Original Article

Diagnostic role of FNAC in breast lesion

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ABSTRACT

Background: Breast lesions are among the most common concerns presenting in surgical outpatient departments, often accompanied by anxiety over potential malignancy. Fine needle aspiration cytology offers a safe, reliable, and efficient diagnostic procedure that minimizes patient discomfort while providing rapid results.

Materials and Methods: This hospital-based descriptive study was conducted in the Department of Pathology at Nepal Medical College Teaching Hospital over one year (August 2023 to July 2024) following ethical approval from the Institutional Review Committee. A total of 94 patients presented with breast lesions were included in the study. Cytology samples were collected through fine needle aspiration cytology, which was performed on each patient after obtaining written consent. The data was then entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 17.0.

Results: A total of 94 cases were enrolled in this study. The highest occurrence of breast lesions was observed in the 31–40 years age group. Benign breast lesions were more common in younger individuals, while malignant lesions were predominantly seen in older age groups. Benign breast lesions were more common in the left breast and the upper outer quadrant was the most commonly affected site. Out of 94 breast lumps, 11 cases (11.7%) were malignant and 83 (88.2%) cases were benign.

Conclusion: Fine needle aspiration cytology serves as a secure and easy method for diagnosing breast lesions with minimal invasiveness.

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INTRODUCTION

Breast lumps are the most common findings in females and can occur in all age groups. Fine needle aspiration cytology (FNAC) is the simplest, most cost-effective, non-invasive, and rapid diagnostic technique for evaluating breast lumps or lesions. Clinical diagnosis of palpable breast lumps is often misleading.[1] FNAC is conducted as an outpatient procedure, as it requires no specialized equipment, causes minimal morbidity, and is highly acceptable to patients. The primary goal of FNAC for breast lumps is to confirm the presence of cancer preoperatively and to prevent unnecessary surgeries

in certain benign conditions.[2]

The "triple assessment," comprising clinical evaluation, radiological imaging, and pathological diagnosis, is the most widely accepted protocol for diagnosing breast lesions. FNAC plays a crucial role in this approach. A key objective of FNAC is to distinguish between benign and malignant lesions.[3] Common benign lesions are fibroadenoma, fibrocystic disease, cysts, adenoma, intraductal papilloma, traumatic fat necrosis, fat degeneration, and serous cystadenoma. Additionally, others include mesenchymal neoplasms such as lipoma and granular cell myoblastoma. Various studies have reported that FNAC has a sensitivity ranging from 80% to 98% and a specificity exceeding 99%.[4-5] FNAC for diagnosing palpable breast lesions was first introduced by Martin and Ellis in 1930, and has since become a crucial tool in the evaluation of breast lesions.[6] Most breast lesions are benign however malignant breast lesions though not very common, receive significant attention. Breast cancer is the most common malignancy in women in Western countries but benign breast lesions are more prevalent than malignant ones.[7]

Breast carcinoma is the second most common malignant neoplasm in India and a leading cause of morbidity and mortality in women.[8,9] Approximately 75,000 new cases of breast cancer are diagnosed in India each year.[10] A palpable breast lump is one of the most common presentations in patients with breast pathology, encompassing both benign and malignant causes.[11] The tumors originate from ductal, glandular structures, and mesenchymal connective tissues.[12] The rising cases of breast cancer are associated with factors such as late marriage, delayed childbirth, shorter durations of breastfeeding, and nulliparity or low parity.[13]

This study aims to evaluate and find out the types of breast lesions on cytology.

MATERIALS AND METHODS

This hospital-based descriptive study was conducted in the Department of Pathology at Nepal Medical College Teaching Hospital (NMCTH) over a period of one year (August 2023 to July 2024). Ethical approval was obtained from the Institutional Review Committee of NMCTH, and informed written consent was collected from participants for the study. All patients with breast lesions attending the surgery OPD of NMCTH were included. Patients were asked about detailed clinical history which was recorded in the proforma. Size, shape, numbers, and consistency of the palpable mass (if any) were recorded. FNAC was done. Afterward, the nature of the aspirated material was noted. The content was expressed on clean, grease-free glass slides and smears were made by applying gentle pressure with another glass slide. The slide was then alcohol fixed for Papanicolau stain (minimum 2 slides) and air-dried for Giemsa stain (minimum 2 slides). The stained slides were then mounted with DPX (Distyrene, Plasticizer, Xylene) and

examined under the microscope. The microscopic findings and all the data were entered in Microsoft Excel 2019 and analyzed using the student version of SPSS software version 17.

RESULTS

In this study, 94 patients with breast lesions underwent FNAC. The age of the patients ranged from 16 to 79 years, with a mean age of 40.28 ± 14.85 years. Breast lesions were most prevalent in the 31-40 years age group with 30 cases (31.91%), whereas the lowest number of cases was seen in the age group 61-70 with 5 cases (5.31%). Among 94 cases, the highest number of malignancies was seen in the age group 51-60 years and 41-50 years with 3 cases (3.19%) in each age group. Similarly, the highest number of benign cases were observed in the 31-40 years age group, with 28 cases (29.78%). The correlation between age group and FNAC findings concerning benign and malignant lesions was not statistically significant (p=0.420). (Table 1)

Table 1: Distribution of breast lesion based on age group (n=94)

Age (years)	Breast lesions		Number of cases (n %)	Mean ± S.D (years)	p-value
	Benign	Malignant			
≤20	6 (6.38%)	0 (0.00%)	6 (6.38%)		
21-30	17 (18.05%)	2 (2.12%)	19 (20.21%)		
31-40	28 (29.78%)	2 (2.12%)	30 (31.91%)		
41-50	15 (15.95%)	3 (3.19%)	18 (19.14%)	40.28 ±	0.420
51-60	7 (7.44%)	3 (3.19%)	10 (10.63%)	14.856	
61-70	5 (5.31%)	0 (0.00%)	5 (5.31%)		
>70	5 (5.31%)	1 (1.06%)	6 (6.38%)		
Total	**83 (88.29%)**	**11 (11.70%)**	**94 (100.00%)**		

Out of the total 94 cases, 91 were female patients (96.80%), while 3 cases were male patients (3.19%). All the 11 cases (11.70%) of malignant lesions were observed in female patients. Three male patients (3.19%) with breast lesions were diagnosed with gynecomastia. The distribution of breast lesions based on gender showed a p-value of 1.000 which is statistically insignificant. (Table 2)

Table 2: Distribution of breast lesion based on gender (n=94)

Sex	Breast lesions		Number of cases (n %)	p-value
	Benign	Malignant		
Male	3 (3.19%)	0 (0.00%)	3 (3.19%)	1.000
Female	80 (85.10%)	11 (11.70%)	91 (96.80%)	
Total	**83 (88.29%)**	**11 (11.70%)**	**94 (100.00%)**	

Breast lesions were more common in the left breast (61 cases, 64.89%) than in the right breast (23 cases, 24.46%). Ten patients (10.63%) had bilateral lesions. The ratio of left to right breast is 2.6:1.

Breast lesions were common in the upper outer quadrant

(70 cases, 74.46%). There were 15 cases (15.95%) in the upper inner quadrant, 5 cases (5.31%) in the lower outer quadrant, and 2 cases (2.12%) in the lower inner quadrant and subareolar region each.

In fibroadenomas and fibrocystic changes, the consistency was mainly firm. Breast lesion with hard consistency was seen in malignancy. Among 83 benign cases, 63 cases (67.02%) had firm consistency, 16 cases (17.02%) had soft consistency and 4 cases (4.25%) had hard consistency. Out of 11 malignant cases, 7 cases (7.44%) had hard consistency, 3 cases (3.19%) had firm consistency and 1 case (1.06%) had soft consistency. The correlation between FNAC findings and breast lesion consistency in benign and malignant cases was statistically significant, with a p-value of 0.000. (Table 3)

Out of the total 94 cases, 84 breast lesions (89.36%) were mobile which includes, 82 (87.23%) benign and 2 (2.12%) malignant cases. Among the 10 cases of non-mobile breast lesions, 1 case (1.06%) was found to be benign, and 9 cases (9.57%) were malignant. Most malignant diseases were seen in breast lesions that were fixed to the underlying tissue. The correlation between lesion mobility/fixity and their benign or malignant nature was highly significant, with a p-value of 0.002, indicating a strong association. (Table 3)

Among 94 cases, 70 patients (74.46%) had non-tender lesions, which include, 62 (65.95%) benign and 8 (8.51%) malignant cases. Out of the 24 cases of tender breast lesions, 21 cases (22.34%) were benign and 3 cases (3.19%) were malignant. The type of breast lesion in relation to tenderness yielded a non-significant outcome, with a p-value of 1.000. (Table 3)

Table 3: Association of different variable with breast lesion(n=94)

Variables		Breast lesions		Number of cases (n %)	p-value
		Benign	**Malignant**		
	Firm	63 (67.02%)	3 (3.19%)	66 (70.21%)	
Consistency	Soft	16 (17.02%)	1 (1.06%)	17 (18.10%)	0.000
	Hard	4 (4.25%)	7 (7.44%)	11 (11.70%)	
Mobility	Mobile	82 (87.23%)	2 (2.12%)	84 (89.36%)	
	Non - mobile	1 (1.63%)	9 (9.57%)	10 (10.63%)	0.002
Tenderness	Tender	21 (22.34%)	3 (3.19%)	24 (25.53%)	
	Non tender	62 (65.95%)	8 (8.51%)	70 (74.46%)	1.000

Of the 94 patients, 83 cases (88.29%) were benign, while 11 cases (11.70%) were malignant. The most prevalent finding was fibroadenoma, which accounted for 46 cases (48.93%). 18 cases (19.14%) were diagnosed with inflammatory lesions which included acute mastitis, subareolar abscess, granulomatous mastitis, and acute on chronic mastitis. Fibroadenoma with fibrocystic changes and fibrocystic changes included 6 cases (6.38%) each. Fat necrosis and

gynecomastia include 4 cases (4.25%) and 3 cases (3.19%) respectively. Among the malignant lesions, 8 cases (8.51%) were suggestive of malignancy and 3 cases (3.19%) were suspicious of malignancy. (Table 4)

Table 4: Distribution of breast disease (n=94)

FNAC diagnosis		Number of cases (n %)
Benign	Fibroadenoma	46 (48.93%)
	Inflammatory lesion	18 (19.14%)
	Fibroadenoma with fibrocystic change	6 (6.38%)
	Fibrocystic changes	6 (6.38%)
	Fat necrosis	4 (4.25%)
	Gynecomastia	3 (3.19%)
Malignant	Breast carcinoma	8 (8.51%)
	Suspicious for malignancy	3 (3.19%)
Total		**94 (100.00%)**

DISCUSSION

The age of the patients ranged from 16 to 79 years, with a mean age of 40.28 ± 14.856 years. Breast lesions were most prevalent (30 cases, 31.91%) in the age group of 31- 40 years. In contrast to this finding, a distinct finding was seen in a study conducted by Pandia et al.[14] where the highest cases (28%) were found in the 40-50 years age group. In a study done by Mitra et al.[15], there was a wide age range of 15 to 69 years in patients with breast lesions, and the majority (36.8%) were in the age group 30-40 years which was similar to our study. Hussain et al.[16] found that the bulk of their patients presenting with breast lesions were in the age group 31-50 years.

Most of the malignant lesions (3 cases, 3.19%) were seen in patients age group 41-50 years and 51-60 years. The highest number of benign breast lesions was observed in the age group of 31-40 years, with 28 cases (29.79%). This correlates well with the findings seen in a study conducted by Khemka et al.[17] In their study, they observed that benign lesions were more prevalent in the age group 30-40 years (20%), while malignant lesions were higher in the age group 41-50 years (14%). Similarly, a study by Abad-Licham et al.[18] found a higher prevalence of benign lesions in the 20-29 years age group (53.1%) and a greater occurrence of malignant lesions in the 50-59 years age group (58.60%).

There were 91 female (96.80%) out of 94 cases and all the malignant lesions (11 cases, 11.70%) were seen in these female patients. There were 3 (3.19%) male patients and all were diagnosed with gynecomastia. Studies have shown that gynecomastia is common in male patients presenting with breast lesions. Its prevalence ranges from 51.2% to 100% across different continents.[17-19]

Breast lesions showed a higher prevalence in the left breast (61 cases, 64.89%) compared to the right breast (23 cases, 24.46%), resulting in a left-to-right ratio of 2.6:1. This

finding is similar to a study done in South India, where left breast lesions were predominant.[20] However, in a study done by Mahadani et al.[19] there was more involvement of the right breast (53.08%) than the left breast (31.75%).

In this study, breast lesions were most frequently located in the upper outer quadrant (70 cases, 74.46%), followed by the upper inner quadrant (15 cases, 15.95%). This observation is similar to the result of Rocha et al.[21] and Hussain et al.[16] where a majority of breast lesions were seen in the upper outer quadrant.

Breast lesions with hard consistency were frequently associated with malignancy while breast lesions with firm and soft consistency are usually benign. In this study, there were 11 cases (11.70%) with hard consistency, 66 cases (70.21%) with firm consistency, and 17 cases (18.10%) with soft consistency. A similar observation was seen in two other studies, where patients with hard breast lesions were more malignant. [21-22]

In this study, most of the breast lesions are mobile (84 cases, 89.36%) and it is seen that the majority of these cases are benign. Similar findings were seen in studies done by Zhu et al [23] and Rahman et al [24] where benign lesions were mobile and most of the malignant breast lesions were fixed to the underlying tissue.

Out of 94 cases, 70 cases (74.46%) were non-tender and 24 cases (25.53%) were tender. Two studies done in different parts of India, by Umat et al.[25] showed that non-tender breast lesions were more common. These findings correlate very well with the findings of our study where most of the benign cases, were non-tender.

There were 83 benign cases (88.29%) and 11 malignant cases (11.70%) on FNAC. The most common finding among the benign lesion was fibroadenoma (46 cases, 48.93%) which was similar to studies done by Khanam et al.[26] and Aslam et al.[27] Their studies showed that fibroadenoma was the most common benign breast lesion. However, in contrast to these findings, Jayaram et al.[28] showed fibrocystic disease (39.8%) as the most common benign lesion in their study. In this study, inflammatory breast lesion was another important finding comprising 18 cases (19.14%). Inflammatory lesions include acute mastitis, subareolar abscess, acute on chronic mastitis, and granulomatous mastitis. This goes hand in hand with the finding in a study done by Bukhari et al.[29] where 85 (20%) cases of breast lesions were inflammatory.

FNAC shows high diagnostic accuracy when performed by experienced cytopathologists. It is a reliable technique for distinguishing benign from malignant breast lesions.[7] Apart from being accurate, FNAC has advantages like minimal invasiveness, minimal discomfort, cost-effectiveness, and rapidity of results. FNAC is therefore an extremely important basic tool in the evaluation of breast lesions especially in resource-limited settings.[30]

CONCLUSIONS

Fine needle aspiration procedure is a safe and minimally invasive procedure carried out in any breast lesion. Results can be obtained in a short period hence better treatment modality can be opted before surgical intervention.

CONFLICT OF INTEREST: None

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