

Cytohystological Correlation of Palpable Breast Mass: A Study of 300 Cases

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ABSTRACT

Background: The present study is aimed at correlation of cytological and histological findings of palpable breast mass and evaluate efficacy of FNAC as a first line of investigation modality in breast lump.

Material Method: Total 378 female patients with breast lump were subjected to fine needle aspiration cytology examination and reported by using five tire system for breast cytology. Out of 378 cases, in 300 cases cytological findings were correlated with histological diagnosis.

Results: In present study, all benign, malignant and suspicious cases on cytology were well correlated with their histological diagnosis. The sensitivity, specificity and positive predictive value of FNAC for palpable breast lump are 97.7%, 98.8% and 97.7% respectively.

Conclusion: FNAC of breast lump is an effective, rapid, cost effective, though simple diagnostic procedure with excellent patient compliance. It is giving high accuracy rates when practiced by and experienced hand; making it one of the most reliable modality for evaluation of palpable breast mass.

Keywords: Breast Cytology, Five Tire System, Malignant Lesion.

Introduction

Palpable breast mass is the commonest presentation at surgical OPD. Breast malignancy is one of the commonest malignancy in women worldwide and its incidence increases with age.⁽¹⁾ It is very essential to evaluate palpable breast mass before any surgical intervention. Most of the countries are now adopting “triple test” diagnostic approach for breast lesions i.e. clinical, radiological and pathological which include fine needle aspiration cytology as first line of investigation modality.⁽²⁾

FNAC carried out by a well trained, experienced hand, has high accuracy rate observed in many series.^(3,4) This makes it most reliable element of the triple test in cases where the three modalities are no concordant.^(5,6)

Moreover, FNAC is a cost effective, simple diagnostic procedure for palpable breast lumps,⁽⁷⁾ which can be used on OPD basis without hospitalization of the patient. It is a minimally invasive procedure, less painful and having less chances of development of hematoma as compared to core needle biopsy. Patient compliance is best with this procedure even if it has to be repeated.

However, fine needle aspiration cytology can be presumptive in some cases. It is not a substitute of core needle biopsy. Final diagnosis can be obtained by histological examination of biopsy tissue. So present study

is done to evaluate efficacy of FNAC in cases of palpable breast lesions, which is done by correlating cytological findings with histological diagnosis.

Aim of study: 1) To analyse various cytological findings of aspirates from palpable breast masses presented to cytology department and categorised them according to **Five tire reporting system** of breast cytology. 2) To correlate cytological diagnosis with histological examinations of breast lesions. 3) To evaluate sensitivity, specificity and predictive value of fine needle aspiration cytology in diagnosis of breast lesion.

Materials and Methods

The present study is performed in a tertiary health care centre in central Gujarat, from December 2014 to December 2016. During this period total 1560 patients referred from various outdoor patient departments were registered in cytology section of pathology department. Out of total 1560 patient, 378 female patients with palpable breast lesions were included in present study. Male patients with breast lump are not included in this study.

All the study participants were subjected to FNA examination after obtaining a written consent. The procedure of FNA was performed in supine position in a well lighted, properly ventilated room with maintaining privacy of the patients. The aspirations were taken using 23

G needle attached to 10ml disposable syringe. The material obtained subsequently smeared on standard microscope glass slides, fixed with alcohol fixative and stained with H & E stain and modified Giemsa stain. A quick review of cellularity obtained in each aspiration was done on the spot immediately after staining the slides. The reporting of cytology slides was done using five tyre system for breast cytology. (table 1).

Out of these total 378 cases diagnosed cytologically, 300 cases subsequently subjected to histopathological intervention. Cytological and histological diagnosis correlated in all the 300 cases. From the obtained data, statistical analysis was done.

Result

Data recorded from all the 378 female patients with palpable breast mass, entered in Microsoft Excel sheet. The age of the female patients included in the present study ranged from 12 to 73years. The age wise distribution of all the five categories (C1 to C5) is shown in a bar diagram, which shows more than 50 % patients with palpable breast mass falls in age range of 20 to 40years. This is the age range where maximum number of patients with palpable breast

lesions are found. Total number of undiagnosed cases on FNAC was considered under C1 category which includes 32 cases in present study.

The bar diagram also shows maximum numbers of benign breast lesions (C2 category) have been found in age range of 20 to 30years. Commonest benign breast lesion found in present study was fibroadenoma.

Maximum number of malignant breast lesions was found between 5th and 6th decade of life. All the six cases above 70 years of age were diagnosed malignant. Not a single benign case found in this age group. Maximum number of suspicious lesions (category C3,C4) were found between 35 to 50 years of age.

Out of total 378 cases of breast FNAC, histological correlation was available in 300 cases (79.3%). Table 3 shows correlation between cytological and histological diagnosis of all the 300 cases in both malignant and benign categories. From the obtained data, sensitivity, specificity, positive predictive value, false negative rate and false positive rate for Breast cytology were calculated. (Table 4).

Table 1: Cytology categories according to five tyre reporting system for breast cytology.

Cytology categories	Explanation
C1	Inadequate
C2	Benign
C3	Suspicious but probably benign
C4	Suspicious but probably malignant
C5	Malignant

Table 2: shows age wise distribution of various pathological categories.

Age in years	Cytology categories- according to Five Tyre Reporting System				
	c1	c2	c3	c4	c5
<20	8	38	1	1	3
21-30	10	81	6	2	2
31-40	6	47	8	6	16
41-50	8	24	3	8	22
51-60	5	4	4	4	35
61-70	2	6	2	1	9
>70	0	0	0	0	6

Table 3: Cyto-Histological correlation of 300 cases of Breast lesions.

Cytological categories*	No. of patients	Histology diagnosis	
		Benign	Malignant
C1	32	31	01
C2	170	169	01
C3	10	09	01

Cytological categories*	No. of patients	Histology diagnosis	
		Benign	Malignant
C4	10	02	08
C5	78	00	78
Total	300	210	90

*C1 for inadequate; C2 for benign; C3 for suspicious, probably benign; C4 for suspicious, probably malignant; and C5 for malignant breast lesions

Table 4: Statistical analysis of data obtained in present study.

Cytological diagnosis	Histological diagnosis		Total no. Of cases
	Positive for malignancy	Negative for malignancy	
Positive for malignancy (C5 +C4)*	TP= 86	FP= 2	88
Negative for malignancy (C2+C3)#	FN=2	TN=178	180
Total no. Of cases diagnosed	88	180	268

*C5- Malignant breast lesions; C4- suspicious probably malignant
 #C2-Benign breast lesions, C3-suspicious probably benign
 TP- True positive; FP- false positive; FN- false negative; TN- true negative
 Sensitivity of the test (FNAC)- $[TP/TP+FN] \times 100 = 97.7\%$
 Specificity of the test (FNAC)- $[TN/ (TN+FP)] \times 100 = 98.8\%$
 Positive predictive value - $[TP/ (TP+FP)] \times 100 = 97.7\%$
 False positive rate- $[FP/FP+TP] \times 100 = 2.27\%$
 False negative rate- $[FN/FN+TN] \times 100 = 1.11\%$

Table 5: Comparison of statistical results of present study with other studies:

Parameter	Results in present study	Chavda J (2013)	A.Daramola et al (2015)	N.Chauhan et al (2012)
Sensitivity	97.7%	95.2%	95.4%	96.6%
Specificity	98.8%	100%	88.9%	100%
Positive predictive value	97.7%	100%	99.6%	100%
False negative rate	1.11%	4.76%	0.8%	1.9%
False positive rate	2.27%	0%	0.4%	--

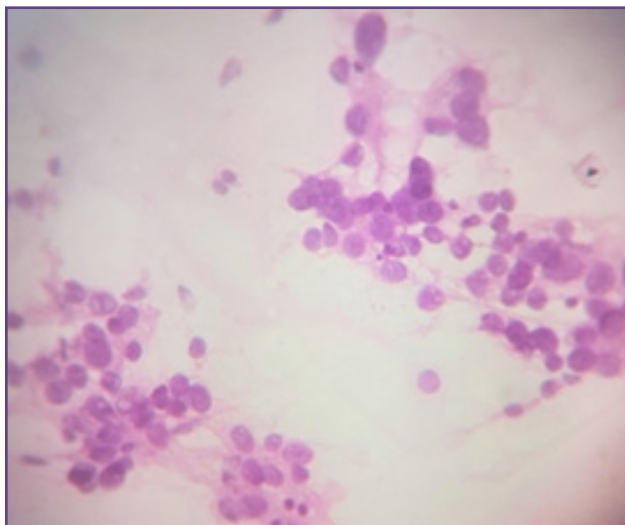


Fig. 1: cytology smear of Malignant breast lesion, showing loosely cohesive clusters of ductal epithelial cells with moderate anisonucleosis, H & E stain, 400X.

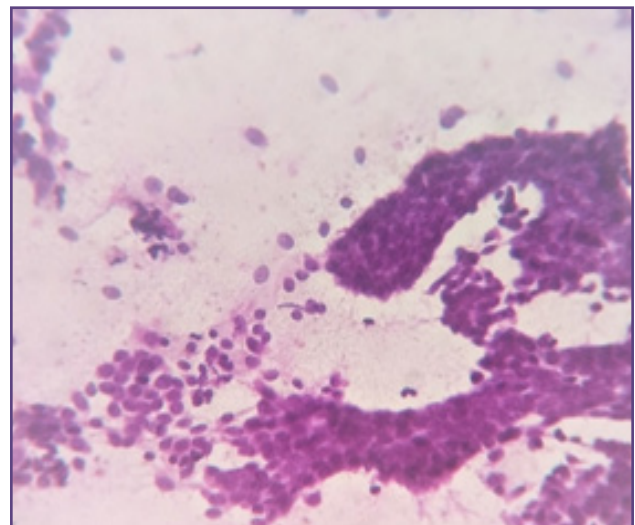


Fig. 2: Cytology smear- Benign Breast lesion- Fibroadenoma, Giemsa stain, 400X.

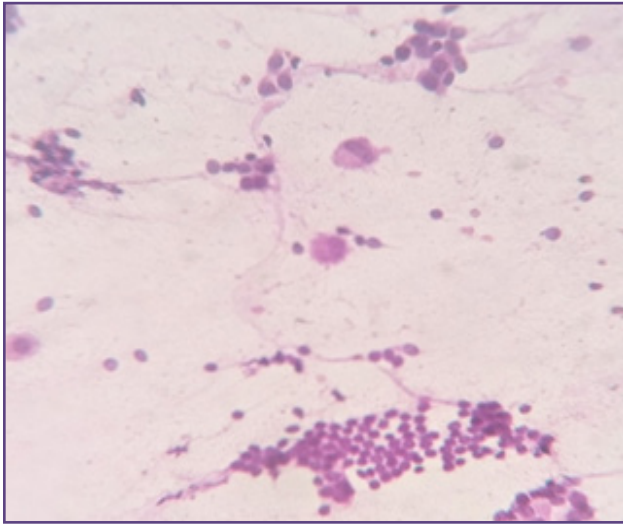


Fig. 3: Cytology smear- Benign proliferative breast lesion- with apocrine changes, H & E stain, 100X.

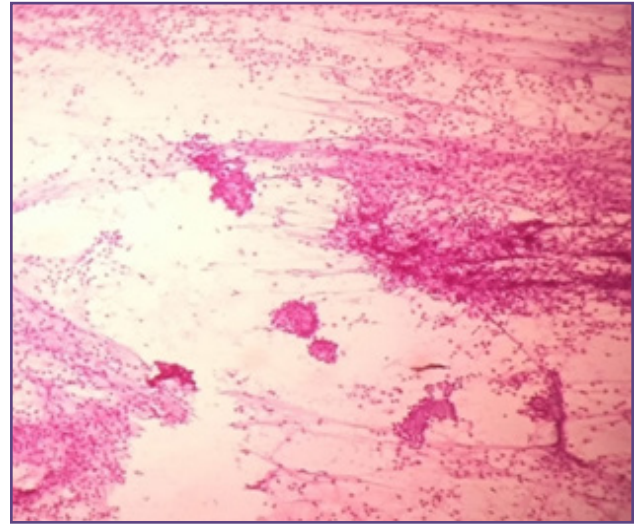


Fig. 4: cytology smear- Inflammatory breast lesion- showing benign cohesive ductal epithelial clusters in inflammatory background, H& E stain, 100X.

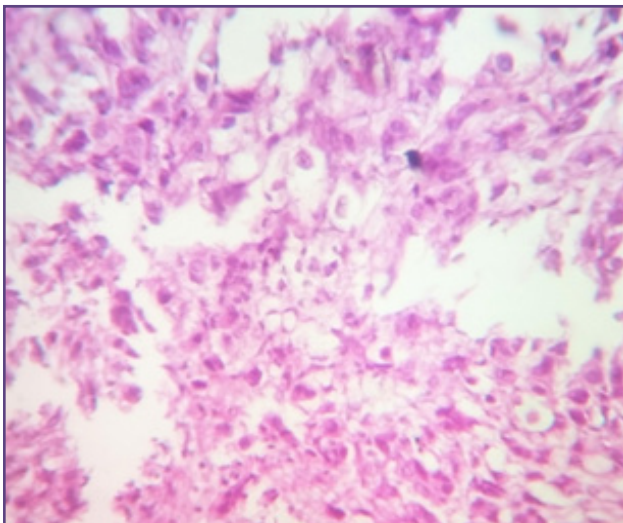


Fig. 5: Histology of Malignant breast lesion- Invasive Ductal Carcinoma, H & E stain, 400x.

Discussion

FNAC of palpable breast masses is considered as a quick, inexpensive, painless and safe procedure. Also, it gives reliable results as far as early detection of breast cancer is considered. This technique is very well accepted by the patient even if it had to be repeated. The only complication arises that is development of hematoma; which can be very well prevented by applying gentle pressure over the site of procedure for short duration.

Most countries have now adopted triple assessment approach (clinical, radiological, and pathological) for palpable breast masses, with FNAC as the first-

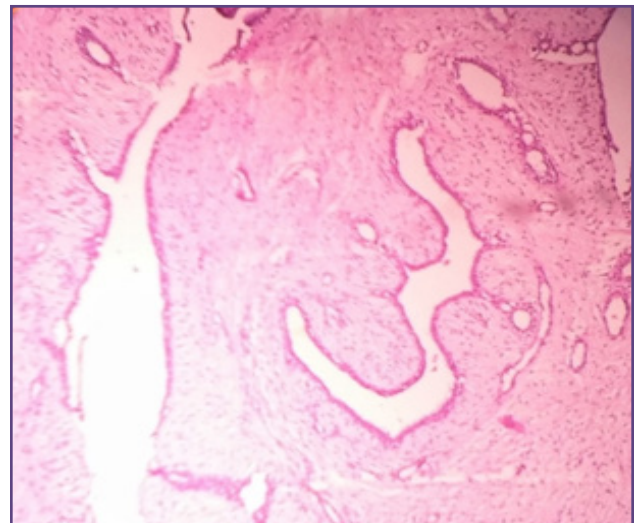


Fig. 6: Histology of Benign Phylloid Tumour, H & E stain, 100x.

line pathological investigation in both screening and symptomatic populations. ⁽⁵⁾

In present study, we observed that maximum number of benign lesions were found in 2nd decade of life. Among these benign lesion, most common benign lesion was fibroadenoma. Similar findings have been observed by Ferguson et al. which shows commonest benign breast lesion is fibroadenoma occurring before age of 25years. ⁽⁸⁾

Assessing malignant breast lesions in present study, we observed that peak incidence of malignant breast lesion is in 5th to 6th decade of life. Similarly peak age of breast malignancies is 50.8 years in a study done by Murali and

Cunden.⁽⁹⁾ In present study, we obtained that most frequent malignant lesion was invasive ductal carcinoma of Not Otherwise Specified type (IDC-NOS). Such findings are comparable with a study done by Singh et al, in which they found ductal carcinoma was most frequently diagnosed breast malignancy.⁽¹⁰⁾

In present study, total 32 cases where FNAC smears were inadequate / unsatisfactory. That gave proportion of inadequate cases in present study was 10.5%. This rate is higher than that obtained in a study done by Daramola et al.⁽¹¹⁾ This proportion of undiagnosed cases on cytology can be reduced by immediate evaluation of cytology smear by pathologist using a rapid staining technique. This “on-site” evaluation makes FNAC even more cost effective modality and reducing chances of recalling patients for re-aspiration.⁽¹²⁾

Technical skills of a cytopathologist performing FNAC are having very much influence of diagnostic yield. Unsatisfactory cytological smears can be due to insufficient experience of a pathologist, poor technique in performance of FNAC or due to the nature of lesion itself. Provision of adequate sample by an experienced pathologist can prove FNAC as highly reliable diagnostic tool.⁽¹³⁾

In present study, total two false negative cases were diagnosed. In one of that, we obtained heavily blood stained smears with mixed cytological features. Cytologically, this was diagnosed as a cystic lesion. On histological evaluation, it turned out to be an invasive ductal carcinoma of NOS type. Yeoh and Chan have also observed such pitfalls in cytodiagnosis. In their study, they got 6 false negative cases including 4 cases misdiagnosed as cystic lesions.⁽¹⁴⁾ Such type of ‘missed diagnosis’ on cytology can be obtained due to either heavily blood stained smear hindering cytological features or the smear contains mixed cytological findings.

Table 5 shows comparison of statistical data obtained in this study with the results obtained in those of other three study done by J Chavda, A. Daramola et al and N. Chauhan et al.^(11,15,16) The table shows the results obtained in this study is quite comparable regarding sensitivity, specificity and positive predictive values of FNAC as a diagnostic modality in detecting malignant breast pathologies.

Conclusion

Palpable breast mass is one of the common presentation at surgical OPD. Chances of a breast lump being malignant are definitely present. So the proper evaluation of a breast lump is very essential part of patient management. FNAC

of breast lump is now proved to be a rapid, reliable, cost effective diagnostic procedure with high degree patient compliance. Present study observed that the findings of breast FNACs are well correlated with histological diagnosis of respective breast lesions. This proves that cytodiagnosis by FNAC when in experienced hand are extremely useful in the evaluation of breast lumps.

Moreover, a benign diagnosis on FNA allows a time period in which a surgery can be planned or delayed, while a positive diagnosis of carcinoma on cytology allows preoperative discussion/ counselling of the patient and further planning of the therapy and reduces morbidity.

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