ORIGINAL RESEARCH

A cytomorphological study of non-malignant breast lumps in a hospital set up

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ABSTRACT

Background- Fine needle aspiration cytology (FNAC) is one the most convenient and inexpensive tool for preoperative assessment of breast lumps. It has gained popularity due to its fast and easy approach and can be performed with very little complications. In other words, FNAC may save anxiety, trauma, time and money. Nevertheless, in FNAC of breast lumps paucity of aspirate material or morphological overlapping features make it challenging for cytopathologists in reporting.

Materials and methods- It is a prospective study done from September 2021 to September 2022. A total of 98 FNAC cases, diagnosed as non malignant breast lesions were included in this study. The study was done at department of pathology, Tripura Medical College and Dr. B R Ambedkar Teaching Hospital, Hapania, Tripura. Some suspected infective cases with purulent material were sent to microbiology department for culture sensitivity testing and Zeihl-Neelson testing to rule out Acid Fast Bacilli. Reporting was done using IAC standardized reporting system for breast lesions. They have categorized the breast lesions into C1 to C5 (C stands for Code). The collected data were entered in SPSS (Statistical Package for Social Sciences Inc, Chicago, IL, USA) version 16.0.

Results- A total of 98 non malignant breast lesions from all the female patients were included. Most of the cases (61.2%) presented in 2nd and 3rd decade and maximum cases i.e. (35.7%) were seen between 20-30 years of age. The mean age of patient was 31.99±11.7. Majority the palpable breast lumps in this study were ≤5 cm (80.6%). Right sided breast lumps were seen in 50.0% cases. Among all the quadrants, upper-outer quadrant presented with most common site for breast lesions (48%). Among the non-malignant breast lesions under category C2 and C3, fibroadenoma presented with highest number of recorded cases (39.8%) and followed by fibrocystic change (32.7%). Females presented with benign breast disease residing in urban areas were (56.1%).

Conclusion- Fine needle aspiration cytology is one of the best technique to evaluate breast lumps used in a country like India with limited resources. It is minimally invasive, rapid and effective method for preoperative diagnosis to relieve the anxiety of patient and also for post-operative follow up of breast lumps to ensure the recurrences.

FNAC has some pitfalls, both false-positive and false-negative results can occur, which can be reduced by experience and expertise of cytopathologist. The triple assessment method by clinical, radiological and pathological examination is a standard approach in the evaluation of breast lumps.

Keywords- Fine needle aspiration, benign breast disease, fibroadenoma.

INTRODUCTION

Breast disease in women comprise of a spectrum of benign and malignant disorders. A palpable breast lump is the reason for consultation to a clinician in around 42% of patients with breast symptoms.(1) For better evaluation of breast lumps, involvement of rational use of a detailed clinical history, clinical breast examination, imaging and tissue diagnosis plays an integral role. Although the final diagnosis is made by histopathological examination of excised tissue, routine excision of all breast lumps is unnecessary, because as much as 80% of lumps turn out to be benign.(2) Thus, there is requirement of less invasive and cost-effective methods of diagnosis without resorting to a more painful and invasive procedure. The modality should be acceptable to the patient, accurate and must not need too much preparations.(3) FNAC is an ideal initial diagnostic modality in breast lumps due to its advantages of being sensitive, specific, economical, safe, quick and acceptable to the patients. In other words, FNAC may save anxiety, trauma, time and money.(4,5) It is also capable to evaluate local chest wall recurrences and providing material for ancillary techniques such as hormone receptor analysis, flowcytometry and molecular studies. International Academy of Cytology (IAC) has established a process to produce comprehensive and standardized approach to FNAC reporting of breast lesions.(6) Nevertheless, in FNAC of breast lumps paucity of aspirate material or morphological overlapping features make it challenging for cytopathologists in reporting. To combat such problems, this new system of categorization has helped immensely to define the uncertain areas.

AIMS AND OBJECTIVES

1. To analyze and categorize various non-malignant breast lesions with reference to IAC standardized reporting system.
2. To find out the prevalence of non-malignant breast lesions.

MATERIAL AND METHODS

1. Inclusion criteria: All female patients with palpable lumps of variable duration
2. Exclusion criteria: Inadequate / insufficient material, suspicious/ malignant breast lesions

The prospective study was carried out at department of pathology, Tripura Medical College and Dr. B R Ambedkar Teaching Hospital, Hapania, Tripura. Some suspected infective cases with purulent material were sent to microbiology department for culture sensitivity testing and Zeihl-Neelson testing to rule out Acid Fast Bacilli. The number of the patients registered for a period of one year from September 2021 to September 2022 (330) was fixed for this study, and researchers decided to include every 3rd patient (using Systematic sampling) coming a biopsy investigation, but considering the pre-fixed exclusion criteria finally 98 cases were included (with a response rate of 89.1%).

Reporting was done using IAC standardized reporting system for breast lesions. They have categorized the breast lesions into C1 to C5 (C stands for Code).

C1: Insufficient material
C2: Benign
C3: Atypical probably Benign
C4: Suspicious, probably in situ or invasive carcinoma

C5: Malignant

Of these, inadequate and suspicious / malignant cases were excluded from this study. Specimen adequacy requires at least six well visualized cell groups. Inadequate degree of cellularity of epithelial cells comes under C1. This can be due to erroneous aspiration, smearing or staining. C2/ benign stands for those lesions exhibiting the characteristic patterns of different benign lesions. Usually such smears are cellular, with ductal and myoepithelial groups and bare bipolar nuclei. Inflammatory and cystic background may be seen in this category also. Smears otherwise benign but show features of cellular crowding, pleomorphism and discohesion, are categorized under C3 or atypical. Aspirate with features such as poor preservation, hypocellularity or components of a benign smear including suspicious malignant cells are reserved for C4 or suspicious. Aspirate with strong malignant findings are categorized under C5.[(6)]

Statistical analysis: The collected data were entered in SPSS (Statistical Package for Social Sciences Inc, Chicago, IL, USA) version 16.0 and checked for any duplicate or erroneous entry. Significance of association between QOL (dependent variable) with the different independent variables was analysed by unpaired t test and P value less than 0.05 (at the level of $\alpha = 0.5$, power 80% and 95% Confidence Interval) was considered as statistically significant.

Ethical Consideration: The protocol of the research study was submitted to the institutional ethics committee (Tripura Medical College & Dr. BRAM Teaching Hospital, Hapania, Agartala) and the study was initiated after getting approval from institution's ethical committee.

RESULTS

All the patients were female with minimum age of 14 years and maximum age of 62 years. Most of the cases (61.2%) presented in 2nd and 3rd decade and maximum cases i.e. (35.7%) were seen between 20-30 years of age, as shown in Table 1. Considering the demographic profile, people residing in urban areas (56.1%) presented with benign breast diseases. These were more prevalent in housewives (37.8%) and seen in married women (56.1%), as shown in Table 1.

Table No. 1: Description of study population according to their Socio-Demographic Characteristics: (n=98)

Socio-Demographic Characteristics	Frequency n (%)
Age category (in years)	
<20	11 (11.2)
20-30	35 (35.7)
30-40	25 (25.5)
40-50	17 (17.3)
50-60	9 (9.2)
≥60	1(1.0)
Residential address	
Rural	43 (43.9)
Urban	55 (56.1)
Occupation	
Student	8 (8.2)
Housewife	37 (37.8)
Unemployed	28 (28.6)

Working	25 (25.5)
Marital status of patient	
Unmarried	36 (36.7)
Married	55 (56.1)
Separated	2 (2.0)
Widow	5 (5.1)

Most of the palpable breast lumps in this study were ≤5 cm (80.6%). More than 5 cm size of breast lumps were noted in benign phyllodes tumour and inflammatory breast lesions. Out of the 98 cases, 49 cases (50.0%) were in right sided breast and 34 cases (34.7%) were in left sided breast. Bilateral cases were seen in 15 (15.3%) cases as shown in Table 2. Among all the quadrants, upper-outer quadrant presented with most common site for breast lesions (48%) as shown in Table 2. Association of pain was noted in (24.5%) cases and nipple discharge was seen in (20.4%) cases. Cytodiagnosis on FNA made under category C2-C3 revealed fibroadenoma being the most common benign breast disease (39.8%) and fibrocystic disease in (32.7%) cases, as shown in Table 2.

Table No. 2: Description of study population according to their disease pattern: (n=98)

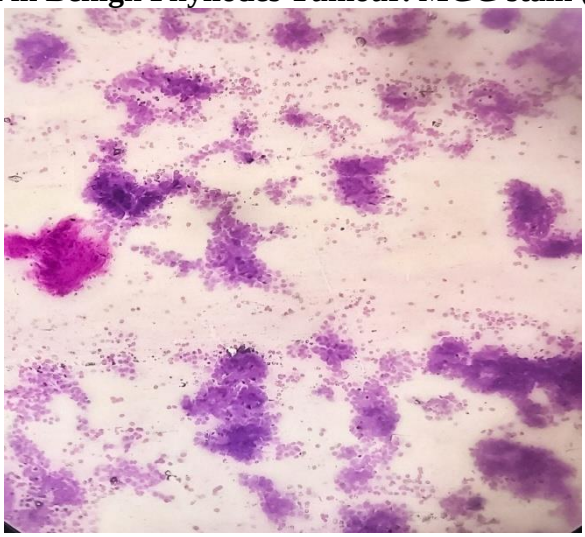
Disease Pattern	Frequency n (%)
Previous family history of breast disease	
Present	37 (37.8)
Absent	61(62.2)
Site of breast lump	
Right sided	49 (50.0)
Left sided	34 (34.7)
Bilateral	15(15.3)
Size of breast lump	
<=5 cm	79(80.6)
>5 cm	19 (19.4)
Involvement of breast quadrant	
Upper outer	47 (48.0)
Lower outer	9 (9.2)
Sub areolar	20 (20.4)
Upper inner	17 (17.3)
Lower inner	5 (5.1)
Associated with pain	
Absent	74 (75.5)
Present	24 (24.5)
Associated with nipple discharge	
Absent	78 (79.6)
Present	20 (20.4)
Cytodiagnosis on FNAC	
Fibroadenoma	39 (39.8)
Fibrocystic	32 (32.7)
Inflammatory change	15 (15.3)
Lactation induced change	9 (9.2)
Benign Phyllodes	3 (3.1)

Inflammatory change accounted for 15 cases i.e. 15.3%. Out of these 15 cases, 1 case turned out to be Acid Fast Bacilli positive and 3 cases shown to be positive for staphylococci.

Fibroadenoma is a very common solid breast lump. It is most commonly seen in women who are less than 40 years of age. The clinical presentation is very characteristic and multiple fibroadenomas are seen in 15-20% of cases. Cytologically, aspirates are normocellular to hypercellular with monolayered cohesive sheets of benign-looking epithelial cells admixed with myoepithelial cells. These sheets have staghorn like configuration (Figure 3). Accompanying fibrillar stromal material may vary in cellularity. Presence of numerous bare bipolar nuclei in the background is a reliable feature favouring fibroadenoma. The presence of atypia in such clusters may be further evaluated with cellular and nuclear spacing, multiple nucleoli and character of nuclear chromatin.[7]

Figure No. 3: Photomicrograph of cellular smears with monolayered sheets of ductal epithelial cells in Fibroadenoma. Staghorn configuration was noted. MGG stain (10X).

Figure No. 4: Photomicrograph of hypercellular smears exhibiting clusters of spindle cells with plump nuclei in Benign Phyllodes Tumour. MGG stain (40X).



It is not unknown that fibroadenoma is difficult to differentiate from phyllodes tumour using aspiration cytology. A cellular aspirate with numerous spindle and plump nuclei, hypercellular stromal components along with cellular atypia are the key points to support the diagnosis of phyllodes tumour over fibroadenoma.[8]

Cystic change in breast lesion is a very common finding. The aspirated material can be clear, blood stained, cloudy or turbid. Mostly, such smears show macrophages along with inflammatory cells. Small clusters or groups of ductal and myoepithelial cells are seen, some of the cells may exhibit apocrine change. Fibrocystic change usually yield scanty material with the above findings. Presence of proteinaceous fluid along with ductal epithelial cells that

are large with enlarged nuclei and vacuolated cytoplasm. Prominent eosinophilic nucleoli may be noted. Nevertheless, one should also be on the outlook for lactational induced change or galactocele. Inflammatory changes in breast lump, present in form of mastitis or sub-areolar breast abscess. Along with mixed inflammatory cells, sometimes multinucleated giants cells are also seldom noted.[7]

DISCUSSION

FNAC is a very useful technique in the preoperative evaluation of breast lumps. It is a sensitive, rapid, cost-effective and safe method in the evaluation of palpable breast lumps. As it is less traumatic and provides immediate report to the patient so it is a widely accepted method to analyze various breast lesions.[9] The present study comprised of 98 non-malignant breast lumps. Only samples with adequate material were considered. Multiple passes were taken from the breast lesions at the same sitting.

In developed nations, core needle biopsy is the preferred procedure as compared to breast FNAC. But in a developing nation like India, till now, the core needle biopsy is still not practised at most medical centers. In limited resources FNA provides much cheaper and less invasive evaluation. The sensitivity and specificity of FNAC as a diagnostic tool for palpable breast lumps are 65-99% and 96-100% respectively[10].

In this study, the mean age of the female population was 31.99±11.7. Maximum cases i.e. (61.2%) were seen in 2nd and 3rd decade. In Khanam K et al[11] , maximum incidence was seen in the age group of 12-20 years (36%) cases. Similarly in Khemka et al[4], benign lesions of breast were more commonly seen in younger age groups. In Gorasiya B et al[12], the most common affected age group was 21 to 40 years having 67 (41.87%) patients followed by 41 to 60 years having 50 (31.25%) patients.

In this study, fibroadenoma presented with highest number of recorded cases (39 cases, 39.8%) that was followed by fibrocystic change (32 cases, 32.7%). Inflammatory change accounted for 15 cases i.e. 15.3%. Similar results were obtained in Khanam et al[11], fibroadenoma being the highest among benign breast lump (39.54%). In Panwar et al[13], C2 lesions which included 48% fibroadenoma followed by 32.7% cases of benign breast disease, mastitis (8.6%), fibrocystic disease (6.4%) and galactocele 4% cases. In Gorasiya B et al[12], fibroadenoma account for maximum number of cases (64.58%). Majority of fibrocystic disease was noted in 3rd and 4th decade, whereas in our study, fibrocystic disease wasprevalent in 2nd and 3rd decade. In Khanam et al[11], inflammatory cases/ mastitis/ abscess were seen in 18.6% cases.

In this study, out of the 98 cases, (50.0%) were in right sided breast and (34.7%) were in left sided breast. Bilateral cases were seen in (15.3%) cases. Among all the quadrants, upper-outer quadrant presented with most common site for breast lesions (47 cases, 48%). In Khanam et al[11], superolateral quadrant was the most common quadrant for breast lesions (24 cases, 48%). In Khemka et al[4], upper and outer quadrant was the commonest site. In khanam et al[11], 58% cases were involving the right sided breast.

Most of the palpable breast lumps in this study were ≤5 cm (80.6%). More than 5 cm size of breast lumps were noted in benign phyllodes tumour and inflammatory breast lesions. In Khanam et al[11], all the palpable breast lumps were between 1-5 cm, majority of the lesions were between 1 to 3 cm. Most of the cases were benign lesions.

Obvious limitation in the present study was the sample size which was small. But we tried our level best to observe the different parameters of non-malignant breast lesions. The important aspect of this study is that demographic profile was analysed in such female patients. Women residing in urban areas frequently visit hospitals. This change can be due to increased awareness and easy accessibility.

CONCLUSION

Fine needle aspiration cytology is the minimally invasive, rapid and effective method for preoperative diagnosis to relieve the anxiety of patient and also for post-operative follow up of breast lumps to ensure the recurrences. Despite being an invaluable tool, FNAC has some pitfalls, both false-positive and false-negative results can occur, which can be reduced by experience and expertise of cytopathologist. Fibroadenoma is the commonest disease in the benign category followed by proliferative breast lesion such as fibrocystic disease. So, we conclude that FNA should be used as a routine diagnostic procedure for breast lumps due to its cost effectiveness, quick results and high accuracy. Breast cancer is the most common cancer in the women after cancer cervix, so we recommend FNAC as a first line diagnostic procedure in patients presenting with breast lumps especially in developing countries with limited resources. Breast self-examination and education to females is very important in case of breast lumps. The triple assessment method by clinical, radiological and pathological examination is a standard approach in the evaluation of breast lumps. The importance of FNAC in management of breast lumps lies with unnecessary surgical procedures and also it may be a vital component of management of patients with advanced breast carcinoma unwilling for extensive surgical intervention. Thus, FNAC being a simple, cost effective, minimally invasive technique must be used a preliminary diagnostic tool in all cases of breast lump.

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