

Content available at: <https://www.ipinnovative.com/open-access-journals>

Indian Journal of Pathology and Oncology

Journal homepage: [www.ijpo.co.in](http://www.ijpo.co.in)

## Original Research Article

# To compare the diagnostic accuracy of FNAC with histopathology in benign and malignant breast lumps

Dayal Singh Bisht<sup>1</sup>, Himanshu Sharma<sup>2,\*</sup>, Dev Jyoti Sharma<sup>3</sup>, Vivek Upadhyay<sup>3</sup><sup>1</sup>Dept. of Pathology, Military Hospital, Prayagraj, Uttar Pradesh, India<sup>2</sup>Station Health Organisation, Prayagraj, Uttar Pradesh, India<sup>3</sup>Dept. of Surgery, Military Hospital, Prayagraj, Uttar Pradesh, India

## ARTICLE INFO

## Article history:

Received 12-01-2022

Accepted 24-02-2022

Available online 28-05-2022

## Keywords:

Fine needle aspiration cytology

Breast lump

Histopathology

Ductal cell carcinoma

Infiltrating ductal cell carcinoma

## ABSTRACT

A retrospective study was conducted in a tertiary care hospital in which the cytological diagnosis of palpable lesion of breast was compared with histopathological diagnosis to see the accuracy of cytology for both benign and neoplastic lumps in breast. A total number of 101 fine needle aspiration cytology was performed over a period of two years in cases of breast lump. The cytological and histological correlation was found in 51 cases (50%) out of 101 cases. The commonest benign lesion was fibroadenoma, which was noted in age group of 15-35 years and the commonest malignant lesion was infiltrating ductal carcinoma, which was noted in the age group of 50-70 years. Thus the present study revealed that FNAC had Sensitivity of 50%, Specificity of 100%, Positive predictive value 100%, Negative predictive value 95.9% and the overall accuracy of the study was 96.1%.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [reprint@ipinnovative.com](mailto:reprint@ipinnovative.com)

## 1. Introduction

Breast lump is one of the commonest surgical problems encountered in female patients. A breast tumor is an abnormal mass of tissue in the breast as a result of neoplasia. The most common breast tumour is fibroadenoma which is a benign condition. Malignant masses include ductal cell carcinoma, lobular cell carcinoma. The method for diagnosis of breast masses involve “Triple Test” which consists of clinical examination, mammography and FNAC.<sup>1</sup> Biopsy of the breast lump is considered the benchmark for the diagnosis of breast lump. The aim of conducting biopsy is to demonstrate a final diagnosis of breast mass prior to surgery. 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.<sup>2</sup>

## 2. Materials and Methods

The study was conducted in the Department of Pathology from Aug 2019 to Aug 2021. During this period, 101 fine needle aspiration were performed for various breast lumps. Out of these, 51 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

\* Corresponding author.

E-mail address: [drhimanshu2007@gmail.com](mailto:drhimanshu2007@gmail.com) (H. Sharma).

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.

### 2.1. Technique and patient preparation

The Patient were 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 draw 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.

### 3. Results

A total of 101 fine needle aspirations on breast lump were performed over a period of two years in a tertiary care hospital. Out of the 101 FNACs, cytological diagnosis was correlated with histopathological diagnosis in 51 patients. Sex distribution included 50 female and 01 was male. The age of patients ranged from 10-70 yrs. In FNAC, 49 cases were labelled as benign and 02 cases were malignant (distribution of cases as per Table 2). Out of 51 surgical specimen which were reviewed with HPE, 47 were confirmed as benign. The distribution of histopathological diagnosis is as per Table 3. Out of the 51 cases, 35 patients had fibroadenoma, 01 patient had phylloid tumor, 01 tubular adenoma, 03 fibrocystic disease of breast, 04 patients had inflammatory or breast abscess, 01 patient had gynaecomastia and in 02 cases no opinion was given. Out of the 04 malignant cases in HPE, 01 patient had a diagnosis of ductal cell carcinoma and 03 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. The false

positives were zero and 02 were false negative cases in the study. The cytohistological correlation of 51 patients, out of which 04 patients has the final diagnosis of malignancy and 47 patients had benign condition. In the present study, the sensitivity of FNAC was 50%, specificity 100% and the positive predictive value of 100%, negative predictive value 95.9% and the overall accuracy of the study was 96.1%.

**Table 1:** Age distribution

Age (years)	No
10-14	01
15-19	08
20-24	16
25-29	06
30-34	08
35-39	05
40-44	06
45-49	04
50-54	00
54-59	00
60-64	01
65-69	00
70-74	01

**Table 2:** Distribution of cases in FNAC

S. No	FNAC	Frequency	%
1.	Fibroadenoma	31	60.8%
2.	Fibrocystic disease of breast	02	3.9%
3.	Breast abscess	04	7.9%
4.	Benign breast disease	11	21.5%
5.	Malignant	02	3.9%
6.	Fibrofatty tissue	01	2%
7.	Total	51	100%

**Table 3:** Distribution of cases in HPE

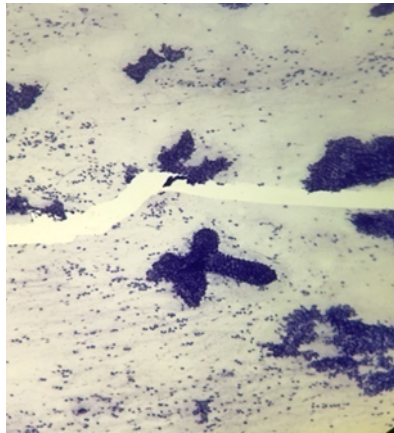
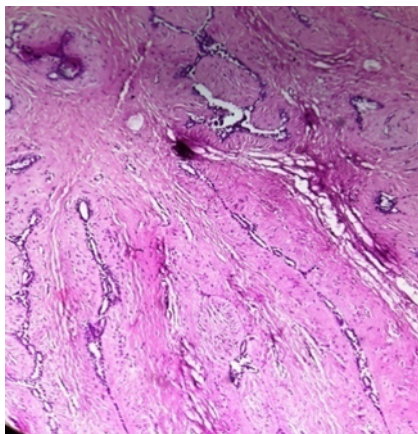
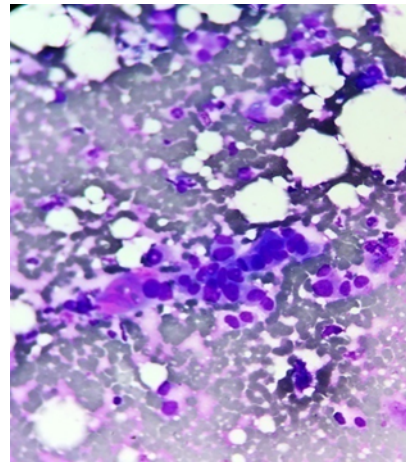
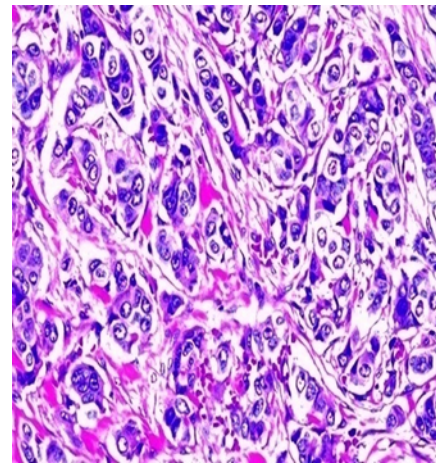
S. No	Histopathology	Frequency	%
1.	Fibroadenoma	35	68.6%
2.	Fibrocystic disease of breast	03	5.9%
3.	Breast abscess	04	7.8%
4.	Gynecomastia	01	2%
5.	Phylloid tumor	01	2%
6.	Tubular adenoma	01	2%
7.	Ductal cell carcinoma	01	2%
8.	Infiltrating ductal carcinoma	03	5.9%
9.	No opinion	02	3.8%
10	Total	51	100%

**Table 4:** Percentage of benign and malignant cases in FNAC

Cytopathology	Frequency	%
Benign	49	96%
Malignant	2	4%
Total	51	100%

**Table 5:** Percentage of benign and malignant cases in HPE

Histopathology	Frequency	%
Benign	47	92%
Malignant	4	8%
Total	51	100%

**Fig. 1:** Cytological smear showing stag horn pattern with benign ductal epithelial cells in sheets & clusters with bare nuclei**Fig. 2:** Histopathological feature shows intracanalicular pattern of fibroadenoma**Fig. 3:** Atypical ductal epithelial cells are arranged in dyscohesive clusters with hyperchromatic nuclei, irregular nuclear membranes and prominent nucleoli**Fig. 4:** Infiltrating tumor arranged in nests, cords and trabeculae. The tumor cells show moderate nuclear pleomorphism, coarse chromatin and moderate eosinophilic cytoplasm

#### 4. Discussion

Fine needle aspiration cytology is performed as the first investigation in breast lumps for screening in both symptomatic and asymptomatic population. The risk factors for breast cancer include female sex, obesity, lack of exercise, hormone replacement therapy during menopause, alcoholism and ionising therapy. In our study, 101 aspirations were performed in a duration of two years. 50 cases were not followed up due to lack of surgical specimen for HPE. 51 cases of FNAC which had excised surgical specimen in form of lumpectomy or definitive surgery depending on diagnosis on aspiration cytology for HPE were included in the study. 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.<sup>3</sup> In the present study, our observation is similar, the fibroadenoma being common in female (68.7%) and gynecomastia being common in male.

K Pailoor studied 40 male patients and out of which 8 cases had cyto-histopathological correlation. The diagnostic accuracy of gynecomastia was 100% in histopathology.<sup>4</sup> In our study similar result were found.

In another study by Tiwari M, 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.<sup>5</sup> Similar results were found in our study as well. Our study showed that the commonest breast lump is fibroadenoma (68.7%) between the age group of 20-40 years. Between the age group of 50-70years, 04 cases (7.8%) of breast malignancy were found & the common malignancy in breast being infiltrating /invasive ductal cell carcinoma. Further, two cases in FNAC showed fibrocystic disease of breast which turned out to be malignant in the biopsy.

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 lesion 44% were reported in fifth decade.<sup>6</sup> Our studied shows benign lesions 92% reported in second to third decade and the malignant lesion 08% were reported in fifth to sixth decade

Many authors suggest different reporting protocols in classifying the breast lesions. In one of the study done by Ishita classification of the lesions were into four groups i.e benign, malignant, suspicious and inadequate.<sup>7</sup> In the present study, cytological diagnosis of 51 aspiration were evaluated and the lesions were classified into four classes, 49 as benign, 02 malignant, suspicious & inadequate being nil.

Another study done by Lopez-Ferrer on 362 cases of fibroadenoma showed Cyto-histological correlation in 287 cases out of 362 (79.28%) and lack of correlation was present in 75 cases.<sup>8</sup> In the present study, the cyto-histological correlation was 68.7% for fibroadenoma and 5.9% for fibrocystic disease of breast. Out of 49 cases of benign condition, 35 cases were diagnosed histologically as fibroadenoma, three fibrocystic disease, one case of benign breast disease as phylloid tumor and another case of benign breast disease as tubular adenoma. In our study we failed to

diagnose two cases of malignancy in FNAC.

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.<sup>9</sup>

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.<sup>10,11</sup> The findings of our study are supported by the literature. (Table 6)

**Table 6:** Results of similar studies

Study	Sensitivity	Specificity	Positive predicative value
Scopa et al <sup>12</sup>	90%	100%	100%
Waghmare RS et al <sup>13</sup>	88.24%	100%	100%
Rubin et al <sup>14</sup>	87%	100%	100%
Zuk JA et al <sup>15</sup>	70.60%	87.50%	95.20%
Gardas, Vasundra <sup>16</sup>	66.66%	100%	100%
Present study	50%	100%	100%

## 5. 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.

## 6. Source of Funding

None.

## 7. Conflict of Interest

The authors declare no conflict of interest.


## References

- Ahmed I, Nazir R, Chaudhary M, Kundi S. Triple assessment of breast lump. *J Coll Phys Surg Pak*. 2007;17(9):535-8.
- Hussain MT. Comparison of fine needle aspiration cytology with excision biopsy of breast lump. *J Coll Phys Surg Pak*. 2005;15(4):211-4.
- 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.
- Pailoor K, Fernandes H, Jayaprakash C, Marla NJ. Fine Needle Aspiration Cytology of Male Breast Lesions-A Retrospective Study Over a Six Year Period. *J Clin Diagn Res*. 2014;8(10):13-5.
- Tiwari M. Role of fine needle aspiration cytology in diagnosis of breast lumps. *Kathmandu Univ Med J (KUMJ)*. 2007;5(2):215-7.

6. Yalavarthi S, 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.
7. Ishita P, Singh P. Cytomorphologic study of palpable breast lesions and histopathologic correlation. *J Cytol.* 2003;20:129–32.
8. López-Ferrer P, Jiménez-Heffernan JA, Vicandi B, Ortega L, Viguer JM. Fine needle aspiration cytology of breast fibroadenoma. A cytohistologic correlation study of 405 cases. *Acta cytologica.* 1999;43(4):579–86.
9. Hamed H, Coady A, Chaudary MA, Fentiman IS. Follow-up of patients with aspirated breast cysts is necessary. *Arch Surg.* 1989;124(2):253–5.
10. 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.
11. 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.
12. Scopa CD, Koukouras D, Spiliotis J, Harkoftakis J, Koureleas S, Kyriakopoulou D, et al. *Br J Cancer.* 1989 Nov;60(5):781–4. doi: 10.1038/bjc.1989.359. *Cancer Detect Prev.* 1996;20(6):620–4.
13. Waghmare RS, Sakore S, Rathod S. Fine needle aspiration cytology of breast lesions and correlation with histopathology. *Int J Res Med Sci.* 2016;4(10):4416–21.
14. Rubin M, Horiuchi K, Joy N, Haun W, Read R, Ratzer E, et al. Use of fine needle aspiration for solid breast lesions is accurate and cost-effective. *Am J Surg.* 1997;174(6):694–8.
15. Zuk J, Maudsley G, Zakhour H. Rapid reporting on fine needle aspiration of breast lumps in outpatients. *J Clin Pathol.* 1989;42(9):906–11.
16. Gardas V. Cytological study of breast lumps with histopathological correlation. *Indian J Basic Appl Med Res.* 2018;7:185–92.

### Author biography

**Dayal Singh Bisht**, Pathologist

**Himanshu Sharma**, Preventive Medicine Specialist  <https://orcid.org/0000-0002-3358-3674>

**Dev Jyoti Sharma**, Plastic Surgeon

**Vivek Upadhyay**, Surgical Specialist

**Cite this article:** Bisht DS, Sharma H, Sharma DJ, Upadhyay V. To compare the diagnostic accuracy of FNAC with histopathology in benign and malignant breast lumps. *Indian J Pathol Oncol* 2022;9(2):107-111.