Original article:

Cytological study of breast lumps with histopathological correlation

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Abstract

Background: Carcinoma breast is second most common cancer, which contributes to mortality and morbidity in women. Lump in breast is the common clinical presentation which poses a dilemma to physician wheather it is benign or malignant. FNAC is a simple, safe and a rapid diagnostic tool to aid surgeon to decide on treatment modalities.

Aim: Evaluate diagnostic accuracy of FNAC in comparison with histopathological diagnosis.

Materials and methods: A prospective study was done in which 169 aspirations were performed on subjects presenting with lump in the breast. Cytological diagnosis was categorized as benign, inflammatory, suspicious for malignancy, positive for malignancy and inadequate and compared with histopathological diagnosis for correlation. Statistical analysis was done to test sensitivity specificity, positive predictive value and degree of agreement.

Results: out of 169 aspirations cytohistological correlation was possible only for 79 cases. In benign lesions cytohistocorrelation for fibroadenoma was 68%, cytohistocorrelation was 100% in malignant lesions and gynecomastia. Sensitivity was 66.66%, specificity was 100%, positive predictive value was 100% and degree of agreement was 0.76. No false positives were seen but 5 false negatives were observed.

Conclusion: Benign fibroepithelial tumors must be interpreted with caution, nevertheless if prominent atypical cells are seen in aspirated smears it is advisable for excision.

Keywords: Fine needle aspiration cytology, Benign, Malignant

Introduction

Lump in the breast is a sensitive issue for male and female patients, with increase in awareness regarding breast cancer, for most women this is a cause of anxiety and apprehension. Timely and accurate diagnosis of a breast lump can not only alleviate anxiety but also early intervention is possible, which can be lifesaving. Fine needle aspiration cytology is a simple, safe, inexpensive method with wide acceptance and being used as a first line diagnostic procedure for diagnosis of breast lesions.

Aim:

The aim of the study was to examine cytological details in aspirates of breast lumps and evaluate diagnostic accuracy of FNAC in comparison with histopathological diagnosis

Materials and methods

A two years prospective study was carried out in the Department of pathology from September 2009 to September 2011. FNAC was performed on 169 patients with complaint of lump in the breast. Prior to the aspiration detailed history, physical examination of both breasts and the lump was done, details of the

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procedure were explained and consent of the patient was taken. Though the majority of the patients were females, male patients presenting with breast lesions were taken into the study.

About 2 to 4 smears were prepared fixed in 95% ethyl alcohol and few were air dried stained with Haematoxylin and Eosin and May Grunwald Giemsa stain . FNAC diagnosis was cytologically grouped into five categories namely benign, inflammatory, inadequate, suspicious for malignancy and positive for malignancy

Of 169 aspirations performed, 79 cases were received for histopathological examination which formed material of the study for cytohistocorrelation. All the specimens were fixed in 10% formalin and tissue bits were submitted for histopathology processing and the slides were stained with haematoxylin and eosin .

Results

Cytological diagnosis of 169 aspirations were classified into 5 categories, benign111 (70.7), inflammatory 13 (8.3), positive for malignancy 24(15.3), suspicious for malignancy 4(2.5) and inadequate 5(3.2). In the study population females were157 (92.9) and males 12 (7.1), age of the patient ranged from 9 to 80 years. Lump in breasts were more on right side (49.7) compared to left (45.6), rest were bilateral (4.7).Out of benign lesions No111. 41(26.1) were reported in the age group of 21-30. Out of 28 malignant cases on cytology 12 were reported in the age group of 41-50.

Table-1-Cytohisto correlated cases

	Histopathology diagnosis			
FNAC diagnosis	Benign N=48 (60.7)	Proliferative N=5 (6.3)	Inflammatory N=4 (5.0)	Malignant N=15 (19.0)
Benign N=57	48 (60.7)	3 (3.8)	2 (2.5)	4 (5.0)
Inflammatory N=3	-	-	2(2.5)	1(1.2)
Suspicious for malignancy N=1	-	-	-	1(1.2)
Positive for malignancy N=9	-	-	-	9(11.3)
Inadequate N=2	-	2(2.5)	-	-

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Table no:2 FNAC diagnosis of benign lesions in comparison with histopathology

FNAC Diadnosis N- 57	Histopathology Diagnosis N- 48											
	Fibroadenoma N=34	Phyllodes tumor N=7	Tubularadenoma N=2	Lactating adenoma N=2	Neurofibroma N=1	Lymphatic mastitis N=2	Adenosis of breast N=2	Epithelial hyperplasia N=1	Intracystic papiloma N=1	Leiomyoma N=1	IDC N=3	Malignant phyllodes N=1
Fibro Adenoma n=50	34	6	2	2	1	2	1	1	-	-	1	-
Fibro Cystic Disease n=1	-	-	-	-	-	-	-	-	-	-	1	-
Phyllodes Tumor n=6	-	1	-	-	-	-	1		1	1	1	1

79 cases turned up for for cytohistological co-relation (table1), females were 72 and males were 7. 57 cases categorized as benign on FNA 50 cases were given specific diagnosis of fibroadenoma followed by phyllodes-6, fibrocystic change, fibrocystic disease1. Cytohisto correlation of fibroadenoma was 68% (table2). Of 10 malignant cases on FNA cytohisto correlation was 100%. In males cytohistocorrelation was 100% for gynaecomastia. Following histopathologic correlation, sensitivity, specificity, positive predictive value were calculated. The degree of agreement between FNAC and histopathology was 0.76 using kappa statistic. There were no false positives in this study and 5 false negatives were observed in benign cases(table-3). In the present study sensitivity was 66.66%, specificity was 100%, positive predictive value was100%.

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Table -3- False negative cases

	Histopathology diagnosis	
FNAC diagnosis	IDC N=4	Malignanat phyllodes N=1
Fibroadenoma	1	-
Fibrocystic disease	1	-
Phyllodes tumour	1	1
Old fat necrosis with resorption	1	-

Discussion

In this study out of 169 aspirations only 79(46.7) cases turned up for histopathological examination, these 79 cases were considered as the study group for present study of cytological and histopathological correlation of breast lesions.Of these 72(91.1) were females and 7(8.9) were males. Age of patients ranged from 9 to 80 years similar to study by yalavarthi etal [1]. Majority of breast lumps were seen in right breast (49.7) compared to left (45.6%) and bilateral involvement was seen in (4.7%).

Cytological diagnosis of aspirations were classified into 5 categories, benign, inflammatory , positive for malignancy , suspicious for malignancy and inadequate . The cytological categorization is similar with the studies of other investigators[2,3].

Aspirations done on 72 females were classified into 5 categories, benign 57, inflammatory 3 , positive for malignancy 9, suspicious for malignancy 1 and inadequate 2 and in males 4 cases were gynecomastia and 3 were inadequate

Among the study group of 72 females ,57 benign lesions, were reported on FNAC ,of which specific diagnosis of fibroadenoma comprised 50 cases(70.8%). Fibroadenoma exhibits a smear pattern composed of large branching sheets of uniform ductal epithelial cells .The key to the diagnosis of fibroadenoma is the detachment of oval naked nuclei from cell clusters and sheets and fragments of fibromyxoid stroma were seen (Figure 1).

On subsequent histopathology 48 cases (60.7%) constituted benign tumors of which fibroadenoma accounted 34 cases (70.8%)showed compressed and dilated ducts with surrounding stroma. Among the benign lesions fibroadenoma was the commonest benign lesion comprising of 70.8% of total benign lesions (Figure2). Majority of the benign lesions were seen in the age group of 11 to 30 years.With regard to fibroadenoma our study findings closely correspond to Stone et al [4]. Cytohistological agreement for benign liesions was 84.2% which correlates with pinto et al[5].

In the present study, a case of fibroadenoma on cytology in a female aged 42 year showed features of neurofibroma on histopathology. Our study findings with regard to neurofibroma in breast were similar to findings of Khanna et al[6].

Among 10 cases diagnosed as malignant where smears were highly cellular with single population of atypical ductal epithelial cells, irregular angulated clusters of atypical cells showing enlargement of nuclei , membrane irregularity and hyperchromasia. On subsequent histopathology infiltrating ductal carcinoma was the most common 8 cases (80%)

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(Figure3), similar to many authors[1,5,7,8,9,10] . Cytohistological agreement was 100% in malignant cases similar to a study by Waghmare RS et.al[7].

Aspirations performed on 7 males, 4cases were gynaecomastia, & 3 cases were inadequate on FNAC were followed up for biopsy showed features of gynaecomastia on histopathology. In males gynaecomastia was the most common lesion. Diagnostic accuracy for gynaecomastia was 100%, similar findings were noticed in study by Waghmare RS[7]. There were no false positives observed in this study same as other authors[10,11,12,13,14].

There were 5 false negatives in which 4 cases had histopathological diagnosis of infiltrating ductal carcinoma and 1 case was diagnosed as malignant phyllodes .

Factors contributing to false negative results may be due to small tumor size, hypocellularity, and inadequate sampling during aspiration. Most of the false negatives in this study had histopathological diagnosis infiltrating ductal carcinoma similar to a study by Velu ARK et.al[15,16] .

A case of malignant phyllodes tumor was seen in female aged 20 years similar findings were seen in a study by Khanna et al.1[7]

In this study Sensitivity was 66.66%, specificity was 100%, positive predictive value was 100% these findings were similar to other authors in table below and degree of agreement was 0.76 using Kappa statistic[22].

Study	**sensitivity**	**specificity**	**Positive predictive value**
Scopa et.al[18]	90%	100%	100%
Rubin et.al[20]	87%	100%	100%
Garg et.al[19]	78.15%	94.44%	
Zuk JA et.al[21]	70.60%	87.50%	95.20%
Waghmare RS et.al[7]	88.24%	100%	100%
Present study	66.66%	100%	100%

Conclusion

Fine needle aspiration cytology is a quick, inexpensive, safe and readily acceptable procedure. A definitive specific diagnosis is not always possible by cytology, but categorization and differential diagnosis can be obtained suggesting most efficient further investigations. However aspiration cytology is not a substitute for histopathology.

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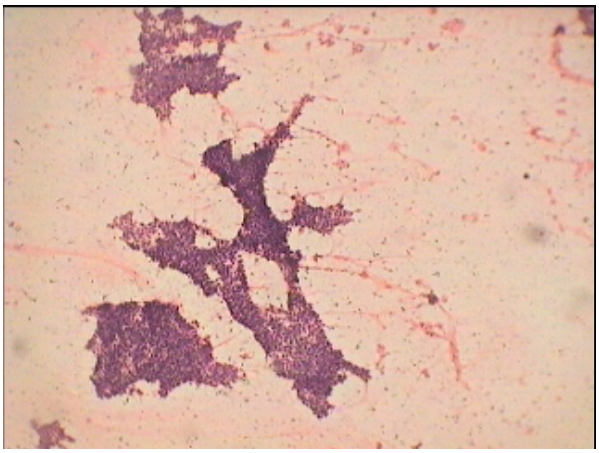
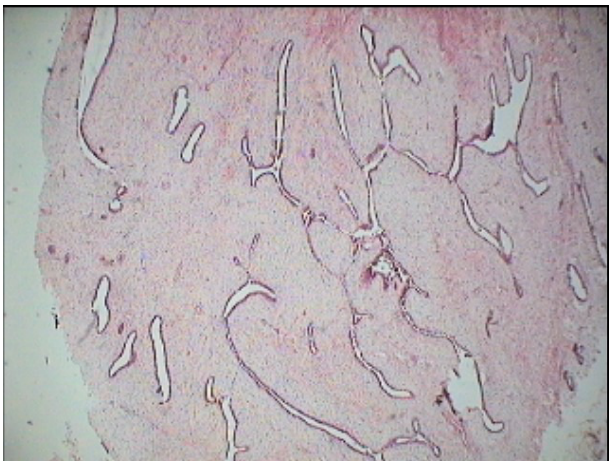
Picture-1 FNAC of fibroadenoma



Picture-2 Histopathology of fibroadenoma



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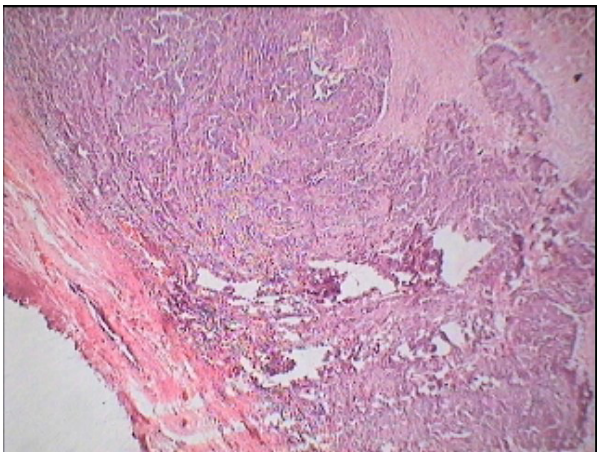
Picture-3**Histopathology of IDC**



Bibliography

1. Yalavarthi S, Tanikella R, Prabhala S, Tallam US. Histopathological and cytological correlation of tumors of breast. Med J DY Patil Univ 2014;7:326-31
2. 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 https://doi.org/10.4061/2011/689521.
3. Nggada HA, Tahir MB, Musa AB, Gali BM, Mayun AA, Pindiga UH, et al. Correlation between histopathologic and fine needle aspiration cytology diagnosis of palpable breast lesions: a five-year review. Afr J Med Med Sci. 2007;36:295–8. [PubMed]
4. Stone AM, Shenker IR, McCarthy K. Adolescent breast masses. Am J Surg. 1977 Aug;134(2):275-7
5. Pinto RG, Kulwant S. A statistical analysis of fine needle aspiration biopsies in palpable benign (neoplastic and non- neoplastic) breast lesions. J cytol 2004;21: 64-7.
6. Khanna R, Khanna S, Chaturvedi S, Arya NC. Spectrum of breast disease in young females: a retrospective study of 1315 patients. *Indian Journal of Pathology and Microbiology*. 1998;41(4):397–401.[PubMed]
7. Waghmare RS, Sakore SD, Rathod SB. Fine needle aspiration cytology of breast lesions and correlation with histopathology. Int J Res Med Sci 2016;4:4416-21.
8. Sinha SK, Bandyopadhyay R, Mitra RB, Chatterjee U. FNAC of breast with reference to topography and nuclear grading in malignant lesions. J Cytol. 2002;19:187–92.
9. Pant I., Singh P.K., Singh S.N., Agarwal A., Singh N.B. — Cytomorphologic study of palpable breast lesions and histopathologic correlation. Journal of Cytology. 20: 129-132, 2003
10. Srikanth S. Cytological and histopathological correlation of breast lesions-A study of one hundred cases. Ind J of Path and Onc 2017; 4(2):273-277.

11. Eltahir A, Jibril J, Squair J, et al. The accuracy of 'one-stop' diagnosis for 1,110 patients presenting to a symptomatic breast clinic. J R Coll Surg Edinb. 1999;44(4):226–230. [PubMed]
12. Ayata G, Abu-Jawdeh GM, Fraser JL, Garcia LW, Upton MP, Wang HH. Accuracy and consistency in application of a probabilistic approach to reporting breast fine needle aspiration. Acta Cytol. 2003;47:973–978.
13. Atamdede FI, Isaacs JH. The role of fine needle aspiration in the diagnosis of breast lesions. Gynecol Oncol 1993; 50: 159- 163.
14. Husain MT. Comparison of fine needle aspiration cytology with excision biopsy of breast lump. J Coll Physician Surg Pak. 2005;15(4):211–14.
15. Velu ARK, Srinivasamurthy BC, Rani J. Cytological evaluation of benign breast lesions with histopathological correlation. Indian Journal of Pathology and Oncology. 2016;3(1):7-10.
16. Nguansangiam S, Jesdapatarakul S, Tangjitgamol S. Accuracy of fine needle aspiration cytology from breast masses in Thailand. Asian Pacific J Cancer Prev. 2009;10:623–6.
17. Khanna R, Khanna S, Chaturvedi S, Arya NC. Spectrum of breast disease in young females: a retrospective study of 1315 patients. Indian J Pathol Microbiol. 1998 Oct;41(4):397-401.
18. .Scopa CD, Koukouras D, Spiliotis J, Harkoftakis J, Koureleas S, Kyriakopoulou D, Tzoracoleftherakis E. Comparison of fine needle aspiration and Tru-Cut biopsy of palpable mammary lesions. Cancer Detect Prev. 1996;20(6):620-4. [PubMed]
19. Garg S, Mohan H, Bal A, Attri AK, Kochhar S. A comparative analysis of core needle biopsy and fine-needle aspiration cytology in the evaluation of palpable and mammographically detected suspicious breast lesions. Diagn Cytopathol. 2007;35:681–9. [PubMed]
20. Rubin M, Horiuchi K, Joy N. Use of fine needle aspiration for solid breast lesions is accurate and costeffective. Am J Surg. 1997;174:694–98. [PubMed]
21. Zuk JA, Maudsley G, Zakhour HD. Rapid reporting on fine needle aspiration of breast lumps in outpatients. J Clin Pathol. 1989;42:906–11.
22. Cross SS. Kappa statistics as indicators of quality assurance in histopathology and cytopathology. J Clin Pathol. 1996;49:597–599. doi: 10.1136/jcp.49.7.597.