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Evaluation of breast lesions by fine needle aspiration cytology in Bangladeshi patients

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Abstract

Background: *The assessment of breast masses can benefit significantly from fine needle aspiration cytology (FNAC). Due to its quick, simple, and inexpensive methodology, it has grown in popularity. Its great accuracy, sensitivity, and specificity have led to its general acceptance for pathological assessment. The study examines the cytological information in aspirated smears from breast tumors. Breast lumps are divided into benign and malignant disorders.* ***Objectives:*** *This study aimed to evaluate the role of FNAC in examining breast lumps in Bangladeshi patients.* ***Materials and Methods:*** *This cross-sectional observational study was conducted in the Department of Pathology, Ad-din Akij Medical College, Khulna, from May 2021 to April 2022. In this study, seventy-nine samples of breast lumps were collected, processed, and stained with hematoxylin and eosin. All data were recorded in a pre-designed data sheet. Statistical analyses were carried out by using SPSS version 24 for Windows. A descriptive analysis was performed for all data. Observations were indicated by frequencies and percentages. Statistical significance was set at a "p" value<0.05. Result: In this study, The mean (±SD) age of the patients was 34.73 ± 10.55 years with the minimum and maximum ages of the patient being 20 years and 50 years respectively. The right breast was found affected more (49.4%) than the left breast. Most of the patients presented with mobile and painless breast lumps. The majority of the patients with breast lumps who presented below 40 years of age had benign lesions. Most of the malignant cases were found over 40 years of age. Fibroadenoma was the most common lesion (24.1%) followed by carcinoma of the breast (19%) identified in this study.* ***Conclusion:*** *Therefore, we concluded that FNAC is our nation's reliable and highly accurate diagnostic tool for breast lumps. Fibroadenoma appears to be most common in young persons—the malignant lesion increases in frequency beyond the age of 40. The results of the current investigation should be confirmed by a large-scale prospective study using standardized methodologies.*

Keywords: *Breast lesions, FNAC, squamous cell carcinoma, fibroadenoma*

Introduction

The breast is a vital component of the female reproductive system. But even among well-educated females, complaints about breast issues are widespread, resulting in their neglect and frequently delayed detection (1). A palpable breast tumor is a frequent diagnostic challenge for doctors and surgeons. Today's needle biopsy technology allows for the minimal surgical excision of benign breast illnesses compared to the accepted excision biopsy of the past (2).

The evaluation of palpable breast lumps now includes fine-needle aspiration cytology (FNAC) as a crucial step. An established and incredibly accurate technique for identifying breast lesions is fine-needle aspiration (FNA) biopsy. Although fine-needle aspiration (FNA) breast biopsy has been demonstrated to be a safe and accurate procedure, many surgeons doubt that it is trustworthy enough to replace excisional biopsy (3).

Common symptoms of benign, premalignant, or malignant lesions include palpable breast lumps, breast discomfort, and nipple discharge. A clinical breast examination, imaging, & cytological testing are three methods used to diagnose breast lesions. FNAC helps to prevent unnecessary procedures by bridging the gap between clinical assessment and the final surgical pathological diagnosis (1). The palpability and extent of the lesion affect the likelihood that FNAC will yield a conclusive diagnosis (4).

Young women can develop benign breast illnesses, and the incidence increases throughout the second decade of life. On the other hand, after menopause, malignant disorders become more prevalent (5, 6). The clinical symptoms of benign processes might range from completely asymptomatic to palpable nodularity, thickness, mass, discomfort, inflammation, or nipple discharge. Numerous signs and symptoms of different breast diseases are nonspecific, necessitating additional testing for a conclusive diagnosis. The benign lesions can be inflamed or proliferative and can develop from various types of cells (7).

One of the premalignant lesions that could indicate a higher risk of breast cancer is atypical ductal hyperplasia. The pathophysiology of breast cancer may be better understood if these conditions are well understood. Identifying high-risk groups may benefit from routine observation. The most prevalent malignant tumor in women worldwide is breast cancer. Differentiating a benign from a malignant lesion is the primary concern of the surgeon and the duty of the surgical pathologist because it is the leading cause of death (7).

In Bangladesh, fine-needle aspiration cytology (FNAC) is frequently utilized as a trustworthy, quick, economical, complication-free, and accurate diagnostic method for the diagnosis or therapy of breast masses. At the Ad-din Akij Medical College Hospital's Department of Pathology, a study was done to determine the efficacy of fine-needle aspiration (FNA) in the screening of palpable breast tumors.

Materials and Methods

Type of Study	Cross-sectional descriptive study
Place of study	Department of Pathology, Ad-din Akij Medical College and Hospital, Khulna
Study period	May 2021 to April 2022
Study population	All patients with clinically detected breast lumps in the Department of

	Pathology, Ad-din Akij Medical College during the specified time duration comprised the study population
Sampling technique	Consecutive sampling.

Inclusion criteria

1. Patients clinically detected with any breast lump.
2. Patients who had given written informed consent.

Exclusion criteria

1. Patients who had not given consent.
2. Those who had received chemotherapy or radiation therapy for breast carcinoma.
3. Inadequate smear.

Data collection

It was a cross-sectional descriptive study for which the Institutional Review Board had granted authorization to use cytology samples. After receiving adequately informed written consent from the patient who was a patient at the Ad-din Akij Medical College's Department of Pathology from May 2021 to April 2022, this study was launched. For this investigation, patients with breast lumps that had received a clinical diagnosis were chosen.

Procedure of Fine-needle Aspiration Cytology (FNAC)

Before beginning the FNAC, the patients are given a verbal consent document, and the technique is then explained to them. For each patient, an FNA is performed using a disposable 10mL syringe and a 23 gauge needle. The needle is injected into the palpable lesions once or twice, depending on the size of the nodule, without the use of a local anesthetic. A syringe is used to aspirate cellular material, which is then ejected onto slides. For each patient, four to five slides are prepared. Near the frosted end of a slide on a table, a small to medium-sized drop of aspirate is placed. Similar to how a peripheral blood smear is made, a second slide is used to disperse the aspirated material. The air-dried smears are stained with Papanicolaou stains, and each smear is wet-fixed in 95% methanol. The Ad-din Akij Medical College's Department of Pathology prepared smears according to protocol.

Under a light microscope, all prepared slides were inspected, and reporting was completed. The study's eligible patients were contacted after receiving the cytological results and offered to participate. Each patient's brief medical history was obtained after they gave their informed consent, paying close attention to their age, anatomical location, and current problems.

Data analysis

After compilation, the data was presented in the form of tables by meticulous checking and rechecking. Statistical analysis of the results was done by using computer-based statistical software, SPSS 24.0 version (SPSS Inc, Chicago, IL, USA). Results were shown as a table and expressed as frequency & percentage for qualitative data and mean ± SD for quantitative data. A ‘p-value <0.05 was considered statistically significant because all analyses were considered a 95% confidence level.

Results

An analysis of 79 cases of breast lesions was done in this study to evaluate the role of FNAC in the diagnosis of breast lesions.

Age groups of the patients

Among 79 patients, most of the patients in this study were in the age group between 20 to 30 years (n=24, 30.4%) followed by the age group 30-40 years (26.4%). The mean (±SD) age of the patients was 34.73 ± 10.55 years with the minimum and maximum ages of the patient being 20 years and 50 years respectively. The least commonly affected age was less than 20 years (Table-1).

Table 1: Distribution of the patients according to age (n=79)

Age group	Frequency	Percentage
<20	4	5.1%
20-<30	24	30.4%
30-<40	21	26.6%
40-<50	20	25.3%
>50	10	12.7%
Total	**79**	**100.0%**

Site of involvement

The right breast was found affected more (49.4%) than the left breast (Table 2). In 3.8% of cases, both breasts were found affected.

Table 2: Distribution of the patients according to the site of involvement (n=79)

Site	Frequency	Percentage
Right	39	49.4%
Left	37	46.8%
Both	3	3.8%
Total	**79**	**100.0%**

Clinical presentation

Most of the patients presented with mobile and painless breast lumps (41.8%) followed by painful lumps in 40.5% of cases **(Table 3)**.

Table 3: Distribution of the patients according to the clinical presentation (n=79)

C/F	Frequency	Percentage
Breast lump only	33	41%
Breast lump + Pain	32	40.5%
Breast lump + Pain + Nipple discharge	9	11.4%
Breast lump + Pain + Nipple puckering	5	6.3%
Total	**79**	**100.0%**

Cytological analysis

The study revealed that most of the cases with breast lumps were benign in nature (n = 57, 72.2%) whereas 9% &19% were premalignant and malignant cases respectively **(Figure 1).**

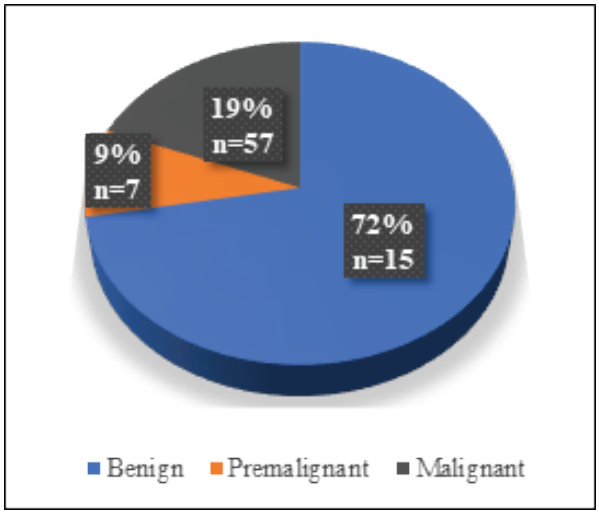

Fig 1. Distribution of the patients according to the nature of the cytological diagnosis (n =79)

Fibroadenoma was the most common lesion (24.1%) followed by carcinoma of the breast (19%) identified in this study **(Table 4)**.

Table 4: Distribution of the patients according to cytological diagnosis (n = 79)

Clinical diagnosis	Frequency	Percentage
Fibroadenoma	19	24.1%
Carcinoma of breast	15	19.0%
Fibrocystic disease	12	15.2%
Atypical ductal hyperplasia	7	8.9%
Inflammatory lesion	7	8.9%
Benign breast disease	4	5.1%
Granulomatous mastitis	4	5.1%
Proliferative breast disease	4	5.1%
Galactocele	3	3.8%
Lactational adenoma	2	2.5%
Fat necrosis	1	1.3%
Fibroadenoma with cystic changes	1	1.3%

The study showed that the majority of the patients with breast lumps who presented below 40 years of age had benign lesions **(Table 5)**.

Table 5: Distribution of the patients according to the age group correlated with the cytological diagnosis (n=79)

Age group	Cytology		
	Benign	Premalignant	Malignant
<20 years	4	0	0
20-<30 years	24	0	0
30-<40 years	17	3	1
40-<50 years	10	3	7
>50 years	2	1	7

Most of the malignant cases were found over 40 years of age **(Figure 2)**. No malignancy was detected below 30 years of age that was significant statistically (Cramer's V= 0.480; p = 0.000).

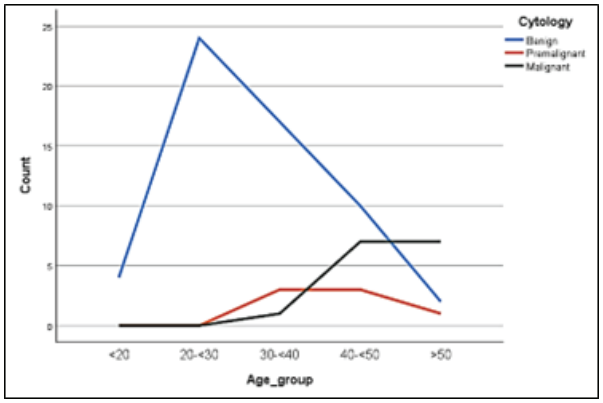

Fig 2. Distribution of the patients according to the age group correlated with the cytological diagnosis (n=79)

In this study, the benign lesions were found distributed almost equally on one side, i.e., 45.6% on the right & 49.1% on the left side **(Figure 3),** whereas most of the malignant cases (73.3%) were diagnosed on the right side even though it was not significant statistically (Cramer's V= 0.194; p = 0.203).

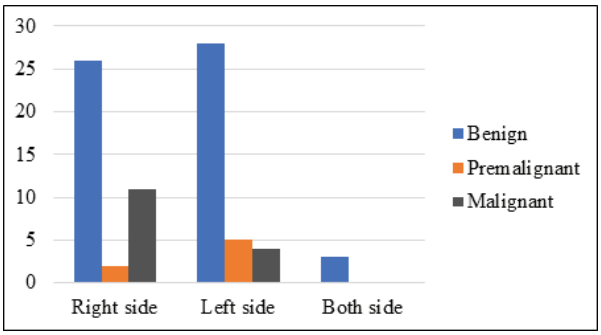

Fig 3. Distribution of the patients according to the site of involvement correlated with the cytological diagnosis (n=79)

Results

Fine-needle aspiration cytology is frequently used in the diagnosis of breast cancer because it is an excellent, safe, and cost-effective diagnostic procedure. Using inexpensive equipment and a straightforward technique, one can obtain on-site immediate reports for a low cost. The FNAC's high degree of accuracy, quick turnaround times, and less invasive process compared to a tissue biopsy are its most important benefits. Less open breast biopsies can be performed after the FNAC of the breast (7, 8, 9, 10).

In the current study, most of the patients were between 20 to 30 years of age with a mean (±SD) age of 34.73 ± 10.55 years. Parappurath et al. reported that the mean age of the patients was 35.6 years. Nkonge et al. showed that the mean age of the evaluated patients was 36.0±16.7 years (1). Koorapati R et al. reported the age range from 11 years to more than 50 years (9). These age differences may be due to different places of study.

In the present study, 49.4% of cases had right breast lesions, 46.8% cases had left breast lesions and both breasts were affected in 3 (3.8%) cases. Chalya et al. also reported right breast involvement in 53.8% of cases, left breast involvement in 42.8%, and bilateral breast lesions in 3.4% of patients which is similar to our findings (10). Sangma et al reported right and left breast involvement by benign disease in 48% and 40% of cases respectively. Bilateral involvement was seen in 12% of cases.

In our study, most of the cases (41.8%) presented with breast lumps that were mobile and painless. Parappurath M et al. also reported most of the cases (39.4%) presented with breast lumps that were painless which is similar to our results (1). Koorpati R et al. found that 68% of breast lumps were mobile and painless, and 24% were associated with pain (9). In the study by Illaiah et al., the most common presentation was the painless lump (58.3%) followed by painful lumps (7).

The cytological analysis in this study showed that 72.2% of cases were benign and 19.0% were malignant lesions. Moreover, the premalignant conditions (atypical ductal hyperplasia) of 8.9% were also considered as a different entity in this study. Mendoza et al. also found a 5% case of atypical ductal hyperplasia in their study (8). Nkonge et al. reported 72.3% benign and 27.7% malignant lesions in their study (6).

In our study, fibroadenoma was the most frequent (24.1%) diagnosis of breast lumps identified by FNAC. Bhargava GS et al. showed fibroadenoma was the most common benign lesion seen in 50% of the total patients (11). Koorapati R et al. mentioned fibroadenoma is the commonest one among benign breast lesions in their study (9).

This study revealed that the majority of the patients with breast lumps who presented below 40 years of age had benign lesions. This might be helpful in an early assumption of the category of breast lumps at an early age. According to our findings, most of the malignant cases were found over 40 years of age. No malignancy was

detected below 30 years of age which was significant statistically that implies that there might be less chance of occurring carcinoma of the breast below the age of 30 years. Yalavarthi et al. also reported the maximum occurrences of benign lesions in the "third decade" and of malignant lesions in the "fifth decade" (2).

In our study, about 45.6% of benign cases were found on the right side and 49.1% on the left. Sangma et al. reported right and left breast involvement by benign disease in 48% and 40% of cases respectively which is in line with our findings (12). Our finding of 73.3% of malignant cases on the right side was not significant statistically. These data imply that the benign or malignant cases may have no laterality issues.

The commonest case among the study population was fibroadenoma 19 (24.1%). The next common was carcinoma of the breast (13), followed by fibrocystic changes (9). There were 7 cases of ADH & Inflammatory lesions. The study also showed 4 cases of benign breast diseases, granulomatous mastitis & proliferative breast disease. There were 3 cases of galactocele, 2 cases of lactational adenoma, 1 case of fat necrosis & FA with cystic changes.

In our study, there were 11 (20%) cases of benign inflammatory lesions, and the majority of these were acute and chronic mastitis. Granulomatous mastitis is a rare chronic inflammatory breast lesion that mimics carcinoma clinically and radiologically (4).

In our experience, FNAC results are reliable regarding malignant lesions; however, the category of "Suspicious for Malignant lesions" or premalignant lesions need histopathological evaluation before performing surgical measures.

Results

According to the study, neoplastic and non-neoplastic breast lesions may be accurately diagnosed in the outpatient setting using fine needle aspiration cytology. Young people seem to get fibroadenoma the most frequently. After age 40, the malignant lesion becomes more prevalent. The patient's comfort, the lack of a need for anesthesia, the speed of the analysis, and the lack of false positive results make the FNAC the first diagnostic tool in the management of breast lesions before surgery.
In light of this, pathologists and surgeons should keep using the method for the early diagnosis of breast cancer. Additionally, the patient's wait time for an excision or incision biopsy will be drastically shortened.

Source(s) of Support: Nil

Conflict of Interest: Nil

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