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Evaluation of Palpable Breast Lesions by Fine Needle Aspiration Cytology in a Tertiary Medical College Hospital

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Abstract

Background: Breast lesions are heterogeneous diseases that consist of several distinct entities with remarkably different characteristic features. Presence of lump in the breast causes anxiety, and apprehension in every woman. This may be attributed to the increasing public awareness of breast cancer. Aim: The study aimed to observe and analyze the diverse cytomorphological features of palpable breast lump by using fine needle aspiration cytology (FNAC). **Methods:** This cross-sectional study was carried out at the Department of Pathology, Gazi Medical College, Khulna; from October 2021 to September 2022. In this study, fifty-eight (58) samples of breast lumps were collected by fine needle aspiration cytology, processed and stained with hematoxylin and eosin. After staining, all the slides were thoroughly examined under light microscope stains to confirm the diagnosis as well as to evaluate cytopathologic characteristics. The data were tabulated and statistical analysis was performed. **Results:** Out of 58 cases, 44 (75.9%) samples belonged to age 21-50 years and the mean age was 34.22±12.09 years. The right breast (53.4%) was found affected more than the left breast and most of the lesions were in the upper and outer quadrants (51.7%). Cytologically, the most common lesion was fibroadenoma (29.3%), followed by fibrocystic change and ductal carcinoma (13.8%). A strong positive correlation ($r = 0.510$, $p = 0.000$) was found between the age and the cytological characteristics. A significant ($p = 0.039$) but weakly positive correlation ($r = 0.277$) was found between the tumor size and the cytological study. No significant correlation was found between the consistency, quadrant, mobility and the cytological characteristics of the tumor. **Conclusion:** FNAC is a simple, safe, reproducible and minimally invasive diagnostic test. It is not a substitute for open biopsy, rather with careful clinical assessment, it should be used to complement histopathology in different clinical settings.

Keywords: FNAC, Palpable breast lesion, Cytology, Fibroadenoma, Ductal carcinoma

Introduction

Breast diseases are a common cause of concern among women and breast cancer is one of the most common causes of cancer-related deaths among women globally.[1] Reduction of deaths from breast cancer is currently a top healthcare priority and an important path to achieving this goal is early detection of disease.[2]

Most of the countries have now adopted a "triple assessment approach" in diagnosing breast disease. This comprises clinical, radiological and pathological assessment. It remains an excellent tool in the assessment of palpable breast lump. Its diagnostic accuracy exceeds 99% if all three modalities are concordant.[3] Fine Needle Aspiration cytology (FNAC) is widely used and accepted as a reliable cytologic method of making initial pre-operative diagnosis in breast diseases. It has a lot of advantages such as high accuracy, cheap, fast, out-patient procedure, high patient acceptability and low complication rate.[4]

The benign lesions can arise from different kinds of cells and can be inflammatory or proliferative. They include skin lesions, vascular lesions, lymph nodes, fat necrosis, foreign bodies, infections, fibroadenomas,

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other benign tumors, cysts, galactoceles, adenosis, fibrosis, duct ectasias, papilloma, radial scar, and spectrum of epithelial hyperplasia with or without atypia.[5] Benign epithelial lesions are classified broadly into three groups, according to the subsequent risk of developing breast cancer.[6]

Non-proliferative breast changes, which include, fibrocystic changes are not associated with an increased risk of breast cancer. Proliferative breast disease characterized by the proliferation of epithelial cells, without atypia, is associated with a small increase in the risk of subsequent carcinoma in either breast. They are predictors of risk but are thought to be unlikely precursors of carcinoma.[7]

The success rate of FNAC for obtaining a definite diagnosis depends both on the palpability and size of the lesion. FNAC has average success rates of 75-90% for palpable and 34-58% for non-palpable breast lesions respectively.[8] Fine-needle aspiration (FNA) biopsy is an established and highly accurate method for diagnosing breast lesions. The use of core biopsy (CB) is being increasingly advertised but its procedure is more troublesome, expensive and time-consuming as compared to the FNA procedure.[9,10] Core Biopsy or true-cut needle biopsy is not widely used because of its complications, interpretation, and time-consuming results; therefore, palpable breast lesions can be accurately diagnosed by triple test only (FNAC, physical examination, and ultrasonography).[11]

So, the study aims to evaluate the role of FNAC in diagnosing palpable breast lesions.

Materials and methods

This was a cross-sectional observational study carried out at the Department of Pathology, Gazi Medical College, Khulna; from October 2021 to September 2022. The sample size was 58. The study population was all the patients with clinically detected palpable breast lumps in the Department of Pathology of Gazi Medical College during the mentioned period.

Inclusion criteria:

1. Patients with a palpable breast lump.
2. Patients who gave written informed consent.

Exclusion criteria:

1. Patients who received chemotherapy or radiation therapy for breast carcinoma.
2. Male patients.

A detailed clinical history was taken and local examination was done. After diagnosing clinically, the patients were advised for FNAC.

The procedure of Fine needle aspiration cytology:

After obtaining proper consent, the technique of FNAC was explained to the patients. FNAC was done under all aseptic conditions in the Department of Pathology. A 5 cc to 10 cc disposable syringe and disposable 22 gauge or 23 gauge needle were used for the procedure. The needle was inserted into the palpable lesion once or twice, depending on the size of the nodules. We didn't use any local anesthetics. The aspirated materials were then ejected onto the slide.

Staining:

For each patient, four to six slides were prepared. The smears were immediately fixed in 95% ethanol. The smears were stained with Papanicolaou stain by maintaining the standard protocol. Then reporting was done using standard diagnostic criteria by the concerned pathologist.

Data Analysis:

After compilation, the data were presented in the form of tables. Statistical analysis was done by using computer-based statistical software, SPSS 24.0 version (SPSS Inc, Chicago, IL, USA). Results were shown in tables and figures and expressed as frequency & percentage for qualitative data and mean ± SD for quantitative data. A 'p-value <0.05 was considered statistically significant.

Results

This cross-sectional study was aimed to assess palpable breast lumps by cytology. In this study age of the patients varied from 13-61 years. Out of 58 cases, 44 (75.9%) samples belonged to age 21-50 years and the mean age was 34.22±12.09 years (Table 01). The right breast (53.4%) was found affected more than the left breast. In 1.7% of cases, both breasts were found affected (Table 02). Most of the lesions were in the upper and outer quadrants (51.7%) (Table 03). Cytologically, the most common lesion was fibroadenoma (29.3%), followed by fibrocystic change and ductal carcinoma (13.8%). In the present study, only 1 patient was diagnosed with lobular carcinoma (1.7%). Most of the patients diagnosed with benign breast lesions were aged between 20-40 years and no malignant case was found below 40 years (Table 05). A strong positive correlation ($r = 0.510$, $p = 0.000$) was found between the age and the cytological study (Figure 01). A significant ($p = 0.039$) but weakly positive correlation ($r = 0.277$) was found between the tumor

size and the cytological study (Figure 02). No significant correlation was found between the consistency, quadrant, mobility, and the cytological study of the tumor.

Table 01: Distribution of patients according to age group

Age (in years)	Frequency	Percentage
1-20	9	15.5
21-50	44	75.9
51 or more	5	8.6
Total	58	100.0

Table 02: Distribution of patients according to laterality of the lesion

Laterality	Frequency	Percentage
Right side	31	53.4
Left side	26	44.8
Bilateral	1	1.7
Total	58	100.0

Table 03: Distribution of patients according to site of lesion

site of lesion	Frequency	Percentage
upper & outer	30	51.7
upper & inner	12	20.7
lower & outer	3	5.2
lower & inner	4	6.9
Central	6	10.3
Multiple	3	5.2
Total	58	100.0

Table 04: Distribution of patients according to cytological diagnosis

Diagnosis	Frequency	Percentage
Fibroadenoma	17	29.3
Fibrocystic change	8	13.8
Proliferative Breast Disease	1	1.7
Proliferative Breast Disease with atypia	3	5.2
Resolving abscess	3	5.2
Granulomatous Mastitis	4	6.9
Fibroadenoma with Fibrocystic Change	3	5.2
Inflammatory lesion, suggestive of fat necrosis	2	3.4
Benign lesion compatible with lipoma	5	8.6
Inflamed epidermal inclusion cyst	1	1.7
Ductal carcinoma	8	13.8
Lobular Carcinoma	1	1.7
Lactational adenoma	2	3.4
Total	58	100.0

Table 05: Correlation of age group of patients with the cytological diagnosis

Table 06: Correlation of age group of patients with the cytological diagnosis

Cytological study	Age group			Total
	1-20 years	21-50 years	51 years or more	
Fibroadenoma	6	11	0	17
Fibrocystic change	0	7	1	8
Proliferative Breast Disease	0	1	0	1
Proliferative Breast Disease with atypia	0	3	0	3
Resolving abscess	0	3	0	3
Granulomatous Mastitis	0	4	0	4
Fibroadenoma with Fibrocystic change	3	0	0	3
Inflammatory lesion, suggestive of fat necrosis	0	2	0	2
Benign lesion compatible with lipoma	0	5	0	5
Inflamed epidermal inclusion cyst	0	1	0	1
Ductal carcinoma	0	4	4	8
Lobular carcinoma	0	0	1	1
Lactational adenoma	0	2	0	2
Total	9	44	5	58

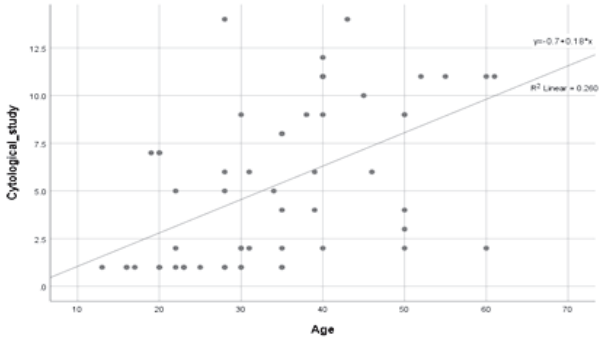

Figure 01: A strong positive correlation (Pearson's) between age and cytological diagnosis.

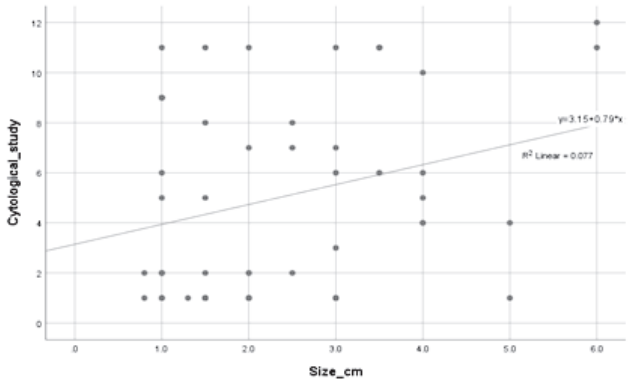

Figure 02: A positive correlation (Pearson's) between size and cytological diagnosis.

Discussion

FNAC is a useful tool in the preoperative evaluation of breast lumps. FNAC is accurate, cheap, and easy to perform and is less invasive than core needle biopsies. Accurate preoperative evaluation is important as it allows for rapid referral of malignant cases for treatment and discharge of benign cases from the clinic and their return to routine follow-up.[12] FNAC can also be used in following up the benign cases.[13]

In the current study age of the patients varied from 13-61. Most of the patients (75.9%) were between 21-50 years with a mean age was 34.22±12.09 years. Some other studies showed similar type of results. Parappurath et al. reported mean age was 35.6±12.7 years.[14] In their study, Nkonge et al. showed that the mean age was 35.6±16.7 years.[15] Bhargava et al. found most of the patients are in the age group 25-40 years.[16] These age differences may be due to different places of study and different sample sizes.

In the present study, 53.4% of patients had right breast lesions and 44.8% of patients had left breast lesions. In 1.7% of cases, both breasts were found to be involved. Parappurath et al. also reported that the right breast (50.6%) was more affected than the left.[14] In their study, Chalya et al. also reported right breast (53.8%) was more affected than the left one.[17] Sangma et al. also showed an increased percentage of right breast involvement.[18]

In this study, most of the patients had lesions in the upper and outer quadrant (51.7%) followed by upper inner (20.7%), central (10.3%), lower inner (6.9%), lower outer (5.2%) and multiple quadrant (5.2%). Ramesh et al. showed the majority of breast lumps (60 %) were located in the upper outer quadrant followed by lower inner (20%) cases, lower outer quadrant (12%) cases, and the least number of cases in the upper inner quadrant (8%).[19] In their study, Parappurath et al. also reported that the majority of the lesions were in the upper and outer quadrants (45%).[14]

Regarding cytological diagnosis, the most common lesion was fibroadenoma (29.3%), followed by fibrocystic change and ductal carcinoma (13.8%). In the present study, only 1 patient was diagnosed with lobular carcinoma (1.7%). The other lesions were PBD (proliferative breast disease) (1.7%), PBD with atypia (5.2%), Granulomatous mastitis (6.9%), resolving abscess (5.2%), FA with FCC (5.2%), fat necrosis (3.4%), lipoma (8.6%), lactational adenoma (3.4%), Epidermal inclusion cyst (1.7%). A group of authors reported Fibroadenoma (n = 136) and fibrocystic changes (n = 38) were the most frequently diagnosed benign breast lesions whereas ductal carcinoma (n = 68) was the most frequently diagnosed malignant breast lesion. Other frequently diagnosed breast lesions included gynecomastia (n = 33), galactocele (n = 12), intraductal papilloma (n = 12) and fat necrosis (n = 12).[15] Another group of authors showed Fibroadenoma was the most common benign breast disease, seen in 50% of patients, followed by breast abscess (12 %), Mastalgia (11%), fibrocystic disease (8%), duct ectasia (7%), duct papilloma (4.0%), cellulitis (3.0%) and antibioma (2.0%). Phyllodes tumor, galactocoele, and accessory breast, each, was seen in 1.0% of patients.[16]

In this study, most of the breast lesions were found within the reproductive age group. Patients with breast lump who were below 50 years of age, usually had benign lesions. Malignancy is more common in above 50 years and no malignancy were detected below 40 years. This result is highly significant. It implies that there might be less chance of occurring breast carcinoma below 40 years. Some authors also showed similar results. Bukhari et al. reported the most benign lesion in the third and fourth decades: and malignancy in the fifth and sixth decades.[20] Bhargava et al. showed most of the benign lesions occurred between 13-40 years of age.[16]

In the present study, a significant but weakly positive correlation was found between the tumor size and the cytological study. No significant correlation was found between the consistency, quadrant, mobility, and the cytological study of the tumor.

So, in our experience, FNAC is an excellent and cost-effective diagnostic procedure. One can get on-site immediate reports with minimal cost using inexpensive equipment and a simple technique. The most significant advantage of FNAC is the high degree of accuracy, rapid results, and a less invasive procedure than a tissue biopsy. FNAC of the breast can reduce the number of open breast biopsies.

Conclusion

FNAC is an essential component in the preoperative management of breast lesions. Its accuracy, ease of use and affordability are the factors that cause its popularity. The advent of imaging technology together with the clinical expertise of the clinician contributed to its increased sensitivity. According to this study palpable breast lesions can accurately be diagnosed by FNAC. The operators' experience and confidence in correlating with the clinical and radiologic findings, the cellularity of smears and the aspiration technique are always helpful.

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