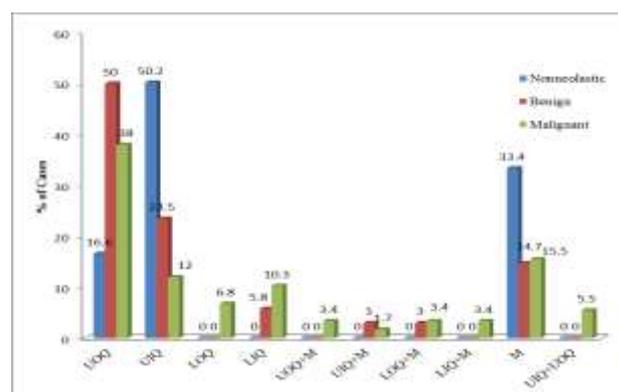


Figure 6: Anatomical quadrant distribution of breast lesions.

Most commonly mass was located in the upper outer quadrant in 40 aspirates followed by upper inner quadrant

In addition to lump breast, other presenting symptom was 22 cases associated with pain, 5 cases associated with bloody discharge from the nipple and 8 cases showed evidence of ulceration adjacent to the mass (Figure 7).

80 cases out of 98 FNAC had a corresponding histological diagnosis. Out of 80 biopsies done, the discrepancies at cytology were as follows:

- Three cases of benign proliferative breast disease in histology were reported as mastitis at cytology (false negative diagnosis in disease)
- One case of Tubercular mastitis was wrongly reported as Granulomatous mastitis at cytology (false negative diagnosis in disease) (Figure 11)
- Three cases reported as intraductal carcinoma in histology were reported as benign proliferative breast disease in cytology (false negative diagnosis in disease).
- One case reported as intraductal carcinoma disease in histology was reported as Hypocellular in cytology (false negative diagnosis in disease) (Table 1).

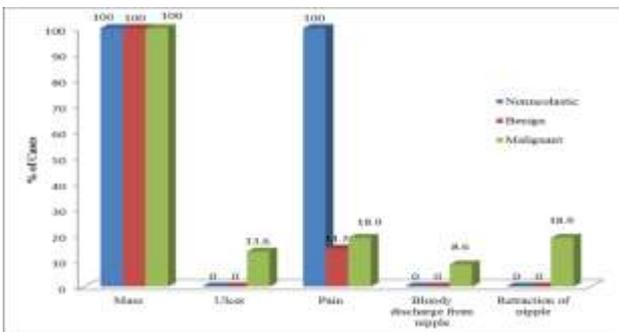


Figure 7: Distribution of cases according to clinical features.

80 cases out of 98 FNAC had a corresponding histological diagnosis. With this confirmation an overall sensitivity, predictive value of a positive result and percentage of false negative indices were calculated. Therefore in 7 out of 80 cases, the diagnosis in cytology was not in keeping with histology. The FNAC proved to be 91.25 % sensitivity in the diagnosis of all breast lesions in our study. Overall false negative percentage was 9.5 (Table 2).

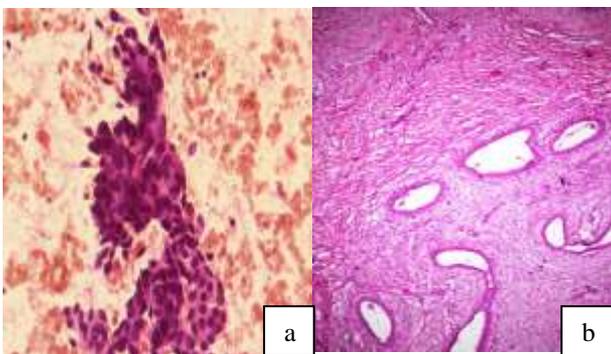


Figure 8: Fibroadenoma; (a) cytological smear; (b) corresponding histological section (H & E 400 x).

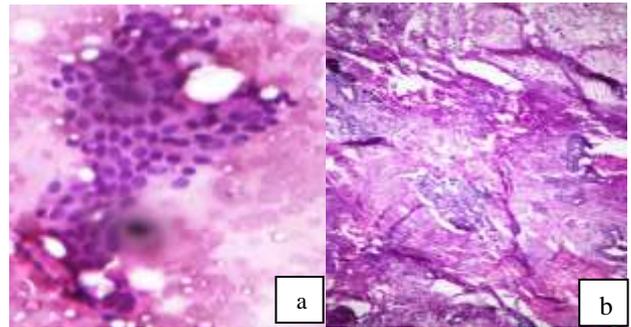


Figure 9: Fibrocystic disease; (a) cytological smear (H & E 400 x); (b) corresponding histological section (H&E 100X).

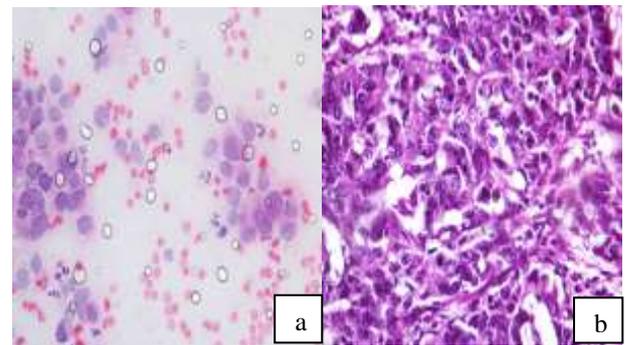


Figure 10: Intraductal carcinoma; (a) Cytological smear; (b) Corresponding histological section (H & E 400 x).

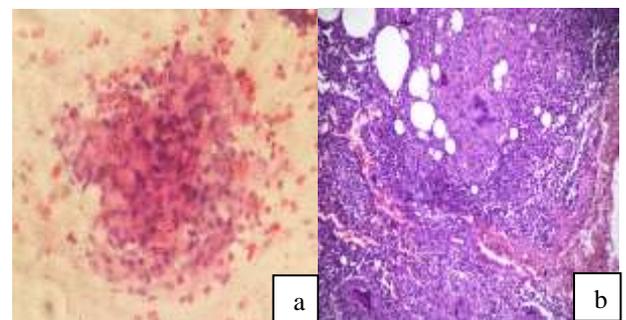


Figure 11: Tubercular mastitis; (a) cytological smear (a) corresponding histological section (H & E 400 x).

Statistical Analysis of malignant lesions

Out of 80 cases biopsied, 36 cases clearly show malignancy; in cytology 9 cases show dyskaryotic changes proved to be malignant in histology also. 2 cases falsely reported as benign proliferative breast disease, and one case was hypocellular. All benign cases reported in cytology were proved as benign in histology also. Therefore, the FNAC proved to be 93.8 % sensitive and 100 specific in the diagnosis of malignant lesions in our study (Table 3).

Table 2: Overall statistical analysis.

Value	Formula	Percentage
Sensitivity	$TP(73)/TP(73)+FN(7)\times 100$	91.25
Positive predictive value	$TP(73)/TP(73)+FP(0)\times 100$	100
False negative percentage	$FN(7)/TP(73)+FN(0)\times 100$	9.5

Table 3: Statistical data in malignant lesions.

Value	Formula	%
Sensitivity	$TP(45)/TP(45)+FN(3)\times 100$	93.8
Specificity	$TN(32)/FP(0)+TN(32)$	100
Positive predictive value	$TP(45)/TP(45)+FP(0)\times 100$	100
Negative predictive value	$TN(32)/FN(3)+TN(32)$	91.4
Accuracy	$TP(45)+TN(32)/TP(45)+TN(32)+FN(3)$	96.3

DISCUSSION

In our study, out of 98 cases, 58 (59.2%) cases were showing malignancy and 40 cases (40.8%) were showing benign and non-neoplastic nature of lesions. Pattari SK et al. studied 71 histologically confirmed cases and documented infiltrating ductal carcinoma as the most common lesion (24/71).³ Unlike our study, Jayaram G et al. in their study of 543 cases of FNAC found fibrocystic disease (39.8%) as the most common lesion.⁴ Khanna R et al. showed 61.3% benign and non-neoplastic nature of lesions and 38.7% malignancy.⁵ Malignant lesions were much higher in our study as cases were taken mainly from cancer lab. Observations made in our study differ from other studies probably because of difference in sample collection from cancer lab, sample size and duration of study. Most common nature of lesions were malignant 58 (59.2% confirmed cases) which includes Intraductal carcinoma (96.6%), Mucinous carcinoma 1 (1.7%), Squamous cell carcinoma 1 (1.7%). Benign lesions were 34 (34.7%) which include mainly fibroadenoma (64.7%) and fibrocystic disease 12 (35.3%). Non-neoplastic lesions were 6 (6.1%) including mastitis 4 cases and granulomatous mastitis 2 cases.

The age of the subjects in the present study ranged from 18 years to 85 years. Majority belonged to 41-50 years age group (29.6%) with the mean age of 46.4 years. Average age was slightly lower than the study undertaken by Bhargava V et al. who found the mean age at 52.26 years.⁶ In the study undertaken by Doussal VL et al. the median age was higher and found to be at 57 years.⁷ Ganiat O et al. reported maximum number of patients with malignant lesions in the fourth to seventh decade of life.⁸

In the present study, all the 98 subjects (100%) presented with breast lump. Out of these, 63 cases (64%) presented

with lump as the main presenting symptom while 22 (22.44%) with lump and pain, 11 (11.22%) with lump associated with retracted nipple and 8 (8.10%) with lump associated with ulcer. In 3(3%) with lump were associated with nipple discharge. In concurrence with this study, breast lump was the main presenting symptom in the study by Raina V et al.⁹

In our study, majority of the masses were situated in the left breast (57.2%) in the upper outer quadrant (40.8%). Majority of non-neoplastic cases were situated in the right breast (66.8%) in the Upper inner Quadrant (50.2%), benign cases were situated in the left breast (64.7%) in the upper outer quadrant (50%) and malignant cases were situated in the left breast (55.2%) in the upper outer quadrant (38%).

Out of 122 cases, 60 cases (49.18%) were in left breast, 54 cases (44.26%) were in right breast, and 8 cases (6.55%) presented bilaterally.¹⁰ Hussain MT et al. reported left breast involvement in 27 patients (54%) and right breast involvement in 23 cases (46%) and concluded similarly that left breast was involved more commonly than right.¹¹

In the present study, majority of the tumors (40) were in the upper outer quadrant (40.8%) followed by upper inner quadrant 18(18.6%). Meena SP et al. also found majority of the tumors in the upper outer quadrant (54%).¹²

In our study, the total number of cases diagnosed cytologically as fibroadenoma was 22. All were female patients aged 18-65 years. The main features of staghorn clusters and single bare bipolar nuclei were seen in all the cases. Fragments of fibromyxoid stroma were seen in 21 cases (95.5%) and Monolayered sheets were seen in 19 cases (86.4%). Cellular dissociation, nuclear pleomorphism, multinucleated giant cells were not seen.

All biopsied fibroadenomas (18 cases) correlated with the FNA diagnosis, giving a sensitivity of 100%. The sensitivity of FNAC in diagnosing fibroadenoma in our study was comparable to study by Kollur et al, which gives a sensitivity of 100%.¹³

In our study, eleven cases were diagnosed at cytology as benign proliferative breast disease. The age of the patients was from 24 to 70 years. These presented with ill-defined to well-formed masses and the smears were

poorly to moderately cellular showing few benign clusters of epithelial cells and myoepithelial cells arranged mainly in sheets. Nuclear pleomorphism was seen in 3 cases in the form of nucleomegaly and prominent nucleoli in some clusters. Bare nuclei were seen all 11 cases. Few cyst macrophages were seen in some cases. In 2 cases were also showed metaplastic apocrine cells and cyst macrophages with ductal epithelial.

Table 4: Diagnostic accuracy of FNAC in the diagnosis of palpable breast Lesions.

Authors	Cases	Sensitivity	Specificity	PPV	NPV	Accuracy
Sheikhetal et al ¹⁶	2623	80	98	100	-	-
Palombinietal et al ¹⁷	1956	95.7	89.6	95.9	-	94
Sneigeetal et al ¹⁶	1995	96	99	99	94	97
Oneiletal et al ¹⁶	697	97	78	92	92	-
Qureshi N et al ¹⁹	-	80	100	-	-	-
Kimetal et al ¹⁶	246	90.3	71.9	98.4	-	-
Mansoor et al ¹⁶	72	98.4	60	93.9	93	-
Choi et al ¹⁶	1297	77.7	99.2	98.4	88	91.1
Tiwari et al ²⁰	21	83.3	100	-	-	90
Qureshi H et al ¹⁸	50	91.66	96.96	-	-	-
Present study	80	93.8	100	100	91.4	96.3

Malik et al studied 271 cases of breast cancer, which comprised of 269 females and two males. Infiltrating ductal carcinoma was documented in 199 (71%) cases. The mean age for presentation of breast carcinoma was 44.1 years.¹⁴ Our study documented 59.2% incidence of Breast carcinomas, among which Infiltrating ductal carcinoma was 96.6 % in the age group 27-80 years.

Mucinous carcinoma of breast is relatively rare, pure form accounting for 2% of all breast cancers. The common age is post-menopausal age. Sharma et al reported a 30 year old female, diagnosed by fine needle aspiration cytology as mucinous carcinoma of the breast with lymph node metastasis and subsequently confirmed by histopathology.¹⁵

In our study, we had one case of mucinous carcinoma diagnosed histologically in a 61 year old woman. One case of squamous cell carcinoma diagnosed histologically in 55 year old woman cytological findings did not match with squamous cell carcinoma. Only mild pleomorphism and hyperchromatism were seen in both cases.

In the literature, the sensitivity ranges from 80-98% and the specificity may be up to 100%. Results of our study were comparable to above studies. High degree of sensitivity and sensitivity in this study may permit surgical management on pre-operative cytological diagnosis (Table 4).

CONCLUSION

Considering histological diagnosis as the gold standard, we concluded that breast lesions are easily accessible to FNAC, which is an easy, cost effective and less time-consuming procedure. FNAC is used to diagnose both benign and malignant lesions. It is more sensitive and specific in diagnosing malignant lesions, showing 93.8 % sensitivity and 100% specificity.

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Ethical approval: Not Required

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