International Journal of Health Sciences and Research
Vol.10; Issue: 10; October 2020
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

Cytological Evaluation of Palpable Breast Lesions with Histopathological Correlation: A 10-Year Retrospective Study from the North-Eastern State of Sikkim

Neelam[1], Mingma Sherpa[2]

[1]Senior Resident, Pandit Bhagwat Dayal Sharma PGIMS, Rohtak, Haryana.
[2]Professor, Sikkim Manipal Institute of Medical Sciences, Gangtok, Sikkim.

Corresponding Author: Neelam

ABSTRACT

Introduction: Fine Needle Aspiration Cytology [FNAC] is a highly accurate, cheap and minimally invasive tool for the diagnosis of benign and malignant breast lesions. It is useful in planning further course of treatment, many a times without the need of a core biopsy. This study was carried out to assess the accuracy of FNAC in remote areas and its role in planning the treatment for the patient.
Aims: To assess the accuracy of FNAC in diagnosing palpable breast lesions.
Material and Methods: 10-year FNAC data comprising of 417 breast aspirates was retrospectively collected from January 2010 to December 2019. Histopathological correlation was done, wherever available. Statistical analysis was done on the results obtained. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy calculated and meaningful conclusions were drawn.
Results: Of the 417 cases, 320 cases were benign [C2], 35 cases were malignant[C5], 16 were suspicious for malignancy[C4], 27 were atypical, probably benign[C3], 19 were inadequate[C1] for opinion. Histopathology was available for 96 cases. FNAC was found to be 86% sensitive, 96% specific and 93% accurate in diagnosing malignant lesions of the breast.
Conclusion: Fine needle aspiration cytology is a cheap, quick and accurate tool to diagnose benign and malignant lesions of breast. In C5 category, surgery can be undertaken without a core biopsy hence reducing cost and saving time for the patient. In suspicious or equivocal cases, clinic-radiological correlation and core needle biopsy may solve the dilemma.

Keywords: Accuracy, Breast lump, FNAC, Histopathology, Surgery

INTRODUCTION

Breast carcinoma is a leading cause of cancer in Indian women. Fine needle aspiration cytology (FNAC) is a minimally invasive and cheap tool to diagnose this malignancy along with clinical examination and mammography. This triple assessment is a very useful tool for diagnosing and evaluating patients with breast lumps with an overall accuracy of 99.3%. [1] Understanding the performance and limitations of FNAC can enhance its value as a diagnostic technique in the management of breast disease. [2]

MATERIAL AND METHODS

This is a retrospective study carried out at a tertiary care hospital in the north-eastern state of Sikkim. The FNAC data and slides were collected for a period of 10 years from January 2010 to December 2019.Histopathological correlation was done wherever available. A total of 417 cases were evaluated in the 10 years period,

96 cases were available for histopathological correlation.

Statistical Analysis

Statistical analysis was done on the results. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC were calculated.

RESULTS

The cases were assigned to various categories according to IAC standardized reporting of breast FNAC. Out of total 417 cases, 19 were inadequate [C1], 320 were benign [C2], 27 were atypical, probably benign [C3], 16 were suspicious [C4] and 35 were malignant [C5]. The inadequacy rate was 4.55%. [Table-1]

Table-1: Spectrum of breast lesions according to IAC standardised categories[n=417]

IAC Category	No. of cases
C1 [inadequate]	19[4.55%]
C2 [benign]	320[76.73%]
C3 [atypical, probably benign]	27[6.47%]
C4 [suspicious]	16[3.83%]
C5 [malignant]	35[8.39%]
Total	417

Among the 320 benign breast lesions, 91[28.4%] were fibroadenoma on cytology. The next commonest cytological diagnoses were benign breast disease, NOS and Inflammatory breast disease, respectively. [Table-2]

Table 2: Spectrum of Benign Lesions diagnosed on FNAC[n= 320]

Cytological Category	No. of Cases
Inflammatory	70[21.9%]
Fibroadenoma	91[28.4%]
Benign breast disease,NOS	74[23.1%]
Cystic breast lesion	18[5.6%]
Fibroadenosis	15[4.7%]
Benign proliferative lesion	11[3.4%]
Lactational change	10[3.1%]
Gynecomastia	7[2.2%]
Lipoma	5[1.6%]
Benign Phylloides	3[0.9%]
Hematoma	1[0.3%]
Reactive lymphoid hyperplasia	2[0.6%]
Duct papilloma	1[0.3%]
Fibrocystic breast disease	12[3.7%]
Total	320

Out of 417 cases, 96 cases were available for histopathological correlation. The biopsy rate was 23.02%. All the cases in C2 category for which histopathology was available turned out be benign. All the cases in C5 category for which histopathology was available turned out to be malignant. Hence, the correlation between cytology and histopathology was 100% for C2 and C5 categories. [Table-3]

Table 3: Histological correlation of the cytological categories

Category	Histopathology available [No. of cases]	Total aspirates	Benign on histopathology	Malignant on histopathology
C1	1	19	1	0
C2	57	320	57	0
C3	14	27	10	4[FP]
C4	6	16	3[FN]	3
C5	18	35	0	18
Total	96	417	71[TN]	25[TP]

FN – False negative, TN – True negative, FP – False positive, TP – True positive

The cases reported as C3, but turned out malignant on histopathology were taken as false negative. The cases reported as C4, but turned out benign on histopathology were taken as false positive. [Table-3] The sensitivity, specificity, accuracy, positive predictive value and negative predictive value were calculated using the above values. [Table-4]

Table 4: Statistical analysis of FNAC as a diagnostic test and comparison of results with other studies

S. No.	Study	Sensitivity [%]	Specificity [%]	Positive predictive value[%]	Negative predictive value[%]	Accuracy[%]
1.	Present study	86	96	89	95	93
2.	Mane et al[3]	85	100	100	96.3	97
3.	Sankaye et al[4]	88.37	96.42	97.43	84.37	Not done
4.	Fugen et al[5]	98.02	90.58	96.48	94.54	95.97
5.	Arul P et al[6]	93.10	99.00	97.60	97.00	97.20
6.	Josip et al[7]	97.70	89.10	95.5	94.20	95.10
7.	Mulazzim Hussain bukhari et al[8]	98	100	100	97	98
8.	Panjvani et al[9]	97.82	100	100	97.50	98.90
9.	Chauhan et al[10]	98.90	99.16	97.82	99.58	99.09

DISCUSSION

FNAC is a simple, cost-effective, highly accurate, and relatively less painful procedure which can be used for diagnosis of breast lumps. It is a rapid method for categorization of palpable breast lumps into benign, malignant, atypical, suspicious and unsatisfactory categories.

In the present study, benign lesions were more common than malignant lesions. FNAC correctly diagnosed all the benign lesions. All the cases diagnosed as C5 also turned out malignant on histopathology. Hence, there was 100 % concordance rate for C2 and C5 categories.

However, out of 14 cases categorized as C3, 4 turned out to be malignant. Out of 6 cases of category C4, 3 turned out to be benign and 3 were malignant. Hence, category C3 and C4 represent grey zones in the diagnosis of breast lesions which affect the sensitivity and specificity of the test. They denote the limitation and difficulty in accurately classifying some of the breast lesions despite adequate sampling. [11] However, according to National Health Service Breast Screening Programme (NHSBSP) guidelines, the diagnosis in these categories should not exceed 15 % to prevent overuse and abuse of such equivocal categories. [12] In the present study, these categories comprised 10.3% of total cases which is acceptable.

In the present study, we found there are no false-positives in C5 category, hence we recommend surgery may be safely undertaken avoiding delay in treatment. In equivocal cases with C3 and C4, triple assessment and clinical correlation plays an important role in taking further decision on the line of treatment. Daramola et al also feel that mastectomy could be done directly on the basis of FNAC, specially in resource limited countries. [13] Eltahir et al reported that when FNAC report was definitely malignant [C5], there were no false positive reports. [14] Kocjan et al also stated when triple assessment is concordant, final treatment may proceed on the basis of FNAC without tissue biopsy. [15]

The inadequacy rate in the present study is 4.6% which is similar to that of Fugen et al. [5] Most of the inadequate samples yielded fibro adipose tissue. One case on histology turned out to be a fibroadenoma. The inadequacy rate is dependent the nature of the lesion, experience and skill of the aspirator.

The false negative rate in this study was 4.16 %.The false-negative rate in various studies varied between 0 to 8.5%.The false-positive rate in this study was 3.12%.The false-positive rate varied between 0 to 11% in various studies. [16-22] Various factors are responsible for these varying rates of false positive and false negative diagnosis such as technical difficulty in obtaining and interpreting the sample, experience of the person who is aspirating and interpreting, and the overlap in the features of benign and malignant lesions. With acquisition of significant technical and diagnostic experience, the sensitivity and specificity in diagnosing breast lesions improves significantly. [23]

In a systematic review and meta-analysis by Mei Wang et al, both FNAC and Core needle biopsy (CNB) were found to have good clinical performance. The sensitivity of CNB is better than that of FNAC, while their specificities are similar. Hence, FNAC could be considered first choice to evaluate suspicious lesions. [24] Hence, given the high performance of FNAC in the diagnosis of breast lumps, surgery can be safely undertaken for the C5 category and significant time and money can be saved for the patient.

CONCLUSION

Early diagnosis of breast lumps can prevent surgery in benign conditions and pave way for early surgery in malignant conditions. FNAC is quick, cost-effective, less invasive, OPD based procedure for diagnosing breast lumps. Based on FNAC results, surgery may be safely undertaken in certainly malignant C5 category. In

equivocal cases of C3 and C4, clinic-radiological correlation and CNB may help to tailor the treatment. Enhancing technical and diagnostic experience of the cytopathologist will improve the overall accuracy of diagnosis.

REFERENCES

1. Jan M,MatooJA, Salroo NA, Ahangar S. Triple assessment in the diagnosis of breast cancer in Kashmir. Indian J Surg.2010; 72(2):97-103.
2. Kim A, Lee J, Choi JS, Won NH, Koo BH.Fine needle aspiration cytology of the breast. Experience at an outpatient breast clinic. Acta Cytol.2000;44(3):361-7.
3. Mane PS, Kulkarni AM,RamtekeRV. Role of fine needle aspiration cytology in diagnosis of breast lumps. Int J Res Med Sci.2017;5:3506-10.
4. Sankaye SB, DongreSD.Cytological study of palpable breast lumps presenting in an Indian rural setup. Indian J Med Paediatr Oncol.2014;35(2):159-64.
5. Aker F, Gumrukcu G, Onomay BC, et al. Accuracy of fine-needle aspiration cytology in the diagnosis of breast cancer a single-center retrospective study from Turkey with cytohistological correlation in 733 cases. Diagn Cytopathol.2015;43(12):978-86.
6. Arul P, Masilamani S. Application of National Cancer Institute recommended terminology in breast cytology.J Cancer Res Ther.2017;13(1):91-6.
7. Miskovic J, Zoric A, RadicMiskovicH, SoljicV. Diagnostic Value of Fine Needle Aspiration Cytology for Breast Tumors. Acta Clin Croat.2016;55(4):625-8.
8. Bukhari MH, Arshad M, Jamal S,et al. Use of fine-needle aspiration in the evaluation of breast lumps. Patholog Res Int.2011; 2011:689521.doi:10.4061/2011/689521
9. Panjvani SI, Parikh BJ, Parikh SB, et al. Utility of fine needle aspiration cytology in the evaluation of breast lesions.J Clin Diag Res.2013;7(12):2777-9.
10. Chauhan V ,PujaniM,AgarwalC,etal.IAC standardized reporting of breast fine-needle aspiration cytology, Yokohama 2016:A critical appraisal over a 2 year period.Breast Dis.2019;38(3-4):109-15.
11. Mitra S,DeyP.Grey zone lesions of breast: Potential areas of error in cytology.J Cytol.2015;32(3):145-52.
12. Shabb NS, Boulos FI, Abdul-Karim FW.Indeterminate and erroneous fine-needle aspirates of breast with focus on the "true grey zone":Areview.Acta Cytol.2013; 57:316-31.
13. Daramola AO, Odubanjo MO, Obiajulu FJ, et al. Correlation between fine-needle aspiration cytology and histology for palpable breast masses in a Nigerian tertiary health institution. Int J Breast Cancer. 2015:742573.doi:10.1155/2015/742573
14. Eltahir A, Jibril JA,HeysSD,etal.The accuracy of "one-stop" diagnosis for 1110 patients presenting to a symptomatic breast clinic.J R Coll Surg Edinb;44:226-30.
15. Kocjan G, Bourgain C, Fassina A, et al.The role of breast FNAC in diagnosis and clinical management : a survey of current practice. Cytopathology.2008;19:271-8.
16. Jiang Y, Wang Q, Wang GY, Zhou LM, Lin TJ.The research of fine needle aspiration cytology in the diagnosis of breast tumor. Guang Zhou Med J.2008;39:44-5.
17. Farshid G, Downey P, Gill PG,Pieterse S. Assessment of 1183 screen-detected, category 3B, circumscribed masses by cytology and core biopsy with long term follow up data.Br J Cancer.2008;998:1182-90.
18. Li JG. The value of CA15-3 and Fine-needle aspiration about the diagnosis of breast cancer. J Radioimmunol. 2008; 21: 190-1.
19. Yang HY, Bao L. Value of fine needle aspiration cytology in the diagnosis of breast cancer. Matern Child Health China. 2000;13:436-7.
20. Zhao QW, Zhan Y,Yu XM, Guo QH.Value of fine needle aspiration biopsy in cytological diagnosis of breast cancer.J Xinxiang Med Coll.2009;26:481-3.

21. Chen TJ.A study of pathologic diagnosis of fine needle aspiration cytology in breast masses. ChinaPract Med.2010;5:115-6.
22. Ma LA, Yang HY. Value of fine needle aspiration cytology in the diagnosis of breast mass. Matern Child Health China. 2010;25:2147-8.
23. Feoli F, Paesmans M, Van EeckhoutP. Fine needle aspiration cytology of the breast: impact of experience on Accuracy, using standardized cytologic criteria.Acta Cytol.2008;52(2):145-51.
24. Wang M,HeX,ChangY,SunG,Thabane L.A sensitivity and specificity comparison of fine needle aspiration cytology and core needle biopsy in evaluation of suspicious breast lesions: A systematic review and meta-analysis.Breast.2017;31:157-66.

How to cite this article: Neelam, Sherpa M. Cytological evaluation of palpable breast lesions with histopathological correlation: A 10-year retrospective study from the north-eastern state of Sikkim. Int J Health Sci Res. 2020; 10(10):8-12.

******