

Original Research Article

Accuracy of Fine Needle Aspiration Cytology in Evaluation of Various Breast Lesions with Histopathological Correlation at Tertiary Care Hospital in South Gujarat

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Abstract

Introduction: Fine needle aspiration cytology (FNAC) is a cost effective, easy procedure in the diagnosis of breast lesions. The sensitivity and specificity of the procedure are high when combined with clinical examination and imaging. Its accuracy in many situations avoids any unnecessary surgical procedures. *Aims and Objectives:* The present study was undertaken to know the accuracy of FNAC in Evaluation of various breast lesions and its histopathological correlation. *Materials and methods:* A retrospective study was conducted over duration of 8 months from January 2019 to August 2019. Needle aspiration was done in 100 cases presenting with breast lesions. Histopathology correlation was done in 33 cases. *Results:* Fibroadenoma was the most common lesions. Malignancy was reported in 16 cases. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy were found to be 90%, 100%, 100%, 95.83% and 96.96% respectively. *Conclusion:* The FNAC of breast is cheap, safe, and highly accurate method for diagnosis of breast lump preoperatively to avoid undue surgery. Our study concluded that an occasional false negative case makes it mandatory to biopsy and subject it for histopathological examination before mastectomy where the diagnosis of malignancy on cytology is suspicious.

Keywords: FNAC; Breast; Biopsy; Benign; Malignant; Fibroadenoma; Ductal carcinoma.

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Introduction

Breast lump is the most common presentation of breast diseases.¹ Cancer of breast is a second most common cause of cancer in women. Increase in

cases of breast cancers are related to late marriage, birth of child in the later age, shorter period of breastfeeding and nulliparity or low parity.² FNAC is sensitive and specific, economical, safe and less time consuming and discomfort to the patient



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is less.³ It plays a major role as an important preoperative assessment procedure along with clinical correlation and imaging, which are referred to as the Triple test.⁴ The main purpose of fine needle aspiration cytology (FNAC) of breast lumps is to confirm cancer preoperatively and to avoid surgery in specific benign conditions.⁵ However a definitive conclusion should always be given through histopathological examination and it is universally accepted.⁶

Materials and Methods

Duration of study

The study was conducted over a duration of 8 months from January 2019 to August 2019 at the Department of Pathology, SMIMER, Surat.

Type of study

A retrospective study observational study.

Sample collection

FNAC was done in cases presenting with breast lesions and Histopathology correlation was done in the Department of Pathology. The patients were counseled about the procedure and informed consent was taken.

Sample size

The study was conducted on the total 100 patients.

Inclusion criteria

All female and male with unknown primary diagnosis of breast mass/lumps undergoing FNAC with those cases underwent for excision biopsy/lumpectomies or mastectomy.

Exclusion criteria

Patients with recurrent malignancy.

Patients undergoing chemotherapeutic treatment procedure.

Methodology

FNAC was performed using 22-24 gauge needle fitted on 10 ml disposable syringe in syringe holder. The wet smear fixed with ether-alcohol mixture stained with H&E and Papanicolaou stain. The air-dried smear stained with May-Grunwald Giemsa's stain. Procedure for histopathology involved the biopsy specimens were fixed in 10% formalin for 24 hours. Then gross examination was done, The gross and cut section findings were noted. Several bits were taken from appropriate sites for processing and paraffin embedding. From each block, sections were cut at 4-5 microns thickness and stained with H and E.

Statistical analysis

Cytological diagnosis was correlated with the histopathological diagnosis and sensitivity, specificity, positive predictive value, negative predictive value and accuracy were assessed.

Results

Total 100 cases in which FNAC performed out of which 33 biopsy received were taken for analysis. Table 1 shows sexwise distribution of these breast lump cases. In our study out of 100, 1 were males and 99 were females. According to Table 1 and 2, maximum number of cases 84 are of benign breast lesion that includes 52 cases of fibroadenoma and 16 cases are of carcinoma of breast which includes 15 cases of ductal carcinoma and 01 cases of mucinous carcinoma (Images 1-5).

Table 1: Sexwise distribution of different cases

Sex	FNAC Diagnosis	No.
Women	Acute mastitis	07
	Suppurative lesion	05
	Chronic granulomatous mastitis	02
	Cystic lesion	10
	Fibrocystic disease	05
	Fibroadenoma	52
	Fibroadenoma with atypia	01
	Galactocele	01
	Ductal carcinoma	15
	Mucinous carcinoma	01
Men	Gynecomastia	01
Total		100

According to Table 3, maximum number of cases 27 were presented in age group of 21-30 years followed by 23 cases in ≤ 20 years age group. According to Table 4, Histopathological correlation with cytological diagnosis was done in 33 cases. One case was reported as Fibroadenoma with atypia. These on histopathology were diagnosed as ductal carcinoma in situ. All other cases are correlate with cytological diagnosis. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy were calculated from Table 5 and were found to be 90%, 100%, 100%, 95.4% and 96.77% respectively.

- Sensitivity = $9 / (9 + 1) = 90\%$
- Specificity = $23 / (23 + 0) = 100\%$
- Positive predictive value = $9 / (9 + 0) = 100\%$
- Negative predictive value = $23 / (23 + 1) = 95.83\%$
- Accuracy = $9 + 23 / (9 + 23 + 0 + 1) = 96.96\%$

Table 2: Categorisation into benign and malignant breast diseases

Category	Cases	Percentage
Benign	84	84%
Malignant	16	16%

Table 3: Age wise distribution of cases

Age	No. of cases
≤20	23
21-30	27
31-40	22
41-50	15
51-60	5
61-70	6
>71	2
Total	100

Table 4: Cytological and histopathological correlation

Cytological Diagnosis	Histopathological Diagnosis				
	F	DCIS	IDC	Mucinous carcinoma	Gynecomastia
F(22)	22	-	-	-	-
F with atypia (FA) (01)	-	01	-	-	-
Ductal carcinoma (08)	-	-	08	-	-
Mucinous carcinoma (01)	-	-	-	01	-
Gynecomastia (01)	-	-	-	-	01

F: Fibroadenoma; FA: fibroadenoma with atypia; DCIS: ductal carcinoma in situ; IDC: infiltrating ductal carcinoma

Table 5: Diagnostic accuracy of FNAC in 33 histologically correlated cases.

Cytological Diagnosis	Histopathological Diagnosis		
	Malignant	Benign	Total
Malignant	09 (TP)	0 (FP)	09
Benign	01 (FN)	23 (TN)	24
Total	10	23	33

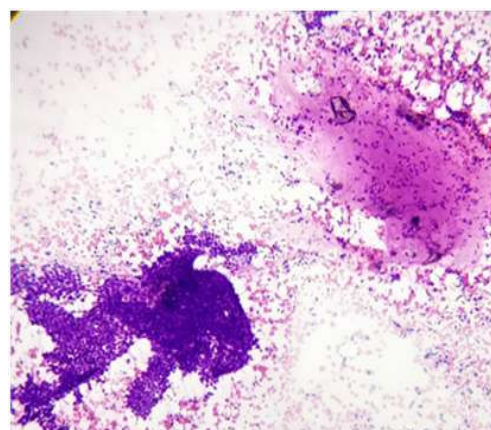


Image 1: Low power view of Fibroadenoma - H&E stain.

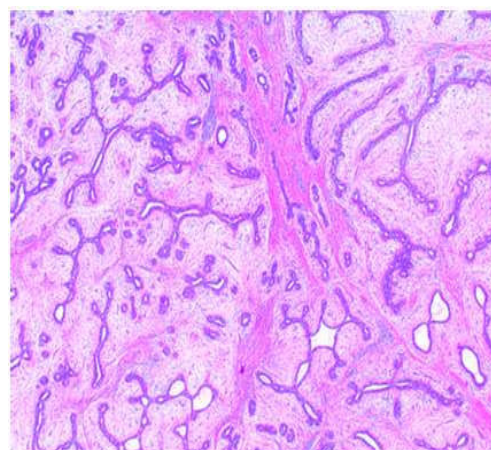


Image 2: Low power view of Fibroadenoma - H&E stain.

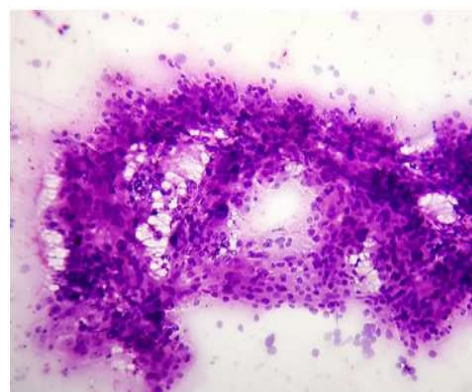


Image 3: Low power view of ductal carcinoma breast - giemsa stain.

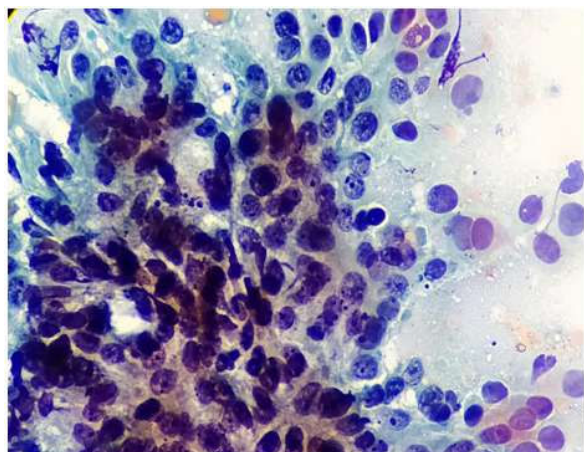


Image 4: High power view of ductal carcinoma breast- papanicolaou stain.

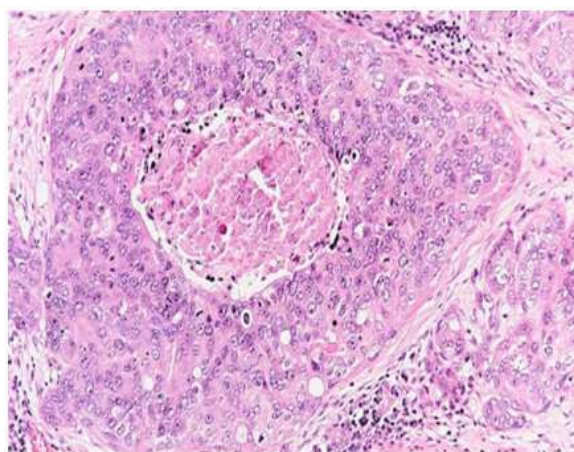


Image 5: low power view of invasive ductal carcinoma of breast - H&E stain.

Table 6: Comparison of statistical parameters with other studies

Statistical parameter	Dominguez F et al. ⁸	Singh A et al. ⁹	Khemka A et al. ¹⁰	Chauhan et al. ⁵	Mane PS et al. ⁴	Present study
Sensitivity	93.49%	84.6%	96%	98.24%	85%	90%
Specificity	95.73%	100%	100%	98.93%	100%	100%
Positive predictive value	93.49%	—	100%	96.55%	100%	100%
Negative predictive value	95.73%	—	95.12%	99.46%	96.3%	95.4%
Accuracy	98.75%	92.3%	—	98.77%	97%	96.77%

Discussion

Breast lump is very common presentation. Although most of the cases of breast lump are benign it causes anxiety for possibility of malignancy. Hence quick diagnosis is essential to reduced anxiety. Considering patients comfort, FNAC is an ideal diagnostic modality in breast lumps.⁷ In the present study, Needle aspiration was done in 100 patients presenting with breast lesions. Histopathology correlation was done in 33 cases. The majority of age is in the 21–30 years of age group. The present study documented 84 cases of benign breast lesions constituting 84% and 16 cases of malignant lesions constituting 16%. Fibroadenoma was the most common diagnosis observed in 58% of cases. Of the 16 cases of malignant tumors the most common type was IDC seen in 15 cases (93.75%). Among the 100 breast lesions, biopsies were obtained for 33 cases. One case was reported as fibroadenoma with atypia these on histopathology were diagnosed as ductal carcinoma in situ. All other cases are correlate with cytological diagnosis, so there were 1 case of false negative diagnosis. Thus, sensitivity, specificity, positive predictive value, negative predictive value and accuracy were found to be 90%, 100%, 100%, 95.4% and 96.77% respectively.

Comparison of sensitivity, specificity, positive predictive value and negative predictive value with other published studies^{8,9,10,6,5} is shown in the Table 6.

There are numerous factors that contribute to the indefinite, FN and FP categories.¹ These include: (1) Technical difficulties where the smears are limited by cellularity or obscured by drying artefact or blood.⁴ (2) The overlap of cytologic features of certain benign and malignant conditions due to the nature of the lesion (true grey zone).⁴ Occasional false negative case makes it mandatory to biopsy and subject it for histopathological examination.

Conclusion

The present study shows that FNAC is cheap, safe, and highly accurate method. It helps to confirm the clinical diagnosis without open biopsy preoperatively to avoid undue surgery. Our study concluded that an occasional false negative case makes it mandatory to biopsy and subject it for histopathological examination before mastectomy where the diagnosis of malignancy on cytology is suspicious.

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