Cytopathological Patterns of Palpable Breast Lumps on Fine Needle Aspiration - A Hospital Based Study

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ABSTRACT

BACKGROUND

The breast is composed of both specialised epithelial cells and stroma. Both benign and malignant lesions can occur in the breast as a palpable lump. Fine needle aspiration cytology (FNAC) is a rapid, easy to perform, minimally invasive and low cost first line high-diagnostic accuracy test for cytopathological evaluation of palpable breast lump with minimum complications.

METHODS

The study was carried out to evaluate the cytopathological patterns of 2706 palpable breast lumps by fine needle aspiration (FNA) procedure and cytohistopathological correlation of the available biopsied palpable breast lumps of the study in the Pathology department of Tezpur Medical College and Hospital, Assam, for a period of three years from July 01, 2016 to June 30, 2019.

RESULTS

Out of 2706 palpable breast lumps in the study, FNA smears of 19 (0.70 %) were inadequate for cytopathological reporting. Out of the remaining 2687 palpable breast lumps where FNA was adequate for cytopathological reporting, female patients (n = 2594) comprised 96.54 % and male patients (n = 93) comprised 3.46 % with a male and female ratio of 1:27.9. Out of the 2687 palpable breast lumps, 2318 were benign breast diseases (86.27 %) and 369 were malignant neoplasms (13.73 %), with a benign and malignant ratio of 6.28:1. Out of the benign breast lumps, fibroadenoma breast was seen in 1228 (52.98 %) and of the malignant neoplasms, infiltrating duct carcinoma was seen in 341 (92.41 %). Cytohistopathological correlation showed 98.70 % sensitivity, 99.38 % specificity, 99.35 % positive predictive value, 98.76 % negative predictive value, and 99.04 % diagnostic accuracy.

CONCLUSIONS

FNAC has high sensitivity and specificity in cytopathological diagnosis of palpable breast lumps. Based on the accurate cytopathological diagnosis of the palpable breast lumps, patients with palpable breast lumps can be given adequate treatment.

KEYWORDS

Fibroadenoma, Gynaecomastia, Duct Papilloma, Infiltrative Duct Carcinoma, Medullary Carcinoma, Mucinous Carcinoma, Malignant Phyllodes

BACKGROUND

Breast is composed of both specialised epithelial cells and stroma. Both benign and malignant lesions can occur in the breast. A breast lesion usually clinically presents as a palpable breast lump. A palpable breast lump, whether benign or malignant, is a cause of anxiety to patients. But it is fortunate that the majority of the palpable breast lumps prove to be benign breast lumps.[1] The term benign breast diseases include a wide variety of breast lesions like developmental abnormalities, inflammatory lesions, epithelial and stromal proliferative lesions and neoplasms. The incidence of benign breast lump is common in the age group of 21 - 40 years.[2] The commonest clinical presentation of breast cancer is also breast lump. In India, breast cancer is the second most common malignancy in women after cervical cancer and is detected in 20 per 100,000 women.[3,4] As per population based cancer registry data, location wise, Bengaluru (also known as Bangalore) ranks the top most position in India (age adjusted incidence rate or AAA per 100,000 population being 36.65 %) and in the North-East region, Aizawl recorded maximum number of cases (30.30 %).[5]

Breast cancer is also the most common cause of cancer death among women. In India, the incidence of breast cancer has increased by more than 20 % while mortality rate due to breast cancer has increased by 145 % due to rapid urbanisation, changes in lifestyle and increased life expectancy. The risk factors for breast cancer include low parity, low age at first childbirth, late menopause, etc. The incidence of breast cancer is highest in the age group of 41 - 60 years.

With growing awareness in the general population, a lady with a palpable breast lump is one of the commonest presentations in outpatient department in a hospital. Fine needle aspiration cytology is a relatively painless, low risk of complications, rapid, easy to perform, minimally invasive and low cost first line high diagnostic accuracy test for cytomorphological evaluation of palpable breast lumps.[6] The breast lumps are easily accessible for fine needle aspiration procedure due to its superficial location. The accurate cytopathological diagnosis of palpable breast lumps is helpful for diagnosis of benign breast lesions to avoid unnecessary surgical interventions like diagnostic excisional or incisional biopsy. Moreover, the accurate cytopathological diagnosis of palpable breast lumps can direct the treatment modalities of breast lesions and reduce unnecessary mastectomies. The study was undertaken to evaluate the cytopathological patterns of palpable breast lumps by fine needle aspiration procedure and to correlate cytopathological and histopathological diagnosis of the available palpable breast lumps of the study group.

METHODS

The study was carried out on 2,706 patients of all age groups, irrespective of sex, who presented with palpable breast lumps for FNAC analysis of the breast lesions in the cytopathology section of Pathology Department of Tezpur Medical College and Hospital, Assam, in a period of 3 years from July 01, 2016 to June 30, 2019 (study group). Fine needle aspiration was done on the palpable breast lumps to collect the materials for cytopathological evaluation using 23 / 24 gauge disposable needles attached with 10 / 20 ML airtight disposable syringes as per standard operative procedure (SOP). The FNA materials were collected by to and fro motions applying negative pressure. The FNA procedures were performed after detailed clinical history, physical examination and basic investigations of the patients. The aspirated materials from the palpable breast lumps were smeared onto clean grease free glass slides; air dried smears for May-Grunwald Giemsa (MGG) staining and 95 % alcohol fixed smears for Papanicolaou staining. Ziehl-Neelsen staining was performed where required. In case of cystic breast lumps, after aspiration of fluids from the cysts, the breast lumps were again aspirated for materials. The aspirated fluids were centrifuged, and smears were made from sediments. The cytopathological diagnosis of the palpable breast lumps were done and recorded after cytopathological evaluation of the smears and proper clinical findings. The cytopathological diagnoses were correlated with histopathological diagnosis of the available 314 breast biopsy tissues of the palpable breast lumps of the study group that underwent biopsy interpretation in Tezpur Medical College and Hospital, during the study period.

The available 314 breast biopsy tissues of the palpable breast lumps of the study group that underwent biopsy interpretation during the study period were received in 10 % buffered formalin. The breast biopsy tissues included excision biopsies, incision biopsies, core needle biopsies, lumpectomy and mastectomy tissues. The breast biopsy tissues were observed grossly in the histopathology section of Pathology department of the institute and findings were noted in the note sheets. The biopsy breast tissues were then sectioned and processed in the conventional manner as described in the "Theory and Practice of Histological Techniques", 6th edition, 2002, edited by J.D. Bancroft and Marilyn Gamble. After completion of the processing, they were made in paraffin blocks and cut in rotatory microtome of about 3 – 5 micron thickness sections. The sections were stained by conventional haematoxylin and eosin staining, mounted in DPX and examined under microscope. Their special features were noted, and a histopathological diagnosis of the studied palpable breast lumps were correlated with their FNAC diagnosis.

Statistical Analysis
True Positive
These were the patients with malignant breast lumps, positive cytological results (malignant breast lumps) confirmed on histopathology.

True Negative
These were the patients without malignant breast lumps, negative cytological results (benign breast diseases) confirmed on histology.

False Positive

These were the patients diagnosed as malignant breast lumps (positive) on cytology but on histopathology the results turned out to be negative for malignancy.

False Negative

These were the patients diagnosed negative for malignancy (i.e., that were diagnosed as benign breast disease) on cytology but on histopathology turned out to be positive for malignancy (malignant breast lumps).

$$Sensitivity = \frac{True\ Positive\ \times 100}{True\ Positive\ + Flase\ Negative}$$

$$Specificity = \frac{True\ Negative\ \times 100}{True\ Negative\ + Flase\ Positive}$$

$$Positive\ Predictive\ Value = \frac{True\ Positive\ \times 100}{True\ Positive\ + Flase\ Positive}$$

$$Negative\ Predicitive\ Value = \frac{True\ Negative\ \times 100}{True\ Negative\ + Flase\ Negative}$$

$$Diagnostic\ Accuracy$$
$$= \frac{(True\ Positive + True\ Negative)\ \times 100}{True\ Positive\ + Flase\ Negative + True\ Negative + Flase\ Positive}$$
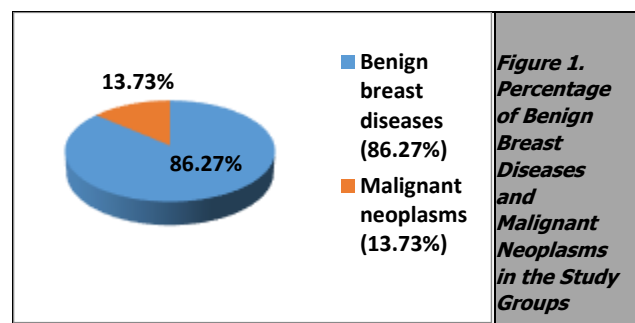
RESULTS

The study included a total of 2706 patients irrespective of age and sex who underwent FNAC evaluation of breast lesions presented with palpable breast lumps in the cytopathology section of Pathology Department of Tezpur Medical College and Hospital, during the study period. But, out of 2706 palpable breast lumps in the study, FNA smears of 19 (0.70 %) palpable breast lumps were inconclusive for cytopathological reporting either due to inadequate aspirated materials or haemorrhagic smears. So, the 19 palpable breast lumps in the study group were categorised as inconclusive and excluded from the study. Therefore, the actual study group consisted of the remaining 2687 palpable breast lumps where FNA was adequate for cytopathological reporting. In our study, female patients (n = 2594) comprised 96.54 % of palpable breast lumps, while male patients (n = 93) comprised only 3.46 % of palpable breast lumps with a male and female ratio of 1:27.9 in the study group. The Table 1 shows the age and sex distribution of patients with palpable breast lumps in the study group. The youngest patient in the study group was a 14-years-old girl diagnosed as fibroadenoma of breast and the oldest patient in the study group was a 72-years-old female diagnosed as infiltrating duct carcinoma breast. Maximum patients with palpable breast lumps, irrespective of sex in the study group were in the age group of 21 - 40 years (n = 1798; 66.91 %).

In the study, out of 2687 palpable breast lumps of the study group, majority were seen in the right side (n = 1395; 51.92 %) whereas in left side were (n = 1175; 43.73 %)

palpable breast lumps and bilateral were (n = 117; 4.35 %) palpable breast lumps. Depending on the cytopathological features of the adequate FNA smears for cytopathological reporting of 2687 palpable breast lumps in the study group were classified into two categories: benign breast diseases and malignant neoplasms. The distribution of cytopathological patterns of all the studied palpable breast lumps (n = 2687, 100.00 %) is shown in the Table 2.

Age Group (Years)	Male (Number & Frequency)	Female (Number & Frequency)	Total (Number & Frequency)
11 - 20	54 (2.01 %)	165 (6.14 %)	219 (8.15 %)
21 - 30	27 (1.01 %)	1014 (37.73 %)	1041 (38.74 %)
31 - 40	08 (0.30 %)	749 (27.87 %)	757 (28.17 %)
41 - 50	02 (0.07 %)	373 (13.89 %)	375 (13.96 %)
51 - 60	02 (0.07 %)	229 (8.53 %)	231 (8.60 %)
61 - 70	00 (0.0 %)	52 (1.94 %)	52 (1.94 %)
70 +	00 (0.0 %)	12 (0.44 %)	12 (0.44 %)
Total	**93 (3.46 %)**	**2594 (96.54 %)**	**2687 (100 %)**

Table 1. Age and Sex Distribution of Patients with Palpable Breast Lumps in the Study Groups

Figure 1. Percentage of Benign Breast Diseases and Malignant Neoplasms in the Study Groups

- Benign breast diseases (86.27%)
- Malignant neoplasms (13.73%)

Out of the 2687 palpable breast lumps in the study group, which had adequate FNA smears for cytopathological reporting, there were 2318 benign breast diseases (86.27 %) and 369 malignant neoplasms (13.73 %) with a benign breast lumps and malignant breast lumps ratio of 6.28:1 (Figure 1). Maximum number of cases were in the age group of 21 - 40 years in benign breast diseases (n = 1770; 65.87 %) and in the age group of 41 - 60 years (n = 295; 10.99 %) in malignant neoplasms (Table 3).

In the present study, most of the palpable breast lumps were neoplastic in origin (n = 1900; 70.71 %). Out of the benign breast diseases, fibroadenoma breast (n = 1228; 52.98 %) was the most significant lesions observed (Table 4) and of the malignant neoplasms, infiltrating duct carcinoma breast (n = 341; 92.41 %) was the most significant lesions observed (Table 5). Fibroadenoma breast (n = 780; 29.02 %) was seen mostly in the age group of 21 - 30 years in our study (Table 3).

The second common benign breast disease was fibrocystic disease of breast (n = 232; 10.01 %). The other benign breast diseases in the study group were acute mastitis (n = 72, 3.11 %), breast abscess (n = 181; 7.81 %), acute cystic lesions (n = 72; 3.11 %), gynaecomastia (n = 90; 3.88 %), granulomatous lesions (n = 32, 1.38 %, out of which AFB positive were n = 22; 0.95 %), benign proliferative lesions (n = 201; 8.67 %), benign phyllodes (n = 26, 1.12 %), duct ectasia (n = 07; 0.30 %), duct papilloma (n = 46; 1.98 %), galactocele (n = 43; 1.86 %), fat necrosis (n = 42; 1.81 %), epidermal cysts (n = 16; 0.69 %) and lipoma (n = 30; 1.29 %).

Cytopathology	Male (Number & Frequency)	Female (Number & Frequency)	Total (Number & Frequency)
(A) Benign breast diseases	**93 (3.46 %)**	**2225 (82.81 %)**	**2318 (86.27 %)**
1. Acute Mastitis	00 (0.00 %)	72 (2.68 %)	72 (2.68 %)
2. Breast abscess	00 (0.00 %)	181 (6.74 %)	181 (6.74 %)
3. Acute cystic lesions	00 (0.00 %)	72 (2.68 %)	72 (2.68 %)
4. Fibrocystic disease	00 (0.00 %)	232 (8.63 %)	232 (8.63 %)
5. Gynaecomastia	90 (3.35 %)	00 (0.00 %)	90 (3.35 %)
6. Granulomatous lesions	00 (0.00 %)	32 (1.19 %)	32 (1.19 %)
7. Fibroadenoma	00 (0.00 %)	1228 (45.70 %)	1228 (45.70 %)
8. Benign proliferative lesions	00 (0.00 %)	201(7.48 %)	201 (7.48 %)
8. Benign phyllodes	00 (0.00 %)	26 (0.97 %)	26 (0.97 %)
9. Duct ectasia	00 (0.00 %)	07 (0.26 %)	07 (0.26 %)
10. Duct papilloma	00 (0.00 %)	46 (1.71 %)	46 (1.71 %)
11. Galactocele	00 (0.00 %)	43 (1.60 %)	43 (1.60 %)
12. Fat necrosis	00 (0.00 %)	42 (1.56 %)	42 (1.56 %)
13. Epidermal cyst	00 (0.00 %)	16 (0.60 %)	16 (0.60 %)
14. Lipoma	03 (0.11 %)	27 (1.01 %)	30 (1.12 %)
(B) Malignant neoplasms	**00 (0.00 %)**	**369 (13.73 %)**	**369 (13.73 %)**
1. Infiltrating duct carcinoma	00 (0.00 %)	341 (12.69 %)	341 (12.69 %)
2. Medullary carcinoma	00 (0.00 %)	13 (0.48 %)	13 (0.48 %)
3. Mucinous carcinoma	00 (0.00 %)	09 (0.34 %)	09 (0.34 %)
4. Malignant phyllodes	00 (0.00 %)	06 (0.22 %)	06 (0.22 %)
Total	**93 (3.46 %)**	**2594 (96.54 %)**	**2687 (100 %)**

Table 2. Distribution of Cytopathological Patterns of Palpable Breast Lumps in the Study Groups

Cytopathology	Age Distribution in Years							Total
	11 - 20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70	70 +	
Acute mastitis	06 (0.22 %)	19 (0.71 %)	21 (0.78 %)	20 (0.75 %)	04 (0.15 %)	02 (0.07 %)	00 (0.00 %)	72 (2.68 %)
Breast abscess	10 (0.37 %)	48 (1.78 %)	61 (2.28 %)	46 (1.72 %)	12 (0.45 %)	02 (0.07 %)	02(0.07 %)	181 (6.74 %)
Acute cystic lesions	01 (0.04 %)	23 (0.86 %)	24 (0.89 %)	16 (0.59 %)	07 (0.26 %)	01 (0.04 %)	00 (0.00 %)	72 (2.68 %)
Fibrocystic disease	02 (0.07 %)	43 (1.58 %)	115 (4.28 %)	61 (2.30 %)	09 (0.33 %)	02 (0.07 %)	00 (0.00 %)	232 (8.63 %)
Gynaecomastia	54 (2.01 %)	26 (0.97 %)	06 (0.23 %)	02 (0.07 %)	02 (0.07 %)	00 (0.00 %)	00 (0.00 %)	90 (3.35 %)
Granulomatous lesion	05 (0.19 %)	14 (0.51 %)	05 (0.19 %)	04 (0.15 %)	03 (0.11 %)	01 (0.04 %)	00 (0.00 %)	32 (1.19 %)
Fibroadenoma	125 (4.65 %)	780 (29.02 %)	306 (11.40 %)	16 (0.59 %)	01 (0.04 %)	00 (0.00 %)	00 (0.00 %)	1228 (45.70 %)
Benign proliferative lesion	11 (0.41 %)	29 (1.08 %)	118 (4.39 %)	23 (0.86 %)	18 (0.66 %)	01 (0.04 %)	01 (0.04 %)	201 (7.48 %)
Benign phyllodes	00 (0.00 %)	01 (0.04 %)	10 (0.37 %)	12 (0.45 %)	03 (0.11 %)	00 (0.00 %)	00 (0.00 %)	26 (0.97 %)
Duct ectasia	00 (0.00 %)	01 (0.04 %)	02 (0.07 %)	03 (0.11 %)	01 (0.04 %)	00 (0.00 %)	00 (0.00 %)	07 (0.26 %)
Duct papilloma	00 (0.00 %)	01 (0.04 %)	12 (0.45 %)	18 (0.66 %)	10 (0.37 %)	05 (0.19 %)	00 (0.00 %)	46 (1.71 %)
Galactocele	02 (0.07 %)	25 (0.95 %)	14 (0.51 %)	02 (0.07 %)	00 (0.00 %)	00 (0.00 %)	00 (0.00 %)	43 (1.60 %)
Fat necrosis	01 (0.04 %)	12 (0.45 %)	18 (0.66 %)	08 (0.30 %)	02 (0.07 %)	01 (0.04 %)	00 (0.00 %)	42 (1.56 %)
Epidermal cyst	01 (0.04 %)	07 (0.26 %)	05 (0.19 %)	02 (0.07 %)	01 (0.04 %)	00 (0.00 %)	00 (0.00 %)	16 (0.60 %)
Lipoma	01 (0.04 %)	12 (0.45 %)	12 (0.45 %)	04 (0.14 %)	01 (0.04 %)	00 (0.00 %)	00 (0.00 %)	30 (1.12 %)
Infiltrating duct carcinoma	00 (0.00 %)	00 (0.00 %)	28 (1.03 %)	127 (4.73 %)	143 (5.34 %)	34 (1.26 %)	09(0.33 %)	341 (12.69 %)
Medullary carcinoma	00 (0.00 %)	00 (0.00 %)	00 (0.00 %)	07 (0.25 %)	05 (0.19 %)	01 (0.04 %)	00 (0.00 %)	13 (0.48 %)
Mucinous carcinoma	00 (0.00 %)	00 (0.00 %)	00 (0.00 %)	03 (0.11 %)	05 (0.19 %)	01 (0.04 %)	00 (0.00 %)	09 (0.34 %)
Malignant phyllodes	00 (0.00 %)	00 (0.00 %)	00 (0.00 %)	01 (0.04)	04 (0.14)	01 (0.04 %)	00 (0.00 %)	06 (0.22 %)
Total	**219 (8.15 %)**	**1041 (38.74 %)**	**757 (28.17 %)**	**375 (13.96 %)**	**231 (8.60 %)**	**52 (1.94 %)**	**12 (0.44 %)**	**2687 (100.00 %)**

Table 3. Distribution of Cytopathological Patterns of Palpable Breast Lumps in Different Age Groups in the Study Group

Benign Breast Diseases	Number	Frequency
Acute mastitis	72	3.11 %
Breast abscess	181	7.81 %
Acute cystic lesions	72	3.11 %
Fibrocystic disease	232	10.01 %
Gynaecomastia	90	3.88 %
Granulomatous lesions	32	1.38 %
Fibroadenoma	1228	52.98 %
Benign proliferative lesions	201	8.67 %
Benign phyllodes	26	1.12 %
Duct ectasia	07	0.30 %
Duct papilloma	46	1.98 %
Galactocele	43	1.86 %
Fat necrosis	42	1.81 %
Epidermal cyst	16	0.69 %
Lipoma	30	1.29 %
Total	**2318**	**100 %**

Table 4. Distribution of Cytopathological Patterns of the Palpable Breast Lumps amongst Benign Breast Diseases

Malignant Neoplasms	Number	Frequency
Infiltrating duct carcinoma	341	92.41 %
Medullary carcinoma	13	3.52 %
Mucinous carcinoma	09	2.44 %
Malignant phyllodes	06	1.63 %
Total	**369**	**100 %**

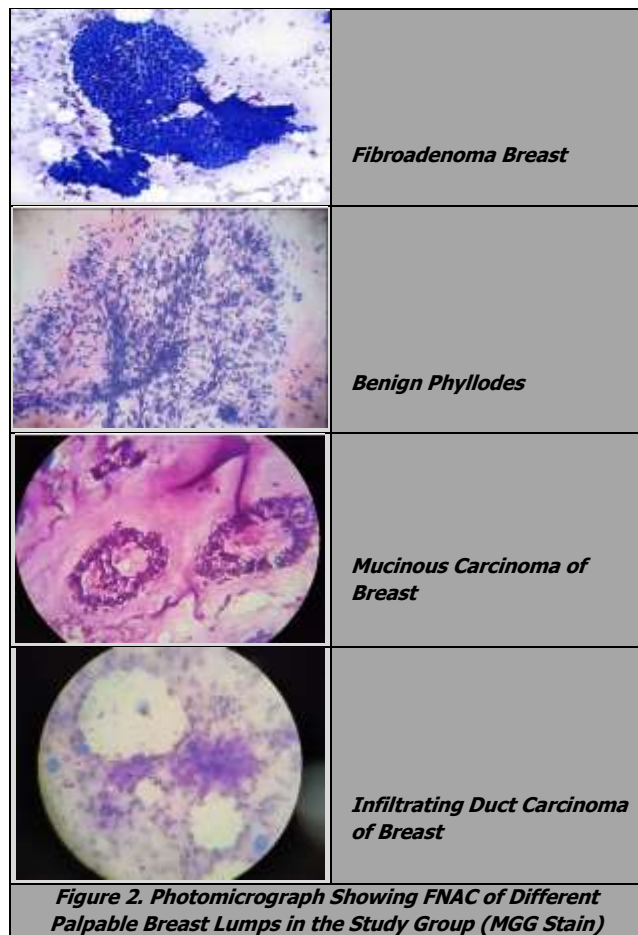*Table 5. Distribution of Cytopathological Patterns of the Palpable Breast Lumps amongst Malignant Neoplasms*

Out of 93 palpable male breast lumps, 90 (96.77 %) were gynaecomastia with increased incidence in teenage men. The other malignant neoplasms found in the study were medullary carcinoma (n = 13; 3.52 %), mucinous carcinoma (n = 09; 2.44 %) and malignant phyllodes (n = 06, 1.63 %).

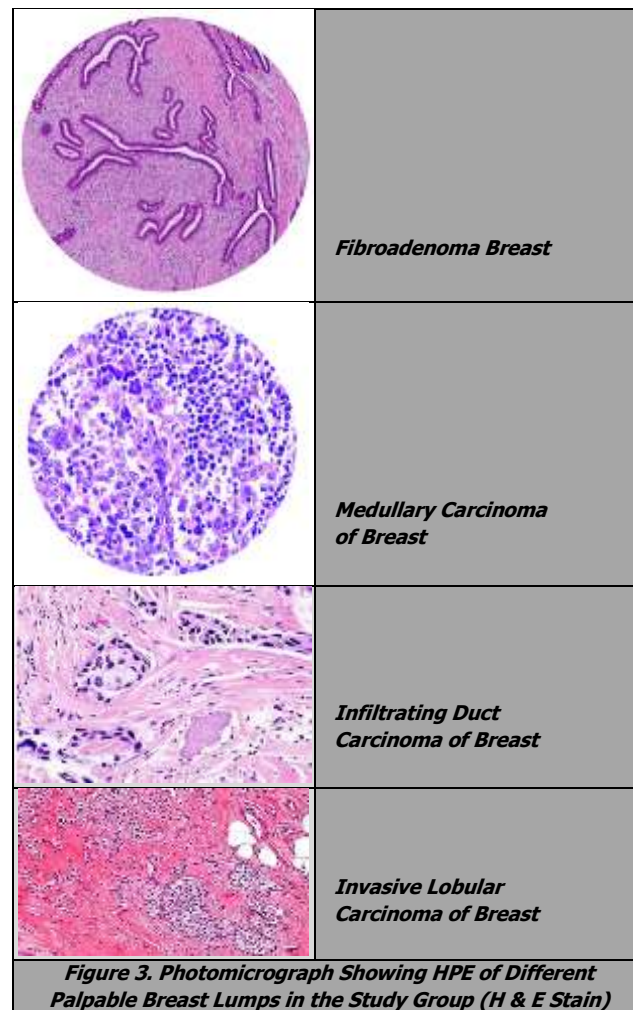| Benign vs. Malignant	Cytopathology Diagnosis	Histopathology Diagnosis	And	Consistent on HPE	Inconsistent on HPE	Total	And	Two Columns Statistical Test Results		
Malignant	153	154		152	01	153		True positive 152	False positive 01	153
Benign	161	160		159	02	161		True negative 159	False negative 02	161
Total	**314**	**314**		**311**	**03**	**314**		**Total**		**314**

Table 6. Cytohistopathological Correlation of Available Biopsied Palpable Breast Lumps of the Study Groups with Two Columns Statistical Tests Results

Of 2687 patients with palpable breast lumps in the study group, who had adequate FNA smears for cytopathological reporting; only 314 patients underwent biopsy interpretation. The breast biopsy tissues included excision biopsies, incision biopsies, core biopsies, lumpectomies and mastectomies tissues.

Fibroadenoma Breast

Benign Phyllodes

Mucinous Carcinoma of Breast

Infiltrating Duct Carcinoma of Breast

Figure 2. Photomicrograph Showing FNAC of Different Palpable Breast Lumps in the Study Group (MGG Stain)

The remaining patients in the study group who were included for FNAC analysis lost follow up for histopathological correlation as their breast biopsy tissues were not available for biopsy interpretation during the study period. Out of the available 314 biopsied palpable breast lumps of the study group, 311 cases were consistent on histopathology and 03 cases were inconsistent. Out of the available 314 biopsied palpable breast lumps of the study group, FNAC diagnosed 161 as benign breast lumps and 153 as malignant breast lumps. But, in histopathological study, out of biopsied 161 benign breast lumps, 02 benign breast lumps that were diagnosed as benign proliferative breast lesions in FNAC were confirmed as infiltrating duct carcinoma. That means, out of the 161 benign breast lumps in FNAC, 159 were consistent on histopathology and 02 were inconsistent. Again, in histopathological study, out of the biopsied 153 malignant breast lumps, 01 malignant breast lump that was diagnosed as infiltrating duct carcinoma in FNAC was confirmed as sclerosing adenosis (benign). So, out of these 153 malignant neoplasms in FNAC, 152 were consistent in histopathology and 01 was inconsistent. Considering positive cases on statistics were malignant and negative cases were benign cases, the two columns statistical tests results and the cytohistopathological correlation of available biopsied palpable breast lumps of the study group is shown in Table 6. The Table 6, as per statistical two columns test results shows that true positive value is 152, false positive value is 01, true negative value is 159 and false negative value is 02 in our study. Therefore, the sensitivity is 98.70 %, specificity is 99.38 %, positive

predictive value is 99.35 %, negative predictive value is 98.76 % and diagnostic accuracy is 99.04 % for FNAC in cytopathological evaluation of palpable breast lumps as per our study.

Fibroadenoma Breast

Medullary Carcinoma of Breast

Infiltrating Duct Carcinoma of Breast

Invasive Lobular Carcinoma of Breast

Figure 3. Photomicrograph Showing HPE of Different Palpable Breast Lumps in the Study Group (H & E Stain)

DISCUSSION

Today, fine needle aspiration cytology is practiced worldwide for rapid and accurate preoperative diagnosis of breast Lumps. There are several studies regarding cytopathological evaluation of palpable breast lumps by FNA and literatures claiming the usefulness of FNAC in breast cytopathology. Out of the 2706 palpable breast lumps in the study group, FNA smears of 19 (0.70 %) palpable breast lumps were inconclusive for cytopathological reporting either due to inadequate aspirated materials or haemorrhagic smears. It is a common problem faced in FNA procedure in most of the available studies and we also faced the problem in our study. Those 19 smears were categorised as inconclusive and excluded from our study. Therefore, the actual study group in our study consisted the remaining 2687 palpable breast lumps where FNA was adequate for cytopathological reporting.

In the present study, palpable breast lumps as a clinical presentation was found to be more common in females (n = 2594; 96.54 %) and males accounted for 93 cases (3.46 %)

only, which is similar to the study done by Almobarak AO et al, 2014[7] (female 94.86 % and male 5.24 %). The peak age group for the palpable breast lumps, irrespective of sex, was 21 - 40 years. Most of the available studies also show the same peak age group for palpable breast lumps.

In the present study, most of the palpable breast lumps were neoplastic in origin (n = 1900, 70.71 %), which is similar to the study conducted by Sankaye SB et al, 2014.[8] Benign breast diseases were (n = 2318; 86.27 %) more common than malignant neoplasms (n = 369, 13.73 %) in our study, which are congruent to the study done by Almobarak AO et al, 2014.[7] and Shah SA et al, 2013.[9] Amongst the benign breast diseases, fibroadenoma breast was the commonest benign breast disease (n = 1228; 52.98 %) in our study which is comparable to other studies like Mansoor I et al, 2001.[10] and Abdul Rashid et al, 2014.[11] In our study, fibroadenoma breast (n = 780; 29.02 %) was more commonly seen in the age group of 21 - 30 years. Similar results were shown by many studies (Khanzada TW et al, 2009; Iyer SP et al, 2000; Ochicha O et al, 2002; Siddiqui MS, 2003; Akhator A, 2007; Irabor DO, 2008; Malik R et al, 2003 and Khanna S et al, 1998.[12,13,14,15,16,17,18,19]

In most of the above-mentioned studies, fibroadenoma breast had the most common presentation in the age group of 21 - 30 years. Thus, the present study is in concordance with the studies available in the literature. The fibrocystic disease of breast was the second common benign breast disease in our study and majority of the patient belonged to fourth and fifth decade of life (31 - 50 years). Though the incidence of fibrocystic disease of breast varies geographically, it is second most common benign breast disease in many studies from Pakistan and India (Khanzada TW et al, 2009; Abdullah P et al, 1999 and Khemkha A et al, 2009).[12, 20, 21]

Benign phyllodes represented (n = 26; 1.12 %) amongst benign breast diseases in our study, which is similar to that reported by Akhator A, 2007.[16] Breast abscess accounted for (n = 181; 7.81 %) benign breast disease in our study as compared to the 8.0 % as reported by Ochicha O et al, 2012.[14] and 6.8 % found by Siddiqui MS et al, 2003.[15]

Malignant neoplasms accounted only (n = 369, 13.73 %) numbers in our study, which is in contrast to the study done by Sing A et al 2011.[22] But it is almost similar with report of Rahman MZ et al, 2013[23] which was 14.17 %. Almobarak AO et al, 2014 [7], Sing A et al, 2011[22] and Rahman MZ et al, 2013[23] reported that infiltrating duct carcinoma of breast is the commonest breast malignancy and found mostly in the age group of 41 - 60 years age. The present study also showed that infiltrating duct carcinoma was the most common breast malignancy (n=341, 92.41%) and encountered mostly in the age group of 41-60 years of age (n=270; 79.18%) in our study. Interestingly, most of the malignant breast lumps were common in more than 40 years of age and all the cases were that of female. Similar observation was also noted by Pudasaini S et al, 2011[24] and Almobarak AO et al, 2014.[7] This study clearly shows increasing age and female gender as the risk factors for breast cancer as shown by Smith MA et al, 2000.[25]

The diagnostic accuracy in our study from available cytohistopathological correlation was 99.04 %, which is almost similar to 86 - 99 % reported in various studies (Nguansangiam S et al, 2009; Rubin J et al, 1997; Jayaram G et al, 1996; Argia R et al, 2002; Hussain MT et al, 2005; Muhamed AZ al, 2005 and Ishikawa T et al, 2007).[26,27,28,29,30,31,32] The sensitivity (98.70 %) and specificity (99.38 %) of our present FNAC study on diagnosis of palpable breast lumps are similar with different studies as shown in Table 7 (Pudasaini S et al, 2011,[24] Rupom TU et al, 2011[33] and Siddegowda MS et al, 2019.)[34] Moreover, the true predictive value and false predictive value in the diagnosis of breast malignancy in FNAC were 99.35 % and 98.76 % in our study.

Study	Sensitivity	Specificity
Pudasaini S et al,2011	93.0 %	100 %
Rupom TU et al, 2011	100 %	100 %
Siddegowda MS et al, 2019	100 %	100 %
Present study	98.70 %	99.38 %
Table 7. Comparison of Specificity and Sensitivity of FNAC Study on Diagnosis of Palpable Breast Lumps		

CONCLUSIONS

FNAC has high sensitivity in cytopathological diagnosis of palpable breast lumps and proper cytopathological diagnosis may be considered as a primary line of investigation for palpable breast lumps and their management. Based on the cytopathological diagnosis of the palpable breast lumps, patients may put off surgeries and can be given medical treatments and can decrease the rate of unnecessary surgical interventions like diagnostic incisional or excisional biopsies. However, we support the standard recommendation that the patients with palpable breast lumps should be diagnosed based on the combination of physical examination, radiological modalities and FNAC (triple test). This study describes the cytopathological patterns of palpable breast lumps within the study period and cytohistopathological correlation was done amongst the available palpable breast lumps of the study group that underwent biopsy interpretation in Tezpur Medical College and Hospital. Due to the high diagnostic accuracy, sensitivity and specificity of FNAC, the study established its usefulness for proper line of management of the patients with palpable breast lumps. This study supports the usefulness of FNAC study in the workout of palpable breast lumps, confirms the predominance of benign breast diseases in young females and increased incidences of malignancy in older age population. The limitation of the study was that due to absence of representative aspirated materials, 19 palpable breast lumps couldn't be diagnosed in the appropriate manner and cytohistopathological correlation couldn't be done amongst all the palpable breast lumps FNAC due to non-availability of biopsy interpretation of all study group palpable breast lumps in our institute. We were unable to follow up all the study group patients in our institute, probably these patients attended other higher centres later.

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