Fine Needle Aspiration Cytology Of Breast Lumps With Histopathological Correlation: A Four Year And Eight Months Study From Rural India.

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Abstract

Fine Needle Aspiration Cytology is known to be quick, simple and effective way of diagnosing Breast Lumps since long. It is also a very good financial alternative to the surgical biopsy. This study was undertaken with the aim to calculate sensitivity and specificity of fine needle aspiration cytology as diagnostic method by correlating it with histopathological findings. This was a retrospective study done in department of pathology, Maharaja Agrasen Medical College from Sept. 2007 to April 2012. Fine Needle Aspiration Cytology was performed on 454 cases of Breast lumps and out of these, 56 cases were received in the department for histopathological examination. We categorized the lesions as Inflammatory, Benign, Atypical, Suspicious and Malignant on Fine Needle Aspiration and compared the result with the histological findings. We found that sensitivity and specificity of Fine Needle Aspiration were 96.42% and 100% respectively in identifying Benign and Malignant Breast Lumps. In conclusion, we found that Fine Needle Aspiration Cytology is very efficacious, simple, easy and cost effective method in diagnosing breast lumps.

INTRODUCTION

A significant proportion of women suffer from Breast Lump during their life. The main issue and worry while investigating such lump are to distinguish between benign and malignant lesion. Ideally, for this a multidisciplinary team approach is required inform of Triple Test which is considered gold standard.[1] Triple Test is combination of clinical examination, Mammography and Fine Needle Aspiration Cytology. However in developing countries and rural areas with limited Resources, this is not always possible. So Fine Needle Aspiration Cytology becomes first choice of surgeons for diagnosis.

Advantages of Fine Needle Aspiration Cytology include simplicity of test and minimal invasion during procedure.[2] Rural patients are generally ignorant about their health, so when they come to surgeon, results are required rapidly. Fine Needle Aspiration Cytology becomes a good choice in such cases as an alternative to open biopsy and core needle biopsy for diagnostic purpose.

Also Fine Needle Aspiration Cytology is cheap as compared to surgical biopsy.[3] This study assess the efficacy of fine needle aspiration cytology in diagnosis of Breast lumps at

Maharaja Agrasen Medical College, Agroha, Hisar.

METHODS AND MATERIAL

This Retrospective study was done at department of pathology, Maharaja Agrasen Medical College, Agroha for a period of four years and eight months. All the patients who had Fine Needle Aspiration Cytology of Breast lumps with subsequent histological confirmation over this period were included in the study.

Aspiration was done by Pathologist under all aseptic Precautions using 10 ml syringe with 23 G needle. Smears were stained with H&E, PAP and Giemsa stains.

Following cytological assessment, smears were categorized under five groups-Inflammatory, Benign, Atypical, Suspicious and Malignant. Histopathological slides of corresponding cytological cases were correlated. Based on these findings sensitivity, specificity, positive predictive value and negative predictive value of Fine Needle Aspiration Cytology as a test were calculated.

OBSERVATIONS & RESULTS

A total of 454 Fine Needle Aspiration Cytology of breast Lumps were done during this period, out of which only 56

(12.3%) had histological confirmation

Table-1 Shows the distribution of all Fine Needle Aspiration Cytology results according to five categories for which histological correlation was available.

Figure 1

Table 1: Distribution of cases according to different categories.

S. No.	Categories	No. of Cases
1	Inflammatory	03
2	Benign	29
3	Atypical	01
4	Suspicious	02
5	Malignant	21
6	Total	56

Figure 2

Table 2: shows the correlation of histological diagnosis with Fine Needle Aspiration Cytological result of all 56 cases

Sr. No.	Categories	FNAC	Histology
1	Inflammatory	03	03
2	Benign	29	28
3	Atypical	01	-
4	Suspicious	02	-
5	Malignant	21	25
6	Total	56	56

Out of 25 confirmed malignant cases, 21 cases were given malignant on cytology, two cases as Suspicious for Malignancy, one case as Atypical and one as Benign. There was no Benign confirmed case on histology which was given Malignant on cytology report.

The statistical test used in interpretation of the result obtained in our study were the determination of sensitivity of Fine Needle Aspiration Cytology as a diagnostic procedure for entire study, specificity of Fine Needle Aspiration Cytology in relation to Malignant lesions, positive predictive value of Fine Needle Aspiration Cytology as a diagnostic procedure for the entire study and negative predictive value in relation to Malignant lesions. In our study, of the 56 patients who underwent Fine Needle Aspiration Cytology, in 54 the Fine Needle Aspiration Cytology report matched with the final histopathology report

Figure 3

Fnac/Histo Correlation	Diseased	Not Diseased
Positive	54	-
Negative	2	-
Total	56	-

Out of the 2 patients, in which FNAC did not match, one showed a benign proliferative breast disorder and the other showed atypical hyperplasia on Fine Needle Aspiration Cytology. On histopathological examination both showed duct carcinoma.

Thus there were 54 true positive, 2 false negative and no false positive and no true negative cases in our study(suspicious cases are considered under true positive). Based on these findings, calculations were done as shown below for all parameters.

The sensitivity of a test is the ability of a test to identify correctly all those who have the disease. In our study the sensitivity would be

Sensitivity of Fine Needle Aspiration Cytology= (True positive / True positive + false negative)
=54/54+2x100=96.42%

The specificity of a test is the ability of the study to identify correctly the candidates who do not have the disease. In our study, only females with a lump in their breast were selected. Therefore, in purely statistical terms, there were no normal individuals i.e., those women with normal breasts were not selected. Hence, the ability of Fine-Needle Aspiration Cytology as a diagnostic test to identify correctly those individuals not having disease (i.e., true negatives) could not be calculated since in every patient in our study, Fine-Needle Aspiration Cytology would reveal some result.

Hence, to give a wider spectrum to our interpretation of the results, we calculated the specificity of Fine-Needle Aspiration Cytology for malignant lesions against benign lesions i.e., "how specific is Fine-Needle Aspiration Cytology as a test in the diagnosis of malignancy in a breast lump?"

Specificity of Fine Needle Aspiration Cytology = (True Negative / True Negative + False positive) = 31/31+0x100=100%

The positive predictive value of a test indicates the probability that the patient with a positive test has, in fact,

the disease in question

Positive Predictive value of Fine Needle Aspiration = (True Positive / True Positive + False Positive) = 54/54+0x100=100%

It should be noted that this positive predictive value is for Fine-Needle Aspiration Cytology as a diagnostic test for all patients.

The negative predictive value of a test indicates the probability of a patient with a negative test not having the disease in question. As stated above in our results, we had no true negatives. In the absence of true negatives, the predictive value of negative test is actually zero, since the numerator becomes zero. As with the calculation of specificity for malignant lesions, we broadened the interpretation of our results by calculating the negative predictive value of the test for malignant lesions.

Negative Predictive value of Fine Needle Aspiration = (True negative / True negative + False negative) = 31/31+2x100=93.4

So in our study, sensitivity and positive predictive value of Fine Needle Aspiration Cytology were 96.42% and 100% respectively, while specificity and negative predictive value for malignancy were 100% and 93.4% respectively.

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 possible malignancy being extremely common. Hence a quick diagnosis of lump in the breast is essential. Considering patients' comfort, lack of requirement of anaesthesia, rapid analysis and reporting, and an absence of false positive results makes Fine Needle Aspiration Cytology an ideal initial diagnostic modality in Breast Lumps. [4]

This study was undertaken to assess the use of Fine Needle Aspiration Cytology as primary method for diagnosis of breast lumps. Fine Needle Aspiration Cytology has been proved to be highly efficacious method in diagnosis of palpable breast lesion in this study. The sensitivity of 96.42% and specificity of 100% obtained in our study were in accordance to sensitivity of 77-99% and specificity of 92-100% reported in various studies [5-11] as shown below by the table 3

Figure 4

Table 3: Shows Results of Various Studies

Name of Study	Sensitivity	Specificity	Positive Predictive value	Negative Predictive value
Hussain MT[5]	90.9%	100%	-	-
Jayaram et al [6]	97.4%	92.4%	-	-
Muhamed et al [7]	90.6%	100%	100%	99%
Rubin et al [8]	87%	100%	100%	89%
Ishikawa et al [9]	86.3%	98.2%	97.9%	-
Ariga et al [10]	99%	99%	99%	99%
Choi et al [11]	77.7%	99.2%	98.4%	88%

Fine Needle Aspiration Cytology sensitivity and specificity is also technique dependent, better results being obtained with free hand aspiration as performed in this study when compared to stereo tactic Fine Needle Aspiration Cytology as noticed by Robinson and McKee. [12]

During our study, cases with Suspicious and Atypical results were found to be Breast Carcinoma following biopsy. This emphasizes need for further evaluation of such lesions, which often prove to be malignant. [10]

One case which was diagnosed benign on cytology and turned out to be malignant on histology had prominent tubular differentiation. Such cases can be a problem on Fine Needle Aspiration Cytology as epithelial atypia may be minimal, but presence of epithelial fragments with an angular or tubular shape with small number of bare nuclei in the background should help in suggesting the diagnosis. [2]

In conclusion, we recommend that Fine Needle Aspiration Cytology is very effective, safe, minimal invasive and cost effective diagnostic method for diagnosing breast lumps specially in developing nations.

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