International Journal of Clinical and Biomedical Research

ACCURACY OF FNAC IN FEMALE BREAST LESIONS

*JETHWANI D P[1], PUROHIT T M[2], PUROHIT M B[1], GANDHI S H[1], DHRUVA G A[3], PUJARA K[4].

[1]Associate Professor, [2]Assistant Professor, [3]Professor and Head, [4]Tutor
Department of Pathology, P.D.U. Medical College, Rajkot, Gujarat, India
*Corresponding author email: hetusidhu@yahoo.co.in

ABSTRACT

Background: Various breast lesions are common lesions in females with a wide range of variability from inflammatory lesions, benign and malignant breast lesions. FNAC is first diagnostic test, as it has high sensitivity and specificity. Lesions were categorized on FNA into inflammatory lesions, benign neoplastic lesions, malignant neoplastic lesions, and suspicious for malignancy. **Methods**: This was a retrospective study done in the Department of Pathology, P.D.U. Medical College, Rajkot, Gujarat State, India from Aug-2013 to July 2014. FNAC of 392 cases of breast lesions were done and reported by expert pathologist. The histopathological specimens when available were reported by other pathologist without prior knowledge of FNA diagnosis. Sensitivity, Specificity and Accuracy of FNA diagnosis were then analyzed. **Results**: A total of 392 cases of breast lesions were diagnosed on FNA, out of them histopathological correlation was available in 87 cases. Benign breast lesions are more common in younger patients in 21-30 yrs age group and malignant lesions are more common in old age group patients of 41-60 yrs with few exceptions. In our setup fibroadenoma is the most common benign breast lesion (26.53%) and ductal carcinoma (17.86%) is the most common malignant lesion. The sensitivity, specificity and accuracy of FNAC for malignant lesions were found to be 91.43%, 100% and 96.25% respectively. **Conclusion**: FNAC is an effective and valid tool as the first line diagnostic modality in the preoperative diagnosis of the malignant and benign breast lesions**.**

INTRODUCTION

The mammary gland or breast tissue is influenced by sex hormones. The lesions of breast are commonly encountered clinical problems in females during reproductive age group.[1] Lesions vary from inflammatory lesions and fibrocystic diseases of breast to neoplastic lesions including benign and malignant counterparts.

Diagnostic cytology, the science of interpretation of cells, that are either exfoliated or aspirated (FNA) from various tissues, is increasingly gaining popularity all over the world and in all parts of India.

FNAC is major diagnostic tool and is of great relevance in breast tissue as they are easily accessible target sites. In this region, FNAC is easy to perform and being minimally invasive OPD procedure, achieves excellent patient's compliance. FNAC is simple, cost-effective, less traumatic and rapid diagnostic method.[2,3] FNAC gives a chance of avoiding surgical procedure in certain inflammatory conditions and helps in planning surgical procedure or further management in case of neoplastic lesions.

Breast malignancy is the most common cause of morbidity and mortality in our country. Breast lesions are classified into various groups.

The aim of study was to find out the common cause of breast lesions and preoperative diagnosis of breast malignancy within 1 day and to conduct cytohistological correlation.

Objectives:

1. To study the common pathology of breast lesions
2. To diagnose malignant lesions on FNAC preoperatively for the planning of further management
3. To correlate FNA diagnosis with histopathology diagnosis whenever available
4. To decide sensitivity, specificity and accuracy of FNA diagnosis in malignant breast lesions

MATERIALS AND METHODS

This was a retrospective study done over a period of one year from Aug-13 to July- 14. Procedure of FNA was explained and was done with prior consent of the patient. After taking full aseptic precautions procedures were done with a 22 gauge needle attached to 10 cc syringe. Samples were smeared onto clean glass slides. Few of the smears were wet fixed in methanol and few smears were air dried. Wet fixed smears were stained with H&E stain and air dried smears were then fixed and stained with Giemsa stain.

In cystic lesions, after aspiration of fluid, the lesions were again aspirated, if needed, under USG guidance. The fluidic aspirates were centrifuged and smears were prepared.

During the period of study, breast lesions were interpreted and classified into various groups.

Histopathological specimens were bisected and fixed overnight in 10% formalin. They were processed using Microm STP-120 automatic tissue processor. Acetone (LR grade) was used for dehydration of tissue, xylene (LR grade) as clearing agent & paraffin wax (melting point 54-56^{0}C)was used for block preparation. The sections were prepared with Microm HM-325 microtome. Routine H&E stain was done, however, as and when required special stains like PAS (Periodic Acid Schiff) stain was employed. The histopathological examination was carried out by a pathologist without prior knowledge of cytodiagnosis and then correlated with cytodiagnosis.

The sensitivity, specificity and accuracy of FNAC in comparison with histopathology for malignant breast lesions were calculated. Out of 80cases (21.41%) of malignant aspirates, histopathological correlation was available in 32(40%) cases.

RESULTS

A total of 392 cases of breast lesions in females were observed in the present study.

Most common benign lesions were observed in younger patients in 21-30years of age group and malignant lesions were observed in older age group patients in 41-60 yrs of age. Age wise distribution of breast lesions is tabulated in Table 1.

Table 1. Age distribution in various breast lesions

| Age Group	Inflammatory Lesions	Suspicious for Malignancy	Benign Lesions	Malignant Breast Lesions
10-20 yrs	03	00	44	00
21-30 yrs	18	01	83	02
31-40 yrs	18	08	62	17
41-50 yrs	09	03	28	27
51-60 yrs	01	03	08	20
>60 yrs	01	01	05	14
Total	50	16	230	80

On FNA, variety of cytodiagnosis were observed, as tabulated in Table 2.

**Table 2. Frequency of various benign and malignant lesions on FNA**

Type of Lesion	Frequency of lesion
INFLAMMATORY LESIONS	50(12.76%)
BENIGN BREAST LESIONS	
Fibrocystic disease	52(13.27%)
Fibroadenosis	15(3.83%)
Ductal epithelial hyperplasia	8(2.04%)
Galactocele	10(2.81%)
Fibroadenoma	104(26.53%)
Benign phylloidestumour	14(3.57%)
Benign breast lesions	27(6.89%)
SUSPICIOUS FOR MALIGNANCY	16(4.08%)
MALIGNANT BREAST LESIONS	
Ductal Carcinoma	70(17.86%)
Lobular Carcinoma	4(1.02%)
Mucinous Carcinoma	4(1.02%)
Medullary Carcinoma	2(0.51%)
UNSATISFACTORY	16(4.08)

Of total 392 cases, inflammatory lesions were observed in 50(12.76%) cases. Other benign lesions including fibrocystic disease, fibroadenosis, ductal epithelial hyperplasia, fibroadenoma (Figure 1), galactocele and benign phylloidestumour (Figure 2) were observed in 230 (58.67%) cases, malignant lesions (Figure 3 & 4) were observed in 80 (20.41%) cases, suspicious for malignant lesions constitutes 16 (4.08%) cases and in 16 Cases (4.08%) smears were unsatisfactory for evaluation.
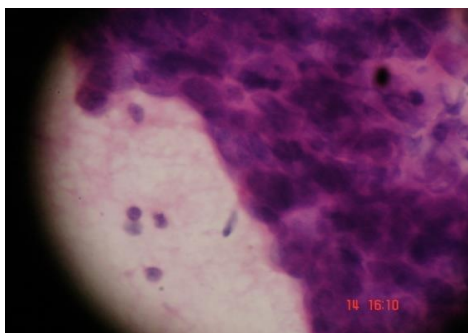
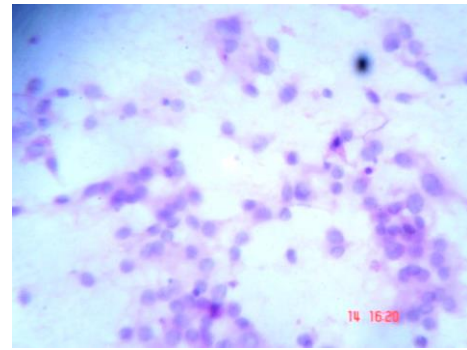**Figure 1. Photomicrograph of fibroadenoma with benign**
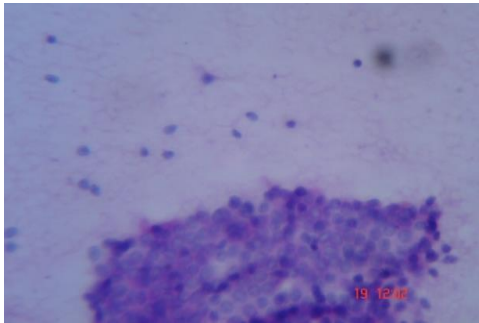
ductal epithelial sheet and stromal bare nuclei on FNA smear.   H & E stain x10
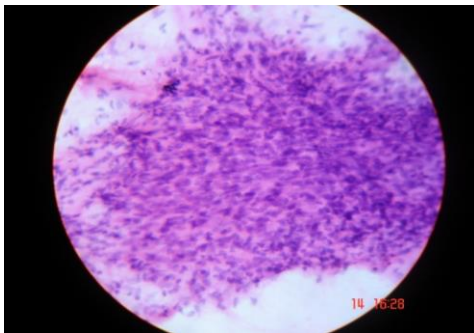
Figure 2. Photomicrograph of phylloides tumour with cytological atypia on FNA smear
H & E stain x100

Figure 3. Photomicrograph of carcinoma of breast on FNA smear. H & E stain x400

Figure 4. Photomicrograph of lobular carcinoma of breast on FNA smear.   H & E stain x400

Among benign breast lesions, fibroadenoma was found in 104 (26.53%) cases and   was most common lesion, followed by fibrocystic disease in 52 (13.27%) cases and fibroadenosis in 15 (3.83%) cases. 8 (2.04%) cases had ductal epithelial hyperplasia with minimal stromal component and 14 (3.57%) cases had predominantly stromal component with mild cellular atypia, suggestive of benign phylloides tumour.

Histopathological correlation was available in 87 cases, results are narrated in Table 3.

Table 3. Cyto-histopathological correlation

| Category of lesion	No. of cases in Cyto-pathological Examination	No. of cases where Histo-pathological Examination available	Correlation with cyto-pathological and histo-pathological diagnosis	False +ve cases	False –ve cases
Inflammatory breast lesions	50	7	7	-	-
Non inflammatory benign lesions	230	45	45	-	-
Suspicious for malignancy	16	3	All the three cases were malignant	-	3
Malignant lesions	80	32	32	-	-

On cytological examination, 80 cases were of malignant lesions, including ductal carcinoma with few of them showing predominantly mucinous (Figure 7) or apocrine differentiation (Figure 8). On histopathological examination, all malignant lesions were confirmed. Lesions of lobular carcinoma showed Indian file pattern on histopathological examination (Figure 5). Ductal carcinoma of breast showing predominantly comedo pattern and showing apocrine differentiation are shown in Figure 6 and Figure 9 respectively.
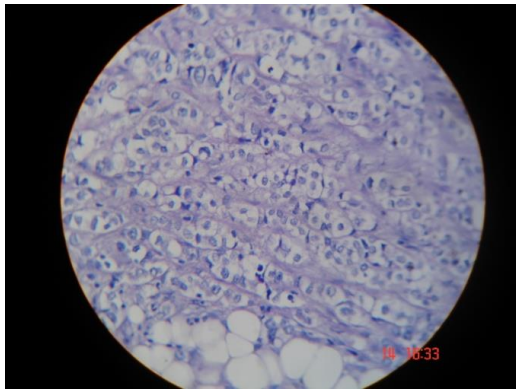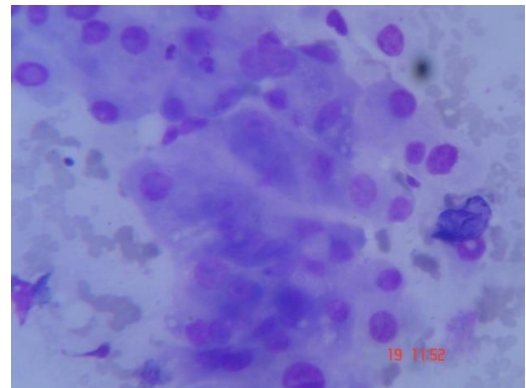

Figure 5. Photomicrograph of lobular carcinoma with Indian file pattern on histopathology.
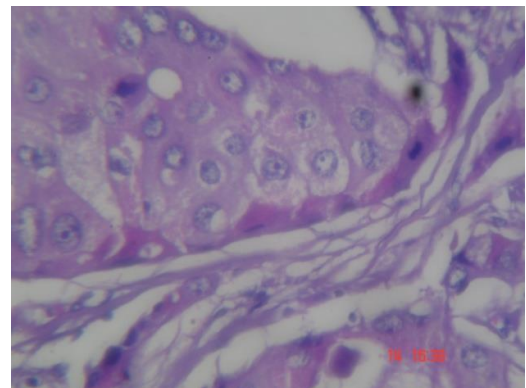**H & E stain x400**
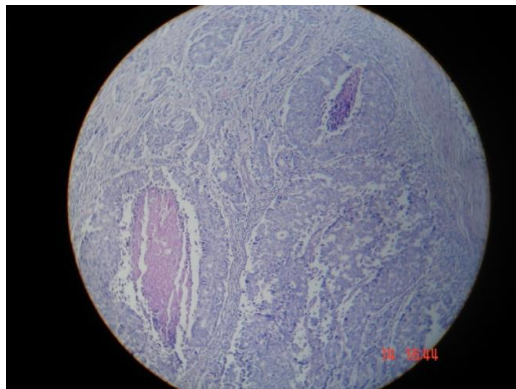
Figure 6. Photomicrograph showing comedo pattern on histopathology.
H & E stain x100
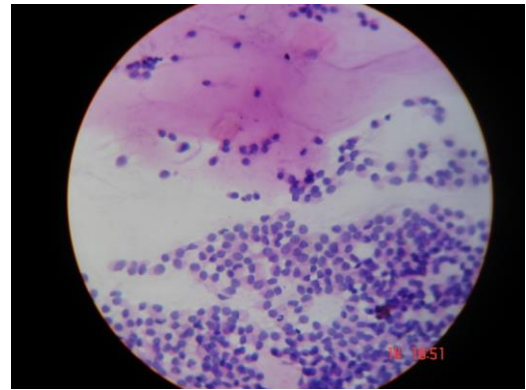
Figure 7. Photomicrograph of mucinous carcinoma with extracellular mucin and plasmacytoid cells on FNA smear.
H & E stain x400

Figure 8. Photomicrograph of Invasive ductal carcinoma of breast with apocrine differentiation on FNA smear.
MGG stain x400

Figure 9 Photomicrograph of Invasive ductal carcinoma of breast with apocrine differentiation on histopathology.
H & E stain x400

DISCUSSION

Breast carcinoma is common cancer among females in India.[4,5] Different studies have shown that the most common lesions are benign and needs only reassurance.[5,6] Early screening and diagnosis of breast lesions can be helpful in accurate management of the patients. Early diagnosis helps to prevent patients discomfort and anxiety.[7,8]Fibroadenoma is the commonest lesion in the category of proliferative breast disease without atypia that has minimal risk for cancer development. In present study, we have observed 104(26.53%) cases of fibroadenoma. Ferguson also reported most common benign breast lesion as fibroadenoma occurring before the age of 25 years of age.[9] In present study, we have observed 80(20.41%)cases of malignant breast lesion, which is comparable with Mahajan et al [10] and Bukhari et al [11] having 22.64% and 28.23% cases respectively. Singh A et al [6] reported that invasive ductal carcinoma is the commonest breast malignancy and found in the age group of 41-60 years of age. The present study shows similar findings having 80(20.41%) cases of malignant lesions with ductal carcinoma in 70(17.86%) cases as the most common breast malignancy in the age group of 41-60 year of age. In our study, we have observed a single case of ductal carcinoma in 25 yrs of age, which was confirmed histopathologically.

In present study, we have reported 16(4.08%) cases as suspicious for malignancy, which is comparable with studies of Mahajan et al[10] having 6.60% cases and Bukhari et al[11] having 7.52% cases.

Out of 392 cases of cytopathological examination, in 87 cases, histopathological specimens were received. From 50 inflammatory cases on cytopathological examination, in 7 cases, histopathological specimens were available and all (100%) were confirmed on histopathology examination. Out of 221 cases of benign lesions, in 45 cases, specimens for histopathological examination were available. They all were histopathologically benign but some variation in subtyping seen. Amongst these, 7 cases were categorized as benign breast lesion on FNA due to low cellularity, out of which, 3 cases were diagnosed as fibroadenoma, 2 cases were diagnosed as fibrocystic disease of

breast and 2 cases were diagnosed as benign phylloidestumour on histopathological examination.

Out of 15 cases of suspicious for malignancy on FNA diagnosis, in 3 cases, histopathological specimens were received, all the three cases were diagnosed as malignant breast lesions-Invasive Ductal Carcinoma on Histopathological Examination. Out of 80 cases of malignant lesions on FNA, 32 cases were confirmed histopathologically.

In present study, 16(4.08%) cases were unsatisfactory, which is comparable with study of Sudarat et al [12] which had 4.2% of unsatisfactory smear i.e. fewer than five epithelial cell groups. Mahajan et al [10] observed higher incidence with 6.60% cases having unsatisfactory material. Unsatisfactory sample can be due to nature of lesion itself or due to uncooperative patients. Provision of adequate sample and experienced pathologist can prove FNAC as highly reliable diagnostic tool. [1]

In present study, sensitivity, specificity and accuracy were 91.43%, 100% and 96.25% respectively. Sensitivity of present study is lower than studies of Bukhari et al [11] having 98% and Mahajan et al [10] having 96.77%. Specificity of present study is comparable with studies of Bukhari et al [11] and Arjun Singh et al [6] having 100% specificity with no false positive cases. Accuracy of present study is higher than studies of Mahajan et al [10] and Arjun Singh et al [6] with accuracy of 91.11% and 92.30% respectively.

CONCLUSION

FNAC of breast lesions is safe, rapid, cost effective procedure and is sensitive, specific & highly accurate as the initial investigation of palpable breast lesions in tertiary hospitals.Thus, FNAC helps in preoperative categorization and is utmost important for management of patients having palpable breast lump.

REFERENCES

1) Vinay Kumar, Abul K Abbas, Nelson Fausto, Jon C Aster. Robbins and Cotran Editor. Robbins and Cotran Pathologic basis of disease. 8th ed. Elsevier: Philadelphia;2004.pp1121-30.

2) Leopold G Koss, Editor. Koss Diagnostic cytology and Itshistopathologic bases. 5th ed. Lippincott Williams &Wilkins: Philadelphia; 2006. Pp 1082-84.

3) Svante R Orell, Gregory F Sterrett, Editor. Orell and Sterrett's Fine Needle Aspiration Cytology. 5th ed Elsevier: Philadelphia:2012. Pp 156-60.

4) Pandey JS, Sayami G, Dali S, Shrestha HG, Shreshtha B, Addhikari RC, et al. Fine needle aspiration cytology of breast lump in TU Teaching Hospital. JNMA 2002:41:388-91.

5) Manohar P, Adhikari RC, Sigdel B, Basnet RB, Amatya VJ. Present Cancer status in TU Teaching Hospital. JSSN 1992;2:16-23.

6) Singh A, Haritwal A, Murali BM. Pattern of breast lumps and diagnostic accyracy of Fine needle aspiration cytology; A hospital based study from Pondicherry, India. The internet journal of pathology 2011;11:2:7568.

7) Hughes JE, Royle GT, Buchanan R, Taylor I: Depression and social stress among patients with benign breast lesion. Br J Surg1986;73:997-99.

8) Ellman R, Angeli N, Moss S, Chamberlain J, Maguire P. Psychiactric morbidity associated with screening of breast cancer. Br J Cancer1989;60:781-84.

9) Ferguson CM, Powell RW. Breast masses in women. Arch Surg1989;124(11):1338-41.

10) Mahajan N A, Bhale C P, Mulay S S. Fine Needle Aspiration Cytology of Breast lesions and correlation with histopathology- A 2 years study. International Journal of Health Sciences & Research 2013;3(2):55-65.

11) Bukhari M H, Arshad M, Jamal S, Niazi S, Bashir S, Bakshi I et al: Use of Fine Needle Aspiration in the evaluation of Breast lumps. Pathology Research International 2011(2011);689521.

12) Sudarat N, Somneuk J, Siriwan T. Accuracy of FNAC from breast masses in Thailand. AJCP2009;10:623-26.