ORIGINAL ARTICLE

ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY IN PALPABLE BREAST LESIONS AND ITS CORRELATION WITH HISTOPATHOLOGICAL DIAGNOSIS

Bhaskar Thakkar[1], Malay Parekh[2], N J Trivedi[3], A S Agnihotri[3], Uravashi Mangar[4]

Authors' Affiliation: [1]Associate Professor, G.M.E.R.S. Medical College And Hospital, Gandhinagar; [2]Resident Doctor, C U Shah Medical College and Hospital, Surendranagar; [3]Professor, C.U. Shah Medical College And Hospital, Surendranagar; [4]Tutour, Gmers Medical College And Hospital, Gandhinagar
Correspondence: Dr. Bhaskar Thakkar, Email: drbhaskar_9@yahoo.com

ABSTRACT

Background: Breast carcinoma is the common malignant lesion in women. Fine needle aspiration cytology has high sensitivity and specificity and is simple, rapid and safe method to diagnose breast lesions.

Materials and methods: A retrospective study was done in department of pathology of C.U.SHAH medical college and hospital of Surendranagar from January 2010 to July 2012. Total 120 FNAC of palpable breast lump was done in pathology department of C.U. SHAH medical college and hospital and correlate it with histopathological findings. All cases are categorized according to risk for cancer into unsatisfactory sample, benign proliferative breast disease without atypia, Benign proliferative disease with atypia, Inflammatory breast disease, suspicious for malignancy and malignant lesions.

Results: Out of 120 cases, 65 cases were benign, 32 malignant, 2 suspicious and 16 were inflammatory breast and 4 were unsatisfactory lesions. Cytological and histopathological correlation found in 114 cases (95.83%) out of 120 cases. Fibroadenoma is the most common benign breast lesion noted in 21-30 years age group, while ductal carcinoma was commonest malignant lesion noted in 41-50 years of age group. The sensitivity and specificity of FNAC were 97.05% and 98.78%

Conclusion: Fine needle aspiration cytology of palpable breast lesions is an effective modality for diagnosis of most of the malignant and benign lesions. Fine Needle Aspiration Cytology is highly sensitive and specific technique for diagnosis of most of the malignant and benign breast lesions.

Keywords: Fine Needle Aspiration Cytology, Breast Lump, Fibroadenoma, Ductal Carcinoma

INTRODUCTION

Breast cancer is second most common cancer in the women in india.(1) Palpable Breast lump is the most common presentation in the most of the breast diseases. Increase in cases of breast cancer is related to late marriage, birth of child in later age, shorter period of breast feeding and multiparity or low parity.(2) Fine Needle Aspiration Cytology (FNAC) of breast lump can be effectively used as a diagnostic tool in diagnosis and management of breast lump on an outpatient basis as hospitalization of patient is not necessary.

Fine needle aspiration cytology of breast is an important of the triple assessment of palpable breast lump(clinical examination, imaging(mammography or ultrasonography) and FNAC.(3) It has been shown than the FNAC can reduce the number of open biopsies.(4) The most common sign and symptom of breast disease is a palpable mass although breast diseases can also present as inflammatory lesion, nipple secretion or imaging abnormalities.(5)

OBJECTIVES

The objectives of this study was to assess utility of FNAC as the intial diagnostic tool in patients with breast lump and to categorize various breast lesions presented in our institute by FNAC and correlate it with histopathological findings.

MATERIALS AND METHODS

A retrospective study of 120 cases of breast lump was done in department of pathology of C. U. Shah medical college and hospital of surendranagar from January 2010 to July 2012. Out of 120 breast lump cases of FNAC, 114 cases received for histopathological correlation.

After careful clinical examination of the breast mass for its presence, consistency and any signs suspicious of malignancy, patient was placed in comfortable position for FNAC and explained the procedure.

FNAC procedure done with 22-23 gauze needle. The aspiration and non-aspiration technique with minimum 3-4 passes used to minimize haemorrhage. The samples were placed on a glass slide and smears were made by inverting second glass slide over the drop and as it spreads, pulling the slides apart horizontally or vertically. Smears were either immediately fixed or air dried while the surface till wet with 70-90% ethyl alcohol.

Routinely at least 3 fixed smears were subjected to H & E and remaining air-dry smears were subjected to giemsa stain. The smears were screened under low and high magnification and diagnosis was made as:

1) Unsatisfactory
2) Benign proliferative breast lesions without atypia
3) Benign proliferative breast lesions with atypia
4) Inflammatory braest lesions
5) Suspicious for malignancy
6) Malignant breast lesions.

Written consent was taken before the procedure from each patient.

RESULTS

All the 120 patients underwent a diagnostic FNAC in our pathology department following which 114 cases underwent a definitive surgical procedure after admission to hospital. All excised specimens obtained were subjected to histopathology. The FNAC reports were correlated with the final histopathology report and statistical tests were used to interpret the results. The observation and results of our study were tabulated and analysed as below area,

Table 1: Age and Sex Distribution of subjects

Age (yrs)	Males (%)	Females (%)
11-20	1 (25)	11 (9.48)
21-30	2 (50)	34 (2 (9.31)
31-40	0 (0)	28 (24.13)
41-50	0 (0)	26 (22.41)
51-60	0 (0)	09 (7.75)
61-70	1 (25)	05 (4.31)
71-80	0 (0)	01 (0.86)
81-90	0 (0)	02 (1.72)
Total	4 (100)	116 (100)

Table no. 2: Cytological diagnosis

Cytological diagnosis	Cases (%)
Unsatisfactory	04 (3.33)
Benign without atypia	61 (50.83)
Benign with atpia	5 (4.16)
Inflammatory	16 (13.33)
Suspicious for malignancy	2 (1.66)
Malignant	32 (26.66)
Total	120 (100)

Table 3: Classification of cytological diagnosis

Cytological Diagnosis	Cases	Fibroadenoma	Sclerosing adenosis	Tubular adenoma	IDC	ILC	DCIS	Mucinous Ca	Medullarry Ca	Lactating adenoma	Gynaecomastia	Fibrocystic braest Disease	Granulomatous Mastitis	CNIT
Benign	63	56	00	1	00	00	00	00	00	1	00	4	00	1
Malignant	32	00	00	00	29	1	1	00	1	00	00	00	00	00
Suspicious	2	00	01	00	1	00	00	00	00	00	00	00	00	00
Inflammatory	14	0	00	00	00	00	00	00	00	00	00	00	00	00
Fibrocystic	2	00	00	00	00	00	00	00	00	00	00	02	00	00
Galactocoele	1	00	00	00	00	00	00	00	00	00	00	00	00	00
Gynaecomastia	2	00	00	00	00	00	00	00	00	00	02	00	00	00
Non specific	4	00	00	00	00	00	00	00	00	00	00	00	00	00
Total	120	61	01	01	26	01	02	01	01	01	02	06	01	01

* Chronic Nonspecific inflammatory tissue

In present study male contribute 4 cases (3.33%) and female contribute 116 cases (96.66%). Male to female ratio in the study was 1:20. In the present study maximum no of cases was females. Amongst female, maximum cases were noted in 3rd (21-30 years) decade (35 cases) were in reproductive age group.(29.16%) Amongst all cases, 65 cases (54.16%) were benign, malignancy was noted in 32 cases(26.66%), suspicious for malignancy in 2 cases(1.67%) and other inflammatory were 16 cases(13.33%). Fibroadenoma was the commonest benign diagnosis.

Among benign and malignant lesions cytological diagnosis and histopathological diagnosis were consistent in 100% cases. The lesions which were diagnosed as suspicious for malignant on cytology one case were found malignant on histopathology sections and one case found benign on histopathological sections. In remaining inflammatory cases, consistency was found in 100% cases. Thus in present study, cytological findings were consistent with histopathology in 116 cases out of 120 cases (98.27%) and inconsistent in 2 cases (1.72%).

In present study out of 63 smears diagnosed as benign on cytology showed 56 fibroadenoma, 4 as Jfibrocystic disease, 1 as lactating adenoma and 1 as tubular adenoma and 1 as chronic nonspecific lesion.

Total 32 cases were diagnosed as malignant on cytology which on histology showed inflammatory duct carcinoma in 28 cases, 2 as infilterating lobular carcinoma and 1 as medullary carcinoma and 1 as intraductal carcinoma. Suspicious for malignancy was made in 2 smears out of which 1 diagnosed as infilterating ductal carcinoma and 1 as sclerosing adenosis. In remaining cases, tuberculous mastitis diagnosed in 4 cases on cytology and were confirmed on histology.

Table 4: Comparison of Cytological Diagnosis

Cytology diagnosis	Cases	Histopathology diagnosis	
		Consistent	Inconsistent
Benign	65	65(100)	0(00%)
Malignant	32	32(100%)	0(00%)
Suspicious of malig-nancy	02	0(00%)	2(100%)
Other	16	16(100%)	(00%)
Total	116	114(98.27%)	2(1.72%)

Table 5: Statistical analysis of Cross tabulation of histopathology and cytology

Histopathology	Cytology		Total
	Positive	Negative	
Positive	33(0.97)	1 (0.03)	34 (100)
Negative	1 (0.01)	81 (0.99)	82 (100)

True Positive (TP): 33; True Negative (TN): 81
False Negative (FN): 1, False Positive (FP):1
Sensitivity = TP/(TP+FN)X100= 97.05%.
Specificity = TN (TN+FP) X 100 = 98.78%.
Positive Predictive Value = TPX100/(TP+ FP) =97.05%.
Negative Predictive Value = TN X 100 /(TN + FN) =98.78%.
Efficiency= (TP + TN) X 100)/(TP+FP+FN+TN) = 98.27%.

DISCUSSION

Fine needle aspiration cytology of breast lump is worldwide accepted and established method of choice to determine the nature of breast lump.

Fibroadenoma was the commonest benign lesion in our study which was concurrent with the findings of Debra (1995) et al (16) and invasive duct carcinoma was the commonest malignant lesion which was similar to findings of study done by Quasim (2009) et al (19).

Table 6: Comparison of cytological diagnosis with other studies

Author	Malignant	Suspicious For Malignancy	Benign	Inadequate smear	Other	Total
Debra et al(1983)	131(7.79%)	300(8.92%)	1019(60.65%)	230(13.69%)	0	1680
Feither G et al(1995)	181(12.3%)	49(3.3%)	1003(68.1%)	239(26.6%)	0	1472
Premila De SR et al (1997)	92(15.33%)	15(2.50%)	486(81.0%)	7(1.16%)	0	600
Kuldeep Singh(2001)	35(14.58%)	5(2.08%)	200(83.33%)	0	0	240
Quasim et al(2009)	32(27.58%)	0	68(58.62%)	16(13.79%)	0	116
Sajid(2010)	58(47.5%)	0	64(52.5%)	0	0	122
Bukhari et al(2010)	120(28.23%)	32(7.52%)	271(63.76%)	0	2(0.47 %)	425
Shreshta et al(2011)	152(10.83%)	175(12.47%)	618(11.97%)	27(1.92%)	431	1403
Tohuiddin(20 11)	72(13.74%)	17(3.24%)	431(82.25%)	3 (0.57%)	4(0.76 %)	524
Present study	**32(26.66%)**	**2(1.66%)**	**65(55.00%)**	**4(3.33%)**	**16(13.33 %)**	**120**

In the present study percentage of malignant cases was 26.66% on cytology; more or less similar to findings to quasim et at (2009) (27.58%). This percentage was more than Debra et al (1983), Feitcher G et al (1995), Premila de SR st al (1997), Kuldeep singh(2001) et al, Shrestha et al (2011) and Tohuiddin et al (2011) and was less than Sajid H(2010) and Quasim et at (2009).

On cytology percentage of benign, in the present study was 55%(65 cases), this was similar to Quasim et at (2009). The percentage was more as compared to sajid et al (2010), shreshtha et at (2011). The percentage was less as compared to Debra et at (1983), Feither Get al (1995), Premila De SR et at (1997), kuldeep singh(2001) et al and Bukhari et al (2011) and Neha et al (2013). Amongst other non-neoplastic lesions 16 cases were observed in the present study. Findings are less than shrestha et al, M Amirjkachi et at (2001) has found to 10 cases of gynecomastia on FNAC. Anuradha Joshi et al (1999) has noted 70 cases of carcinoma and 295 cases of benign breast lesions amongst males.

In present study 1 case was diagnosed as gyenecomastia, 2 cases were benign and one case diagnosed as malignant among males. Diagnostic accuracy for gynecomastia, benign and malignant breast lesion in male was 100%. Park IA et at (1997) has observed that the success of cytodiagnosis was varied according to histological subtypes. FNAC tend to be inadequate and false negative in case of duct carcinoma of schirrous subtype. The main cause for inadequate smears are may be due to lack of technical experience in performing FNA preparation. Bukhari et al (2010) noted that FNA of ill-defined masses like lesions or lesions with hyalinization and deeply situated lumps may also be contributed to the inconclusive diagnosis.

In the present study, we noted one false negative case in cystic breast lesion where cellularity is also low and we considered it in suspicious for malignant lesion category which turns out to be malignant on histopathological diagnosis. Criteria for adequacy during cytology reporting if cut off to 6 epithelial cell clusters reduces the false negative rates by approximately 50%. False positive diagnosis is always interpretation errors.

Common false positive lesions include some fibroadenomas with myoepithelial hyperplasia, complex sclerosing lesion, radial scar, sclerosing adenosis. Sclerosing adenosis was misdiagnosed as suspicious for malignancy on cytology smears as false positive case in our study. Epithelial aggregates in smears may show an obivious micro-acinar pattern giving rise to similar finding like tubular carcinoma. Apocrine metaplasia occurring in areas adenosis can look extremely worrying and may be the cause of false positive diagnosis.

Table 7: Comparison of Accuracy of FNAC

Author	Sensitivity	Specificity	PPV*	Efficiency	NPV#
Kline TS et at (1979)	89.5%	92.5%	85.33%	91.63%	-
Francisco D et at (1995)	93.49%	95.73%	93.49%	98.75%	95.73%
Feichter et at (1997)	86%	99.3%	99.3%	93%	85%
Premila De SR et at (1997)	93.8%	98.21%	92.70%	97.40%	-
Zhang Qin(2004)	97.1%	97.3%	-	9.2%	-
Arjun Singh et al (2011)	84.6%	100%	-	92.3%	-
Khemka A et at (2011)	96%	100%	100%	-	95.12%
Bukhari et at (2011)	98%	100%	97%	98%	100%
Present study	**97.05%**	**98.78%**	**97.05%**	**98.27%**	**98.78%**

*Positive predictive value; #Negative predictive value

In the present study sensitivity was high as compared to Kline TS et al (1979), GE Feitcher et al (1997) and Arjun Singh et al (2011). Specificity in present study was similar to Premila De SR et at (1997) and it was higher than Kline TS (1979), Francisco Dominez et al (1997) and Zhang Qin(2004). The positive predictive value of present study was similar to Bukhari et al (2011) and was higher than Francisco Dominez et at (1997) and Premila De SR et at (1997) and Kline TS et at (1979). The negative predictive value was higher than Feitcher et at (1997), Francisco Dominez et at (1997). Efficiency was higher than all the series mentioned above. Thus in present given study the sensitivity, specificity, positive predictive value, negative predictive value and efficiency of malignant cases is 97.05%, 98.78%, 97.05% and 98.78%. respectively. The high specificity and predictive value of positive results allow for the early diagnosis, treatment and management of breast cancer.

CONCLUTION:

The FNAC of breast is safe, easy, reliable, rapid, economical and highly accurate method for diagnosis of breast lump preoperatively. FNAC of breast lump should be used as preliminary investigation in outdoor patient department. High specificity and a high negative predictive value for malignancy suggests that FNAC differentiates between benign and malignant lesions very well preoperatively, so reduce patients's anxiety and also helps surgeon to plan the surgical management.

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