**Original Research Article**

# Correlation of Fine Needle Aspiration Cytology and Histopathology in Palpable Breast Lesions

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**Abstract**

**Background:** This study compared the diagnostic value of fine needle aspiration cytology (FNAC) with the gold standard of histopathological diagnosis in breast lesions.

**Methods:** From April 2022 to September 2022, the Pathology Department of Patna Medical College and Hospital, Patna, Bihar, worked in partnership with the Surgery Department to carry out this descriptive cross-sectional study. 88 FNAC of palpable breast lesions were carried out, and their associated histological findings were compared. Age of the patient, the location of the breast lesion, and other pertinent observations were documented on a proforma that had been previously developed. Slides were prepared, processed, and stained for cytology and reported by a cytopathologist. In order to conduct a diagnostic and histological investigation, biopsies were processed. Breast lesions in all female patients of any age were included, and those for which there was no histological report were omitted. The mean and standard deviation were calculated using the Statistical Package for Social Sciences (SPSS) version 20. Frequencies with percentages were also calculated. Additionally, algorithms were used to calculate the specificity, sensitivity, diagnostic accuracy, positive predictive value, and negative predictive value.

**Results:** The age range in this study was 16 to 80 years, with a mean age of 34.44±21.57 years. Ages 26 to 35 were the most prevalent, followed by 36 to 45. In this investigation, the metrics for sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were each 83.33%, 100%, 100%, and respectively.

**Conclusion:** FNAC breast is a simple, less intrusive, affordable, quick, and nearly accurate diagnostic technique for both palpable and non-palpable breast lesions.

**Keywords:** FNAC; Breast lesions; Mastitis; Fibroadenoma; Invasive ductal carcinoma

## Introduction

The significant shift in clinical practice over the past ten years has seen the increase in patients being referred for preoperative diagnosis of breast lumps using fine needle aspiration cytology (FNAC). This pattern is brought on by patients' growing sensitivity to conservative medical care [1]. In extensive series of investigations, the FNAC has a

sensitivity of 90–95% for breast diagnosis. The sensitivity goal should not be less than 95%, and a cytopathologist's knowledge can help you reach that goal [2]. The accuracy of breast FNAC diagnosis is influenced by a number of variables, including competence, experience, preparation, and smear interpretation. Experience can help you become more accurate. The cytopathologist who read the FNAC should also report histology for the best outcomes [3,4].

One of the typical observations in females at any age is a breast lump. Depending on the patient's budget, a variety of non-invasive and invasive methods are available to support the clinical diagnosis [5].

However, while accurate, biopsy is often needless and mutilating. The easiest, most economical, non-invasive, quick, and inexpensive diagnostic method is FNAC. The benefit of FNAC is that they are easy to conduct, quickly accepted by the patient, and cosmetically undetectable [6,7].

When a diagnosis of benign disease is made, conservative treatment is usually necessary; surgery is typically not necessary. In contrast, when a diagnosis of malignancy is made, preoperative planning, discussion, and proper management with minimal morbidity are made possible [8]. Fine Needle Aspiration Cytology is a highly accurate procedure in many series when performed by an experienced hand. This guarantees its dependability in everyday practise. Definitive diagnosis is occasionally not achievable on FNAC alone, either due to FNAC's inherent limits or occasionally due to a lack of access to sufficient material. In certain circumstances, FNAC may be presumed. FNAC does not take the place of tru-cut or open biopsy. Histological examination of tissue is necessary for the final diagnosis [9]. The present study evaluates the sensitivity, specificity, diagnostic accuracy, positive predictive value

and negative predictive value of FNAC in cases of palpable breast lesions and their correlation with histological diagnosis [10]. Fine Needle Aspiration Cytology because of its diagnostic accuracy has significantly reduced the number of open breast surgeries.

However, due to the paucity of cytologists or the fact that breast FNAC has a sensitivity range of 80% to 98% and a specificity of 99-100%, open biopsy is still the preferred treatment in most regions. The combined use of the triple test (FNAC, mammographic results, and clinical findings) has significantly reduced the rate of incorrect breast cancer diagnosis [11]. This study sought to determine FNAC's diagnostic value in breast lesions.

## Material and Methods

From April 2022 to September 2022, Department of Pathology, PMCH, Patna, Bihar, in conjunction with the surgery department at Patna Medical College and Hospital, undertook this descriptive cross-sectional study. 88 FNAC reports of palpable breast tumours were completed, and their associated histopathology findings were compared. On a pre-designed proforma, the patient's age, the location of the breast lesion, and other pertinent data were noted. Disposable 10 ml syringes were used to perform FNAC. Giemsa and H&E stain were applied to the prepared slides, which were then mounted, labelled, and reported by a cytopathologist. According to the five tier reporting method of breast cytology (C1-C5), the lesions were divided into five categories: insufficient, benign, suspicious likely benign, suspicious likely malignant, and C5. In order to conduct a diagnostic and histological investigation, pertinent biopsies were processed. Breast lesions in all female patients of any age were included, and those for which there was no histological report were omitted. The frequencies with percentages and means with standard

deviation were computed using SPSS-20. Additionally, the following formulas were used to compute specificity, sensitivity, diagnostic accuracy, positive predictive value, and negative predictive value.

Sensitivity = TP/TP+FN × 100.

Specificity = TN/TN+FP × 100.

Positive Predictive Value = TP/TP+FP × 100.

Negative Predictive Value = TN/TN+FN × 100

Diagnostic Accuracy = TP+TN/TP+FN+FP+TN×100.

False Positive Rate=FP/FP+TP×100.

False Negative Rates=FN/FN+TP×100.

TP = True Positive, TN = True Negative, FN = False

Negative, FP = False Positive.

## Results

The age range in this study was 16 to 80 years, with a mean age of 28.58 17.34 years. Ages 26 to 35 were the most prevalent, followed by 36 to 45. Among the 88 instances on FNAC, 64 (72.72%) were classified as benign (C-2) and 17 (19.31%) as malignant (C-5). There were no cases of poor reporting. Four (4.54%) of the suspected cases were classified as suspiciously probable malignant, while three (3.40%) were evaluated as suspicious possibly benign.

The final results did not include these C-3 and C-4 cases. There were no FP cases, but one FN case (C-2) that was initially described as benign but later revealed to be medullar carcinoma.

64 (79.01%) of the 81 breast FNAC definitive diagnoses were confirmed as benign by histopathology and represented TN cases, while 17 (20.98%) cases were diagnosed by FNAC as malignant and confirmed by histopathology as representing TP cases.

The sensitivity (94.44%), specificity (100%), positive predictive value (100%), negative predictive value (98.46%), and diagnostic accuracy (98.78%) for this investigation of breast FNAC were all high. False Negative Rate was 1.53%, while False Positive Rate was 0%.

**Table 1: Cytological correlation with gold standard of histopathology of breast lesions (n=81)**

| FNA Cytology | Histopathology | |
|---|---|---|
| | **Benign** | **Malignant** |
| Benign | 64 (79.01%) TN | 01 (1.23%) FN |
| Malignant | 00 (0%) FP | 17 (20.98%) TP |

**Table 2: Cytological diagnosis of breast lesions based on (C1-C5) five tier system (n=88)**

| Cytologic category | No. of cases | Percentage |
|---|---|---|
| C-1 (Inadequate) | 00 | 00 |
| C-2 (Benign) | 64 | 72.72% |
| C-3 (Suspicious probably benign) | 03 | 3.40% |
| C-4 (Suspicious probably malignant) | 04 | 4.54% |
| C-5 (Malignant) | 17 | 19.31% |
| Total | 88 | 100% |

**Table 3: Histopathological diagnosis of palpable breast lesions (n=88)**

| Breast lesion type | Histologic diagnosis | No. of patients | Percentage | Cumulative percentage |
|---|---|---|---|---|
| Inflammatory | Acute mastitis | 03 | 05(5.68%) | 67(76.14%) |
| | Chronic mastitis | 01 | | |
| | Chronic granulomatous mastitis | 01 | | |
| Benign | Fibroadenoma | 45 | 62(70.45%) | |
| | Fibrocystic disease | 05 | | |
| | Lactating adenoma | 05 | | |
| | Ductal papilloma | 04 | | |
| | Duct ectasia | 03 | | |
| Malignant | Invasive ductal carcinoma | 15 | 21(23.86%) | 21(23.86%) |
| | Invasive lobular carcinoma | 04 | | |
| | Mucinous carcinoma | 01 | | |
| | Medullary carcinoma | 01 | | |
| Total | | 88 | 100% | 100% |

## Discussion

Breast lump is a common clinical diagnosis. Excisional biopsy was the preferred method in the past. The use of FNAC has a number of preoperative advantages over open biopsy, including quick diagnosis, a clear treatment plan with the patient's informed consent, the avoidance of unnecessary procedures, particularly in benign instances, and a decreased requirement for frozen sections [11]. The main goal of FNAC is to identify cancerous lesions before surgery and prevent unnecessary treatment on benign lesions. Currently, breast FNAC is a valid first-line diagnostic technique for evaluating breast lesions, including those that are palpable and those that are not [12].

The age range in this study was 16–80 years, with a mean age of 28.58±17.34 years. Ages 26 to 35 were the most prevalent, followed by 36 to 45. The age range in a research by Rathi et al [13]. was 16 to 64 years. The largest age range was between 30 and 39. The age range in a study by Vasavada et al. was 12-73 years, with the typical age group being 20-40 years; the study's sensitivity, specificity, positive predictive value, and negative predictive value were all 100%.

Studies by Vasavada et al., Pandy et al., Daramola et al [16]. Chauhan et al [17]. Srilakshami et al., Mehra et al., and Paramesh et al. reveal that the sensitivity was, respectively, 97.7%, 100%, 95.4%, 96.6%, 95.23%, 93.8%, and 95.45%. In the investigations mentioned above, the specificity was 98.8%, 89.5%, 88.9%, 100%, 100%, and 100%, respectively.

The positive predictive value was 97.7%, 95.3%, 99.6%, 100%, 100%, and 100% in investigations by Vasavada et al, Pandy et al, Daramola et al, Chohan et al, Srilakshami et al, Mehra et al, and Paramesh et al, respectively [18-21]. According to the research by Vasavada et al., Pandy et al., Srilakshami et al., Mehra et al., and Paramesh et al., the negative predictive value was 98.8%, 100%, 95.23%, 91.45, and 96.06%, respectively.

The percentages of sensitivity, specificity, positive predictive value, and negative predictive value are very consistent throughout all of these trials. The accuracy of diagnosis was 98.78%. False Negative Rate

was 1.53%, while False Positive Rate was 0%.

The diagnostic accuracy of the aforementioned studies is essentially the same. Most of the research listed above had false positive rates of zero, while studies by Vasavada *et al*. and Bukhari *et al*. had false positive rates of 2.27% and 2.38%, respectively. With the exception of Mehra *et al* high's rate and Bukhari *et al* zero's rate, the false negative rate was nearly the same in the studies mentioned above.

## Conclusion

FNAC breast is a simple, less intrusive, affordable, quick, and nearly accurate diagnostic technique for both palpable and non-palpable breast lesions.

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