Study of Fine Needle Aspiration Cytology of Breast Lump: Correlation of Cytologically Malignant Cases with Their Histological Findings

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Abstract:

Background: In Bangladesh a large number of patients have been suffering from breast cancer and with each passing year, the number is increasing. **Objectives:** To correlate breast lesions diagnosed as cytologically malignant with their histological findings. **Methods:** This is a prospective study carried out in the Department of Pathology, BSMMU, Dhaka during the period of January 2009 to December 2009. Patients with breast lump, having malignant breast lesions on cytology were included in the study. A total of 524 patients with breast lump underwent FNA examination for the diagnosis during this period. FNA slides were examined under light microscope after Papanicolaou staining and were categorized into five groups: i) inadequate ii) benign iii) atypical cells iv) suspicious for malignancy and v) malignant. Of these, 431 were diagnosed as benign, 4 as atypical, 17 were diagnosed as suspicious for malignancy and 72 cases were diagnosed as malignant. Out of these 72 cases, which were cytologically diagnosed as malignant, 55 corresponding surgical specimens (either mastectomy or lumpectomy specimens) were received for histopathology. The sections were stained with haematoxylin and eosin for microscopic examination. **Results:** 55 cases which were diagnosed as malignant by FNAC were found to be malignant by histopathology. 54 (98.18%) were invasive ductal carcinoma (NOS) and one (1.82%) was mucinous carcinoma. In this study, considering only cases with a definitive diagnosis of malignancy, the sensitivity of FNAC to diagnose the disease was 100% and accuracy was 100% and Chi-square test revealed Chi-square value 10.83 (P< 0.001). **Conclusion:** From the present study it is evident that FNAC is a simple and reliable method. No local anaesthesia is required. Operative risk of surgical biopsy, danger of post operative infection can be avoided by adopting the procedure. It helps to confirm the clinical impression without open biopsy.

Key words: Breast lump; FNAC; Mastectomy; Malignancy.

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Introduction:

In Bangladesh, patients suffering from breast cancer have been increasing. Because of the existing social circumstances, the tendency to overlook the complaints, and because female patients are hesitant to be examined by the clinicians for lump in the breast, they report in advanced stage of breast cancer[1]. FNAC of breast lump can be effectively used as a diagnostic tool in the diagnosis and management of breast lump on an outpatient basis as hospitalization of the patient is not necessary. Fine needle aspiration cytology (FNAC) of breast is an important part of the triple assessment of palpable breast lump (clinical examination, imaging [mammography or ultrasonography], and FNAC). It has been shown that FNAC can reduce the number of open biopsies[2]. The most common sign and symptom of breast disease is a palpable mass; although breast diseases can also present as inflammatory lesion, nipple secretion or imaging abnormalities[3].

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FNAC is now used more frequently to diagnose any mass in the breast, which is clinically malignant. It is extremely beneficial in reaffirming the clinical impression of benign disease, which may not need subsequent biopsy. Furthermore, it allows more rapid diagnosis of a malignant condition in clinically non-suspicious masses. The ultimate benefit of aspiration cytology, however, rests in its demonstration of malignant disease, when other diagnostic modalities are inconclusive[4]. FNAC is now a well established tool for the investigation of women with suspected breast carcinoma[5]. A cytodiagnosis based on the examination of smears prepared from the aspirate can accurately predict the histology of the tumour in about 90% of cases[6].

It has improved decision making and the selection of patients for biopsy of breast lesion and has contributed in saving time in the clinical management of breast disease[7]. Advantage is that when the cytological diagnosis is a malignant lesion, the nature of the condition can be discussed with the patient and a full explanation of the proposed operation, length of stay in hospital and after care can be given[8].

The present study is designed to correlate findings of cytologically malignant breast lesions of patients attending outpatient department, with their histomorphologic findings.

Methods:

It was a prospective type of study carried out in the Department of Pathology, BSMMU, Dhaka, during the period of January 2009 to December 2009 and the study was approved by the departmental ethical committee. Patients with breast lump, initially diagnosed as malignant on FNA cytology were included in the study. A total of 524 patients with breast lump underwent FNA examination for evaluation during this period. FNA slides were examined under light microscope after Papanicolaou staining and were categorized into five groups: i) inadequate ii) benign iii) atypical cells iv) suspicious for malignancy and v) malignant. Of these, 431 were diagnosed as benign, 4 as atypical, 17 were diagnosed as suspicious for malignancy and 72 cases were diagnosed as malignant and were graded by Robinson's Cytology Grading System. Out of these 72 cases, cytologically diagnosed as malignant, 55 corresponding surgical specimens (either mastectomy or lumpectomy specimens) were received for histopathological examination subsequently. Specimens were fixed in 10% formalin solution, routinely processed, sectioned and stained with hematoxylin and eosin staining methods for microscopic examination and were graded by Bloom Richardson Scoring System. Cytological findings of malignant cases were correlated with their histologic findings. Sensitivity and accuracy of diagnosis were calculated using Chi-square test.

Results:

The age range of total 55 patients was 20-80 years with the mean age of 43.2 years. Highest frequency of malignant breast lump was found in the age group of 36-45 years. Out of 55 patients, 32 had lump in the right breast and 23 had lump in the left breast. In both right and left breasts, highest percentage was located in the upper and outer quadrant (29.09% and 18.18% respectively).

Correlation between cytopathologic and histopathologic diagnosis:

All the 55 cases diagnosed malignant by FNAC were found to be malignant by histopathology. 54 (98.18%) were invasive ductal carcinoma (NOS) (Fig: 1) and one (1.82%) was mucinous carcinoma. (Fig: 2) (Table-I)

Cytologic findings (FNAC):

Out of 55 cases, 54 were ductal carcinoma and only one was mucinous carcinoma. Out of the 54 ductal carcinoma (NOS), 11 were in grade-I, 43 were in grade- II. No case was diagnosed as grade- III (Fig-3).

Histologic findings:

Out of 55 patients, 54 were diagnosed as invasive ductal carcinoma (NOS) and one was mucinous carcinoma. Among 54 patients with invasive ductal carcinoma (NOS), 36 cases were in grade- II, 17 were in grade- I and one was in grade- III. (Fig-4).

Cytologic grading compared with the histologic grade:

It was found that out of 17 cases of histological grade- I, 10 were cytologically in grade- I and 7 were in grade- II. Out of 36 cases which were histologically in grade- II, 35 were cytologically in grade- II and one was in grade- I. One patient with histological grade- III was grade- II cytologically (Fig-5).

Statistical analysis by Chi-square test showed that cytological grade significantly correlated with histological grade, $P<0.001$.

Evaluation of cytopathologic diagnosis and histologic findings:

In this study, the sensitivity of the test (FNAC) to diagnose malignant breast diseases was 100%.

The overall diagnostic accuracy of FNAC in the present study was 100%. Statistical analysis by Chi-square test revealed Chi-square value 10.83 ($P< 0.001$), which is statistically significant. Sensitivity of FNAC obtained by various workers ranges from 97% to100% and present study correlates with that study (Table-II). So there is strong correlation between cytologically malignant cases with their histologic findings.

Table- I

Cytologic and histopathologic correlation of 55(n) cases with malignant breast lesions.

Cytology (FNAC)(n=55)	Total 55(n)	Histology (n=55)				
		Ductal	Mucinous	Medullary	Lobular	Others
Ductal	54	54	-	-	-	-
Mucinous	1	-	1	-	-	-
Medullary	-	-	-	-	-	-
Lobular	-	-	-	-	-	-
Others	-	-	-	-	-	-

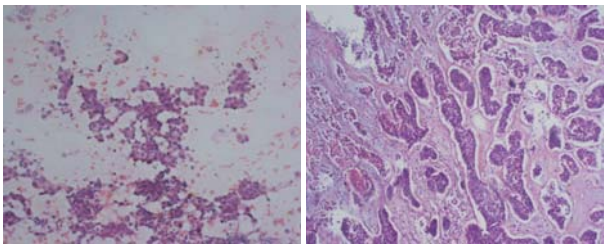
Percentage of (+) ve correlation= 100%.

Table-II

Comparative evaluation of FNAC of the present study with other studies.

Authors	Aspiration	False positive	False negative	Sensitivity	Accuracy
Russ et al 1978	257 (T) 143 (M)	-	-	-	94%
Lannin et al 1984	100 (T) 30 (M)	0	4%	87%	96%
Wollenberget al 1985	184 (T) 73 (M)	0	25%	65%	91%
Hammond et al 1985	125 (T) 63 (M)	0.8%	3.2%	94%	95.40%
Silverman et al 1987	219 (T) 93 (M)	0	4.4%	82.2%	96%
Friechteret al 1997	939 (T) 211 (M)	0.6%	14.2%	86%	54.80%
Willkison et al 1989	276 (T) 35 (M)	-	-	79.4%	92.4%
Chiemchanya et al 2000	239 (T) 86 (M)	0	2%	92.6%	97.5%
Present Study2010	524 (T) 55 (M)	0	0	100%	100%

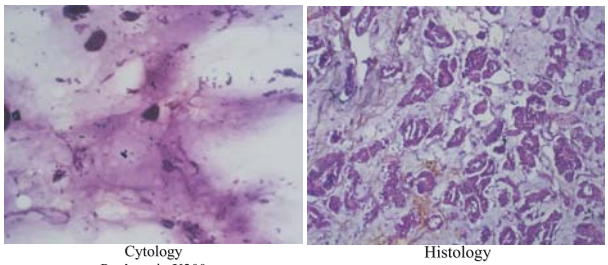
T= Total, M= Malignant



Cytology
Pap's stain X200

Histology
H & E stain X200

Fig-1: *Ductal Carcinoma (NOS).*



Cytology
Pap's stain X200

Histology
H & E stain X200

Fig-2: *Mucinous Carcinoma*

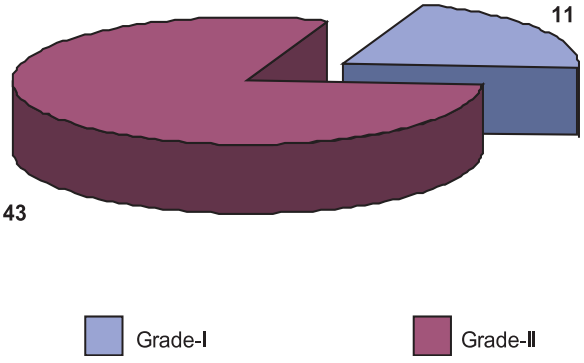


Fig-3: *Distribution of cases by Robinson's cytology grading system*

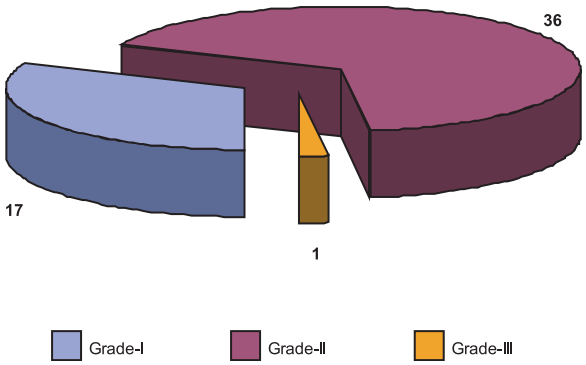


Fig-4: *Distribution of cases by Bloom Richardson's histologic grading system*

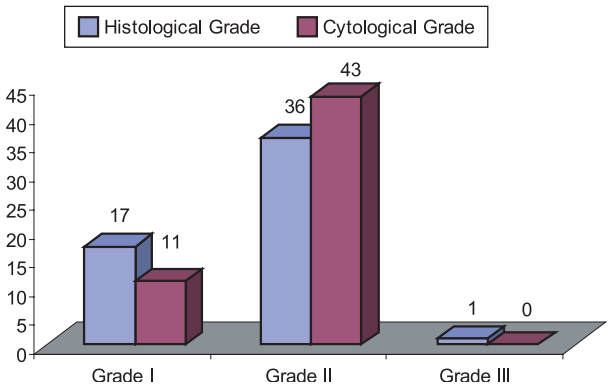


Fig-5: *Comparison of histological and cytological grading by Bar Diagram.*

Discussion:

Breast cancer is one of the common clinical problems in Bangladesh. Although there has been little success in preventing breast cancer, significant reduction of mortality could be achieved by early detection. It is the general consensus that a firm pre-operative diagnosis should be established before surgery and FNAC is an extremely useful diagnostic technique. It has already been established that FNAC is an easily performed outpatient diagnostic method for determining the nature of breast lesion. Its success is due to its diagnostic accuracy and its cost effectiveness in the management of breast lump. As a diagnostic modality, FNA cytology has many advantages for the patients as well as for the physicians. Before the introduction of FNAC, open biopsy/true cut biopsy was carried out in only suspicious cases. The purpose of this present study was to determine the value of fine needle aspiration cytology in the diagnosis of breast carcinoma and to compare the result of FNAC with histological diagnosis to assess its accuracy. Keeping in mind the aim and objectives of the present study, 55 cases which were diagnosed as malignant breast lesions on FNAC, were correlated with their histological diagnosis. All the cytologically diagnosed malignant lesions were proved to be malignant on histology. All but one of 55 cases of breast carcinoma was invasive ductal carcinoma which was the most common group (98.18%). Chiemchanya et al, 2000 reported a similar finding from FNAC of the breast lumps[9]. In this study, 45 cases showed correlation between histologic and cytologic grades. Maximum correlation occurred in grade- II. Only 9 cases showed no correlation. This discrepancy between cytological and histological grades is possibly due to dissimilar criteria of the grading systems and appears to occur in the lower grades. The only common criteria in both systems are nuclear pleomorphism. Development of a grading system common to both cytology and histology can significantly reduce the discordance.

In the present study, lumps were found more frequent in the right breast than in the left. Upper and outer quadrant of the breast was found most frequently involved. The highest frequency was found in the 4th decade of life. This observation is almost same as that of Eisenberg et al, 1986[10].

The diagnostic accuracy of the present study is 100% which correlates well with Chiemchanya et al, 2000[9]. The data indicate that when adequate, well prepared samples are submitted, accurate cytological diagnosis can be made. The high predictive value of positive results allows for early diagnosis, treatment and management of breast cancer.

Conclusion:

The present study shows that FNAC is a reliable method. It helps to confirm the clinical impression without open biopsy. The most important aspect of this procedure lies on the diagnosis of malignancy. With adequate number of trained cytopathologists this procedure can be extended to all the Medical Colleges and district hospitals of Bangladesh and this will help in pre-operative management of the patients and to take decision about the type of surgery. From this study it can be concluded that diagnosis of breast carcinoma from fine needle aspiration cytology (FNAC) should be practiced as a routine procedure as there is a high degree of correlation with histopathological findings. Now-a-days, neoadjuvant chemotherapy is increasingly being offered to the patients with invasive breast carcinoma. In this regard, FNAC as an alternative to histological examination is an important denominator for planning of management where core biopsy of breast is not practised in Bangladesh. Experience gained from this study further advocates that FNAC could be an ideal method for follow-up of malignant cases, especially when there is recurrence.

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