

A two year study of spectrum of breast lesions and cyto-histopathological correlation in a tertiary hospital, Devanahalli .

First author (Corresponding) :

Dr. Ankita Das

Assistant Professor

Department of Pathology

Akash Institute of Medical Sciences and Research Centre, Devanahalli.

Email id: drankitadas1990@gmail.com

Mob: 8147246535

Second author:

Dr. Rashmi S P

Associate Professor

Department of Pathology

Akash Institute of Medical Sciences and Research Centre, Devanahalli.

Email id: drrashmiumesh@gmail.com

Mob: 9964283861

Third author:

Dr. Anuja Dasgupta

Associate Professor

Department of Pathology

Akash Institute of Medical Sciences and Research Centre, Devanahalli.

Email id: dasgupta.anuja@gmail.com

Mob: 9902336642

Fourth author:

Dr. Uma K

Associate Professor

Department of Pathology

Akash Institute of Medical Sciences and Research Centre, Devanahalli

ABSTRACT

Introduction: Breast diseases are showing rising trend worldwide. Benign breast disease (BBD) is the most common cause of breast problem among women with prevalence rate of 68% among all breast lesions in India. It is more frequent than malignancy.

Making an early diagnosis and planning the treatment

help in alleviating unnecessary anxiety about breast cancer, atypical hyperplasia and are given prompt treatment, follow-up, awareness regarding the risk of breast cancer. Fine needle aspiration cytology (FNAC) is a relatively simple, reliable, non-traumatic, complication-free technique for breast lump evaluation.

Materials and methods: This study was done on a total of 105 female patients attending a tertiary hospital for a period of 2 years January 2021-january 2023 in Devanahalli, Karnataka. The FNAC technique was done with 18-23G needle attached to 10 mL syringe inserted into palpable breast mass. Cellular material aspirated and smeared on glass slide, fixed in 95% methanol, stained with hematoxylin and eosin.

Air-dried slides were stained with Giemsa. Histopathological diagnosis was correlated with FNAC details in all cases. All the collected data were transferred into a master sheet and fed into computer for statistical analysis using Pearson's Chi-square test.

Results: In our study the patients belonged to age group of 15 to 80 years with a median of 38.5 years. Irrespective of sides, maximum numbers of cases were found in upper and outer quadrants. Maximum malignant lesions were in the age group of 42 to 50 years, whereas benign lesions were maximum in 23 to 35 years age group. The commonest pathology found in our study was fibroadenoma (52%) followed by ductal carcinoma (29%).

In our study out of 105 patients, 4 cases where FNAC showed benign proliferative breast disease, histopathological examination(HPE) report suggested infiltrating ductal carcinoma (IDC). Another 2 cases where FNAC showed fibrocystic disease with atypical ductal hyperplasia (ADH), HPE report turned it out as IDC. Sensitivity of 75% specificity 100%, positive predictive value (PPV) 100%, and negative predictive value NPV of 93% were obtained.

Conclusion: Fine needle aspiration cytology is a very important preliminary diagnostic tool in palpable breast lumps and results show high degree of correlation with final HPE report.

INTRODUCTION

Breast is an organ that undergoes cyclical changes under the influence of various hormones throughout a woman's reproductive life. Breast diseases are showing rising trend worldwide. Wide spectrum of disorders ranging from self-limiting inflammatory lesion, benign breast lesion to life-threatening invasive carcinoma arises from breast. Benign breast diseases constitute a heterogeneous group of disorders, including developmental abnormality, epithelial and stromal proliferations, inflammatory lesions, and neoplasm. It is the most common cause of breast problem among women with prevalence rate of 68% among all breast lesions in India. It starts to rise in second decade of life, peaks in third decade, and decline thereafter, whereas incidence of breast carcinoma rises as age advances. It is more frequent than malignancy. Benign breast lesions deserve attention because of their high prevalence, their impact on women's life, and due to cancerous potential of some histological types. 1 Benign breast disease is more frequent than malignant

ones. Up to 30% women who suffer from BBDs will require treatment at some point in their lives. 2 Benign neoplasms include fibroadenoma, benign phyllodes, tubular adenoma, duct papilloma, fibrocystic disease, sclerosing adenosis, granulomatous mastitis, tuberculous mastitis, and fat necrosis. Breast cancer is the most common female cancer worldwide, representing nearly a quarter (25%) of all cancers. Cancer breasts constitute 14.3 to 30% of all cancers in women (as per the data collected from hospital-based cancer registry). The data from the report of the project on "Development of an Atlas of Cancer in India" show that, in Hospital-based Cancer Registry, cancer of the breast is the leading site of cancer in Mumbai and in Thiruvananthapuram. The second leading states include Bengaluru and Chennai. 3 As per the statistics reported in GLOBOCAN, World Health Organization 2012 (International Agency for Research on Cancer) in India, 1,44,937 women were newly detected with breast cancer and 70,218 women died of breast cancer. 4 So, roughly for every two women newly diagnosed with breast cancer, one lady is dying of it. The reported incidence rates for breast cancer from the National Cancer Registry Programme (NCRP) data indicate that percentage

of breast cancer relative to total cases over time in Bengaluru and Chennai has increased.⁴ Also, projections of cancer cases in India (2010–2020) of NCRP indicate that there will be more than 100,000 estimated number of breast cancer cases annually in India based on the data from NCRP in Bengaluru.⁵ Cancer breast has emerged as leading site of cancer in most urban populations of India. It is rapidly replacing cancer of cervix as most important leading site of cancer among women.³ Several etiological factors, such as age, genetics, family history, diet, alcohol, obesity, lifestyle, physical inactivity, endocrine factors, are implicated in pathogenesis of disease. Current management of carcinoma of the breast is multimodality treatment, which includes surgery, radiotherapy, chemotherapy, and hormone therapy. Malignant tumors include IDC not otherwise specified (NOS), metaplastic carcinoma, mucinous carcinoma, invasive lobular carcinoma (ILC), invasive papillary carcinoma, intracystic papillary carcinoma. The IDC-NOS is the most common malignant neoplasm. A triple assessment, which is done by a clinical examination imaging like ultrasonography or mammography and a pathological examination—FNAC, during the initial consultation allows a majority of the patients with discrete BBDs to be given immediate reassurance. Making an early diagnosis and planning the treatment within 72 hours of the first consultation help in alleviating unnecessary anxiety about breast cancer, and those BBDs patients with an increased risk of malignancy like atypical hyperplasia are given a prompt treatment, a proper follow-up, and awareness regarding the risk of breast cancer.² Fine needle aspiration cytology is a relatively simple, reliable, non traumatic, complication-free technique for breast lump evaluation. It has reduced number of open biopsies because of high diagnostic sensitivity and specificity. Most countries have adopted triple assessment approach to breast diagnosis with FNAC included as one of pathological investigations.

Materials and methods

This retrospective study was done on a total of 105 female patients attending a tertiary hospital for a period of 2 years January 2021-january 2023 in Devanahalli, Karnataka. After taking consent, detailed history of patient, including past history and family history, thorough physical examination of the patient, was done to find out regarding position, size, shape, mobility, and consistency of palpable breast mass. Fine needle aspiration cytology was done with 18-23G needle attached to 10 mL syringe inserted into palpable mass. Cellular material aspirated and smeared on glass slide, fixed in 95% methanol, stained with hematoxylin and eosin. Air-dried slides were stained with Giemsa. Histopathological diagnosis was also correlated with FNAC details in all cases.

Biopsy specimens were received in 10% formalin. In cases where mastectomy was done whole breast mass was received and grossing was done as per standard procedures. Specimens were then systematically examined. Representative tissue section processed routinely by paraffin section for light microscopy. Benign tumors included fibroadenoma, phyllodes tumor, fibrocystic disease, papillomas, tubular adenoma, lactating adenoma, and epithelial hyperplasia.

Malignancy included ADH, atypical lobular hyperplasia, carcinoma *in situ* (ductal carcinoma *in situ*, lobular carcinoma *in situ*), and infiltrating carcinomas (IDC-NOS, ILC, tubular carcinoma, medullary carcinoma, mucinous carcinoma, invasive papillary carcinoma, invasive micropapillary carcinoma, apocrine carcinoma, secretory carcinoma, etc.).

Statistical Analysis

All collected data were transferred into a master sheet and fed into computer for statistical analysis. Data were analyzed using Statistical Package for the Social Sciences program. Pearson's Chi-squared test was used for statistical analysis.

RESULTS

In our study, a total of 105 cases were studied for cyto-histopathological correlation of breast lumps. In our study, the patients belonged to age group of 15 to 80 years with a median of 38.5 years. Irrespective of sides, maximum numbers of cases were found in upper and outer quadrants. Maximum malignant lesions were in the age group of 42 to 50 years, whereas benign lesions were maximum in 23 to 35 years age group. The commonest pathology found in our study was fibroadenoma (52%)(Fig. 1) followed by ductal carcinoma (29%). In our study out of 105 patients, 4 cases where FNAC showed benign proliferative breast disease, HPE report suggested IDC. Another 2 cases where FNAC showed fibrocystic disease with ADH, in HPE report it turned out to be IDC. Thus, we got 6 true positive, 93 true negative, 0 false positive, and 6 false negative. The statistical tests used in interpretation of results obtained in our study are: sensitivity: 75%, specificity: 100%, positive predictive value PPV: 100%, and negative predictive value(NPV): 93%.

DISCUSSION

In our study, benign lesions were commonest in the age group of 23 to 35 years and malignant lesions were commonest in 42 to 50 years. Many studies (Table 1) concluded that the incidence of benign breast lesions begins to rise during the second decade of life and peaks in the fourth decade. This is because changes in breast are most dynamic and profound during reproductive years of female. Before pregnancy lobules are small and invested by loose cellular intralobular stroma and during pregnancy branching of terminal ducts produce numerous larger lobules. Both epithelial and stromal elements of lobule are under hormonal control. Any interference with these close interactions results in conditions grouped under BBD. Also, in repeated development and involutinal changes of menstruation, pregnancies are responsible for minor aberrations. In 2015, Pandey et al conducted a study of 781 patients with breast pathologies at Department of Surgery, Mahatma Gandhi Institute of Medical Sciences, Sevagram, Wardha, Maharashtra. They observed that out of 781 patients, 722 had BBD accounting for 92.4%. In another study, BBDs were more common in 20 to 30 years age followed by 30 to 40 and 11 to 20 years.⁶ Kapoor et al⁶ observed malignant lesions were common in fourth decade followed by fifth, sixth, seventh decade. Mudholkar et al⁷ observed in his study that maximum cases were found in fifth decade. Similar findings were reported by Bhalla et al⁸ and Kalyani and Banu.⁹ Incidence of breast cancer increases as age advances peaking at 70 to 80 years. Late menopause results in prolonged exposure to estrogens that increase risk. With increasing age breast tissue gets replaced by adipose tissue and fibrous connective tissue increases in density. Women with very dense breasts have increased risk of carcinoma. Extensive mammographic density and delayed breast involution, both result in cumulative exposure of breast tissue to hormones and growth factors that stimulate cell division and accumulation of genetic damage in breast cells that are major determinants of breast cancer incidence. The risk for breast cancer also rises with increasing severity of BBD, including hyperplasia with moderate to marked atypia in premenopausal women. Thus, the

present study is in concordance with the studies available in the literature. The commonest pathology found in our study (Table 2) was fibroadenoma (51%) followed by ductal carcinoma (27%). Our finding agreed with most of available literature on benign breast lumps where frequency of fibroadenomas ranged from 46.6 to 55.6%. Peak incidence of fibroadenoma ranged from second to third decade of life. Since they arise from lobules they are seen predominantly in 15 to 25 years age group. Fibroadenomas also represent “aberrations of normal development and involution.” Clinical observations in women receiving estrogens suggest hormonal events play a role in etiology. A direct association has been noted between oral contraceptive usage before 20 years age and risk of fibroadenoma. In malignancy, commonest neoplasm was IDC-NOS (85%). The findings in our study correlated with others like Mudholkar et al,⁷ Bhalla et al,⁸ Kapoor et al,⁶ Rasheed,¹⁰ and Kalyani and Banu⁹ that have reported a low incidence of 19.44 and 20.15% of IDC-NOS respectively. Kalyani and Banu (Table 1) studied 129 cases over a period of 1 year of which maximum were benign lesions 77.5% and only 22.5% malignant lesions, which could be the reason for low incidence. In the present study, 105 cases had cyto-histopathological investigation done. Out of 105 cases, 99 cases showed cyto-histopathological correlation, rest 6 cases showed discrepancy (Table 3). In our study, 4 cases of benign proliferative breast disease on FNAC turned out to be IDC-NOS on biopsy and 2 cases of fibrocystic disease with ADH on FNAC turned out to be IDC-NOS on biopsy. In our study, we missed the diagnosis due to small size of the tumor that was obscured by surrounding fibrous stroma and in other case tumor was situated adjacent to a benign cystic lesion that was missed by the needle. In other case, it was a small tumor situated deep with cystic change next to tumor area. Sampling from representative area was missed. Infiltrating ductal carcinoma on cytology can appear fibrocystic due to FNAC done from nonrepresentative area. So, image guidance is important to increase diagnostic accuracy in smaller deeper lesions. The findings of Dey and Luthra¹¹ indicate presence of associated fibrocystic disease can be misleading because it can mask malignancy. Hypocellularity and mild nuclear atypia are most common reasons for misdiagnosis in malignancy. In our study, sensitivity 75%, specificity 100%, positive predictive value PPV 100%, negative predictive value NPV 93% were obtained, which correlated with other studies. Results compared with other studies substantiate findings of our series. The results have been summarized in Table 4.

CONCLUSION

Fine needle aspiration cytology is a sensitive and specific modality that assist in diagnosis and management of breast lesions. In conclusion, FNAC is a very important preliminary diagnostic tool in palpable breast lumps and results show high degree of correlation with final HPE report.

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Table 1: Supporting studies

Studies	Benign years	Malignant years
Bhalla et al ⁸	17-55	23-75
Kapoor et al ⁶	11-40	31-70
Mudholkar et al ⁷	11-60	27-80
Kalyani and Meharaj Banu ⁹	11-40	31-70

Table 2: Cyto-histopathological correlation of cases

Diagnosis	No. of cases diagnosed in FNAC	No. of cases consistent with HPE	No. of cases inconsistent with HPE	Improved diagnosis
Inflammatory	2	2	–	–
Fibroadenoma	54	54	–	–
Fibrocystic	7	7	–	–
BPBD	5	1	4	IDC
Benign phyllodes	4	4	–	–
Fibrocystic disease with ADH	2	–	2	IDC
Ductal carcinoma	31	31	–	–

Table 3:	Malignant	Non-malignant
HPE		

Malignant	6	-
Non-Malignant	6	93
Total	12	93

Table 4: Studies supporting our findings of Sensitivity , specificity , PPV

Studies	Sensitivity (%)	Specificity (%)	PPV (%)
Ahmed et al	92.6	95.2	95.5
Yalavarthi et al ¹³	100	88.5	84
Kanchana et al ¹⁴	87.5	100	100
Usman et al ¹⁵	85.96	88.81	75.38

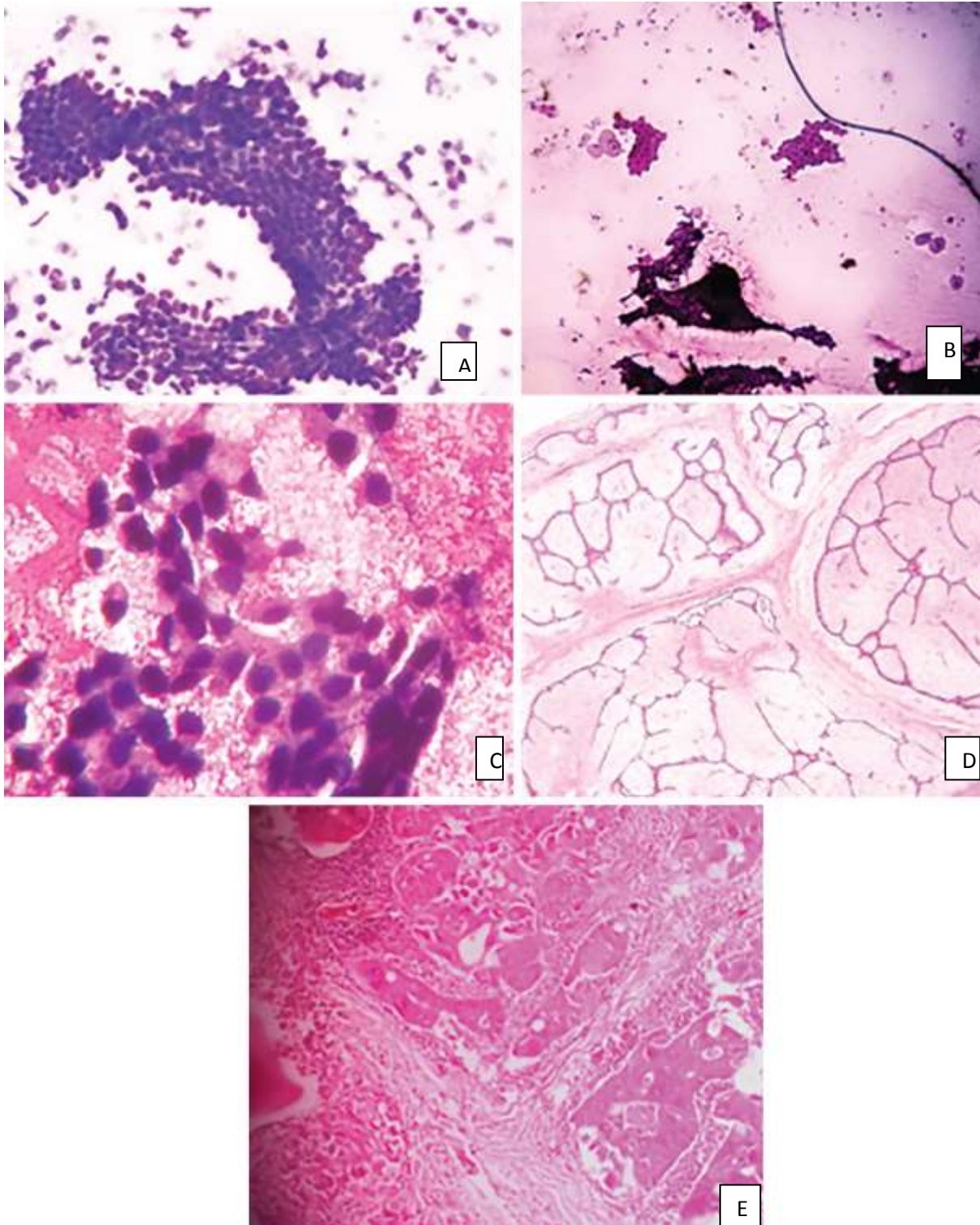


Figure FNACs A: Fibroadenoma B: Fibrocystic disease with apocrine cells C: Malignancy

Figure HPEs D: Fibroadenoma E: IDC -NOS