Fine Needle Aspiration Cytology of Breast Lumps- A correlation with histopathology diagnosis

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Abstract

FNAC of breast lump is an important mode of diagnosis and forms a part of triple assessment. A retrospective study was undertaken at a tertiary hospital to know the feasibility and utility of fine needle aspiration of breast aspirates by comparing the diagnosis of malignancy with its histology. Of the 321 cases selected for the study, 93 cases were detected positive for malignancy. On reviewing, one case of false positivity and 5 cases of false negativity were detected. The sensitivity and specificity of FNAC for detecting malignancy was 98.27% and 99.49% respectively. Thus, we conclude that FNAC is a very important preliminary diagnostic test in palpable breast lumps and the results show a high degree of correlation with the final histopathology report.

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Introduction

FNAC of breast lump is an important mode of diagnosis and forms a part of triple assessment.[1] This method is accurate, easy to perform, reproducible and acceptable to the patient. FNAC is not only helpful in diagnosis and further planning of treatment but also helps in prognostication of the tumor.

The aims of this study were to know the feasibility and utility of fine needle aspiration of breast aspirates by comparing the diagnosis of malignancy with histology.

Materials and Methods

This is a retrospective study undertaken in pathology department of a tertiary hospital. Data based on breast aspirates done in the last four years were retrieved from records. Demographic data including age, sex, site, and clinical presentation were obtained from the requisition forms. Only those cases who underwent subsequent surgical intervention were selected for this study. FNAC findings were correlated with histopathology report. Sensitivity, specificity and test efficiency were calculated using standard statistical methods. FNAC was performed with 22G needle and 10 ml syringe. The cytology slides were spray-fixed using 95% alcohol and stained using Papanicolaou reagent. Observations - 321 cases of breast aspirates with histology correlation were obtained in 4 years period. The age of the patients ranged from 28-72 years. Benign lesions were common in the younger age group while malignant cases were seen in the older age group. Fibroadenoma was the commonest cause (in 130 cases out of 321) of breast lesions in the aspirates. The diagnosis of Benign breast disease, benign phyllodes and mastitis was given in 48, 24 and 15 patients respectively. Diagnosis of malignancy was given in 93 cases. The most common quadrant of involvement of malignant tumors was in upper outer quadrant (49 patients -52.6%) followed by the central quadrant (21 patients-22.5%). On correlating with histopathology diagnosis, false positivity was noted in 1 case while false negativity was seen in 5 cases (Table 1). Using the standard statistical formulae, the sensitivity and specificity for malignancy in this study were calculated to 98.27% and 99.49%. The sensitivity of FNAC for malignancy in this study was calculated using the formulae

Sensitivity = true positive/ (true positive + false negative) = 98.27% the specificity to detect malignancy was calculated using the formulae Specificity = true negative/ (true negative + false positive) = 99.49%. The positive predictive value of a test indicates the probability that the patient with a positive test has, in fact, the disease in question. The positive predictive value for malignancy was True positive x 100/ (True positive + false positive) = 92x100/ (92+1) = 98.92. The negative predictive value of a test indicates the probability of a patient with a negative test not having the disease in question. The negative predictive value for malignancy was = True Negative x100/ (true negative + false negative) = 223x100/ (223 + 5) = 97.8. The false positive case was of a 60 years woman who had carcinoma of breast 10 years back for which she underwent radical mastectomy with adjuvant chemotherapy. She had now presented with a small nodule at the operative scar. In the background of high index of suspicion and the presence of few atypical cells in the aspirates a diagnosis of recurrence of malignancy was offered(Fig. 2). On histology, however there was only atypical ductal hyperplasia seen in the ductal lining

along with chemotherapy induced fibrosis in the stroma of the lumpectomy specimen(Fig. 4).

In the false negative category, two cases of histology proven malignancy were missed on aspirates because the diagnosis of benign lesion was offered on paucicellular aspirates causing a procedural error. In one case, a small cluster of malignant cells was overlooked resulting in an observational error(Fig. 1, 3). In two cases, few atypical cells were seen on a background of cellular cohesive benign ductal epithelial cells. This was an interpretational error.

Table 1

Histology *Cytology*	**Benign**	**Malignant**	**Total**
Benign	223	5	*228*
Malignant	1	92	*93*

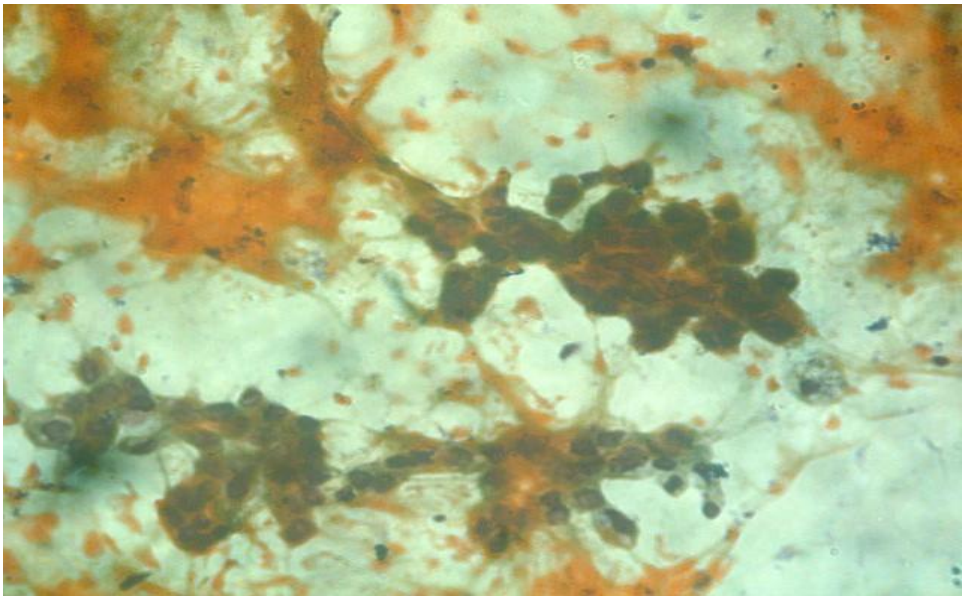

Fig. 1: A single cluster of malignant ductal epithelial cells in the background of benign ductal epithelial cells and cyst macrophages which was missed on prelimnary cytological examination

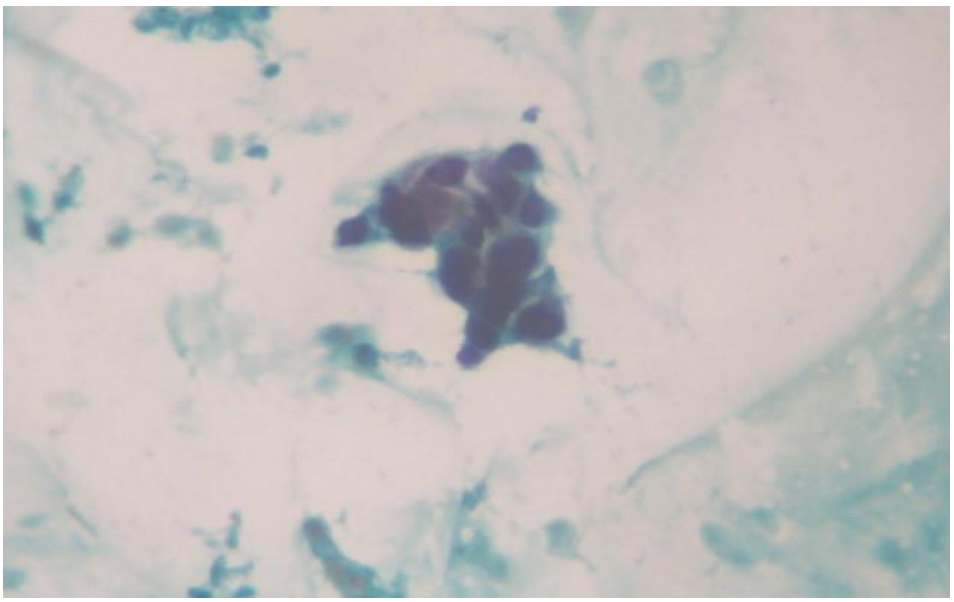

Fig. 2: Paucicellular aspirate of a post-chemotherapy patient showing atypical ductal cells which were interpreted as malignant causing a false positive diagnosis

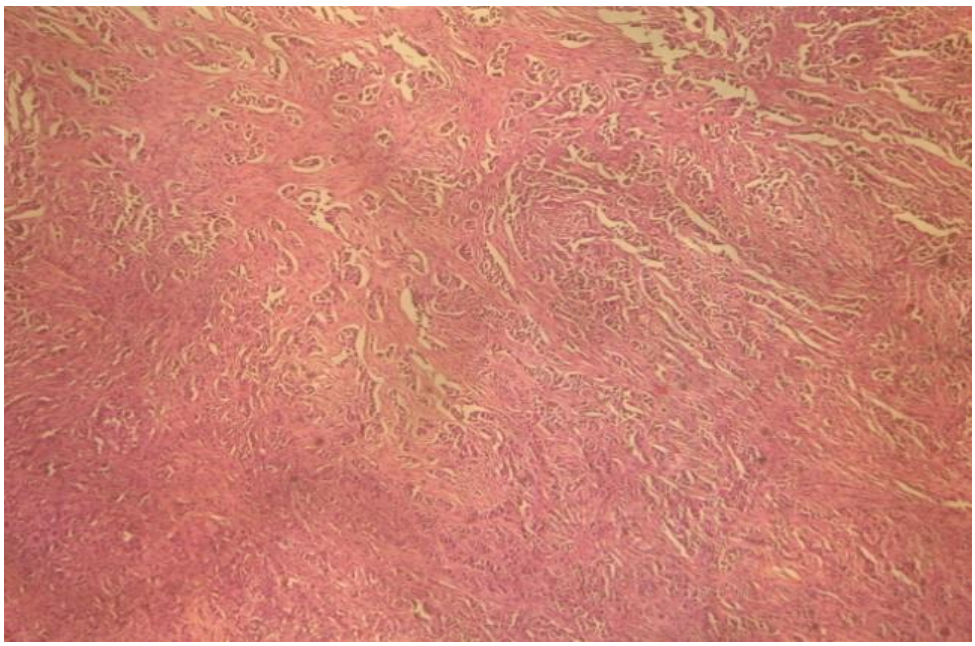

Fig. 3: H & E section of a tumour mass showing invasive ductal carcinoma

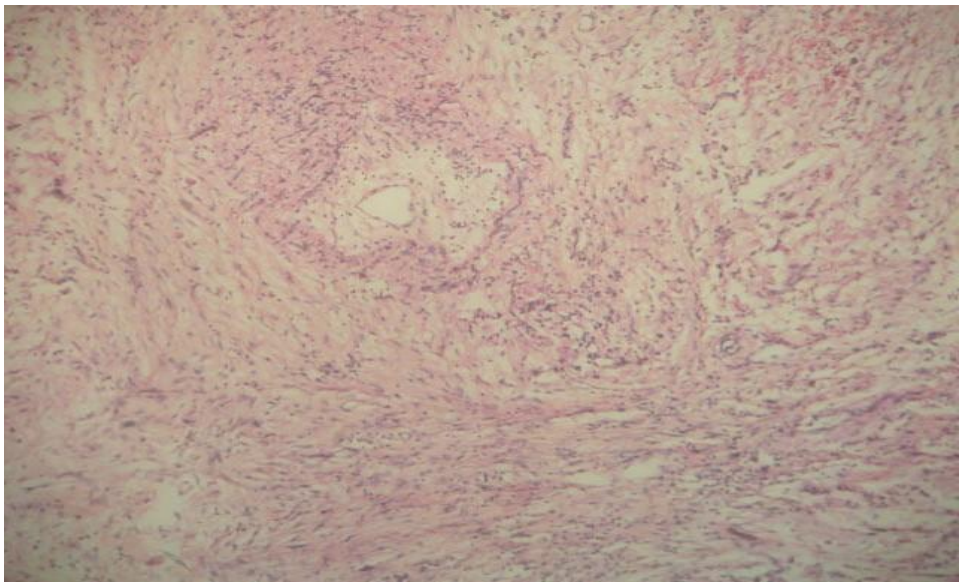

Fig. 4: H & E section of nodule on the scar site of a post- mastectomy women showing chemotherapy induced fibrosis

Discussion

A lump in the breast is a common complaint presenting in the surgical out-patient department of all major hospitals, with anxiety regarding a possibility of malignancy. Hence a quick diagnosis of a lump in the breast is essential. The observations of this study regarding the age distribution and location of the malignant tumors correlated with the study by Hussain et al,[2] Homesh[3] et al., Tiwari[4] and Ariga et al.[5] The commonest pathology found in our patients was fibroadenoma in130 patients (40%). In a study of 91 patients, Tiwari et al.[4] also reported fibroadenoma as the commonest pathology (39.6%). The primary aim of our study was to determine diagnostic correlation between fine needle aspiration cytology report and the final histopathology of the lump. In other words, how accurate and reliable was FNAC in diagnosing breast pathology which could help us in proceeding towards definitive excisional (and often mutilating) surgery without having an unpleasant surprise at the final histology report of the specimen. For centuries, conventional histology has remained the cornerstone of diagnostic pathology and was often described quite rightly as ‘the final court of appeal' in the presence of controversy. The obvious advantages of FNAC are in form of a rapid and cost effective, out-patient's

procedure, not requiring anaesthesia[1]. In relation to breast pathologies there are obvious advantages (apart from the more general ones) in the form of very few false positives in differentiating between benign and malignant lesions, as well as of being diagnostic and therapeutic in most breast cysts. Recurrence of carcinoma of the breast, too, can often be diagnosed. The conditions which have a risk of a false positive result are papillary lesions, atypical epithelial hyperplasia, regenerating epithelial atypia, and atypia of ductal epithelium in a cyst[1]. A risk of false negative results exists in low grade malignancies, small or complex proliferative lesions as well as in tumors with central necrosis or a small cell carcinoma. Silverman et al.[6] concluded that for palpable lesions, FNAC, as compared to core biopsy, appears to have more predictive value in confirming the diagnosis of carcinoma and locally recurrent disease.

In our study, there were 92 true positives, 5 false negatives, 223 true negatives and 1 false positives. As shown previously, sensitivity and positive predictive value of FNAC in our study were calculated as 98.27% and 98.92% respectively, while specificity and negative predictive value for malignancy were 99.49% and 97.8%, respectively.

The positive and negative predictive value of a test are the ones which measure the performance of a test by measuring its "predictive value" which reflects the diagnostic power of the test. They depend upon the sensitivity, specificity and disease prevalence. In this regard, Franco et al.[7], in his study of 300 patients on the utility of FNAC, reported a positive predictive value of 100% and a negative predictive value of 92%. A very large study of 1,297 patients done by Choi et al.[8], on correlation of FNAC and histopathology reports, found the positive predictive value to be 98.4% and a negative predictive value of 88%.

Conclusions

Fine-needle aspiration cytology is a patient friendly, easy, reliable, repeatable and simple diagnostic test. When performed by an expert pathologist, the diagnostic accuracy of FNAC is very high. A high sensitivity and a high positive predictive value proved that a positive FNAC in the breast means a definite diagnosis of the concerned pathology if compared with the final histology report. The high specificity and a high negative predictive value for malignancy illustrated the high accuracy of FNAC in the diagnosis of malignancy in the breast. Very importantly, a report negative for malignancy was highly accurate in predicting an absence of malignancy. Thus, there should be no hesitation in concluding that FNAC is a very important preliminary diagnostic test in palpable breast lumps and the results show a high degree of correlation with the final histopathology report.

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