Evaluation of Benign Breast Lesions Using Cytology and Association with Histopathology

Kumari Poonam[1], Rachana[2*], Om Prakash Dwivedi[3]

[1]Tutor, Department of Pathology, Nalanda Medical College and Hospital, Patna, Bihar
[2]Tutor, Department of Pathology, Nalanda Medical College and Hospital, Patna, Bihar
[3]Professor and Head of Department, Department of Pathology, Nalanda Medical College and Hospital, Patna, Bihar

Abstract:

Background: FNAC is now a commonly used method for identifying breast lesions because of its safety, ease of use, and high diagnostic accuracy. The purpose of this study is to evaluate the accuracy of benign breast lesion diagnosis using fine needle aspiration cytology (FNAC). In order to assess the diagnostic efficacy of FNAC, women with benign breast lesions identified by FNAC underwent histological analysis.

Methods: From January 2019 to June 2020, this study was carried out in the Pathology Department of the Nalanda Medical College and Hospital, Patna, Bihar. 180 female patients, ages 10 to 60, are enrolled in the NMCH, Patna, Bihar, outpatient department.

Results: With a 96.7% diagnostic accuracy for benign breast lesions, FNAC revealed 180 benign cases, of which 174 were benign. In contrast, 3 cases of fibrocystic disease and 3 cases of mastitis, respectively, had infiltrating ductal carcinoma.

Conclusion: FNAC is a reliable test for detecting and managing benign breast lesions because cytology and histology are associated.

Keywords: Breast Lump, FNA, Benign Breast disease.

Introduction

Because FNAC is a straightforward, safe procedure with good diagnostic accuracy, it has gained widespread acceptance as a diagnostic tool for breast lesions worldwide [1]. Its success can be attributed to its high accuracy for a breast lump, cost effectiveness, and time saving. As a result, it is believed to benefit both patients and surgeons greatly [2]. Breast pathologies come in a great variety. It is hypothesized that inflammatory and nonproliferative breast lesions do not raise the risk of cancer.

A higher risk of malignancy is associated with carcinoma in situ, and there is a slight to moderate risk with proliferative breast disease that does not exhibit atypia and with atypia, respectively[3].The lesion's size and palpability determine how successful FNAC is in providing a definitive diagnosis. For palpable breast lesions, the approximate success rates of FNAC are 75–90%, while for non-palpable lesions, they are 35–55% [4]. Although core biopsies are more labor-intensive, costly, and time-consuming than FNA procedures, they can be used as a backup option [5–6].This study used FNAC and histological correlation to examine the distribution of benign lesions in the breast in order to assess the accuracy of the diagnosis. The aim of the study was to compare the histology of breast lesions in females to assess the diagnostic accuracy of FNAC in detecting benign lesions and to comprehend the distribution of various benign lesions in breast lumps.

Material and Methods

From January 2019 to June 2020, the Department of Pathology at Nalanda Medical College and Hospital, Patna, Bihar, conducted this investigation. 180 female patients, ages 10 to 60, are enrolled in the NMCH, Patna, Bihar, outpatient department. All patients who had mastectomy, FNAC, or excision biopsy/lumpectomies with an unknown primary diagnosis of breast lump were included in the study.

Patients who did not get a second histological evaluation were excluded from the study. The patient received a thorough explanation of the procedure before giving their signed consent. FNAC was performed with 23 gauge needle without the need for

anesthesia. The skin above the bulge was cleaned, stabilized, and held in place using spirit.The plunger was retracted over several passes through the lump until sufficient material was seen in the needle hub. After aspirating air with the syringe and reattaching the needle, the aspirated material was injected onto slides. Six to eight slides were made for each subject. One of the smears was wet fixed in 95% methanol and then stained with hematoxylin and eosin (H&E). The smears that had air dried were stained with Giemsa. For each case, a histopathological correlation was established.

Results

Once admitted to the hospital, each of the 180 patients underwent a skilled surgical procedure after a diagnostic FNAC in our pathology department. The excised specimens that were obtained underwent histological examination. When the FNAC report and the final histopathology report were compared, statistical tests were run to examine the data. With 180 benign instances that FNAC classified as benign, 174 of them turned out to be benign, meaning that FNAC had a diagnostic accuracy of 96.7% when it came to diagnosing benign breast tumors. The age groupings were divided into four categories: over 50, 40 to 49, 30-39, 20 to 29 and 10-19. The largest group among these was 20–29. 114 were in the 20–29 age range, 36 in the 30-39 age range, 12 in the 10–19 age range, 18 in the 40–49 age range, and over 50.Three patients with fibrocystic illness had a history of breast cancer in their families. There were 84 cases of right-sided lesions and 96 cases of left-sided lesions. 180 patients of breast disease underwent FNAC; 117 of these cases had fibroadenoma, 6 had mastitis, 21 had benign proliferative disease, 30 had fibrocystic disease, 3 had phyllodes, and 3 had fibroadenosis.

Table 1: Cytological Diagnoses of Breast diseases includedin the study

Cytological Diagnosis	No.of Cases	Percentage
Fibrocystic disease	30	16.66%
Fibroadenoma	117	65.0%
BenignProliferativeDisease	21	11.66%
Fibroadenosis	3	1.66%
Mastitis	6	3.33%
Phyllodestumor	3	1.66%

Of the 180 cases of benign breast illness observed in cytology, 174 showed benign breast disease on histological investigation, with a diagnosis accuracy of 96.7° for benign breast disease on FNAC. With a 100% diagnosis accuracy, nine cases displayed traits of both fibroadenoma and fibrocystic illness. 111 instances had fibroadenoma out of the 117 cases of fibroadenoma found on FNAC. Eighty percent of the thirty cases of fibrocystic disease that were identified by FNAC showed the same results on histology and three as infiltrating ductal carcinoma of the breast.With 100% diagnostic accuracy, histology in 21 patients with benign proliferative breast disease showed the same results. Three examples of fibroadenosis and phyllodes tumor on FNA each had the same histological characteristics, indicating 100% diagnostic accuracy. For the six mastitis cases, the diagnosis accuracy was only 50%; three cases were identified as mastitis and the remaining three as breast infiltrating ductal carcinoma. Of the benign breast tumors identified on FNAC, only six were malignant.

Table 2: Histopathological correlation of cases diagnosed as being non-cytology

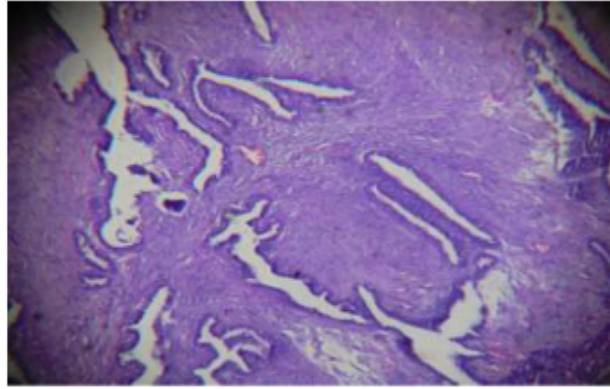| Breast Lesion	Cytology	HPE
Fibroadenoma	117	111
Fibrocystic disease	30	24
Fibroadenoma and fibrocystic disease	0	9
Benign Proliferative Breast Disease	21	21
Mastitis	6	3
Fibroadenosis	3	3
Phyllodestumor	3	3
Infiltrating Ductal carcinoma	0	6

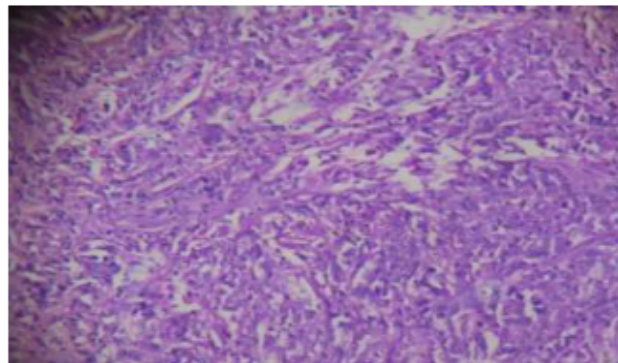**Figure 1: Section showing compressed ducts surrounded by stroma X 40(H&E)–fibroadenoma.**

Figure 2: Section showing sheets of malignant pleomorphic hyperchromatic ductal epithelial cells X 40(H&E) -infiltrating ductal carcinoma of breast.
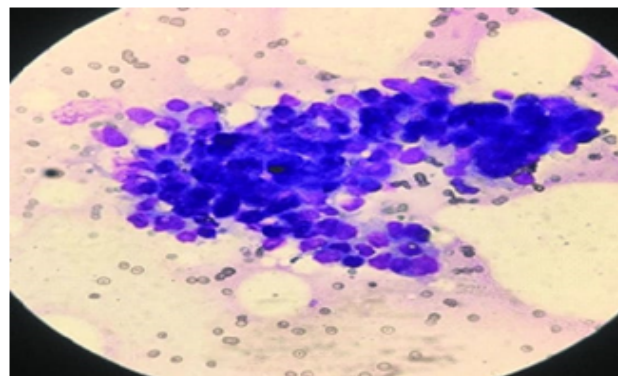

Figure 3: Smear showing hyperchromatic and pleomorphic epithelial cells X40(H&E)-ductal carcinoma breast.
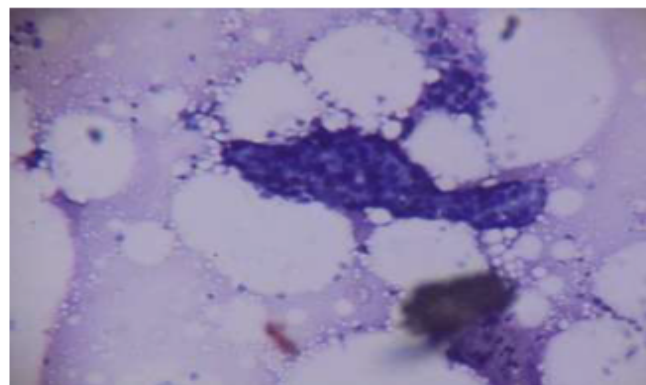

Figure 4: Smear showing mono layered sheets of benign ductal epithelial cells X 10(H&E)-Fibroadenoma

Discussion

The results of our investigation indicate that breast masses can be accurately diagnosed with FNA. Triple examination by clinical, radiological, and FNAC can yield 99% accuracy for both benign and malignant tumors, as false negative results could mislead a doctor and delay critical investigation, diagnosis, and treatment.[7] The majority of lesions are benign, as numerous studies have shown. Early diagnosis, treatment, and grouping of breast diseases can all contribute to accurate management of breast abnormalities. [8]

Akçil and colleagues conducted a literature study and discovered 72%–95% diagnostic accuracy. We found that our research yielded slightly higher accuracy than the published range.[9] The overall false-negative rate for our study was 3.3%, which is comparable to the range of other studies that Chaiwun et al.[10] reviewed, which was between 2.5 and 17.9%.All false negative patients received the histopathologic diagnosis of infiltrative ductal carcinoma, according to Sudarat et al.[11] False negative results can also be caused by small tumor sizes, hypocellularity, poor sample quality after aspiration, interpretive problems, and certain histologic tumor types, like scirrhous tumors or low nuclear grade carcinoma.[12]The lesion's palpability influences the FNAC's ability to provide a conclusive diagnosis. The reported accuracy percentage for FNAC with non-palpable breast lesions is 34-58%, while the reported accuracy rate for core needle biopsy is 94%.[13,14] For the diagnosis of fibrocystic disease, adenosis, epithelial hyperplasia with or without atypia, apocrinemetaplasia, radial scar, and papilloma, imaging studies may need to be combined with FNAC in order to rule out malignancy.[15]

On the other hand, the same-day diagnosis and prompt treatment of breast cancer, together with the prompt reassurance and discharge of patients with benign disease, are made possible by the rapid analysis of breast lesions utilizing FNAC. In a triple assessment, when the majority of patients have benign illness, FNAC provides a comparable, if not superior, method of patient evaluation.[16] Without requiring a sample, FNAC is useful in predicting tumor characteristics such as nuclear grading, mitotic index, hormone receptor status, and DNA contents. It also aids in diagnosis and subsequent therapy planning.[17]

Breast lesions are a major public health concern. When used in healthcare settings with limited resources, FNAC works quite well.[18] Cytopuncture, or non-aspiration cytology, has gained popularity recently due to its convenience of use, safety, and the claims that it yields specimens with higher diagnostic accuracy. [19] However, FNAC is a commonly used strategy.[1]

Conclusion

Different breast diseases can be identified using a variety of techniques. FNAC is a very reliable approach for evaluating breast lumps and separating benign from malignant tumors without the need for surgery. It has the advantage of being an extremely precise, reasonably priced method that may be finished as an outpatient surgery. It can be an excellent diagnostic technique when used in conjunction with a multidisciplinary approach. The FNAC technique was shown to be valid by the latest investigation.

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