

Correlation of Fine Needle Aspiration Cytology and Histopathology in Breast Lesions: Five Years Study

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Abstract: *This retrospective study aim at the correlation of Fine Needle Aspiration Cytology(FNAC) of Breast lumps with Histopathology. 461 cases were compared and found a sensitivity of 97.49%, specificity 99.23%, Positive Predictive value of 98.98% and Negative Predictive value of 98.11%. FNAC results were very well correlated with histopathology and it can be combined with ancillary techniques to increase the diagnostic accuracy.*

Keywords: FNAC, Correlation, Histopathology, Breast lumps

1. Introduction

Carcinoma of the breast is the most common non skin malignancy in women.^[1] According to the Surveillance Epidemiology and End results[SEER] data, 178,480 women were diagnosed with invasive breast cancer in 2007 and the number of women with breast cancer is expected to increase by about a third over the next 20 years. The age standardized incidence rate of breast cancer varies between 9 to 32 per 1,00,000 women. Breast cancer is the most common diagnosed malignancy in women worldwide (22%) and in India ranks second to cervical cancer.^[2] In India the increasing trend in incidence is reported from various registries of national cancer registry project and now India is a country with largest estimated number of breast cancer deaths worldwide.^[2] The most common symptoms reported by women are pain, a palpable mass or nipple discharge. Women should be educated and aware of the symptoms of Breast cancer. Screening can be done stringently to detect the cancer at the earliest. So we are in a main way to detect breast lesions earlier and to reduce the disease burden. Self breast examination, triple test which includes clinical examination, mammogram and Fine Needle Aspiration Cytology (FNAC). FNAC was first introduced by Martin and Ellis in 1930^[3] which is highly sensitive. FNAC is a rapid and reliable investigation which helps in planning of treatment. Molecular ancillary techniques and DNA pattern analysis can also be performed in FNAC. In this study we aim to analyze the sensitivity and specificity of FNAC and to correlate with that of biopsy results

2. Materials and Methods

It is a retrospective study carried out in the Department of Pathology, Government Vellore Medical College. All the FNAC results of breast lesions during the year January 2012 and December 2016 were collected. FNAC procedure was done after explaining the procedure to the patients. After strict aseptic precaution, by using 23 Gauge needle maximum of 3 passes were made and the slides were fixed in 70-80% alcohol and stained with routine Hematoxylin and Eosin stain. Smears were screened by two pathologists and the FNAC results were reported using a 5-tier system: C1 for

inadequate, C2 for benign, C3 for suspicious, probably benign, C4 for suspicious, probably malignant, C5 for malignant lesions. These FNAC results were correlated with available histopathology results

3. Literature Survey

FNAC is a reliable procedure and it is a valuable tool in the assessment of Breast lumps. The diagnostic accuracy of FNAC increases to 99% when it is combined with clinical and radiological examination.^[4] The diagnostic accuracy of FNAC further increases to 100% when it is combined with cell block preparation.^[5] Quality assurance statistics calculated by Adetola et al.,^[4] show a high accuracy of FNAC in breast lumps and they also found that Fibroadenoma was the commonest cause of false positive result and it may be due to frequent presence of occasional isolated intact cells with dissociation , epithelial nuclear atypia and high cellularity

Ramesh S et al., found a 100% diagnostic accuracy of FNAC in Gynaecomastia and malignancy in males. However Adnan K et al.,^[6] described some difficulties and pitfalls in FNAC such as inadequate samples, suspicious malignancies, overlapping features of different lesions. Wrong diagnosis can occur when cytological atypia from inflammatory lesions mimics malignancy.^[7] Apart from inflammatory lesions sclerosing adenosis and microglandular adenosis mimic malignant lesions.^[8] In spite of all these limitations FNAC is useful in the diagnosis of simple cysts, suspected recurrence. FNAC is also useful in the confirmation of inoperable, locally advanced cancer.^[9]

4. Problem Definition

A palpable breast lump is a common diagnostic problem in which excisional biopsy was done in the past. But in the current scenario FNAC combined with radiological imaging alleviates the problem. The trend towards more conservative surgery and strict treatment protocol has increased the importance of FNAC.

5. Results

2389 Cases of breast lumps were evaluated by FNAC during this five year period. Of these 461 cases subsequently had biopsies. The results of FNAC were described in Table:1.

Table 1: Distribution of Cytological Diagnosis

Category	FNAC
C1	5(1.08%)
C2	255(55.31%)
C3	5(1.08%)
C4	35(7.6%)
C5	161(34.9%)
Total	461

Of the 5 cases which were C1 in FNAC, 3 cases turned out to be Fibrocystic disease and one case was Fibroadenoma and the other case was acute mastitis. All the 255 cases which were benign (C2) in FNAC were consistent with histopathology result. Fibroadenoma is the most common benign lesions reported in our study. 5 cases which were reported as C3 category in FNAC confirmed as Fibroadenoma in biopsy. This also shows a 100% sensitivity. Out of 35 cases which were reported under C4 category in FNAC, 34 cases were found to be malignant and one case was turned out to be Proliferative Breast Disease with atypia. Out of 161 cases which were reported as malignancy, 160 cases were consistent and one turned out to be Proliferative Breast Disease with atypia. Of the 194 cases which were reported as malignant 191 cases were Invasive ductal carcinoma of NOS Type, 3 cases were Medullary carcinoma and one case was Lobular carcinoma.

Accuracy of FNAC was described in terms of malignancy and reported with a sensitivity of 97.49%, specificity 99.23%, Positive predictive value was 98.98%, Negative Predictive value was 98.11% and Efficiency was 98.48%

Table 2: Comparison of Cytology and Histopathology diagnosis

Cytological Diagnosis	No. of Cases	Histopathology Consistent	Histopathology Inconsistent
Benign	260	260(100%)	0
Malignant	161	160(97.14%)	1(0.02%)
Suspicious Of Malignancy	35	34(97.14%)	1(0.02%)
Others	5	0	5(100%)
Total	461	454(98.48%)	7(1.52%)

6. Discussion

The incidence of breast cancer is gradually increasing over the past 20 years due to valuable and accurate diagnostic methodologies and increased awareness. FNAC is a useful tool in the screening and diagnosis of Breast lumps. FNAC is an easy procedure by which we can avoid trucut and incisional biopsies and it can also be used in the follow up of benign lesions.

Fibroadenoma was the commonest benign lesion and Invasive Ductal Carcinoma was the commonest malignant lesion which was similar to Bhaskar et al.,^[10]

The sensitivity of 97.49% of this study was correlated with Bhaskar et al., which showed a sensitivity of 97.05%. Sensitivity of this study was high compared to Ramesh et al.,^[11] and Feichter GE et al.,^[12]

The specificity of the present study was well correlated with Feichter GE et al., and it is less than that of Bukhari et al.,^[13] Singh A et al.,^[14]

Positive predictive value of 98.98% is similar to Feichter et al., which showed 99.30% of positive predictive value and Sheryl LW et al.,^[15]

Negative predictive value of this study was higher compared to Hashemzadeh SH et al.,^[16] and Feichter GE et al.,

Efficiency of this study was higher compared to Kline TS et al.,^[17] and similar to Rocha PD et al.,^[18]

Percentage of malignant cases in the present study was 34.9% which was higher than Shreshta et al.,^[19] and the percentage of benign cases was 55.31% which was similar to Bhaskar T et al., and higher than Shreshta et al.,

Table 3: Comparison of Statistical analysis

Authors	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive value	Efficiency
Kline TS et al.,	89.95%	92.95%	85.33%	-	91.63%
Feichter GE et al.,	86.0%	99.30%	99.30%	85.0%	93%
Sheryl LW et al.,	90.0%	98.0%	98.0%	-	-
Arjun Singh et al.,	84.6%	100%	-	-	92.3%
Bukhari et al.,	98.0%	100%	97.0%	100%	98.0%
Our study	97.49%	99.23%	98.98%	98.11%	98.48%

7. Conclusion

Our study concludes that Breast FNAC is a reliable, easy, cheap and effective procedure for the diagnosis of Breast lumps. It reduces the need of core needle biopsies and very well correlated with Histopathological examination. FNAC differentiates non neoplastic from neoplastic by which it reduces the patient's anxiety and helps the Surgeons in planning the mode of treatment. It also helpful in the administration of Neoadjuvant therapy in the cases of malignancy

8. Future Scope

FNAC can be combined with cell block to increase the diagnostic accuracy. Immunohistochemistry and molecular techniques like PCR, FISH and genomic imprinting can be carried out in the cytology itself to define the cancer biology

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