DIAGNOSTIC UTILITY OF FNAC IN BREAST LESIONS AND ITS CORRELATION WITH HISTOPATHOLOGY; A TERTIARY CARE HOSPITAL BASED STUDY

Pathology

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ABSTRACT

BACKGROUND: Breast lesions most commonly present as breast lump. Breast carcinoma is the most frequent cancer among women worldwide. FNAC is the initial first line of investigation in evaluating breast lesions because of its reliability, rapidity, cost effectiveness, lack of requirement of anaesthesia and minimal or no morbidity. On the basis of the result of FNAC, further treatment can be planned in most of the cases.

AIMS: To determine the accuracy of FNAC in the diagnosis of breast lesions and to correlate the cytological findings with histopathological examination.

MATERIAL AND METHODS: The present work is a retrospective type of study, conducted in the department of pathology of a tertiary care hospital, RIMS Ranchi over a period of one year from July 2017 to June 2018. In present study cyto-histopathological correlation was done in 88 patients.

RESULTS: Out of 88 patients, 58(65.91%) cases were benign, 28(31.82%) cases were malignant and 2(2.2%) cases were inflammatory on cytological examination. On histopathological examination 55(62.5%) cases were benign and 31(35.23%) cases were malignant and 2(2.27%) cases were found to be inflammatory. FNAC had sensitivity of 90.32%, specificity of 100% positive predictive value of 100% and negative predictive value of 94.83% and cyto-histopathological correlation was found in 96.51% cases in our study.

CONCLUSION: FNAC is an easy, cost effective, less time-consuming and less traumatic method for diagnosis of breast lesions. FNAC can provide a preoperative diagnosis of both benign and malignant lesions with reasonable accuracy as compare to histology.

KEYWORDS

Breast lesions, FNAC, Benign, Malignant

INTRODUCTION

Breast lesions are one of the most commonly encountered lesions in women. Breast lesions most commonly present as lump. It is sometimes difficult to determine whether a suspicious lump is benign or malignant simply from clinical assessment. FNAC is an important initial diagnostic modality in breast lumps as there is no need for anaesthesia and rapid analysis and reporting can be done with few false positive results[1]. FNAC is one of the important components of "triple approach", which has been widely accepted for the preoperative diagnosis of breast lesions which includes clinical and radiological examination in conjunction with FNAC features , to diagnose the breast lesions and to determine the best management plan for the patient[2]. The main purpose of FNAC of breast lesions is to confirm cancer, preoperatively and to avoid unnecessary surgery in specific benign conditions[3]. FNAC is a relatively simple, reliable, atraumatic, economical and complication-free technique for the evaluation of mass lesions. FNAC is now a well-established technique for the investigation of women with suspected breast carcinoma[4].FNAC has become one of the most important diagnostic tools for palpable breast masses and false-negative results have become a major concern. Different studies have determined that FNAC has a sensitivity ranging from 80% to 98% and a specificity of 99% to 100%[5]. The purpose of the present study is to determine the value of FNAC in the diagnosis of breast lumps and to compare the result of FNAC with histological diagnosis and to assess the accuracy of FNAC.

MATERIAL AND METHODS

The study was carried out in department of pathology, Rajendra institute of medical sciences, Ranchi. This is a retrospective study done on 88 patients who presented with breast lesions and had initial evaluation with FNAC from July 2017 to June 2018. Comparison between cytology and histology was done according to availability of samples. FNAC was performed on all the breast lesions without local anaesthesia. FNAC was carried out using 10cc syringe and 22 gauge needle from proper site under aseptic precautions. Smears were stained with Haematoxylin and Eosin (H&E), Papanicolaou and Giemsa stains. Smears with adequate material were followed for subsequent histopathological correlation on tru-cut biopsies, lumpectomies and mastectomies. All specimens were processed by fixation, dehydration and clearing followed by impregnation with wax. The wax blocks were cut in 5-6 micro meter sections & stained by hematoxylin and eosin stain. The diagnosis in all the cases were made on histopathological

examination of routinely processed tissue. Based on these findings, the sensitivity, the specificity, positive predictive value and negative predictive value of FNAC as a test were calculated.

OBSERVATIONS AND RESULTS

In the present study, 88 patients with breast lesions were studied. The age range for total 88 patients was 15 to 75 years. Majority of patients (59.09%) were in age group between 15 to 30 years (table 1). Out of 88 patients 14(15.91%) patients were unmarried.

TABLE 1 : Age wise distribution of patients enrolled in study (n=88)

S. No.	Age group(in years)	No. of patients	% of patients
1	15 to 30	52	59.09%
2	31 to 45	21	23.86%
3	46 to 60	12	13.64%
4	61 to 75	03	3.41%
Total		88	100

Out of 88 cases, 2(2.27%) cases were diagnosed as inflammatory lesion, 58(65.91%) cases were benign and 28(31.82%) cases were malignant on cytology. The inflammatory lesions were mastitis. The benign lesions on cytology included fibroadenoma and fibrocystic disease (Table 2).

TABLE 2: cytological diagnosis of breast lesions on FNAC n=88

Category	Cytological diagnosis	No. of patients (n=88)	% of patients
Inflammatory(n=02)	Mastitis	02	2.27
Benign(n=58)	Fibroadenoma	50	65.91
	Fibrocystic disease	08	
Malignant(n=28)		28	31.82
Total		88	100

Out of 88 cases, 55(62.5%) cases were benign and 31(35.23%) cases were malignant. 2 cases were inflammatory (Chronic lymphocytic mastitis) on histopathological examination. The spectrum of malignant lesions on histopathology included classic invasive ductal carcinoma, mucinous carcinoma, medullary carcinoma, metaplastic carcinoma(Table 3).

TABLE 3: Histopathological diagnosis of breast lesions n=88

| Category	Histopathological diagnosis	No. of patients (n=88)	% of patient
Inflammatory (n=02)	Chronic lymphocytic mastitis	02	2.27
Benign(n=55)	Fibrodenoma	48	62.5
	Fibroadenosis	01	
	Fibrocystic disease	02	
	Lactating adenoma	01	
	Benign phylloides tumour	03	
Mlignant (n=31)	Classic invasive ductal carcinoma	28	35.23
	Mucinous carcinoma	01	
	Medullary carcinoma	01	
	Metaplastic carcinoma	01	
Total		88	100
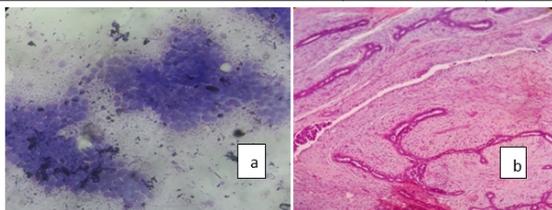
Figure 1: Fibroadenoma (a) cytological smear (b) corresponding histological section
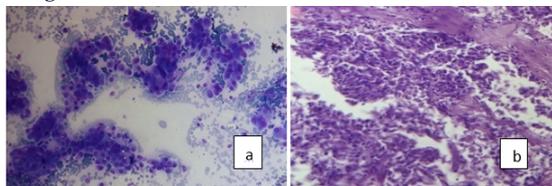

Figure 2: Classic invasive ductal carcinoma (a) cytological smear (b) corresponding histological   section.
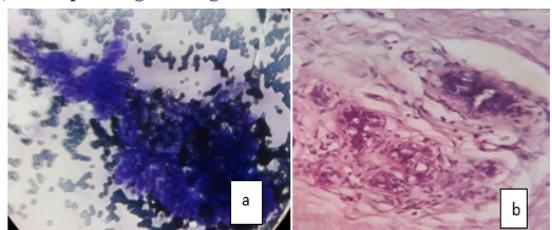

Figure 3: Fibrocystic disease (a) cytological smear (b) corresponding histological section.

Out of 88 patients, diagnosed malignant on histopathological examination i.e. 31 cases, 14 cases (15.91%) were in age group of 46-60 years. Out of 55 benign lesions, majority of cases (51.14%) were in age group of 15-30 years (Table 4)

TABLE 4: Age wise distribution of patients with various breast lesions on histopathology (n=88)

S. No.	Age group (in years)	Patients with inflammatory lesions % (n=02)	Patients with benign lesions % (n=55)	No. of patients with malignant lesions% (n=31)
1	15-30	00(00)	51.14(45)	2.27(02)
2	31-45	2.27(02)	11.36(10)	13.64(12)
3	46-60	00(00)	00(00)	15.91(14)
4	61-70	00(00)	00(00)	3.41(03)
Total 100% n=88		2.27(n=02)	62.5(n=55)	35.23(n=31)

Out of 88 cases, 2 cases were diagnosed as inflammatory on cytology and as lymphocytic chronic mastitis. On histopathological examination out of 58 cases diagnosed as benign on cytology, 3 cases were found to be malignant on histopathology and 55 cases were benign. Out of 28 cases diagnosed malignant on cytology, all cases were found to be malignant on histopatholgy (Table 5).

TABLE 5: Cyto-histopathological correlation of patients enrolled in the study(n=88)

cytology	Histopathology		Total
	Benign	Malignant	
Benign	55	03	58
Malignant	00	28	28
Total	55	31	86

Analysis of the results of present study is shown in Table (6) and Table (7).

TABLE 6: Analysis of results

True positives (TP)	28
False Positives(FP)	00
True Negatives(TN)	55
False Negatives(FN)	3

TABLE 7: Analysis of results

Sensitivity=TP/TP+FN*100=28/31*100	90.32%
Specificity=TN/TN+FP*100=55/55*100	100%
Positive predictive value=TP/TP+FP*100=28/28*100	100%
Negative predictive value=TN/TN+FN*100=55/58*100	94.83%
Accuracy rate=TP+TN/TP+TN+FP+FN*100=83/86*100	96.51%

The sensitivity and specificity of FNAC was found to be 90.32% & 100% respectively. The positive predictive value was 100% and negative predictive value was 94.83% for FNAC. Accuracy rate of the study was 96.51%. There was no false positive case in the study.

DISCUSSION

FNAC of the breast is commonly used as part of the diagnostic triad, which in addition to FNAC includes clinical breast examination and radiological evaluation (mammography and ultrasonography). The diagnostic accuracy is close to 100% when all three modalities favour a benign or malignant diagnosis6. Clinically palpable breast mass is the most common presentation of breast lesions in females. It is also the usual presentation of carcinoma breast7. The application of FNAC for diagnosis of palpable breast masses was first introduced by Martin and Ellis in the year 19308. It has since become an increasingly popular diagnostic procedure owing to its distinctive advantages of being easy, fast, sensitive, economical and safe with excellent patient acceptability9.FNAC of the breast has two main goals. One is to confirm a radiological and clinical benign lesion and avoid unnecessary surgery and the other is to confirm a malignant diagnosis to allow definite treatment planning10. The present study was done on 88 cases of breast lesion to determine diagnostic accuracy of FNAC and its histopathological correlation. In all 88 cases, FNAC were done and subsequently histopathological examination of the tissue were done after surgery. So a correlation between cytological and histopathological finding were available. The age range was 15 to75 years in our study. The breast pathology was common in age group 15-30 years (59.09%) followed by 31- 45 years (23.86%), 46-60 years(13.64%) and 61-75 years(3.41%) respectively in our study . On cytology out of 88 cases, 58 (65.91%) cases were benign, 28 (31.82%) cases were malignant and 2(2.27%) cases were inflammatory in our study. Out of 88 cases, 50 (56.82%) cases were diagnosed as fibroadenoma and 8(9.09%) cases were diagnosed as fibrocystic disease and 2(2.27%) cases diagnosed as chronic mastitis on cytology in our study. On histopathological examination out of 88 cases 55(62.5%) cases were benign and 31(35.23%) cases were malignant and 2(2.27%) cases were inflammatory in our study. On histopathological examination, 48 (54.54%) cases were fibroadenoma ,01(1.14%) case was fibroadenosis 2(2.27%) cases were fibrocystic disease, 01(1.14%) case was lactating adenoma, 03(3.41%) cases were benign phylloid tumour and 02 (2.27%) cases were diagnosed as chronic mastitis. Among 31 malignant cases 28(31.81%) cases were classic invasive duct carcinoma, 01(1.14%) case was mucinous carcinoma, 01(1.14%) case was medullary carcinoma , 01(1.14%) case was metaplastic carcinoma in our study. Fibroadenoma was found to be the most common benign tumour infilterating duct carcinoma was the most common malignant tumour in our study. In our study, benign lesions were more common in age group of 15- 30 years and malignancy was more common in age group of 46- 60 years. Out of 58 benign cases on cytological examination only 3 cases were found to be malignant on histipathological examination and all the malignant cases on cytological examination were confirmed as malignant on histopathological examination. Thus in majority of cases i.e. 96.51%, the cytological diagnosis was consistant with that of histopathological

diagnosis. The sensitivity and specificity was found to be 90.32% & 100% in our study which was comparable as found in other studies (Table 8)11,12,13,14,15,16,8.

TABLE 8 Statistical evaluation of breast lesions in various studies.

Studies	Sensitivity (%)	Specificity (%)	Positive predictive value (%)	Negative predictive value (%)
Shagufta et al	90.65	96.84	97	90.19
Manju et al	83.3	100	-	-
Koirala et al	100	100	-	-
Tiwari m	83.3	100	-	-
O Neil S et al	97	78	-	-
Zhang Qin et al	97.1	97.3	-	-
A.Z. Moham med et al	90.6	100	-	-
Present study	90.32	100	100	94.83

The current study showed that FNAC is a reliable method. It helps in diagnosing breast lesions without surgical intervention and it also helps in pre-operative decision making. However, the 3 cases were false negative in our study which were diagnosed benign on cytology and turned out to be malignant (invasive ductal carcinoma) on histopathology. Hypocellularity, despite of repeated aspiration and presence of mixed benign and malignant cell were the contributing factors for false negative cases. False negative diagnosis may be due to technical failure, misdiagnosis or the presence of mixed benign and malignant features17. Adequate clinical information of the cases, observation made at the time of aspiration regarding the nature and quantity of the material aspirated and experience of the cytopathologist in regarding the smear are the factors which influenced the accuracy of diagnosis.

CONCLUSION

FNAC is a simple, reliable, fast, cost effective and accurate diagnostic method for the assessment of breast lesions. FNAC can be used as routine preliminary tool for assessment of breast lesions, especially in developing countries with limited resources. FNAC is used to diagnose both benign and malignant lesions. FNAC helps to take preoperative decision and further management of patient and can avoid unnecessary surgical intervention.

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