



UTILITY OF FNAC AS A FIRST LINE INVESTIGATION IN THE EVALUATION OF PALPABLE BREAST LUMPS WITH HISTOPATHOLOGICAL CORRELATION: A FIVE YEAR STUDY.

Dr. Manisha Khare	HOD & Professor, HBT Medical College, Mumbai.
Dr Saraswathi J	Assistant Professor, KJ Somaiya Medical College, Mumbai.
Dr Yogita Sable	Assistant Professor, HBT Medical College, Mumbai.
Dr Yasmeen Khatib*	Professor – Additional, HBT Medical College, Mumbai. *Corresponding Author
Dr Prajakta Gupte	Assistant Professor, HBT Medical College, Mumbai

ABSTRACT

Introduction: Fine needle aspiration cytology (FNAC) is a simple cost-effective and rapid diagnostic modality for the evaluation of breast lumps. The aim of the present study was to correlate the cytological diagnosis with histopathological findings and to find out the accuracy of FNAC in the evaluation of breast lesions. FNAC is very helpful in distinguishing benign from malignant lesions and deciding the further management of the patient.

Materials And Methods: The study comprised of 250 cases of FNAC of palpable breast lesions with histological correlation. All the aspirates were examined using PAP and Giemsa stains. The accuracy of FNAC was calculated by determining the sensitivity, specificity, positive predictive value, negative predictive value and accuracy.

Results: Total 250 cases were studied of which there were 246 female and 4 male patients. A concordant diagnosis was made on FNAC in 134 out of 136 of benign lesions, one of two cases of suspicious for malignancy and all 112 cases of malignant lesions. Fibroadenoma (FA) (63.2%) was the commonest benign lesion observed while ductal carcinoma (42%) was the most frequent malignancy seen. In the diagnosis of breast lesions FNAC had a sensitivity of 99.12%, specificity of 98.54%, positive predictive value of 98.25%, negative predictive value of 99.26% and accuracy of 98.8%.

Conclusion: FNAC is a reliable tool for diagnosis of breast lesions. It is minimally invasive and is a good alternative to biopsy in the diagnosis of benign lesions. However for the cases which fall into "suspicious for malignancy" category biopsy is advisable.

KEYWORDS : Breast, benign, cytology, histopathology, malignant.

INTRODUCTION

Breast carcinoma is the most common cancer among females in India with an estimated 1.5 lakh new cases reported in 2016 as per ICMR.^{1,2} Evaluation of a palpable breast lump is advisable for the early detection of cancer. The triple diagnostic approach of clinical examination, FNAC and mammography is being widely used for the diagnosis and optimum management of breast lesions.³ A correlation of these three modalities offers a correct diagnosis in majority of the cases. However some benign breast lesions may mimic malignancy both clinically and radiologically and vice versa. In these cases cytology is a useful, quick procedure in determining the exact nature of the lesion and offers a preoperative diagnosis, obviating the need for open biopsy. Many earlier studies done on FNAC of breast do not have histopathological correlation in all the cases.^{4,5} The present study was undertaken to study the utility of FNAC in breast lesions with histopathology correlation in all the cases thus verifying its accuracy in detecting breast lesions.

MATERIALS AND METHODS

A five year study was undertaken in the department of pathology of a tertiary care hospital after getting approval from the ethics committee. All patients referred for FNAC of palpable breast lumps, and who subsequently had a histopathological diagnosis were included in the study. After taking the relevant history and clinical examination FNAC was performed using a 22 gauge needle and a 10ml syringe. Smears were spray fixed and stained with Papanicolaou stain and air dried smear was used for May Grunwald Giemsa stain. The cytological features were studied by microscopy to arrive at a cytological diagnosis. Results were divided into benign, malignant and suspicious categories with specific diagnosis in benign and malignant categories. The subsequent histopathology samples were studied using routine paraffin embedding and H&E staining. A correlation was done between cytological diagnosis and the final histopathological diagnosis which was considered as a gold

standard. Statistical analysis was done using the SPSS 16 software to calculate the different variables.

OBSERVATION AND RESULTS

Out of the total 1969 cases of FNAC breast done in the study period, histological correlation was available in 250 cases which constituted our study group. There were 246 females and four males. The age ranged from 16 years to 69 years with maximum number of cases between 30 and 40 years of age. Majority of the benign cases were in 3rd and 4th decades (75.7%) while most of the malignant cases were in 4th and 5th decades (78%). There were 136 benign cases, 112 malignant cases and two cases were suspicious of malignancy on cytology. Table-1 illustrates the cytological diagnosis of breast lumps along with their frequency. In 125 out of 136 benign cases specific diagnosis was given. In the remaining 11 cases a nonspecific diagnosis was given as benign breast lesion (6 cases), benign cystic lesion (4 cases) and benign papillary lesion (1 case). In all cases of malignancy a specific diagnosis was made.

Correlation was done between cytological diagnosis and the final histopathological diagnosis which was considered as a gold standard. Statistical analysis was done using the SPSS 16 software to calculate the different variables.

Table 1: Cytological Findings Of Breast Lumps

Cytological diagnosis	No. of patients	Total Percentage (n=250)
BENIGN LESIONS (n=136)		
1) Acute mastitis	11	4.4%
2) Granulomatous mastitis	1	0.4%
3) Fibrocystic disease	11	4.4%
4) Fibroadenoma	86	34.4%
5) Benign phyllodes tumour	15	6.0%
6) Adenomyoepithelioma	1	0.4%
7) Benign breast lesions	6	2.4%

8) Benign Cystic lesions	4	1.6%
9) Benign papillary lesion	1	0.4%
SUSPICIOUS FOR MALIGNANCY (n=2)		
Suspicious for malignancy	2	0.8%
MALIGNANT LESIONS (n=112)		
1) Infiltrating duct carcinoma	106	42.4%
2) Infiltrating lobular carcinoma	2	0.8%
3) Mucinous carcinoma	2	0.8%
4) Malignant phyllodes tumour	2	0.8%
TOTAL CASES	250	100.0%

A concordance between cytological diagnosis and histopathology was seen in 134 out of 136 cases of benign lesions, one of two cases suspicious for malignancy and in all 112 malignant cases. Table 2 illustrates the cyto-histological correlation of benign and malignant lesions.

Table 2: CYTO-HISTOLOGICAL Correlation Of Benign And Malignant Lesions

Histopathology Diagnosis	No of cases	Cytology Diagnosis
BENIGN LESIONS		
Mastitis	12	Mastitis- 12
Fibroadenoma	85	Fibroadenoma-83 Benign Phyllodes tumor -1 Fibrocystic disease-1
Tubular adenoma	1	Fibroadenoma -1
Benign Phyllodes tumor	14	Benign Phyllodes tumor -13 Fibroadenoma-1
Galactoceles	2	Benign cystic lesion-2
Lactating adenoma	2	Benign cystic lesion -2
Fibrocystic disease	13	Fibrocystic disease -10 Benign breast disease-2 Fibroadenoma -1
Gynaecomastia	4	Benign breast disease-4
Adenomyoepithelioma	1	Adenomyoepithelioma-1
Fat necrosis	1	Suspicious for malignancy -1
MALIGNANT LESIONS		
Intraductal carcinoma	1	Suspicious for malignancy -1
Infiltrating duct carcinoma.	107	Infiltrating duct carcinoma-106 Benign Phyllodes tumors-1
Mucinous carcinoma	2	Mucinous carcinoma-2
Lobular carcinoma	2	Lobular carcinoma-2
Invasive Papillary carcinoma	1	Benign papillary lesion-1
Malignant Phyllodes tumor	2	Malignant Phyllodes tumor -2
Total	250	250

Statistical Analysis

In the present study, cytological findings were consistent with histopathological findings in 246 out of 250 cases (98.40%) and discordant in 4 cases (1.60%).

One case suspicious for malignancy on cytology was diagnosed as benign on histopathology. Another case reported as infiltrating duct carcinoma on FNAC was diagnosed as benign phyllodes tumor on histopathology, giving 2 false positive results.

Two cases diagnosed as benign lesions on cytology were found to be malignant on histopathology, giving 2 false negative results. Fischer exact test was applied to know the association between cytological and histopathological diagnosis. Chi square value was 119.5 and p value was found to be <0.000001. Thus the association was significant between cytological and histopathological diagnosis.

In our study the sensitivity of FNAC was 99.12%, specificity was 98.54%, positive predictive value was 98.25%, negative predictive value was 99.26 % and accuracy was 98.80%.

DISCUSSION

Breast carcinoma is the most common malignancy in women worldwide and has now overtaken cervical cancer to be the most common malignancy even in India.⁶ FNAC forms one of the pillars of the triple test comprising of clinical examination, radiology and cytology and is being widely used in the evaluation of palpable breast lumps.^{3,7,8} Breast lesions are easily accessible to FNAC and it is an easy, quick, cost effective and minimally invasive procedure. FNAC helps in categorising a lesion as benign or malignant and plays a major role in the primary diagnosis of breast carcinoma.⁹ Most benign lesions are treated non-surgically hence FNAC obviates the need for biopsy in these cases.

There were 55% benign and 45% malignant lesions in our study while Singh et al,¹⁰ reported only 14.6% and Mohammed et al¹¹ 27.6% malignant lesions. Thus a larger number of malignant cases were found in our study when compared to others. This difference could be because of higher referral of patients with suspected diagnosis of breast cancer to our hospital as it is a tertiary care centre. Moreover benign lumps are infrequently excised and were not included in the present study. Cases of mastitis can sometimes be mistaken for malignancy both clinically and radiologically. In our study there was a 100% cyto-histological correlation in all cases of mastitis, which has also been reported in other studies.¹¹

Fibroadenoma was the most frequent benign tumour found in our study. Out of 86 cases diagnosed on FNAC 83 were confirmed on histopathology. There was a discordant diagnosis in 3 cases, which on histology were one each of tubular adenoma, fibrocystic disease and benign phyllodes tumour. Tubular adenomas show cells arranged as small, three dimensional balls, tubules or closely approximated acini. Our cases showed the presence of many relatively loose epithelial cell clusters, which were interpreted as fibroadenoma with epithelial hyperplasia. Studies have shown that this rare benign neoplasm can be identified with certainty only after histopathological examination.¹² Fibrocystic disease shows paucicellular aspirate with variable mixture of epithelial cells, macrophages and apocrine cells against a fluid background.¹³ Our case showed only benign epithelial clusters, this could be because of sampling error. Out of 6 cases reported as benign breast lesions on FNAC 2 were fibrocystic disease and 4 were gynaecomastia on histopathology. Specific diagnosis on FNAC was not possible in these cases because of paucicellular aspirate composed of only benign epithelial cell clusters. Cases of galactoceles and lactating adenoma both yielded milky aspirate with low cellularity and were indistinguishable on cytology.

A case of juvenile fibroadenoma was reported as benign phyllodes on cytology because of the increased stromal cellularity with a greater degree of epithelial hyperplasia than the usual type of fibroadenoma. This uncommon variant of fibroadenoma, seen commonly in adolescent girls can mimic phyllodes tumor clinically and cytologically, therefore histopathology is required in these cases.^{14,15} One case of benign phyllodes tumour showed epithelial predominance hence was mistaken for FA and this could be due to sampling error.

There were two false negative cases in our study. One case of infiltrating duct carcinoma with marked desmoplasia was reported as benign phyllodes tumour on cytology. Smears showed spindle cells which were misinterpreted as stromal fragments. One invasive papillary carcinoma was

misinterpreted as benign papillary lesion on FNAC. Papillary lesions of the breast often pose difficulty in diagnosis. The distinction between intraductal papilloma/florid papillomatosis, intracystic papillary carcinoma/papillary DCIS and well differentiated invasive papillary carcinoma is difficult on FNAC smears. It is advisable to perform biopsy in such cases.¹⁶

There was one false positive case of fat necrosis which was reported as suspicious for malignancy on FNAC. There was reactive atypia in the ductal cells with necrotic background that appeared malignant on cytology. However the preponderance of inflammatory cells, lipophages and scanty ductal cells with reactive atypia are suggestive of fat necrosis.¹⁷ The present study showed a very high sensitivity, specificity, positive predictive value and negative predictive value which was similar to other studies. Table 4 gives the comparison of these parameters with other studies.

Table 3: Comparison Of FNAC Results In Various Studies

Studies	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
Zhang Qin ¹⁸ (2004)	97.10%	97.30%	-	-
Ariga et al ¹⁹ (2002)	99	99	99	99
Arjun Singh et al ²⁰ (2011)	84.60%	100.00%	-	-
Khemka A et al ²¹ (2011)	96.00%	100.00%	100.00%	95.12%
Bukhari et al ²² (2011)	98.00%	100.00%	97.00%	100.00%
Present Study	99.12%	98.54%	98.25%	99.26%

CONCLUSIONS

FNAC is very helpful in distinguishing benign from malignant lesions and deciding optimum management of the patient. Though it may not always give a specific diagnosis in benign lesions, management is conservative and surgery is avoided. In suspicious category biopsy is necessary. It is accurate in the primary diagnosis of cancer as an alternative to biopsy especially in resource poor settings where core needle biopsy is unavailable.

REFERENCES:

- Gupta S. Breast cancer: Indian experience, data, and evidence. *South Asian J Cancer* 2016;5:85-6.
- Malviya S, Bagadi SA, Uma SD, Saxena S. Epidemiology of breast cancer in Indian women. *Asia Pac J Clin Oncol* 2017;13:1-6.
- Kocjan G, Bourgain C, Fassina A, et al. The role of breast FNAC in diagnosis & clinical management: a survey of current practice. *Cytopathology*. 2008; 19: 271-78.
- Sahil I, Panjvani I, Biren J, Parikh Swati B, Parikh Bhawana R. Utility of Fine Needle Aspiration Cytology in the Evaluation of Breast Lesions *Journal of Clinical and Diagnostic Research*. 2013 Dec, Vol-7(12): 2777-2779.
- Yalavarthi S, Tanikella R, Praabhala S, Tallam U S. Histopathological and cytological correlation of tumours of breast. *Medical Journal of Dr.D.Y. Patil University*. 2014;7(3):326-31.
- Bharath Rangarajan, Tanuja Shet, Tabassum Wadasadawala, Nita S. Nair, R. Madhu Sairam, Sachin S. Hingmire, Jyoti Bajpai. Breast cancer: An overview of published Indian data. *South Asian J Cancer*. 2016 Jul-Sep; 5(3): 86-92. doi: 10.4103/2278-330X.187561
- Jan M, Mattoo JA, Salroo NA, Ahangar S. Triple assessment in the diagnosis of breast cancer in Kashmir. *Indian J Surg*. 2010 Apr;72(2):97-103. doi: 10.1007/s12262-010-0030-7. Epub 2010 Jul 1. PMID: 23133217; PMCID: PMC3452506.
- Ogbuanya AU, Anyanwu SN, Iyare EF, Nwagwe CG. The Role of Fine Needle Aspiration Cytology in Triple Assessment of Patients with Malignant Breast Lumps. *Niger J Surg*. 2020 Jan-Jun;26(1):35-41. doi: 10.4103/njs.NJS_50_19. Epub 2020 Feb 10. PMID: 32165834; PMCID: PMC7041348.
- Badge SA, Ovhal AG, Azad K, Meshram AT. Study of fine-needle aspiration cytology of breast lumps in rural area of Bastar district, Chhattisgarh. *Med J DY Patil Univ* 2017;10:339-42
- Singh K, Sharma S, Dubey VK, Sharma PR. Role of FNAC in diagnosis of breast lumps. *JK Science*. 2001 Jul-Sep;3(3):126-128.
- Mohammad Q, Akbar SA, Ali J and Mustafa S: Lump in breast: Role of FNAC in diagnosis. *Professional Med J* Jun 2009;16(2):235-238.
- Salemi, N. S., Gemenetzi, G., Karagiouzis, G., Seretis, C., Sapounas, K., Tsantilas, V, Lagoudianakis, E. (2012). Tubular Adenoma of the Breast: A Rare Presentation and Review of the Literature. *Journal of Clinical Medicine Research*, 4(1), 64-67.
- Logrono R, Kurtycz DF, Inhom SL: Criteria for reporting fine needle aspiration on palpable and nonpalpable masses of the breast. *Acta Cytol*. 1997 May-Jun; 41(3):623-627.

- Veneti S., Manek S. Benign phylloides tumour vs. fibroadenoma: FNA cytological differentiation. *Cytopathology*, 2001, 12(5):321-328.
- Bandyopadhyay, R., Nag, D., Mondal, S. K., Mukhopadhyay, S., Roy, S., & Sinha, S. K. (2010). Distinction of phylloides tumor from fibroadenoma: Cytologists' perspective. *Journal of cytology*. 2010; 27(2):59-62.
- Mitra, S., & Dey, P. (2015). Grey zone lesions of breast: Potential areas of error in cytology. *Journal of Cytology / Indian Academy of Cytologists*, 32(3), 145-152.
- TH Kalidas Singh, Gunvanti B. Rathod. Diagnosis of fat necrosis on FNAC – A case report. *International Archives of Integrated Medicine*. 2015; 2(6): 236 - 239.
- Zhang Q, Shigui N, Yuhua C and Limei Z. Fine needle aspiration cytology of Breast Lesions: Analysis of 323 cases. *The Chinese German Journal of Clinical Oncology*. 2004 Sept;3(3):172-174.
- Ariga R, Bloom K, Reddy VB, Kluskens L, Francescatti D, Dowlat K et al.; fine needle aspiration of clinically suspicious palpable breast masses with histopathological correlation. *Am J Surg*. 2002; 184(5): 410-413.
- Singh A, Haritwal A and Murali BM. Pattern of breast lumps and diagnostic accuracy of fine needle aspiration cytology: a hospital based study from Pondicherry, India. *Internet J Pathol*. 2011;11(2):1-14.
- Khemka A, Chakrabarti N, Shah S, Patel V. Palpable Breast Lumps: Fine Needle aspiration cytology versus histopathology: A correlation of diagnostic accuracy. *The Internet Journal of Surgery*. 2009;18(1):1-20.
- Bukhari MH, Arshad M, Jamal S, Niazi S, Bashir S, Bakhshi IM, Shaharyar. Use of fine-needle aspiration in the evaluation of breast lumps. *Patholog Res Int*. 2011;2011:689521. doi: 10.4061/2011/689521. Epub 2011 Jun 21. PMID: 21789264; PMCID: PMC3135154.