

ORIGINAL ARTICLE

Evaluation of Breast lumps by Fine needle aspiration cytology in correlation with Histopathology

Veena Kumari L¹, Vani R², Jijiya Bai P³, K.R.K Prasad⁴, Vijaya K⁵

1. Professor, Department of Pathology, Mallareddy Medical College for Women, Hyderabad
2. Assistant Professor, Department of Pathology, Mallareddy Medical College for Women, Hyderabad
- 3,4, 5- Professor, Department of Pathology, Mallareddy Medical College for Women, Hyderabad

Abstract

Background: FNAC of breast lumps is an important mode of investigation and forms a part of triple test. It is difficult to determine whether a lump is benign or malignant from clinical assessment. Thus need for FNAC and tissue analysis arises. **Methods:** It is a retrospective study conducted from March 2015 to March 2017 to assess the accuracy of FNAC by comparing with histopathology. **Results:** FNAC was done in 178 patients. Out of these 142 underwent surgery and results of histopathology were compared. Benign lesions are 112 and 30 are malignant lesions. 6 cases of suspicious lesions in FNAC were confirmed as malignant in histopathology. The commonest benign lesion is fibroadenoma and the commonest malignant lesion is infiltrating duct cell carcinoma. **Conclusion:** FNAC serves as a rapid and reliable tool for the diagnosis of palpable breast lesion as there is a strong correlation between FNAC and histopathology.

Keywords: Fibroadenoma, Carcinoma, Fine Needle Aspiration Cytology, Histopathology

Address for correspondence: Dr. L Veena Kumari, Professor, Department of Pathology, Mallareddy Medical College for women, Suraram, Quthbullapur, Hyderabad, Telangana, India. Mobile: 9553630052, Email: lveenakumari@yahoo.com

Received on: 24/04/2017 Revised: 25/04/2017 Accepted : 26/04/2017

Introduction

Breast cancer is the commonest malignancy in women worldwide and leading cause of death from cancer in women. So the preoperative evaluation of breast lumps is an essential part of the management of breast lesions.^[1,2] In 2012 it were diagnosed 1.7 millions of cases worldwide and half of deaths occur in developing countries.^[3] Although there has been little success in controlling the disease by increasing the awareness and screening by self examination of the breast. FNAC is considered as extremely vital tool in the evaluation of palpable breast lumps as it is reliable, rapid, cost effective and accurate with excellent results and correlation. The objective of this study is to determine the diagnostic accuracy of FNAC in the evaluation of palpable breast lumps which helps in planning of treatment and also in prognosis of the tumor.

Materials & Methods

A two years study of 178 patients attending outpatient department of Mallareddy Medical College for Women from March 2015 to March 2017 presented with breast lump, who underwent FNAC in the Department of Pathology was done. They were correlated with histopathology in 142 cases.

FNAC was performed with 23G needle and 10ml syringe. No local anesthesia was utilized. The needle was inserted once or twice depending upon the size of the mass. Cellular material aspirated into the syringe was expelled onto two or three slides. Three or four slides are prepared for each patient. The cytology smears are fixed using Isopropyl alcohol and stained with Papanicolaou reagent and also Hematoxylin & Eosin stains.

The biopsy specimens were fixed in 10% formalin for 24 hours. Then gross examination was done in the department of

Pathology by histopathologists. The gross and cut section findings were noted. Pictures were taken. Several bits were taken from the different representative sites for processing and paraffin embedding. From each block sections were cut at 3-4 microns thickness and stained with Hematoxylin & Eosin stain.

We categorize FNAC results into five groups

- C1 – Unsatisfactory (4)
- C2 – Benign (134)
- C3 – Benign with atypical cells (14)
- C4 – Suspicious of malignancy (6)
- C5 – Malignant (20)

The inadequate smears were repeated and sufficient material obtained and excluded from calculations.

The groups C4 & C 5 were included in malignant in calculations.

Results

The age range of 178 patients included in this study was 15 to 60 years. The most effected age group was 21–30 years. Out of these highest frequency of benign lesions was in the age group of 21–30 years and highest frequency of malignancy was in the age group of 51–60 years old. 58 cases were diagnosed as fibroadenoma which is the commonest cause of breast lumps (32.58%). 18 cases were reported as fibrocystic disease (10.1%), 6 cases were diagnosed as fibroadenoma with fibrocystic disease (3.3%), 14 cases as fibroadenoma with mild atypia

(7.8%), 4 cases as lactating adenoma (2.2%) and 6 cases of phyllodes (3.3%). Few lesions like duct ectasia (8), galactocele (4), breast abscess (14) and fibroadenosis (7). A total of 33 cases were not underwent surgery. We diagnosed 12 cases of gynecomastia in male patients (6.7%). Out of these, 8 cases were in the age of 15 to 20 years, 2 cases were between 21-30 years and 2 cases were in the age of 50-60 years which are showing ductal hyperplasia. Two patients are having bilateral gynecomastia. The results of FNAC were compared with histopathology (Table- 1).

The patients under C1 category, 4 cases (2.2%) revealed sufficient material on repeat aspiration. Out of 178 cases 134 cases were benign (C2:75.28%), 14 cases were of benign with atypical cells (C3:7.8%), 6 cases were suspicious for malignancy (C4:3.3%) and 20 cases were positive for malignancy (C5:11.2%) (Table- 2).

The sensitivity of the test was 99.23%. The specificity of the test was 90.17%. The positive predictive value of the FNAC test to detect malignancy was calculated by the formula, True positive x100/ (True positive + False positive)= 130x100/130+11=92.19. The negative predictive value for malignancy was calculated by the formula true negative x100/ (True negative + false negative) =101x100/101+1=99.01.

Table-1: Comparison of Different lesions of Cytology results with Histopathology

	FA	FA with atypia	FCD	Lactating adenoma	FA with FCD	Fibroadenosis	Carcinoma	Gynacomastia	Phyllodes
Cytology (177)	58	14	18	4	6	7	26	12	6
Histopathology (142)	60	7	12	4	10	1	30	12	6

Note: FA - Fibroadenoma, FCD - Fibrocystic disease

Table -2: Comparison of FNAC with histopathology findings

Category	No. of cases	of FNAC	Histopathology	
			Benign	Malignant
C1	0	Unsatisfactory	0	0
C2	102	Benign	101	1
C3	14	Benign with atypical cells	11	3
C4	6	Suspicious of malignancy	0	6
C5	20	Malignant	0	20

The diagnosis of malignancy was given in 26 cases in FNAC. They are correlated with histopathology and confirmed. They are equally common in right and left breasts but more common in upper quadrants in our study. Two patients are showing fibroadenoma with malignant transformation in FNAC but diagnosed as Infiltrating duct cell carcinoma in histopathology. 14 patients are showing benign lesions with atypical changes on cytology were confirmed by histopathology as benign in 11 cases, 3 cases showed malignant features in histopathology. One case of fibroadenoma in FNAC was diagnosed as fibroadenoma and medullary carcinoma on histopathology. Three cases of fibrocystic disease with atypical epithelial hyperplasia in cytology diagnosed as malignancy in histopathology. In malignancies the commonest is infiltrating duct cell carcinoma (24 cases), followed by medullary carcinoma (4 cases), and tubular carcinoma (2 cases). In IDCC, 2 cases are showing micropapillary pattern. FNAC & HP diagnosis were strongly correlated which is statistically significant ($p = <0.001$).

Discussion

It is of general accord that a confident preoperative diagnosis should be made before surgery, thus making FNACs a reliable diagnostic and excellent tool in the assessment of palpable breast lumps. Its diagnostic accuracy exceeds 99% [2] which is correlating with our study (99.28%). About 90% are benign, but malignant lumps contribute to a consequential 10% of all breast lumps.[4] It is difficult to determine whether a lump is benign or malignant from clinical assessment.[5]FNAC in the hands of experienced cytopathologists have high diagnostic accuracy, as high as 98.9% in some series. A confident diagnosis can be established in more than 95% of cases utilizing triple assessment.[6] FNAC is now a well established technique for the investigation of women with suspected breast carcinoma.[7]

The use of Core Needle Biopsy is being increasingly advertised but its procedure is more cumbersome, expensive and time consuming as compared to FNA procedure [8,9]. Therefore palpable breast lesions can be accurately diagnosed by triple test only [10].

The MD Anderson Cancer center Group proposes that 4 – 6 well visualized cell groups consisting of at least 6 cells in each cluster & more than 10 cells per flat sheet constitute an adequate specimen [11]. Studies have shown FNB to be more accurate than CNB in distinguishing benign from malignant papillary lesions [11] and in diagnosing malignancy in palpable breast cancers [12].

In our study sensitivity of the test is 99.23%, and specificity is 90.17%. Statistical analysis by Chi-square test revealed Chi-square value ($p < 0.001$), which is statistically significant. In a similar study performed by Adnan Khan et al, the sensitivity & specificity was 95.83% and 100% [13]. The results of this study were similar to another study performed Mulazim Hussain Bukhari et al, which showed sensitivity 98% and specificity 100% [14].

In the present study, on FNAC of 178 cases, 142 cases underwent surgery, 101 were benign, Fibroadenoma (58 out of 142) (Fig 1a,b) is a common benign breast lump in the majority of young females (32.58%) which is comparable with previous studies by Tiwari et al as 39.6% [15]. Two cases of fibroadenoma with cystic change on cytology were diagnosed as fibrocystic disease in histopathology. Two patients have multiple fibroadenomas and one patient with fibroadenoma on cytology showed fibroadenoma associated with mastitis on histopathology. One of the cases of fibroadenoma on cytology turned out to be malignant on histological diagnosis because the patient had 2 separate lumps on histopathology (Fig 2a), one was diagnosed as fibroadenoma and other lump was medullary carcinoma on histopathology (Fig 2b). FNAC was done from the benign lump which is anterior to carcinoma in this patient.

Fourteen cases out of 178 on FNAC were C3 lesions (benign with atypical cells) (Fig 3a,b). On histological examination 3 cases were malignant and 11 were benign. Six cases were diagnosed as C4 lesions (suspicious of malignancy) on FNAC, all of them being malignant on histological examination. These cases have associated fibrocystic disease of breast to adjacent carcinoma on histopathology, reason may be the FNAC has done from the fibrocystic disease component giving the appearance of mixed carcinoma and fibrocystic

disease on cytology. Twenty six cases were diagnosed on FNAC as malignant (Fig 4a,b) and all were correlated and proven to be malignant

on histopathology. The spindle cell lesions were diagnosed as Phyllodes on cytology reports in 6 cases which were confirmed on histopathology.

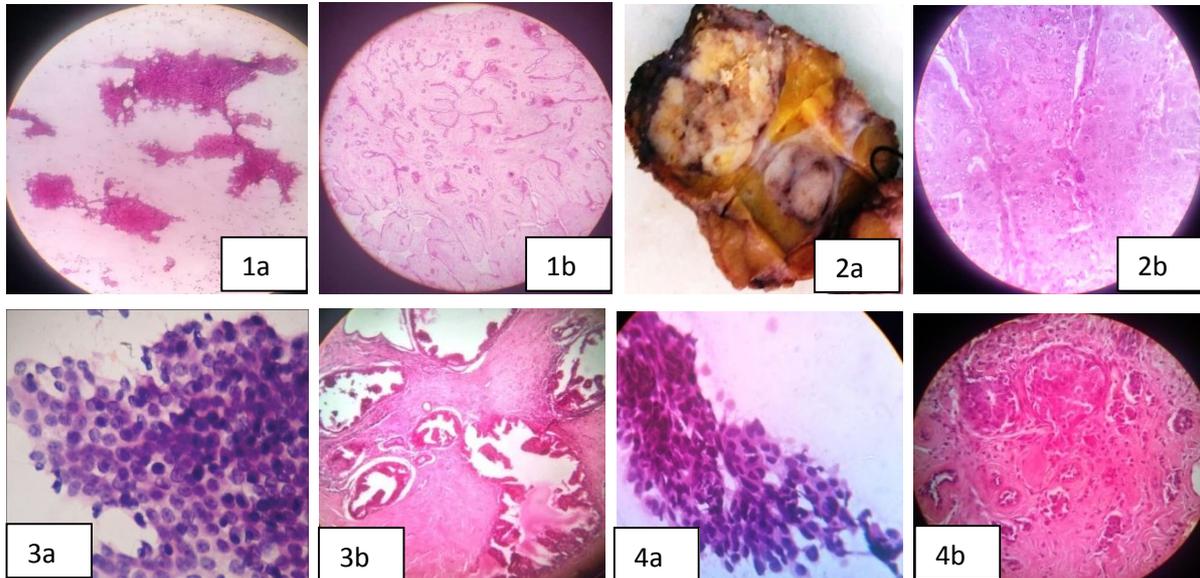


Figure- 1a: FNAC Fibroadenoma- Sheets of regularly arranged epithelial cells (stag horn pattern) and numerous bare nuclei

Figure- 1b: Comparison on histopathology of Fibroadenoma breast

Figure- 2a: Double lesion with Anterior Fibroadenoma & underlying Medullary carcinoma in same breast.

Figure- 2b: Photomicrograph of histopathology of Medullary carcinoma

Figure- 3a: Atypical smear of breast- increased cellularity with mild pleomorphism lacking other features of malignancy.

Figure- 3b: Comparison on histopathology of Atypical ductal hyperplasia

Figure- 4a: FNAC- Malignant smear of Ductal Carcinoma breast showing loosely cohesive cluster with pleomorphic nuclei.

Figure- 4b: Comparison on Histopathology- Infiltrating Duct Cell Carcinoma, malignant ducts with infiltration in to stroma

The current study showed that FNAC is a reliable method. It helps in diagnosing breast lumps without surgical intervention and it also helps in pre- operative decision making. From this study we can presume that FNAC has an association with histological findings and ought to be performed on standard premises. Confident pre operative diagnosis is becoming increasingly important. FNAC should be practiced on routine basis as it is cost effective and reliable and thus maximizes the availability of health care for patients with breast related pathologies.

FNAC of the breast can reduce the number of open biopsies. The procedure has some challenges due to false positive or uncertain test results in the diagnosis of fibrocystic disease, fibroadenosis, apocrine metaplasia, radial scar and papilloma. There are some difficulties and limitations that need to be mention about FNAC, both false negative and false positive results can occur. The most significant difficulty in making a diagnosis is due to the overlapping features of different lesions.

FNAC has certain limitations on account of inadequate sample, suspicious diagnosis and overlapping of cytological features can cause cytodiagnostic errors and wrong diagnoses.

Conclusion

This study shows the usefulness of FNAC which is replacing the invasive procedures with a sensitivity of 99.28%. No overemphasis should be made in the reporting of FNAC and very careful strict criteria should be adopted like advised repeat FNAC and correlate with clinical findings. FNAC should be repeated when inadequate and improper smears are prepared. When smears are obviously benign, patients should be reassured and can be prevented from undergoing radical surgery. In cases of clearly malignant smears, surgery or other treatments should be started without delay. While for gray lesions like suspicious (C4) smears core needle biopsy or excision biopsy is advised. For overlapping lesions of breast ultrasound guided aspiration is advised.

Acknowledgment

We thank Dr. Soumya, Tutor in Department of Pathology, Mallareddy Medical College for Women for her assistance.

Conflict of Interest: None declared

Source of Support: Nil

Ethical Permission: Obtained

References

1. International agency for Research on Cancer. GLOBOCAN2012. Estimated cancer incidence, Mortality & Prevalence worldwide in 2012.215. http://globocan.iarc.fr/pages/fact_sheets_population.aspx.
2. Ellis I.O., Humphreys S, Michell M, Pinder S.E, Wells C.A, Zakhour H.D. Guidelines for Non operative Diagnostic Procedures & Reporting in Breast cancer screening. Sheffield, UK; NHS Cancer Screening Programme. 2001.
3. International Agency for Research on Cancer IARC. Available from: <http://www.iarc.fr/en/media-centre/pr/2013/pdfs/pr223Epdf,cited2014jun20>.
4. Aslam S, Hameed S, Afzal T, Hussain A, Zafar H, Naz M et al. Correlation of FNAC & histological diagnosis in the evaluation of breast lumps. JMDC2012. Jul-Dec;3(2):1-7.
5. Yong. W Chia K Poh W Wong C. A comparison of trucut biopsy with FNAC in the diagnosis of breast cancer. Singapore Med J 1999 Sep;40(9):587-9.
6. Rahman S, Ali, Khalili Y, Al A, Lal A. Role of fine needle aspiration cytology in evaluating the breast lumps. Gomal J Med Sci;2011 Jan-Jun;9(1) 59-61.
7. Baak JPA. The relative prognostic significance of nucleolar morphology in invasive ductal breast cancer. Histopathology. 1985 Apr;9(4); 437-44.
8. M. Rubin, K. Horiuchi, N. Joy et al., Use of fine needle aspiration for solid breast lesions is accurate and cost-effective. American Journal of Surgery 1997;174(6):694-698.
9. D. Lieu. Value of cytopathologist - performed ultrasound-guided fine needle aspiration as a screening test for ultrasound guided core needle biopsy in non palpable breast masses. Diagnostic Cytopathology 2009;37(4):262-269.
10. T. Ishikawa, Y. Hamaguchi, M. Tanabe et al. False-positive and false negative cases of fine needle aspiration cytology for palpable breast lesions. Breast Cancer 2007;14:388-392.
11. Masood S, Loya A, Khalbuss W. Is core needle biopsy superior to fine needle aspiration biopsy in the diagnosis of papillary breast lesions? Diagn. Cytopathol 2003;28:329-34.
12. Ballo MS, Sneige N. Can core needle biopsy replace fine needle aspiration cytology in the diagnosis of palpable breast carcinoma. A comparative study of 124 women. Cancer 1996;78:773-7.
13. Adnan Khan, Raza Jamali, Muneeb Jan, Maria Tasneem. Correlation of Fine Needle Aspiration Cytology and Histopathology Diagnosis in the Evaluation of Breast lumps. The International Journal of Medical Students 2014;12:2.
14. Mulazim Hussain Bukhari, Madiha Arshad, Shahid Jamal Shahidami Niazi, Shahid Bashir, Irfan M.Bakhshi, and Shaharyar. Use of Fine in the Evaluation of Breast Lumps. Pathology research International. 2011.
15. Tiwarii N. Katmandu University Medical Journal. 2007;5(2):215-217.