



Role of FNAC in Breast Lesions and its Correlation with Histopathology

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Abstract

Background: Fine needle aspiration cytology (FNAC) is a widely accepted diagnostic test performed routinely on palpable breast lesions. It is a relatively easy, simple, economical, rapid, minimally invasive diagnostic method which obviates the need for surgery. The aim of this study was to evaluate the role of FNAC in breast lesions and correlate with biopsy results.

Methods: This is a retrospective study conducted in the department of pathology, B&B Hospital, Nepal over a period of three years. A total of 90 breast aspirates were studied. Histopathological correlation was obtained in 49 cases.

Results: Benign breast lesions were found in 49 (54.4%) cases among which fibroadenoma was the commonest lesion. There were 35 (40%) malignant cases, 2(2.2%) suspicious for malignancy, 2(2.2%) indeterminate and 2(2.2%) unsatisfactory on FNAC. All indeterminate and suspicious for malignancy cases were diagnosed as carcinoma on biopsy. Three cases were misdiagnosed as benign on FNAC among which one was diagnosed as non hodgkin lymphoma and others as invasive breast carcinoma (IBC) on biopsy. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of FNAC in breast lesions were 90.6%, 100%, 100% and 78.57% respectively.

Conclusions: FNAC is a valuable and reliable diagnostic tool in breast lesions. However, in clinically suspicious cases and diagnostic challenging cases, biopsy evaluation must be performed.

Keywords: Breast; benign; FNAC; lymphoma of breast; malignant.

Introduction

A palpable breast lump is a common health problem in females and is associated with great anxiety and stress. Any palpable breast lesion is perceived as malignancy by the patients leading them to seek early medical attention. Majority of breast lumps are benign; however, it is difficult to determine whether the lesion is benign or malignant by performing a clinical examination.^{1,2,3} Breast cancer is the most commonly diagnosed cancer and leading cause of cancer death in females.⁴

FNAC is a widely accepted diagnostic test performed routinely on palpable lesions of body.^{5,6,7,8} It is a relatively easy, simple, economical, rapid, minimally invasive diagnostic method which obviates the need for surgery.^{9,10} It has a significant role in pre-operative diagnosis of breast lesions which in conjunction with clinical and radiological assessment is referred to as triple assessment.^{1,11,12} The main role of FNAC is to differentiate benign lesions that are managed conservatively from the malignant ones which require aggressive treatment.^{13,14}

Methods

This is a retrospective study conducted in the Department of Pathology, B&B hospital, Nepal over the duration of 3 years from June 2018 to May 2021. All the patients who had FNAC of breast lumps over this period were included in the study. The patients with diagnosed breast cancer on treatment and recurrent breast carcinoma were excluded from the study.

FNAC was performed by pathologists using a 10ml syringe with 23 G needle. The aspirate was smeared on labelled slides and stained with papanicolaou and giemsa stain. FNAC diagnosis was given in the following categories:

- 1) Unsatisfactory: Aspirates with dense haemorrhage or acellular were kept under this category.
- 2) Benign: It included inflammatory conditions (acute mastitis, granulomatous mastitis and abscess), fibroadenoma, fibrocystic changes, benign breast disease and benign cystic lesions.
- 3) Atypical/Indeterminate: It included proliferative breast disease with atypia. Biopsy evaluation was recommended in these cases.

4) Suspicious for malignancy: When the cellular changes were strongly suggestive of carcinoma but were not definite for malignancy, this category was used and biopsy evaluation was recommended.

5) Malignant: When the cellular findings were those of malignancy, this category was used.

Cyto-histological correlation was done wherever biopsy was available. Statistical analysis was done by SPSS version 20.

Results

FNAC was carried out on 90 patients with breast lesions at a tertiary care hospital of Nepal. The age of the patient ranged from 17-78 years. Age distribution of the cases is shown in Table 1. This study documented that breast lesions were more common in the fourth decade of life. There were 88 female patients and 2 male patients. Left sided breast lesions (67.7%) were more common than right sided ones (32.3%). Majority of breast lesions were located in the upper and outer quadrant of the left breast.

Cytological diagnosis was categorised as unsatisfactory, benign, atypical/ indeterminate, suspicious for malignancy and malignant lesions. Cytological diagnosis of cases is shown in Table 2. Among 90 patients, tissue biopsy was done in 49 cases giving a biopsy rate of 54.4%. The most common cytological diagnosis was benign (54.4%) followed by malignant lesions (40%) (Figure 2). Among the benign lesions, the maximum number of cases was of fibroadenoma and occurred mostly in women of age group 21-30 years.

There were three cases with cyto-histopathological discrepancy. Out of three, one was interpreted as suppurative mastitis on FNAC which turned out to be NHL on biopsy. The other two were reported as fibrocystic disease on cytology which ended up as invasive breast carcinoma no special type (IBC-NST) on tissue diagnosis (Figure 3).

Two cases were unsatisfactory on evaluation in cytology which came out to be benign on biopsy. There were two cases reported as atypical/indeterminate (Figure 1) and another two cases as suspicious for malignancy and all were confirmed as malignant lesions on histopathology.

IBC-NST was the most common histological subtype of breast carcinoma. Other subtypes include IBC-NST with medullary pattern, mixed IBC and micropapillary carcinoma, mixed IBC and cribriform carcinoma, invasive micropapillary carcinoma (Figure 4), metaplastic carcinoma, mucinous carcinoma

and lobular carcinoma. There was one case of NHL of breast which on immunohistochemistry revealed anaplastic large cell lymphoma (ALCL), anaplastic lymphoma kinase + (ALK).

Statistical analysis showed sensitivity of 90.6%, specificity of 100% of FNAC in breast lesions with PPV and NPV being 100% and 78.57% respectively.

Age Group	Frequency
<20	5(5.6%)
21-30	8(8.8%)
31-40	23(25.5%)
41-50	29(32.3%)
51-60	14(15.5%)
61-70	6(6.7%)
71-80	5(5.6%)
Total	90(100%)

Table 1.Age distribution of patients with breast lesions

Categories	Frequency
Unsatisfactory	2(2.2%)
Benign	49(54.4%)
Atypical/Indeterminate	2(2.2%)
Suspicious for malignancy	2(2.2%)
Malignant	35(40%)
Total	90 (100%)

Table 2.Categorization of breast lesions on cytology

Categories	Frequency
Granulomatous mastitis	7(14.3%)
Suppurative mastitis	3(6.2%)
Fibroadenoma	18(36.7%)
Fibrocystic disease	8(16.3%)
Benign breast disease	10(20.4%)
Benign cystic disease	2(4.1%)
Gynecomastia	1(2%)
Total	49(100%)

Table 3. Benign breast lesions on cytology

Cytology	Biopsy	
	Benign	Malignant
Unsatisfactory	2	0
Benign	11	3
Atypical/Indeterminate	0	2
Suspicious for malignancy	0	2
Malignant	0	29
Total	13	36

Table 4. Correlation of cytological and histological diagnosis

Malignant lesions	Total cases
IBC-NST	25(70%)
Mixed IBC-NST & micropapillary carcinoma	2(5.5%)
IBC-NST with medullary pattern	2(5.5%)
Metaplastic carcinoma	2(5.5%)
Micropapillary carcinoma	1(2.7%)
Mixed IBC-NST & cribriform carcinoma	1(2.7%)
Mucinous carcinoma	1(2.7%)

Lobular carcinoma	1(2.7%)
NHL	1(2.7%)
Total	36(100%)

Table 5.Malignant breast lesions on biopsy

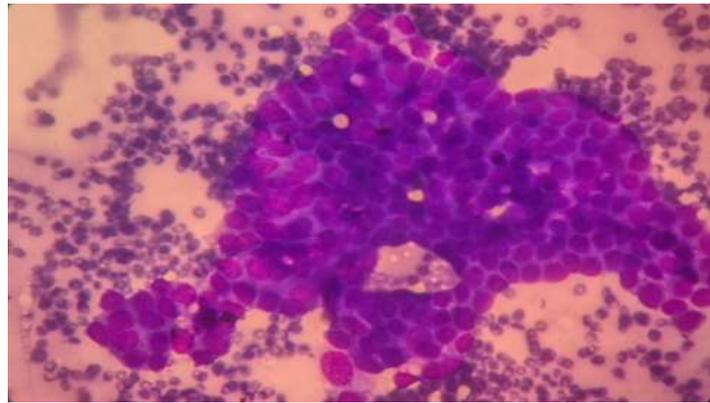


Figure 1.Cytological smear showing atypical ductal cells.

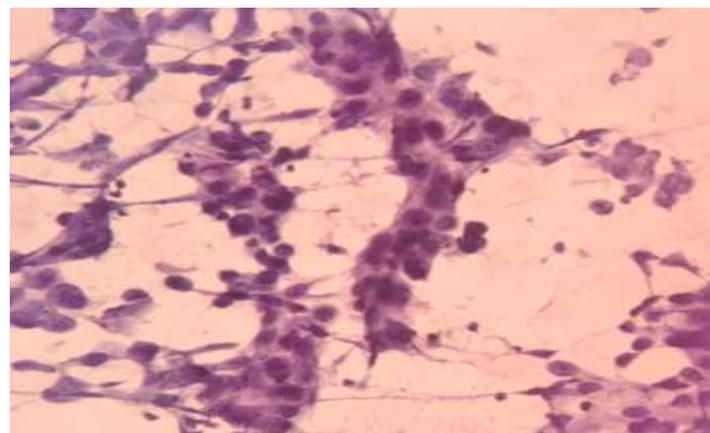


Figure 2.Malignant cells in cytology

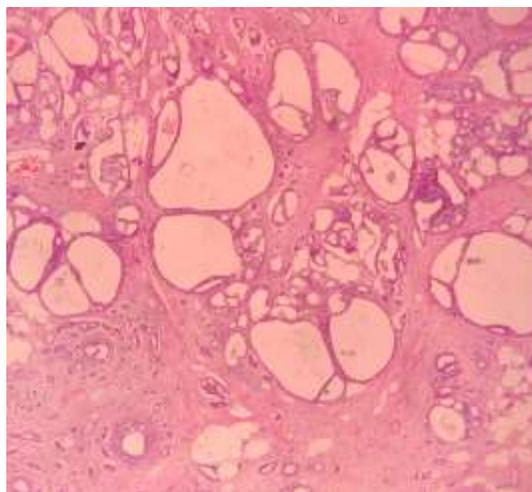


Figure 3. Invasive breast carcinoma of no special type with fibrocystic changes

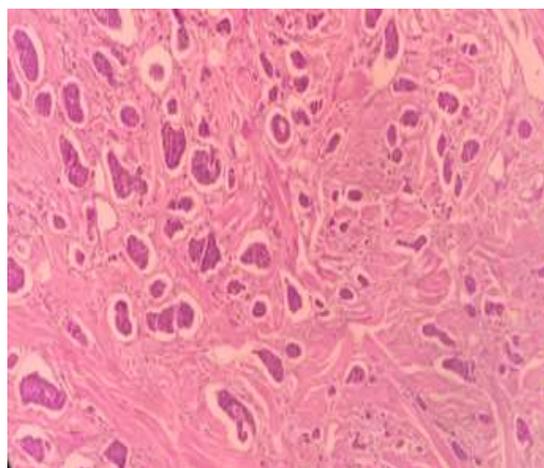


Figure 4. Invasive micropapillary carcinoma

Discussion

In the present study, breast lesions were more common in 41-50 years which is similar to study conducted by Mohan et al.⁵ Left breast was commonly involved than right breast which is in contrast to other studies.^{2,3,7} However, Mohan et al, Siddegowa et al and Risaldar et al found left breast lesions more common than right. ^{5, 8,9} There was significant female preponderance in this study.

Maximum number of cases (54.4%) belonged to benign category on FNAC which is consistent with other studies.^{1,2,3,6, 10,14} In contrast to our study, Mohan et al reported malignant lesions as the most common finding.⁵ Of the benign lesions, majority of cases were of fibroadenoma (36.7%) which was common among women of second decade in agreement with other studies.^{2, 6,12,13}

All 29 cytologically diagnosed malignant cases were confirmed on subsequent biopsy evaluation. Therefore, it showed 100% cyto-histological correlation in malignant lesions which is similar to studies done by Panjavani et al, Tiwari et al and Zhang et al .1,15,16 The most common malignant lesion on histopathological examination was IBC-NST which is comparable to many other observations.2,6,8,9,10,17 A single case of male breast carcinoma with excellent cyto-histological correlation was also seen in our study comparable to other studies. 12

There were 2 cases diagnosed as suspicious for malignancy which was confirmed on histopathological examination. Many have mentioned that cases diagnosed as suspicious for malignancy on FNAC showed increase in rate of malignancy on biopsy.1,5 Two cases which showed some degree of atypia with indeterminate features for definite opinion later confirmed as malignant on biopsy. One was diagnosed as lobular carcinoma on core needle biopsy and other as mixed IBC-NST and cribriform carcinoma on lumpectomy.

Three cases that were diagnosed as benign on FNAC showed discordant findings on biopsy. One case was misinterpreted as suppurative mastitis on cytology which on histopathology showed sheets of atypical cells with areas of necrosis and suppuration. It was diagnosed as NHL with immunohistochemical findings of ALCL, ALK+. Breast is a very uncommon site of extranodal lymphoma which comprises of 2.2% of all extranodal lymphomas.18,19 Majority of them are of B cell phenotype with Diffuse Large B Cell Lymphoma being the most common subtype.20,21 Therefore, our study highlights a rare case of breast lymphoma of T cell type (ALCL, ALK+). Few studies have reported that neutrophil rich variant of ALCL can mimic abscess on cytology and may pose diagnostic confusion.22

Other two cases were under-diagnosed as fibrocystic lesions by FNAC which turned out to be IBC- NST. One of the patients presented with a small breast lump and nipple retraction. FNAC was attempted multiple times and USG guided aspiration was also performed. The misinterpretation in FNAC could be attributed to the cystic nature of the lesion. Therefore, in such cystic lesions with suspicious clinical findings, biopsy evaluation is highly recommended.2,12 Breast lesions with many overlapping features could be one of the reasons for false negativity on FNAC.3 The false negativity rate ranges from 1-8% according to different studies.1,15 Other factors like small size of tumour, histologic tumours with low nuclear grades (invasive lobular carcinoma, tubular carcinoma, and papillary carcinoma), inadequate sampling and hypocellularity due to desmoplastic reaction could be other reasons.2,7,12,13

In our study, sensitivity, specificity, PPV and NPV of breast FNAC were 90%, 100%, 100% and 78.5% respectively. The specificity and PPV were 100% with no false positive case which is in agreement with many other studies.^{1,2,8,9,12} According to literature, sensitivity of FNAC in breast lesions ranges from 80-98% and specificity may be reached up to 100%.^{3,14} A meta-analytical study by Akcil et al. noted 72-90% diagnostic accuracy of FNAC.²³ Therefore, FNAC is considered a reliable and useful initial method of pathological assessment for palpable breast lesions.

Conclusions

Our study concludes that FNAC is a reliable diagnostic test in palpable breast lesions. It is an economic, safe, sensitive, specific, rapid and minimally invasive technique which helps to maximise the pre-operative diagnosis and guides the clinicians in planning accurate management. However, the potential pitfall of FNAC must always be considered and correlated with clinical and radiological findings. In clinically suspicious cases and diagnostic challenging cases, biopsy evaluation must be performed.

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