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Original Research Article

Cyto-Histopathological Correlation in Palpable Malignant Breast Lesions

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Abstract

This study represents correlation of five needle aspiration cytology with histopathology at the cytology department of khanpur Kalan Medical college during 3 year period only the cases where subsequent histology diagnosis was available were analyzed. All the aspirations were performed by the pathologists. Out of the total of the 89 cases cytological diagnosis was malignant in 35 cases (39.32%). Two cases were false negative. There were no false positive case in the study. A sensitivity Rate of 94.5% and specificity of rate 100% was obtained for malignancy. Positive and negative predictive value for the diagnosis of malignancy was 100% and 94.7% respectively. accuracy of the test was 97.26%. FNA specific diagnosis showed an overall agreement of 98.5% for malignant lesions. All these result compare favorably with the best reported in literature. All these factors help the clinicians in the management of malignant breast lesions.
Keywords: Cyto-Histopathological, malignant breast lesions.

INTRODUCTION

A palpable breast lump is a common diagnostic problem to both general practitioners and surgeons and its evaluation requires judicious use of available diagnostic techniques including radiological investigations, clinical examination and pathological investigations.

Benign and malignant breast lesions are common in Indian population. It is the second most common site of malignancy after carcinoma of cervix in Indian females. Currently, 75,000 new cases of breast cancer are detected in India every year [1].

While FNA is a traditional modality that has been used as a rapid and safe tool for distinguishing benign from malignant breast lesions, CNB has been increasingly employed since the 1980's. Its main advantage is that it provides preoperative knowledge of a histological diagnosis and prognostic factors. Vacuum assisted biopsy (VAB) systems are recent large-core variants of CNB. With cytology and CNB both having unique advantages, there is an increasing acceptance of CNB for evaluating breast lesions [2].

MATERIALS AND METHODS

All the aspirates were obtained at the pathology department of BPS Government Medical college for women, Khanpurkalan Sonepat, Haryana during three year period between January 2015-december 2017. Cytological and histological diagnosis and other details of the malignant breast lesions were obtained from the records of BPS Government Medical college for women, Khanpurkalan Sonepat The data was analyzed and sensitivity, specificity and accuracy rate was calculated and cyto-histological correlation of palpable malignant breast lesion was done. FNAC was carried out using 10ml syringe attached to 23 gauge needle. Slides were stained by haematoxylin and Eosin (H&E) stain. Air dried smears were prepared and stained with Leishman stain. The cytological diagnosis was compared to histological diagnosis of lesion. Sensitivity, specificity, positive predictive value, negative predictive value was calculated. Cyto-histologic correlation was done from the breast FNAs and corresponding surgical pathology specimens.

OBSERVATIONS

The study represents a statistical analysis of 89 FNA done and there correlation with subsequent histological samples received over a period of 3 years. In the category of malignant lesions the youngest patient was 28 year old diagnosed as metaplastic carcinoma breast. The oldest was 80 years old woman with invasive ductal carcinoma.

Results Of Cytological Examination

Total of 89 aspirations were done. Out of these cytologic diagnosis was positive for malignancy in 35 cases (39.32%) and 16 cases (17.97%) smears were inconclusive and biopsy was advised.

Results of Histological Examination

Histological examination was available in 89 cases,malignant lesions were diagnosed in 35 cases. Out of 35 cytologically postive cases (malignant) all were positive by histology. Out of 16 cases which were inconclusive 14 were histologically positive for malignancy.

Statistical Analysis of FNA

There were 36 (94.73%) true negatives, 2 false negatives (5.26%), 35 true positives (52.05%) and no false positive. Inconclusive cytology smears were excluded for calculation of statistical values of sensitivity, specificity, positive predictive value, negative predictive value, positive likelihood ratio, negative likelihood ratio and accuracy.

Table-1: Statistical Values

Test	Formula	Value	95%Confidence interval
Sensitivity	TP/TP+FN x100	94.59%	81.81-99.34%
Specificity	TN/FP+TN x100	100%	90.26%-100%
Positive predictive value	TP/TP+FP x100	100%	
Negative predictive value	TN/FN+TN x100	94.74%	82.38%-98.58%
Negative likelihood ratio	1-sensitivity/specificity	0.05	0.01-0.21
Accuracy	TP+TN/TP+ FP+ TN+ FN x100	97.26%	90.45%-99.67%

For the diagnosis of malignant lesions, a sensitivity of 94.59%, specificity of 100%, positive predictive value of 100%, negative predictive value of 94.74%, negative likelihood ratio of 0.05% and accuracy of 97.26% was calculated. Positive likelihood ratio could not be calculated as specificity was 100% (Table-1).

Table-2: Cytohistological Correlation (Diagnostic Agreement) Among Malignant Lesions Diagnosed On Cytology

Number	Cytology diagnosis (Number of cases=35)	Histology diagnosis (Number of cases=35)	Agreement
1	Invasive ductal carcinoma (34)	1.Invasive ductal carcinoma (31) 2. Metaplastic carcinoma (2) 3.Invasive ductal ca with medullary features (Medullary carcinoma) (1)	91.17%
2	Metaplastic carcinoma (1)	Metaplastic carcinoma (1)	100%

Cyto-histological Correlation of Cases Diagnosed as Malignant on FNA

Out of 35 cases diagnosed as malignant on FNA and included in cyto-hostological correlation invasive ductal carcinoma comprise maximum number of cases followed by metaplastic carcinoma (3), invasive ductal carcinoma with medullary features

Invasive ductal carcinoma was commonest diagnosis on cytology (97.14%) and histology (88.57%). Diagnosis of invasive ductal carcinoma agreed with histology in 91.17% cases. One case of metaplastic carcinoma diagnosed on cytology showed 100% agreement with histological diagnosis (Table-2).

DISCUSSION

FNAC breast is the initial investigation of choice in any patient presenting with palpable breast lump. It is safe, economical, does not require anesthesia, can be done in outpatient setting and provides rapid results with reporting time less than biopsy. FNAC results help the surgeon to decide about further management.

However, FNAC has some limitations which are important to recognize. These include grey zone lesions which are difficult to interpret and the problem of inconclusive smears. There are a very small number of false positive and false negative malignant diagnosis even in centers of excellence [3].

This study was undertaken to estimate specificity, sensitivity, positive predictive value, negative predictive value and accuracy of FNAC in breast lesions. Histological diagnosis was also compared with cytological diagnosis. Only those cases were included in which both cytologic and histologic diagnosis was available.

During the period of present study, a total of 883 breast FNACs were done. Out of these, subsequent histologic diagnosis was available in 89 cases (10.07%). Majority of the FNACs were done in female patients with male patients constituting only two cases (2.25%). Youngest patient was 15 years old female and had a fibroadenoma on both histology and cytology. Oldest patient was 80 years old and she was diagnosed with invasive ductal carcinoma on histology and cytology.

As expected, benign lesions were more common in younger age groups while malignant lesions were more common in older age groups as has been observed in other studies.

In present study, inconclusive smears, which included both inadequate and indeterminate (C3 and C4 Categories) [4] smears, constituted 17.07% of total FNAC smears. Other studies have reported inconclusive (inadequate/indeterminate) smears in the range of 9%-25.5% [5-7]. Results in present study compare favourably with other studies.

Sensitivity of 94.59% and specificity of 100% was obtained in the present study. There is a wide range of sensitivity and specificity reported in different studies. It varies from 85-98.1% 100% for sensitivity and 88.9% – 100% for specificity. However, in most of these studies, sensitivity and specificity are more than 85%.

Present study compares well with these other studies in literature.

Table-3: Comparison Of Sensitivity And Specificity With Other Studies

Study	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Mehra *et al*., [8]	93.8%	100%	100%	91.4%
Gupta *et al*., [9]	85%	95.8%	89%	93.8%
Daramola *et al*., [10]	95.4%	88.9%	99.6%	*
Kochhar *et al*., [11]	98.1%	100%	100%	96.8%
Present Study	94.59%	100%	100%	94.74%

Note In some studies negative predictive value and accuracy was not mentioned

In present study, positive predictive value of 100 % and negative predictive value of 94.74% was calculated.

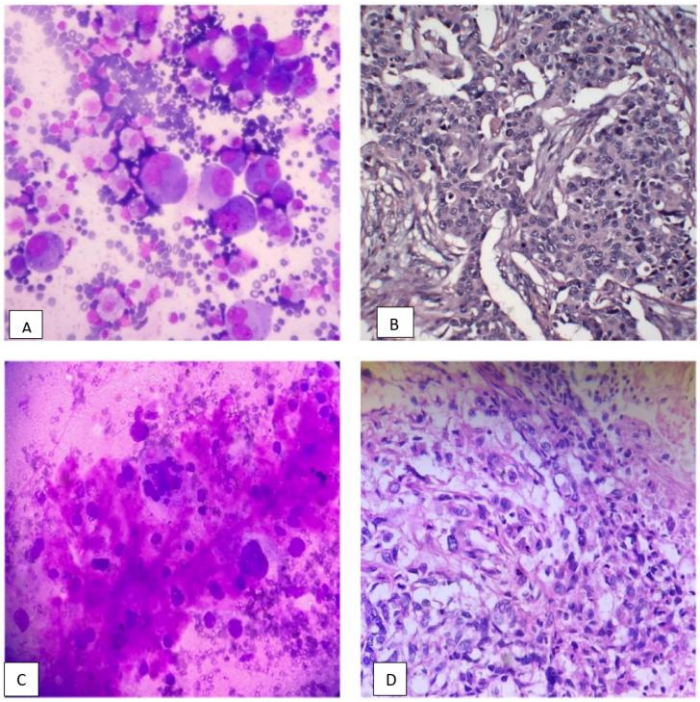
In various studies, Positive predictive value in the range of 89%-100% has been observed. Positive predictive value for malignant diagnosis in present study is within the range mentioned in various studies (Table-3). Negative predictive value in the literature has been in the range of 91.4-96.8%. Negative predictive value in present study is within the range mentioned in literature. Both positive and negative predictive value compare well with the best in literature.

Most common malignant diagnosis on cytology was invasive ductal carcinoma (97.14%) in present study. Other studies have also found invasive ductal carcinoma to be the commonest malignant diagnosis on cytology [9, 12]

Among the malignant diagnosis, one case was of ductal carcinoma in situ and one case was of papillary carcinoma. Both of these malignant lesions belong to so called grey zone lesions and are difficult to diagnose on cytology.

In case of malignant diagnosis, invasive ductal carcinoma showed agreement with histology in 91.17% of cases. In other cases, agreement with type of carcinoma was not seen. A study, involving interlaboratory comparison found that sub-classification of breast cancer on cytology is sometimes not possible. One case was of invasive ductal carcinoma with medullary features in which presence of lymphoid cells and marked cellular atypia lead to a diagnosis of invasive ductal carcinoma. Reason was that it was considered to be Grade 3 invasive ductal carcinoma and lymphoid infiltrate was considered to derived from stromal lymphocytes. Two cases of metaplastic carcinoma were diagnosed as invasive ductal carcinoma as on cytology, atypical stromal cells were not seen and only epithelial component was observed. One case of metaplastic carcinoma showed 100% agreement with histology, however the number is too small to arrive at satisfactory conclusion.

In the present study, two false negative cases were observed. This case proved to be invasive ductal carcinoma on histology and granular background actually represented necrosis. Few atypical cells with histiocyte like appearance were degenerating malignant cells. Second case was diagnosed as subareolar abscess on cytology. Histologically, it showed features of invasive ductal carcinoma. Cytology showed few squamous cells and neutrophils. No malignant cells were seen and it probably resulted due to non-representative sample.



Invasive Ductal carcinoma;
(A) Cytological smear showing poorly cohesive malignant epithelial cell with nuclear enlargement and pleomorphism singly and in clusters (Leishman Stain-400 x).
(B) Corresponding histological section showing sheets of malignant cells (H & E 400 x).

Metaplastic Carcinoma;
(C) Cytological smear chondrosarcomatous areas (dense brightly staining chondroid ground substance) (Leishman Stain 100 x).
(D) Corresponding histological section showing round to oval shape cells with nuclear pleomorphism, irregular nuclear membrane with mitosis(H. & E 400 x).

SUMMARY/CONCLUSION

To summarise – Breast FNAC shows a very high swnsitivity and specificity. Our results correlate well with results of other studies. Breast FNAC can be used as an initial diagnostic test in the workup of breast lesions in association with clinical examination and radiologicsal findings. Small number of False negative cases seen in our study.

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