Original Research Article

A Hospital Based Comparative Assessment of the Diagnostic Accuracy of Fine Needle Aspiration Cytology (FNAC) and with Histopathological Correlation in Patients with Detectable Breast Lesions

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Abstract

Aim: To compare the diagnostic accuracy of fine needle aspiration cytology (FNAC) and with histopathological correlation in patients with detectable breast lesions.

Methodology: The study was conducted in the Department of Pathology, ANMMCH, Gaya, Bihar for six months. During this period, 100 fine needle aspiration were performed for various breast lumps. The FNAC was carried out using 23 Gauge needle and 10 ml disposable syringe for aspirating the material from the breast lump. The cytological smears were fixed in 95% alcohol and stained with Haematoxylin and Papanicolaous stains. The surgical specimens for histopathological examination were fixed in 10% formal saline. Several sections were taken from appropriate sites for processing and paraffin embedding. The section from each block were cut in 04 micron thickness and stained with Haematoxylin and Eosin. The slides were seen under the microscope and graded accordingly.

Results: Out of the 100 FNACs, cytological diagnosis was correlated with histopathological diagnosis in 100 patients. Sex distribution included 97% females and 3% males. The age of patients ranged from 10-70 yrs. In FNAC, 95% cases were labelled as benign and 5% cases were malignant. The correlation between FNAC and histopathological examination for the sensitivity, specificity and positive predictive value were calculated. The false positives were zero and 3% were false negative cases in the study. The cytohistological correlation of 100 patients, out of which 8% patients had the final diagnosis of malignancy and 92% patients had benign conditions. In the present study, the sensitivity of FNAC was 50%, specificity 100% and the positive predictive value of 100%, negative predictive value 97% and the overall accuracy of the study was 96.1%.

Conclusion: In patients with a palpable breast lump fine needle aspiration cytology can help to rule out a malignant lesion. This can hence afford as a cost –effective method in diagnosing breast lesions. Also due to its good tolerability and high diagnostic accuracy the patient need not be subjected to further evaluation which helps in the psychological well-being of the patient.

Keywords: Aspiration, Cytopathology, Histopathology, Malignancy.

Introduction

Breast lump is the clinical presentation of numerous breast diseases ranging from innocent benign cysts to malignant lesions. Distinction of benign from malignant is of paramount importance for patient care and proper management [1]. Breast cancer is the most common site specific cancer in women and is the leading cause of death from cancer for women of age 40 to 44 year [2, 3]. It accounts for 33% of all female cancers and is responsible for 20% of the cancer related deaths in women [3]. However, it is seen that misdiagnosed breast cancer accounts for the greatest number of malpractice claims for errors in diagnosis [3].

Presently a wide range of diagnostic modalities are available for the evaluation of breast lump. Conventional open biopsy, considered to be the gold standard for confirming diagnosis, has significant morbidity, is costly and time consuming. Fine Needle Aspiration Cytology (FNAC) is one of the important components of 'triple approach', which has been widely accepted for the preoperative diagnosis of breast lesions [4]. It is a multi-disciplinary approach that includes analysis of clinical and radiological findings in conjunction with FNAC features, to diagnose the breast lesions and to determine the best management plan for the patient. FNAC can reduce the number of open breast biopsies [5].

Scope of FNA has now extended into identifying the subtypes of benign, malignant lesions and residual disease for the purpose of planning the therapeutic protocol and eventual follow-up [6, 7]. Fine needle aspiration cytology (FNAC) of breast lump is accepted and established method to determine nature of lump with sensitivity ranging from 82%-97.5% and specificity >99% [8, 9].

Fine needle aspiration cytology (FNAC) is a relatively simple, reliable, atraumatic, economical and complication-free technique for the evaluation of mass lesions. It can be facilely reiterated if an adequate aspirate is not obtained [10]. FNAC is now a well-established technique for the investigation of women with suspected breast carcinoma [11]. Fine-needle aspiration (FNA) has become one of the most important diagnostic tools for palpable breast masses and false-negative results have become a major concern. However, cytopathologists agree in certain parameters to the adequacy of an FNA specimen [12].

It has been shown that FNAC has reduced the number of open biopsies because of its high diagnostic sensitivity and specificity. However, open biopsy is still preferred in some centers due to lack of expert cytologists [13]. The biopsy of the palpable breast lesion predicated on the histological study of the tissue specimens can provide all the reliable information to the surgeon and oncologist for modern therapeutic strategies as part of the decision-making regarding the patient's treatment. This technique permits the eventual use of neo-adjuvant therapy [14]. Our aim is to compare the diagnostic accuracy of fine needle aspiration cytology (FNAC) and with histopathological correlation in patients with detectable breast lesions.

Methodology

The study was conducted in the Department of Pathology, ANMMCH, Gaya, Bihar for six months.. During this period, 100 fine needle aspirations were performed for various breast lumps. The FNAC was carried out using 23 Gauge needle and 10 ml disposable syringe for aspirating the material from the breast lump. Three or four dry clean slides were used for preparing the smear. The slides were labelled with glass pencil and were air dried. The cytological smears were fixed in 95% alcohol and stained with Haematoxylin and Papanicolaous stains.

The surgical specimens for histopathological examination were fixed in 10% formal saline. The grossing and the cut section findings were noted. Several sections were taken from appropriate sites for processing and paraffin embedding. The section from each block were cut in 04 micron thickness and stained with Haematoxylin and Eosin.

The Patient were explained about the FNAC procedure in complete detail. The procedure was performed without any anesthesia by a trained pathologist. The lump over the doubtful area was cleaned with spirit, the lump was palpated with hand and fixed. The plunger of the needle was retracted and many passes were done till the sufficient material was obtained in the needle hub. The air was drawn out in the syringe and after attaching the needle, the aspirated material was scattered on the glass slide and the smear was made. The smear was fixed with 95% alcohol and later stained with haematoxylin and eosin. The slides were seen under the microscope and graded accordingly.

Results

A total of 100 fine needle aspirations on breast lump were performed over a period of two years. Out of the 100 FNACs, cytological diagnosis was correlated with histopathological diagnosis in 100 patients. Sex distribution included 97% females and 3% males. The age of patients ranged from 10-70 yrs. In FNAC, 95% cases were labelled as benign and 5% cases were malignant.

Table 1: Patient age (in years)

Age (in years)	%
10-19	14
20-29	45
30-39	21
40-49	10
50-59	5
60-69	3
>69	2

Out of 100 surgical specimen which were reviewed with HPE, 66% patients had fibroadenoma, 3% patient had phylloid tumor, 2% tubular adenoma, 7% fibrocystic disease of breast, 9% patients had inflammatory or breast abscess, 2% patient had gynaecomastia and in 3% cases no opinion was given. Out of the 8% malignant cases in HPE, 1% patient had a diagnosis of ductal cell carcinoma and 7% patients infiltrating ductal carcinoma. Benign lesions involved patients in second & third decades of life. The malignant lesions were reported in fifth and seventh decades. The most common benign lesion was fibroadenoma with maximum incidence in second & third decades and followed by breast abscess and then fibrocystic disease of breast with maximum incidence in fourth decade. In the malignant cases, the most common was infiltrating ductal cell carcinoma with maximum incidence in fifth & sixth decades.

Table 2: Distribution of cases in HPE

Histopathology	%
Fibroadenoma	66
Fibrocystic disease of breast	7
Breast abscess	9
Gynecomastia	2
Phylloid tumor	3

Tubular adenoma	2
Ductal cell carcinoma	1
Infilterating ductal carcinoma	7
No opinion	3

Table 3: Distribution of cases in FNAC

FNAC	%
Fibroadenoma	61
Fibrocystic disease of breast	5
Breast abscess	9
Benign breast disease	18
Malignant	5
Fibrofatty tissue	2

The correlation between FNAC and histopathological examination for the sensitivity, specificity and positive predictive value were calculated. The false positives were zero and 3 were false negative cases in the study. The cytohistological correlation of 100 patients, out of which 8% patients had the final diagnosis of malignancy and 92% patients had benign conditions. In the present study, the sensitivity of FNAC was 50%, specificity 100% and the positive predictive value of 100%, negative predictive value 97% and the overall accuracy of the study was 96.1%.

Table 4: Percentage of benign and malignant cases in FNAC and HPE.

Malignancy	Cytopathology	Histopathology
Benign	95	92
Malignant	5	8

Discussion

FNAC is an easily diagnostic method for determining the causes of a breast lesion. Its success is due to its accuracy and cost effectiveness for a breast lump. Therefore, it has many advantages for patients and physicians [15]. Breast cancer is one of the most frequently occurring clinical conditions worldwide [16]. Although there has been little success in controlling the disease, it is of general accord that a confident preoperative diagnosis should be made before surgery, thus making FNAC a reliable diagnostic tool. It is a cheap and complication-free technique. The cost is economical, equipment is low-priced and the technique is relatively easy [17]. The procedure can also be performed anywhere. Furthermore, FNAC has a high accuracy, making it a reliable procedure [16]. The results can be obtained quickly and it is less invasive compared to tissue biopsy.

Pinto et al. [20] carried out 58 FNACs of breast with subsequent histopathology, the youngest patient was 12 years old & the oldest patient was 82 years old. In their study fibroadenoma was the most common benign lesion in female and gynecomastia was the most common lesion in male. In the present study, our observation is similar. In another study by Tiwari M et al [21], 21 cases of histopathological correlation, the commonest cause of breast lump was fibroadenoma accounting (39.5%) of total cases and Invasive/infiltrating ductal carcinoma being 6.6%. All cases of malignancy in FNAC proved to be malignant lesion by biopsy. In one case, FNAC showed only inflammatory & necrotic material, which was later proved to be malignant by biopsy.

In another study done by Yalavarti S et al [22], 56 patients were studied with cytopathological correlation, of which benign lesion, 45% were reported in third decade and the maximum number of malignant lesion 44% were reported in fifth decade. Our studied shows benign lesions reported more commonly in second to third decade and the malignant lesion were more common in fifth to sixth decade.

In the present study, the sensitivity of FNAC was 50%, specificity 100% and the positive predictive value of 100%, negative predictive value 97% and the overall accuracy of the study was 96.1%. Reinikainen et al [23] had a series of 84 patients where they have found sensitivity and specificity of FNAC to be 92 % and 83 % respectively. In a study done by Philip J Drew et al [24], sensitivity of fine-needle aspiration cytology was 79.1% and specificity of 97%.the specificity is similar to our study. Al-Mulhim et al [25], in a study to assess accuracy of the "triple test" found that fine-needle aspiration cytology (FNAC) showed 91.7% sensitivity, 100% specificity and 100% positive predictive value. 26]

Conclusion

In patients with a palpable breast lump fine needle aspiration cytology can help to rule out a malignant lesion. This can hence afford as a cost –effective method in diagnosing breast lesions. Also due to its good tolerability and high diagnostic accuracy the patient need not be subjected to further evaluation which helps in the psychological well-being of the patient. But, FNAC results when negative or suspicious should be correlated with clinical examination and imaging findings to prevent false positives and false negatives.

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