

Diagnostic Accuracy of FNAC with Histopathology in Benign and Malignant Breast Lumps: A Comparative Assessment

Rakesh Raushan Chaudhary¹, Kumari Rashmi²

¹Tutor, Department of Pathology, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India

²Tutor, Department of Pathology, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India

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Corresponding author: Dr. Kumari Rashmi

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Abstract

Aim: The aim of the present study was to compare the diagnostic accuracy of fine needle aspiration cytology (FNAC) and with histopathological correlation in patients with detectable breast lesions.

Methods: The study was conducted in the Department of Pathology Darbhanga medical college and Hospital, Darbhanga, Bihar, India for a period of eight months. During this period, 100 fine needle aspiration were performed for various breast lumps. Out of these, 50 patients underwent surgery and form the material of the study.

Results: A total of 50 patients presenting with palpable breast lumps were included in this study. The maximum number of patients attended were in 41–50 years of age group (13 cases, 26%), followed by 51–60 years (24%) with mean age of the patient was 46.93 years. The maximum number of benign lesions (10 in number) occurred in 31–40 years of age group and the maximum number of malignant lesions (13 in numbers) occurred in 41–50 years of age group. Out of the 50 cases, 32 patients had fibroadenoma, 1 patient had phylloid tumor, 1 tubular adenoma, 3 fibrocystic disease of breast, 4 patients had inflammatory or breast abscess, 2 patients had gynaecomastia and in 2 cases no opinion was given. Out of the 04 malignant cases in HPE, 2 patients had a diagnosis of ductal cell carcinoma and 4 patients infiltrating ductal carcinoma.

Conclusion: Fine needle aspiration cytology is a comfortable, easy, reliable, rapid and simple diagnostic test. The FNAC of breast lump should be used with” triple test” for preliminary investigation in outdoor patient department, which will further enhance the diagnostic accuracy of breast lumps.

Keywords: Fine needle aspiration cytology, Breast lump, Histopathology

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Introduction

Breast lumps constitute a large proportion of cases in surgical practice, and it needs to be differentiated between benign from malignant lesions prior to definite treatment. [1] The most common

presentation of breast disease is palpable mass although it is difficult to determine whether a suspicious lump is benign or malignant simply by clinical examination. [2] Breast carcinoma is one of the most

common cancer in women and is one of the leading causes of death among women worldwide. [3]

So, for the diagnosis of breast lumps and to distinguish benign from malignant lesion fine-needle aspiration cytology (FNAC) and needle core biopsy (NCB) are done which reduces open biopsy of breast lesions. The main purpose of FNAC and NCB of breast lumps is to confirm malignancy preoperatively and to avoid unnecessary surgery in specific benign conditions. FNAC and NCB becoming very much important as preoperative diagnosis of breast cancer can be made on which basis neoadjuvant chemotherapy can be started.

FNAC of the breast is minimally invasive diagnostic procedure which often obviates an open biopsy. It is cheaper, easy to perform, and its results can be obtained within a short time. FNAC can easily distinguish between benign and malignant lesions; however, it is not able to differentiate invasive and noninvasive breast carcinoma if a malignant cell is detected. [4] There is increasing awareness with associated anxiety and stress among women, who perceive every symptom in breast as cancer, compelling them to seek medical advice. It is sometimes difficult to determine whether a suspicious lump is benign or malignant simply from clinical assessment. [5]

For an accurate diagnosis of the breast lump FNAC (Fine Needle Aspiration Cytology) has gained wide popularity and acceptance as a quick, simple and reliable diagnostic procedure that can be carried as outpatient service. However it has its own limitations in terms of sensitivity and specificity. [6]

Biopsy of the breast lump is a minor surgical procedure done under local anaesthesia or general anaesthesia with post-operative morbidity included. The main purpose of fine needle aspiration cytology (FNAC) of breast lump is to

confirm cancer preoperatively and to avoid surgery in form of biopsy for specific benign conditions. The cost factor is also taken into the account, given the large volume of work generated by breast cancer screening. Our aim is to compare the diagnostic accuracy of fine needle aspiration cytology (FNAC) and with histopathological correlation in patients with detectable breast lesions.

Methods

The study was conducted in the Department of Pathology Darbhanga medical college and Hospital, Darbhanga, Bihar, India for a period of eight months. During this period, 100 fine needle aspiration were performed for various breast lumps.

Out of these, 50 patients underwent surgery and form the material of the study. 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.

Technique and patient preparation

The Patient was explained about the FNAC procedure in complete detail. The procedure was performed without any anaesthesia 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

Table 1: Age distribution

| Age (years) | Number of cases, n (%) |
|-------------|------------------------|
| ≤30 | 8 (16) |
| 31-40 | 10 (20) |
| 41-50 | 13 (26) |
| 51-60 | 12 (24) |
| 61-70 | 7 (14) |
| Total | 50 |

A total of 50 patients presenting with palpable breast lumps were included in this study. The maximum number of patients attended were in 41–50 years of age group (13 cases, 26%), followed by 51–60 years (24%) with mean age of the

patient was 46.93 years. The maximum number of benign lesions (10 in number) occurred in 31–40 years of age group and the maximum number of malignant lesions (3 in numbers) occurred in 41–50 years of age group. Table 1

Table 2: Distribution of cases in FNAC

| FNAC | Frequency % |
|-------------------------------|-------------|
| Fibroadenoma | 30 (60%) |
| Fibrocystic disease of breast | 2 (4%) |
| Breast abscess | 3 (6%) |
| Benign breast disease | 10 (20%) |
| Malignant | 3 (6%) |
| Fibrofatty tissue | 2 (4%) |
| Total | 50 (100%) |

In FNAC, 47 cases were labelled as benign and 3 cases were malignant (distribution of cases as per Table 2).

Table 3: Distribution of cases in HPE

| Histopathology | Frequency % |
|-------------------------------|-------------|
| Fibroadenoma | 32 (64%) |
| Fibrocystic disease of breast | 3 (6%) |
| Breast abscess | 4 (8%) |
| Gynecomastia | 2 (4%) |
| Phylloid tumor | 1 (2%) |
| Tubular adenoma | 1 (2%) |
| Ductal cell carcinoma | 2 (4%) |
| Infiltrating ductal carcinoma | 3 (6%) |
| No Opinion | 2 (4%) |
| Total | 50 (100%) |

Out of the 50 cases, 32 patients had fibroadenoma, 1 patient had phylloid

tumor, 1 tubular adenoma, 3 fibrocystic disease of breast, 4 patients had

inflammatory or breast abscess, 2 patients had gynaecomastia and in 2 cases no opinion was given. Out of the 4 malignant cases in HPE, 2 patients had a diagnosis of ductal cell carcinoma and 4 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. The correlation between FNAC and histopathological examination for the sensitivity, specificity and positive predictive value were calculated.

Table 4: Percentage of benign and malignant cases in FNAC

| Cytopathology | Frequency % |
|---------------|-------------|
| Benign | 48 (96%) |
| Malignant | 2 (4%) |
| Total | 50 (100%) |

The cytohistological correlation of 50 patients, out of which 2 patients has the final diagnosis of malignancy and 48 patients had benign condition.

Table 4: Percentage of benign and malignant cases in FNAC

| Histopathology | Frequency % |
|----------------|-------------|
| Benign | 46 (92%) |
| Malignant | 4 (8%) |
| Total | 50 (100%) |

The histopathological correlation of 50 patients, out of which 4 patients has the final diagnosis of malignancy and 46 patients had benign condition.

Discussion

The earliest large-scale use of Fine Needle aspiration Cytology FNAC as a diagnostic tool in the management of palpable masses was recorded in Memorial Hospital, New York, United States in the 1930s but it did not gain much encouragement in United States during the ensuing years. The technique had resurgence in Scandinavia during the 1950s and 1960s, where it flourished before spreading to other parts of the world. [7]

True FNAC for breast aspirations were first introduced in the beginning of 1960s by Franzen and Zajicek at the Karolinska Hospital in Stockholm. [8] Being an oncologist, Franzen introduced standard May-Grunwald Giemsa stains on air-dried

smears to allow for rapid interpretation. Despite their success, it was not until 1980s that FNAC became widely used. The reasons included lack of confidence in the sensitivity and specificity of the procedure, fear of tumour implantation in the needle track, lawsuits, and surgeons not willing to relinquish the use of histological biopsy technique. [9]

The "ideal" method of biopsy to diagnose breast cancer is debatable and should depend on the expertise available in the unit, as well as the physical characteristics of the lump. FNAC is a reliable and relevant method for the pathological diagnosis of breast carcinoma in a developing nation like Malaysia. It is highly useful as an initial method of pathological assessment for palpable breast lumps. If the initial FNAC is inadequate, CNB can be a useful second line method of pathological diagnosis.

Excision biopsy should be the last option to obtain a pathological diagnosis. [10]

The aspiration cytology was correlated with the histology report to see accuracy of fine needle aspiration cytology with open biopsy/Lumpectomy HPE specimen. The results were tabulated and conclusion drawn based on statistical study.

Pinto et al. 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. [11] In the present study, our observation is similar, the fibroadenoma being common in female (60%) and gynecomastia being common in male.

In another study done by Yalavarti S, 56 patients were studied with cytopathological correlation, of which benign lesion, 45% were reported in third decade and the maximum number of malignant lesions 44% were reported in fifth decade. [6] Our studied shows benign lesions 92% reported in second to third decade and the malignant lesion 08% were reported in fifth to sixth decade. [12] Many authors suggest different reporting protocols in classifying the breast lesions. In one of the studies done by Ishita classification of the lesions were into four groups i.e benign, malignant, suspicious and inadequate. [13] In the present study, cytological diagnosis of 51 aspiration were evaluated and the lesions were classified into four classes, 48 as benign, 02 malignant, suspicious & inadequate being nil.

In our study, two cases in FNAC show fibrocystic disease of breast turned out to be malignant in biopsy. Similar observations were found in study done by Hamed H, Coady et al. on 401 women presenting with breast lumps. [14] Most of the breast lesions are benign and need reassurance to the patient to prevent

anxiety and discomfort. Therefore, FNAC is very highly accurate in diagnosing benign lesions and hence surgery can be avoided in such cases for HPE. [15,16,17]

Conclusion

Fine needle aspiration cytology is a comfortable, easy, reliable, rapid and simple diagnostic test. The FNAC of breast lump should be used with "triple test" for preliminary investigation in outdoor patient department, which will further enhance the diagnostic accuracy of breast lumps. The FNAC aspirate can be used for ancillary molecular testing also.

References

1. Mulford DK, Dawson AE. Atypia in fine needle aspiration cytology of nonpalpable and palpable mammographically detected breast lesions. *Acta cytologica*. 1994 Jan 1;38(1):9-17.
2. Kline TS, Neal HS. Role of needle aspiration biopsy in diagnosis of carcinoma of the breast. *Obstet Gynecol* 1975; 46:89-92.
3. Kocaay AF, Celik SU, Sevim Y, Ozyazici S, Cetinkaya OA, Alic KB. The role of fine needle aspiration cytology and core biopsy in the diagnosis of palpable breast masses. *Nigerian medical journal: journal of the Nigeria Medical Association*. 2016 Mar;57(2):77.
4. Hussain MT. Comparison of fine needle aspiration cytology with excision biopsy of breast lump. *Journal of the College of Physicians and Surgeons-pakistan: JCPSP*. 2005 Apr 1;15(4):211-4.
5. Yong WS, Chia KH, Poh WT and Wong CY. A comparison of trucut biopsy with fine needle aspiration cytology in the diagnosis of breast cancer. *Singapore Med J*. 1999; 40(9): 587-589.
6. Dixon JM, Anderson TJ, Lamb J, Nixon SJ, Forrest AP. Fine needle aspiration cytology, in relationships to

- clinical examination and mammography in the diagnosis of a solid breast mass. *British Journal of Surgery*. 1984 Aug;71(8):593-6.
7. Das DK. Fine Needle aspiration Cytology: Its origin, development and present status with special reference to a developing country, India. *Diagn Cytopathol*. 2003; 28(6): 345-351.
 8. Fraznen S, Zajicek J. Aspiration Biopsy in Diagnosis of Palpable Lesions of the Breast: Critical review of 3 479 consecutive biopsies. *Acta radiologica: therapy, physics, biology*. 1968 Jan 1;7(4):241-62.
 9. Berner A, Torill Sauer T. Fine-needle Aspiration Cytology of the Breast. *Ultrastruct Pathol*. 2011; 35(4): 162–167.
 10. Tham TM, Rangaswamy Iyengar K, Taib NA, Yip CH. Fine needle aspiration biopsy, core needle biopsy or excision biopsy to diagnose breast cancer-which is the ideal method? *Asian Pacific Journal of Cancer Prevention*. 2009;10(1):155-8.
 11. Pinto R, Singh K. A statistical analysis of fine needle aspiration biopsies in palpable benign (neoplastic and non-neoplastic) breast lesions. *J Cytol*. 2004;21(2):64–7.
 12. Tanikella R, Prabhala S, Tallam US. Histopathological and cytological correlation of tumors of breast. *Med J Dr DY Patil Univ*. 2014;7(3):326–11.
 13. Ishita P, Singh PK. Cytomorphologic study of palpable breast lesions and histopathologic correlation. *J Cytol*. 2003; 20:129-32.
 14. Chaudary MA, Fentiman IS. Follow-up of patients with aspirated breast cysts is necessary. *Arch Surg*. 1989; 124(2):253–5.
 15. Hughes JE, Royle G, Buchanan R, Taylor I. Depression and social stress among patients with benign breast disease. *J Br Surg*. 1986;73(12):997–9.
 16. Ellman R, Angeli N, Christians A, Moss S, Chamberlain J, Maguire P. Psychiatric morbidity associated with screening for breast cancer. *Br J Cancer*. 1989;60(5):781–4.
 17. Essad Ayoub, Atbib Y., Berdi Fadoua, Tadlaoui Y., & Bousliman Y. Hépatotoxicité médicament euse: synergie d'action hépatotoxique des antirétroviraux, des antituber culeux, et d'antifongiques. *Journal of Medical Research and Health Sciences*, 2022; 5(7): 2064–2071.