

Cytopathological Evaluation of Breast Lump in A Tertiary Care Hospital of Bangladesh

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ABSTRACT

Background: Breast lump is a very sensitive issue for the patient, so a reliable, non invasive and prompt diagnosis helps to lessen the associated anxiety and leads to early definitive treatment. Fine Needle Aspiration Cytology (FNAC) is a quick, simple and inexpensive procedure in diagnosis of these lumps and helps the clinician to plan correct management. This study was designed with the aim to evaluate the value of FNAC in promoting proper preoperative diagnosis and management for palpable breast lump and also to compare its diagnostic yield with that of paraffin sections.

Material and methods: This cross sectional descriptive study was carried out in the Department of Pathology, Chittagong Medical College, Chattogram from October 2013 to September 2014. The study conducted on 123 patients with breast lumps irrespective of their age. FNAC was done from each patient. and stained by Papanicolaou staining. In each case their accuracy was compared to histopathological diagnosis. Statistical analysis done employing χ^2 test.

Results: Out of 123 cases studied, 120 could be correctly differentiated into benign and malignant tumors with an accuracy rate of 97.56%.

Conclusions: FNAC is a simple, accurate, rapid and cost-effective diagnostic tool, not requiring specific instruments in contrast to open tissue biopsy, can be used per-operatively for both diagnosis and management of breast lump if correlated clinically.

Key words: FNAC; Palpable breast lump; Preoperative diagnosis.

INTRODUCTION

Breast carcinoma is the most common malignant neoplasm and the leading cause of death from cancer in women, with more than one million cases occurring worldwide annually¹. With the improvement of healthcare and increasing longevity, more and more females are being exposed to the risk of developing breast carcinoma². Increase incidence of breast cancer is related to late marriage, birth of child in the later age, shorter period of breast feeding and nulliparity or low

parity³. Diseases of the breast constitute a significant proportion of surgical cases seen in both developed and developing countries and frequently, the need arises to distinguish benign from malignant lesions prior to definitive treatment⁴. A breast lump is the most common symptom associated with breast cancer. 1 in 10 women with a breast lump will have breast cancer⁵.

Fine Needle Aspiration Cytology (FNAC) is cheap, safe and highly sensitive and specific technique for diagnosis of most of the breast lumps. Thus it can be used preoperatively to avoid unnecessary surgery and discomfort during open biopsy. Several study showed that most of the breast lesions are benign and needs only reassurance and early diagnosis to prevent patients discomfort and anxiety⁶. The main purpose of FNAC of breast lumps is to confirm cancer preoperatively and to avoid unnecessary surgery in specific benign conditions⁷. In this study, we evaluated the nature of breast lump by FNAC comparing with histopathological diagnosis.

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MATERIALS AND METHODS

This cross-sectional descriptive study was carried out in the Department of Pathology, Chittagong Medical College (CMC) Chattogram, Bangladesh from October 2013 to September 2014. Total 123 female patients with palpable breast lump who has given written consent to participate in this study were the study subjects. All consecutive patients with palpable breast lumps came to this Department for FNAC and subsequently underwent elective surgeries of breast lump. Institutional ethical clearance was obtained. Clinical history, questionnaire, thorough physical examination and relevant investigations were recorded in details in all cases.

FNAC was performed with 10 ml disposable plastic syringes fitted with 23 gauge disposable needles in the Department of Pathology, CMC, Chattogram. The smears were fixed in 95 % ethyl alcohol and stained by Papanicolaou (Pap) stain.

After FNAC, patients were selected for surgery. The specimens were then fixed in 10% formalin. Paraffin blocks of the sections for histopathological examination were processed in the routine way and 5 micrometer thick sections were stained with Hematoxylin and Eosin (H & E) stain. The stained sections were examined in the light microscope to get a definitive diagnosis of the lesions and its type. The diagnosis obtained by preoperative FNAC was compared with those of paraffin sections. The overall diagnostic accuracy of FNAC for specific type of benign and malignant breast lesion was also found out.

The data analysis was done using the 'SPSS version-18' software. The association between FNAC and histopathology was tested by Chi square test. Various indices such as sensitivity, specificity, false positive rate, false negative rate, positive predictive value, negative predictive value and accuracy were calculated.

RESULTS

This study included 123 patients with palpable breast lump of which the age incidence ranged from 12 years to 65 years (Mean age 31.41 years, SD \pm 14.31). On the basis of age, patients were divided into six groups and it was seen that maximum number of patients 39 (31.7%) were in age group 21-30 years, followed by \leq 20 years group 36 (29.3%) (Table I).

The breast lumps of variable sizes were noted. Breast lump sizes were categorized into three groups according to American Joint Committee on Cancer (AJCC) staging system. Maximum numbers 93 (75.6%) were 2-5 cm size, 21 (17.1%) were $<$ 2 cm size and 09 (7.3%) were $>$ 5 cm size.

FNAC was done in 123 cases, of which 71 (57.7%) were benign lesion and 52 (42.3%) were malignant. All of the malignant lesions were diagnosed as duct cell carcinoma. Among the benign lesions, 69 (56.1%) diagnosed as Fibroadenoma, 01(0.8%) was atypical hyperplasia and 01 (0.8%)

revealed normal ductal epithelial cells. Histopathological diagnosis showed 70 (56.9%) benign lesions and 53 (43.1%) malignant lesions.

Out of 53 histopathologically diagnosed malignant cases, 51 was reported as malignant in FNAC, 1 as atypical hyperplasia and 1 as negative for malignant cell. Seventy histopathologically diagnosed benign cases showed 66 fibroadenoma, 3 fibrocystic changes, 1 benign phyllodes tumour. Sixty six cases of fibroadenoma were correlated with FNAC report. Out of 3 cases of fibrocystic changes, 2 were fibroadenoma and 1 was duct cell carcinoma on FNAC. One case of benign phyllodes tumour was fibroadenoma on FNAC. True Positive (TP) cases were 51, False Negative (FN) cases were 02, True Negative (TN) cases were 69 and False Positive (FP) case was 01, $p=0.000$, highly significant ($p<0.001$). Association between FNAC and histopathological diagnosis done using Chi-square test.

In Fine Needle Aspiration Cytology (FNAC) the sensitivity was found 96.23%, specificity 98.57%, PPV 98.08%, NPV 97.18% and accuracy was 97.56%.

Table I : Age distribution among the study subjects (n = 123).

Age in Groups	Frequency	Percentage (%)
\leq 20 Years	36	29.3
21 – 30 Years	39	31.7
31 – 40 Years	18	14.6
41 – 50 Years	16	13.0
51– 60 Years	12	9.8
$>$ 60 Years	02	1.6
Total	123	100.0

Mean- 31.41, SD- 14.31, Median- 26.00, Range- 12-65 years.

Table II : Socio-demographic Variables among the cases (n-123).

Socio-demographic Variables		Frequency	Percentage (%)
Marital Status	Married	89	72.4
	Unmarried	34	27.6
Socio-economic Status	Poor*	29	23.6
	Average**	84	68.3
	Affluent***	10	08.1
Occupation	House Wife	74	60.2
	Student	22	17.9
	Service Holder	15	12.2
	Garments Worker	12	09.7
Family History of	Yes	14	11.4
Breast Lump	No	109	88.6
Contraceptive History	Yes	54	60.7
	No	35	39.3

* Poor class: – Family income Tk. 5000 or below per month

Average class: – Family income between Tk. 5000 - 15000 per month *Affluent class: – Family income above Tk. 15000 per month.

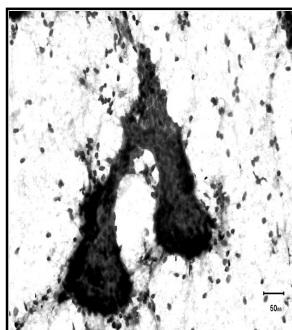
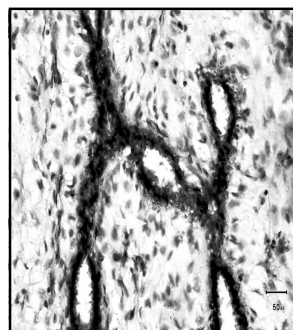
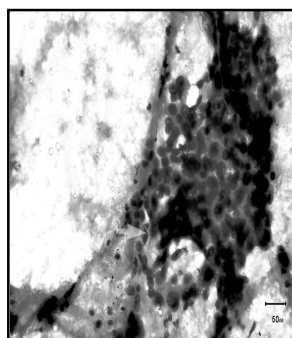
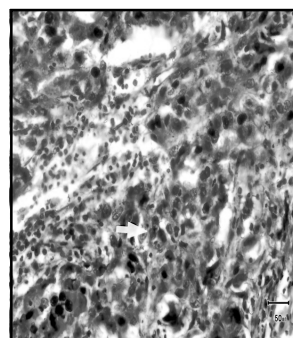
Table III : Association between FNAC & histopathology (With χ^2 test significance).

Fine Needle Aspiration Cytology (FNAC)	Benign Lesion	Histopathology Malignant Lesion	Total	χ^2 test Significance
Benign Lesion	69	02	71	$\chi^2 = 111.074$ p = 0.000 Highly Significant
Malignant Lesion	01	51	52	
Total	70	53	123	

Sensitivity-96.23%, Specificity - 98.57%, PPV- 98.08%, NPV- 97.18%, Percentage of False Negative - 3.77% Percentage of False Positive - 1.43% Diagnostic Accuracy- 97.56%.

Table IV : Comparison of sensitivity, specificity and accuracy of FNAC in diagnosis of breast pathology between this study and other studies.

Reference	Year	Country	Number of patients(n)	Sensitivity (%)	Specificity (%)	Accuracy (%)
Bukhari et al ¹⁷	2011	Pakistan	425	98	100	98
Khair et al ²⁰	2009	Sudan	271	56.1	80.9	63.8
Liew et al ¹⁵	2011	Taiwan	408	88.5	100	92.4
Bhuiyan et al ²¹	2011	Bangladesh	70	92.3	98.24	97.1
Saleem ²²	2010	Iraq	60	92	100	96.7
This study	2014	Bangladesh	123	96.2	98.6	97.6

**Figure 1 :** Fibroadenoma (IOSC Smear) (Pap stain) 400X**Figure 2 :** Fibroadenoma (Histopathology) (H & E stain) 400X**Figure 3 :** Duct cell carcinoma (IOSC Smear) (Pap stain) 400X.**Figure 4 :** Invasive Duct cell carcinoma (Histopathology) (H & E stain) 400X.

DISCUSSION

The age range of 123 patients was 12 to 65 years with maximum number of patients were in 21-30 years group, 39 (31.7%). Rahman and Islam in their study showed highest number of patients (38.13%) were in 21-30 years age group which is similar to our study¹. Study done by Ramraje et al showed patient's age ranged from 12 to 70 years, majority of benign and malignant cases were between 21 to 40 years and 41 to 60 years respectively⁸. Hiregoudar et al also showed, age ranged from 13 to 65 years, with most common benign and malignant lesions were 21 to 30 years and 31 to 50 years respectively which were consistent with our study⁹. In the present study, out of 123 cases, the maximum numbers of lumps were in the left breast 82 (66.70%) and in the right breast it was 41 (33.30%) which is similar to the study done by Farouque et al and Afridi and Ahmed¹⁰⁻¹¹. Although no surgical importance can be attached to this observation since patient selection was in no way dictated by involvement of any particular breast¹². In this study, it was seen that 54 (60.7%) had history of contraceptive use and 35(39.3%) had no history. An analysis of epidemiological data from more than 50 studies worldwide by the Collaborative Group on Hormonal Factors in Breast Cancer. found that women who are current or recent users of birth control pills had a slightly higher risk of developing breast cancer than women who had never used the pill¹³. Present study revealed that, 14 (11.4%) had family history of breast lump and 109 (88.6%) had no family history. Among 14 cases with family history of breast lump, 3 (21.3%) cases had family history of breast cancer. Tazzite et al showed 18.4% cases having family history of breast cancer which is nearer to our study¹⁴.

Among 123 study cases, 71 (57.7%) cases were benign lesions and 52 (42.3%) were malignant lesions on FNAC. Liew et al showed benign cytologic results 59.6% and malignant cytologic results were 31.1%¹⁵. Pandey et al reported benign cytologic results were more (60.85%) than malignant cytologic results (39.15%)¹⁶. Bukhari et al and Singh et al also showed, benign lesions more than malignant lesions^{17,18}. Here percentages of benign and malignant lesions were nearer to our study. On histological basis, there were 2 false negative cases in FNA smears, both of which later showed malignancy on histopathology. This false negative results may possibly due to sampling error⁴. There was 1 false positive case on FNA smears which later showed benign. This false positivity is due to presence of cellular atypia in some cases of fibrocystic changes. These atypical findings are also described by Veneti et al and Jacob et al¹⁹. Statistical analysis of the study cases was done considering the FNAC as screening test and histopathology as gold standard. In Fine Needle Aspiration Cytology (FNAC) the sensitivity was found 96.23%, specificity 98.57%, PPV 98.08%

NPV 97.18% and accuracy was 97.56%. Several studies were analyzed to compare success of the present study. In this study the sensitivity, specificity and accuracy are statistically significantly comparable to those reported in most of the recent studies in different parts of the world as shown in Table-4^{17, 20,15,21,22}.

In reviewing the observations of several studies by different authors it had been seen that sensitivity of conventional FNAC ranged from 78 to 100% and specificity ranged from 76 to 100%²⁰.

CONCLUSION

FNAC of the breast lump showed acceptable sensitivity, specificity and accuracy with high statistical significance when compared with histological diagnosis. It can be utilized as a first line diagnostic procedure in patient presenting with palpable breast lesions especially developing countries and countries with limited resources. When diagnostic accuracy has been determined to be high in a centre, definitive treatment can be offered to patients with cancer and those with benign results.

RECOMMENDATION

FNAC can be utilized as a first line diagnostic procedure in patient presenting with palpable breast lesions especially developing countries and countries with limited resources.

DISCLOSURE

All the authors declared no competing interest.

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