

Clinicocytological and Histopathological Comparison of Palpable Breast Masses in and around Jabalpur

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Abstract

Introduction: Breast lesions are a heterogeneous group of disorders ranging from inflammatory lesions to invasive cancers.¹ Diseases of the breast are showing a rising trend worldwide; from 1.05 million in 2000 to 2.08 million in 2018, the cases of breast cancer almost doubled up in 8 years.² At the end of 2020, there were 7.8 million women alive who were diagnosed with breast cancer in the past 5 years, making it the world's most prevalent cancer. The accuracy of diagnosis can be increased by a combination of preoperative tests (like physical examination, mammography, fine-needle aspiration cytology, and core needle biopsy). These modalities are more accurate, reliable, and acceptable when compared with a single adopted diagnostic procedure despite of having their own technical limitations.³ Fine needle aspiration cytology (FNAC) is a relatively safe, quick, easy and a cheap diagnostic tool to decipher the benign or the malignant nature of the swelling. based on NHSBSP of Britain cytology was subclassified into 5 categories C1- C5. This study was conducted to document the spectrum of breast lesions encountered in a tertiary care centre in FNAC and sub classify them. **Materials and Methods:** A total of 90 cases of breast lesions which were referred for FNAC to the Department of Pathology, were evaluated. All of these patients presented with palpable swelling and a clinico- cytological and histological correlation was done. FNACs were performed and both air dried and alcohol-fixed smears were prepared and stained with haematoxylin and eosin. The adequacy of the diagnostic material and the results of FNAC were reported. **Results:** Out of the total of 90 cases of breast lesions on which FNAC were done and evaluated, there were 92 females and 3 males. The clinical diagnoses were confirmed by cytology. Fibroadenoma (60.32%) was the most common benign cytological diagnosis followed by fibrocystic disease (6.35%) and ductal carcinoma (62.96%) was the most common diagnosis in malignant category. FNAC was false negative in six cases; 01 case was fibrotic tissue; two cases were diagnosed as fibro adenosis and 3 cases were diagnosed as of carcinoma. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of FNAC in diagnosing benign breast lesions were 98.41% ,85.19%, 93.94% ,95.83 % and 94.44% respectively while the sensitivity, specificity, PPV, NPV and diagnostic accuracy of FNAC in diagnosing malignant breast lesions were 85.19 % ,98.41%, 95.83% ,93.94 % and 94.44%.

Conclusion: FNAC is rapid, accurate, minimally invasive, outpatient-based procedure and helps in diagnosis of benign and malignant breast lesions and involvement in experienced pathologist chances of false results are less.

Keywords: fine needle aspiration cytology, infiltrating duct carcinoma, fibroadenoma, sub-category, diagnostic accuracy.

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Introduction

About 5-55% of all females suffer from breast diseases in their lifetime. In 2020, there were 2.3 million women diagnosed with breast cancer and 685 000 deaths globally. As of the end of 2020, there were 7.8 million women alive who were diagnosed with breast cancer in the past 5 years, making it the world's most prevalent cancer[1-4].In India, 1,62,468 women were newly detected, and 87,090 women died due to breast cancer in the year 2018[5]. It is not always possible to determine whether a suspicious lump is benign or malignant simply by clinical assessment. Early detection of breast cancer reduces the morbidity and mortality rate. Mammography is the widely accepted modality used for breast cancer screening in clinically suspected lesion. Fine needle aspiration cytology (FNAC) is a safe, quick, easy, and a cheap diagnostic tool to decipher the benign or the malignant nature of the breast lesion. It involves sampling of

the cells using a needle, from the potentially pathological swelling. It is also a less invasive and less traumatic procedure, and better results are obtained in the hands of an experienced pathologist. The major concern of the clinician and the responsibility of the pathologist lies in the ability to differentiate a benign from a malignant lesion as breast cancer is the leading cause of mortality in women. Therefore, a cumulative approach i.e. Triple assessment of breast mass which includes clinical examination, imaging and FNAC are necessary to reach a diagnosis. Furthermore, invasive procedures like open biopsies can be avoided. Various studies have shown that imaging techniques and FNAC, both used individually or coupled, improve the accuracy of diagnosis and help in avoiding unnecessary invasive procedures[6,7]. The aims and objectives of this study were as follows: 1. To document the spectrum of breast lesions encountered. 2. The clinicopathological and radiological correlation of the diagnoses 3. To categorise the cytology results by NHSBSP cytological grading along with histopathological correlation 4. To assess the importance of FNAC to decipher the nature of these lesions .5. To assess the sensitivity and specificity and diagnostic accuracy of FNAC as a diagnostic procedure.

Materials and Methods

A 1.5-year prospective observational study was conducted after obtaining permission from the Institutional ethical committee and

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informed consent from the patients. A total of 90 cases of breast lesions which were referred for FNAC to the Department of Pathology, were evaluated. All of these patients presented with palpable breast lump. Physical examination of all the palpable swellings was done and the clinical diagnoses were confirmed by cytology. FNACs were done using 20- or 22-gauge needles with or without the gun. Both air dried and alcohol-fixed smears were prepared. All the air-dried smears were stained with May-Grunwald Giemsa stain, and the alcohol-fixed smears were stained with haematoxylin and eosin and Papanicolaou stains. The adequacy of the diagnostic material was assessed and FNAC were reported and categorized accordingly into 5 categories according to the National Cancer Institute (NCI) guidelines in 1996

Results

Out of the total 90 cases of breast lesions on which FNAC were done and evaluated, there were 97 females and three males. The clinical diagnoses were confirmed by cytology. [Table:1] This study showed that benign breast lesions were the most common lesions (71.43%) in young females (19-45 years) among which the Fibroadenoma (60.32%) was the commonest one. [FIGURE 1] The malignant lesions were common (44.44%) in fourth and fifth decades of life, among which infiltrating ductal carcinoma (62.96%) was the most common lesion. [FIGURE 2] Malignant lesions were more common in urban population (37.04%) as compared to rural population (25.4%). On analysing the consistency and mobility of breast lumps it was observed that benign lesions were firm (79.37%) and mobile (87.30%) while hard consistency (77.78%) and fixed lumps (70.37%) was seen in malignant lesions. The most common site for breast lump is in our study is superolateral quadrant while benign lesions were found maximum in superomedial quadrant (30.16%) but malignant lesions were most common in superolateral quadrant of breast (62.96%). As has been shown in [Table 2], three out of six cases which was cytologically inadequate of evaluation was diagnosed as a duct carcinoma -scirrhous type by doing a histopathological examination (false negative result). Most of all cases showed good correlations between FNAC and histopathology. FNAC was able to make correct definitive diagnosis in 84 cases (93.3%). All 56 cases diagnosed as Benign (C2) and those diagnosed as malignant (C5) (16 cases) ended up as benign and malignant respectively on histologic examination. The seven cases which were categorized as C4 - suspicious for malignancy by cytology six turned out to be malignant ductal carcinoma on histopathology while one showed features of atypical ductal hyperplasia. Sensitivity of FNAC is the ability of a test to identify correctly all those who have the disease The specificity of FNAC is the ability of the study to identify correctly the candidates who do not have the disease. The positive predictive value (PPV) of FNAC was calculated as the probability that the patient with a positive test has the disease in question and the negative predictive value (NPV) of FNAC is the probability of a patient with a negative test not having the disease in question. The sensitivity, specificity, PPV, NPV and diagnostic accuracy of FNAC in diagnosing benign breast lesions were 98.41%, 85.19%, 93.94%, 95.83% and 94.44% respectively while the sensitivity, specificity, PPV, NPV and diagnostic accuracy of FNAC in diagnosing malignant breast lesions were 85.19%, 98.41%, 95.83%, 93.94% and 94.44%.

Discussion

FNAC of breast lumps is an accepted, reliable and established pre-operative diagnostic method for determining the nature of breast lesions. The application of FNAC for breast aspirations were first introduced in the beginning of 1960s by Franzen and Zajicek, an oncologist at the Karolinska Hospital in Stockholm, since then it has been widely used as an important tool in the evaluation of breast lesions. Breast lesions are one of the most common pathologies seen in a cytology laboratory. Due to increasing incidence of carcinoma breast there is a lot of anxiety in the minds of patients causing significant plight to the patients. Carcinoma breast pose a major

public health problem but its relatively easy to detect at an early stage, and start effective treatment in the form of conservative surgery and chemotherapy had prompted a worldwide initiation of triple assessment including a clinical (palpation), radiologic (ultrasonography or mammography), and cytological (FNAC) assessment. In our study, majority of patients were females, in reproductive age group (19-45 year age group) Benign lesions were seen in younger age group (18 to 45 year) and malignant lesions were more common in age group >45 year (peri and post-menopausal age group). Similar results were seen in the earlier conducted studies [10-12]. In our study, mobile breast lump was the most common presentation in benign cases (87.30%) while fixed breast lumps were more common in malignant cases (70.37%). Fixed masses become the integral part of all awareness programmes on Breast cancer education about self-breast examination. Among all four quadrants, upper and outer (superolateral) quadrant (35%) was the most commonly involved quadrant in the present study. The marked difference in the frequency of breast lump depends on the amount of breast parenchyma in each quadrant which is also seen in published literature [10-14]. In the present study of 90 patients, 70% were benign and malignant lesions were found in 30% cases and fibroadenoma was the commonest benign lesion while duct carcinoma was the commonest malignant tumor, results are similar to other studies [10,15,16]. In our study, out of 6 cases of cytologically sub category C1 three were diagnosed as benign cases, while three cases were histologically confirmed as malignancy. In C3 category four were confirmed benign while one case was misinterpreted as a benign lesion with few atypical cells by FNAC, was later on diagnosed as a borderline phyllodes tumour on doing a histopathological examination. This might be due to inadequate sampling, deep seated lesion and excessive collagenization in scirrhous type of breast carcinoma and extensive haemorrhage and necrosis in breast carcinomas. In cases of inadequacy, it is better to re-aspirate the lesion or FNAC should be performed under image guidance to locate the atypical area. It is always necessary to correlate the FNAC findings with clinical diagnoses as well as radiologically and to go for Rapid on site assessment can improve the diagnostic yield of FNACs and save time and money by reducing the need for repeat procedure/biopsy. In the present study, seven cases which were cytologically sub-categorized in C4 (suspicious for malignancy) six were confirmed as malignant ductal carcinoma while one had atypical ductal hyperplasia on doing histopathological examination. In the present study, all the 27 cytologically diagnosed malignant cases were confirmed as malignant on subsequent histopathological examinations. So, in our study, a 100% cytohistopathological correlation was observed for malignant lesions. Similar results were observed in different studies [17-19]. The sensitivity of FNAC was 98.41% for benign lesions and 85.19% in malignant lesions in the present study. The specificity in benign and malignant cases was 85.19 and 98.41 respectively. The positive predictive value of benign and malignant cases were 93.94% and 95.83% respectively while the negative predictive value was 95.83% in benign cases and 93.94% in malignant cases. The diagnostic accuracy of FNAC in our study was 94.44%, which were quite comparable with the findings of other studies. Unsatisfactory cytological smears can be due to faulty FNA technique resulting in inadequate cellular yield and sampling errors due to the nature of lesion itself. False negative results can be due to necrosis, haemorrhagic aspiration, scanty material or drying artefact.

Conclusion

FNAC is a reliable, fast, well tolerated and accurate pre-operative outpatient diagnostic method for the assessment of breast lesions. The whole procedure is time-saving and in the hands of an experienced pathologist an assessment of sample adequacy and cellularity can be performed in single setting thus eliminating the need for repeat procedures or biopsy. A simultaneous assessment of the axillary lymph node is also possible at the same sitting. Thus, FNAC is an

effective and valid tool as the first line diagnostic modality in the preoperative diagnosis of breast lesions thus providing guidance to both surgeons and pathologists leading to better patient care.

Table 1: Correlation of Cytological and histological diagnosis of breast lesions by FNAC (n=90)

Category	Cytological Diagnosis		Histological Diagnosis	No. of Cases	Percentage
C1	Inadequate	6	Fibrocollagenosis	1	1.1
			Fibroadenosis	2	2.22
			Ductal carcinoma	3	3.33
C2	Benign	56	Fibroadenoma	38	42.22
			Fibrocystic disease	04	4.44
			Nonspecific inflammatory lesion	3	3.33
			Acute mastitis	2	2.22
			Granulomatous mastitis	2	2.22
			Chronic mastitis	1	1.1
			Benign phyllodes	1	1.1
			Galactocele	1	1.1
			Lipoma	1	1.1
			Gynaecomastia	3	3.33
C3	Atypical/indeterminate	5	Fibroadenoma with epithelial hyperplasia	1	1.1
			Benign phyllodes	1	1.1
			Borderline phyllodes	1	1.1
			Ductal hyperplasia with usual type	1	1.1
C4	Suspicious of malignancy	7	Mesenchymal cell tumour	1	1.1
			Atypical Ductal hyperplasia	1	1.1
C5	Malignant lesions	16	Ductal carcinoma	6	6.67
			Ductal carcinoma	14	15.56
			Inflammatory carcinoma	01	1.1
Total		90	Malignant phyllodes[FIG:3]	01	1.1
				90	100

Table 2: Comparison of FNAC (cytological grade) with Histological diagnosis

Cytological grade	Histological Finding			
	Benign (N=63) C1-C4		Malignant (N=27) C5	
	N	%	N	%
C1 (inadequate)	3	4.76%	3	11.11%
C2 (benign)	56	88.89%	0	0
C3 (atypical/indeterminate)	3	4.76%	2	7.41%
C4 (Suspicious of malignancy)	1	3.17%	6	22.22%
C5 (malignant)	0	0	16	59.26%

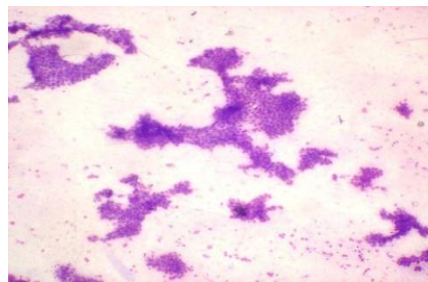


Fig 1: Microphotograph Showing Fnac of Fibroadenoma Showing Antler-Horn Pattern (H&E X10)

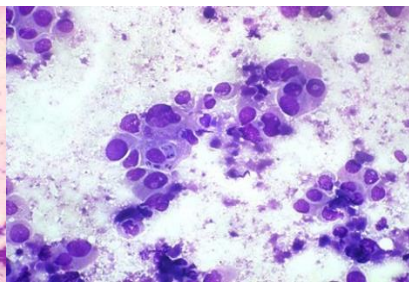


Fig 2: Microphotograph Showing Fnac of Duct Carcinoma Showing Pleomorphism With Hyperchromatism and Irregular Nuclear Membrane (H&E X40)

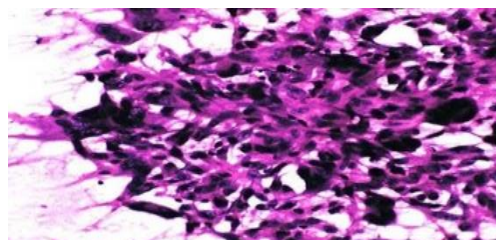


Fig 3: Microphotograph Showing Fnac Of Malignant Phyllodes -Showing Spindle Shaped Neoplastic Cells With Marked Nuclear Pleomorphism (H&E X40)

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