Original research article

Comparison Between Fine Needle Aspiration Cytology with Histopathology to Validate Accurate Diagnosis of Palpable Breast Lump

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Abstract

Background and objectives : A palpable breast lump is defined as a dominant mass if it is 3-dimensional, distinct from surrounding tissues, and asymmetrical relative to the other breast. A method of definitive diagnosis of patients who present with palpable breast lump at the outpatient clinic is needed. This method must be accurate, easy to perform and acceptable to the patient. FNAC is an important diagnostic tool in management of patient with a breast lump. Considering patient's comfort, lack of requirement of anesthesia, it provides rapid and accurate diagnosis. This study was conducted to compare the diagnostic accuracy of fine needle aspiration cytology (FNAC) in differentiating the benign and malignant lesions of palpable breast lump with histopathological correlation and also to study the accuracy of FNAC procedure.

Method : This study was a prospective study done in 50 patients presenting with palpable lump in the breast for FNAC to the Department of Pathology, VIMS. FNAC was performed with 23G needle. The material aspirated by FNAC and histopathology sections both were stained with H&E. Cytological diagnosis was compared with histopathology . Specificity, sensitivity, accuracy, and predictive values were calculated using standard formulas.

Results : In this study Fibroadenoma was most common benign lesion and Infiltrating ductal carcinoma is most common malignant lesion. Diagnostic accuracy of FNAC was 88.6% and overall sensitivity of FNAC in diagnosing the palpable breast lump was 85.71%, specificity was 100%, positive predictive of 100% and negative predictive value of 93.55%

Conclusion: The diagnostic efficacy, sensitivity and specificity observed in this study by FNAC were comparable to Histopathological examination. Hence FNAC stands as an effective and valid tool as a first line diagnostic modality in the preoperative diagnosis of both benign and malignant lesions. A positive correlation was observed between Robinson cytological grading system and Scarff Bloom Richardson Histological grading system.

Key words: FNAC; Breast lumps; HPE; Comparison; Benign Lesion; Malignant Lesion

Introduction

The class mammalia is remarkable for the evolution of modified skin appendages, known as mammary glands or breasts that provide complete nourishment and immunological protection for the young. In humans, paired mammary glands are situated in the upper chest wall, resting on the pectoralis muscle. The breast is composed of specialized epithelium and

stroma that gives rise to both benign and malignant lesions specific to the organ. The female breast is made up mainly of lobules, ducts and stroma. Carcinoma of the breast is the most common non-skin malignancy in women and is second only to lung cancer as a cause of cancer deaths.[1] A woman who lives to age 90 has a one in eight chance of developing breast cancer. As the demographic bulge of the "baby boomers" continues to grow older, the number of women with breast cancer is expected to increase by about a third over the next 20 years. It is both ironic and tragic that a neoplasm arising in an exposed organ, readily accessible to self- examination and clinical diagnosis continues to exact such a heavy toll.[1]Fine needle aspiration cytology (FNAC) is increasingly being used for preoperative diagnosis of breast cancer in order to determine various prognostic parameters so that the best therapy that can be offered to the patients.[2] FNAC provides a rapid and accurate diagnosis and also has therapeutic value in cystic conditions.[2]The scope of cytology now extends into identifying the subtypes of benign and malignant breast lesions. It has been shown that FNA may provide added information such as the intrinsic features of tumor and hence be helpful in prognostication of the tumor factors like nuclear grading, mitotic index and DNA contents.[3] Thus, it plays a major role as an important preoperative assessment procedure along with clinical correlation and imaging which are referred to as the "Triple test."[4]Cytologic grading has shown a positive correlation with the histological grade and hence cytologic grade is important in predicting the histopathologic grade preoperatively. Cytologic grade would thus provide relevant information on the tumor biologic behavior and could be a useful parameter to take into consideration when selecting neoadjuvant therapy.[4]Fine needle aspiration cytology (FNAC) of breast lump is an accepted and established method to determine the nature of the lump and it may play an important role when it is difficult to determine the nature of breast lump by clinical examination. It has been shown that, FNAC can reduce the number of open breast biopsies.[7]FNAC is now used more frequently to diagnose any mass in the breast, which is clinically malignant. It is extremely beneficial in reaffirming the clinical impression of benign disease, which may not need subsequent biopsy. Furthermore, it allows more rapid diagnosis of a malignant condition in clinically non-suspicious masses. The ultimate benefit of aspiration cytology, however, rests in its demonstration of malignant disease, when other diagnostic modalities are inconclusive.[8]Fine needle aspiration cytology of the breast lumps is a substitute to excision biopsy in majority of instances and can differentiate and delineate the nature of the disease in most of the instances.[9]Though, critics have rightly pointed to the possibility of false negative reports in respect to malignant lesions, with improved techniques and expertise, a FNAC reported by an expert cytologist as unequivocally malignant is now considered by most a sufficient evidence to proceed to definitive surgery[6].This study was undertaken to see how well a preliminary FNAC in a breast lump correlated with the final histopathology report to which every excised specimen would invariably be subjected. Accuracy of the needle tip in localizing the tumour in fine needle aspiration cytology was also studied by comparing the normal glandular cell aspirate with tumour cell aspirate. Since the needle aspiration cytology was done for palpable tumour ultrasound guidance was not followed.

MATERIAL AND METHODS:

Patients presenting with palpable lump in the breast for FNAC to the Department of Pathology, VIMS. FNAC was performed with 23G needle. The material was aspirated, smears were prepared and routinely stained with haematoxylin and eosin. Histological sections of the mastectomy and lumpectomy specimens will be stained with haematoxylin and eosin . The cytological diagnoses was compared with histopathology wherever possible. Specificity, sensitivity, accuracy, and predictive values, *P* value, and correlation is calculated using standard formulas.

METHOD OF COLLECTION OF DATA:

Study design : Prospective study
Sample size : 50
Period of study: Between August 2018 – Feburary 2020

Inclusion Criteria

- All females with unknown primary diagnosis of palpable breast lumps

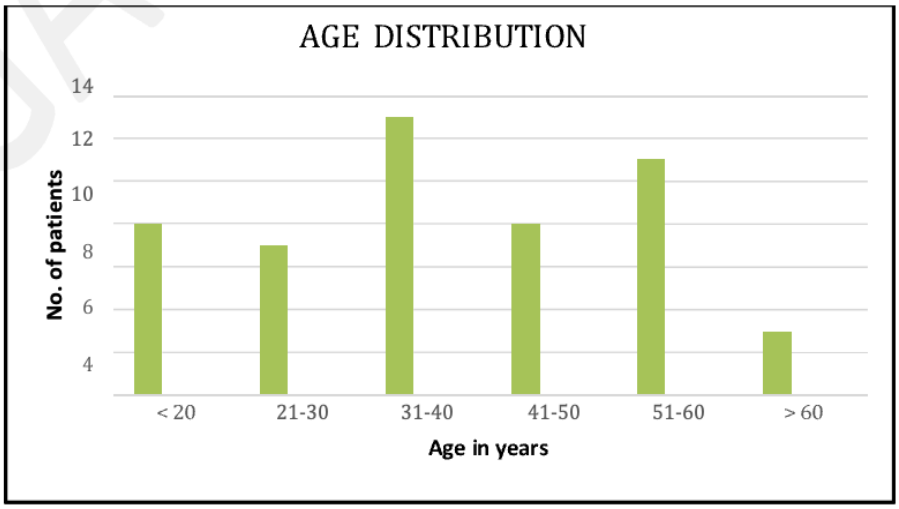
Exclusion Criteria

- Patients with recurrent malignancy, past or current chemo-therapeutic and prevention treatment.
- Patients who underwent FNAC but did not undergo subsequent histopathological diagnosis.
- Patients in whom FNAC was either acellular or nondiagnostic or inflammatory
- Male patients with breast cancer and gynecomastia.

RESULTS

Table 1: Distribution of patients according to age (n=50)

		Frequency	Percent
Age in years	< 20	8	16.0
	21-30	7	14.0
	31-40	13	26.0
	41-50	8	16.0
	51-60	11	22.0
	> 60	3	6.0
	Total	**50**	**100.0**

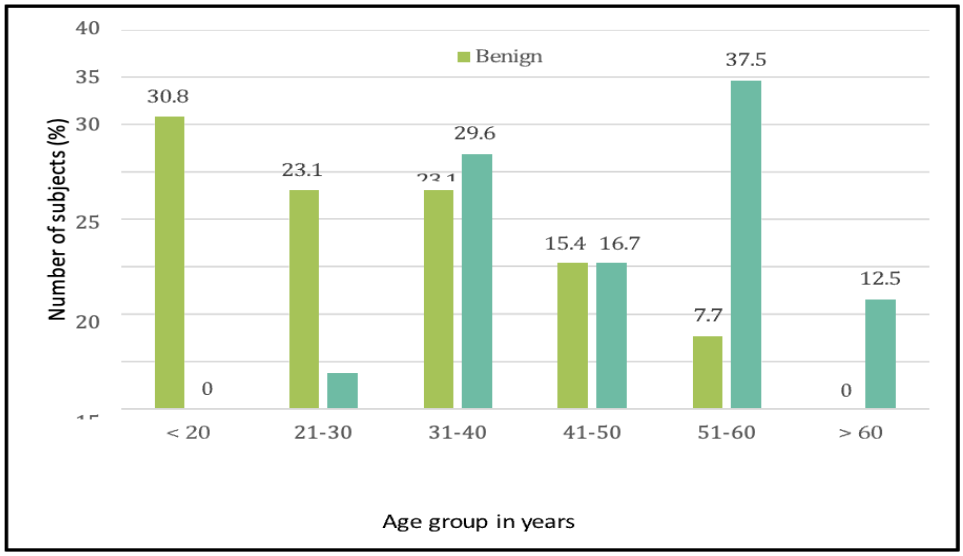


GRAPH 1 :

Among 50 patients with palpable breast lump, age incidence ranged from 15-70 years. The most common age group having palpable breast lump was 31- 40 years of 13 patients (26%) and 2nd most common age group was 51-60 years of 11 patients (22%). Mean age was 38.2 years.

Table 2: Age wise distribution of Benign and Malignant cases

		Benign		Malignant		Total
		Frequency	Percent	Frequency	Percent	
Age in years	< 20	8	30.8	0	0.0	8
	21-30	6	23.1	1	4.1	7
	31-40	6	23.1	7	29.2	13
	41-50	4	15.3	4	16.7	8
	51-60	2	7.7	9	37.5	11
	> 60	0	0.0	3	12.5	3
Total		26	100.0	24	100.0	50

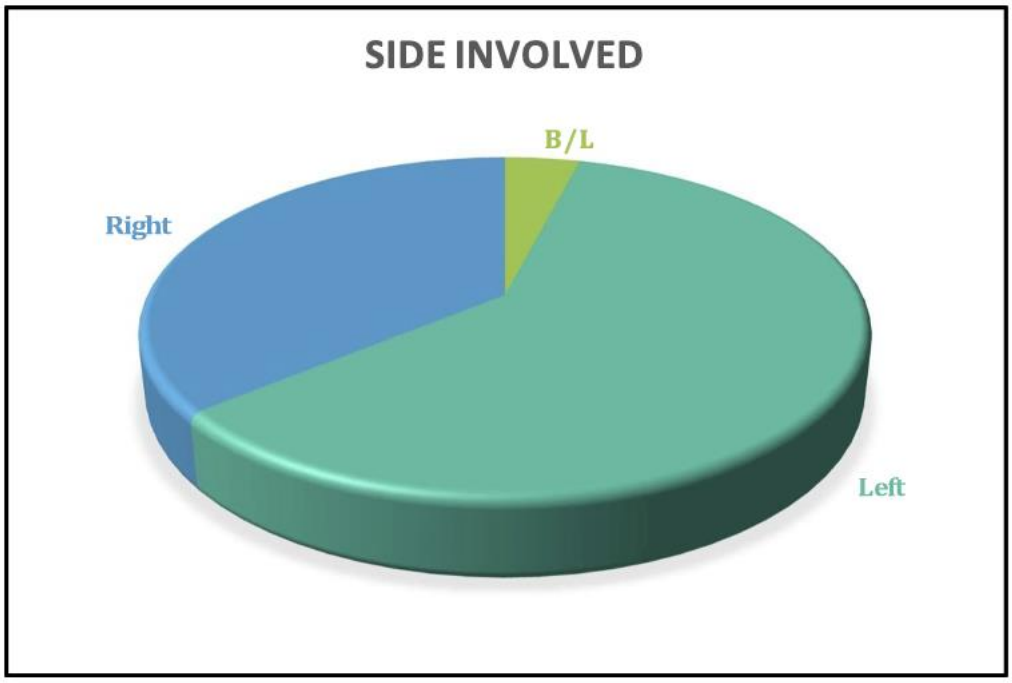


GRAPH 2 :

In this study of 50 patients the age incidence for benign lesions ranged from 15 years to 60 years (mean age 28.55 years, SD= 7.57 years). The incidence for the malignant lesions ranged from 30 to 65 years (mean age 52.67 years, SD=9.84years). The most common age group for benign lesion was 21 to 40 years and most common age group for malignant lesion was 51 – 60 years.

Table 3: Distribution of patient according to Side involved

		Frequency	Percent
Side	B/L	2	4.0
	Left	30	60.0
	Right	18	36.0
	Total	**50**	**100.0**

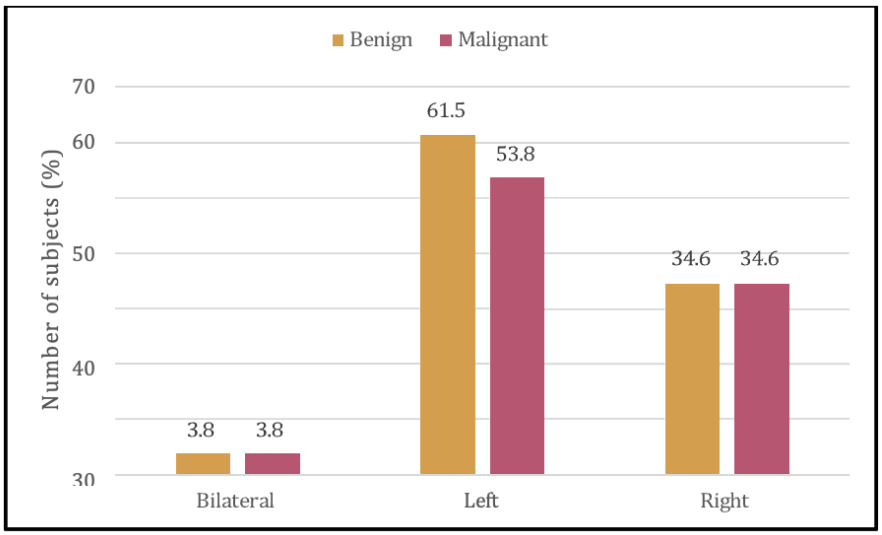


GRAPH 3 :

Out of 50 patients studied with palpable breast lump 30 patients (60%) had lump in left side, 18 patients (36%) in right side and only 2 patients (4%) had bilateral lump.

Table 4: Distribution of Benign & Malignant Lump according to side involved

		Benign		Malignant		Total
		Frequency	Percent	Frequency	Percent	
side	Bilateral	1	3.8	1	4.1	12
	Left	16	61.6	14	58.4	30
	Right	9	34.6	9	37.5	18
Total		26	100.0	24	100.0	50

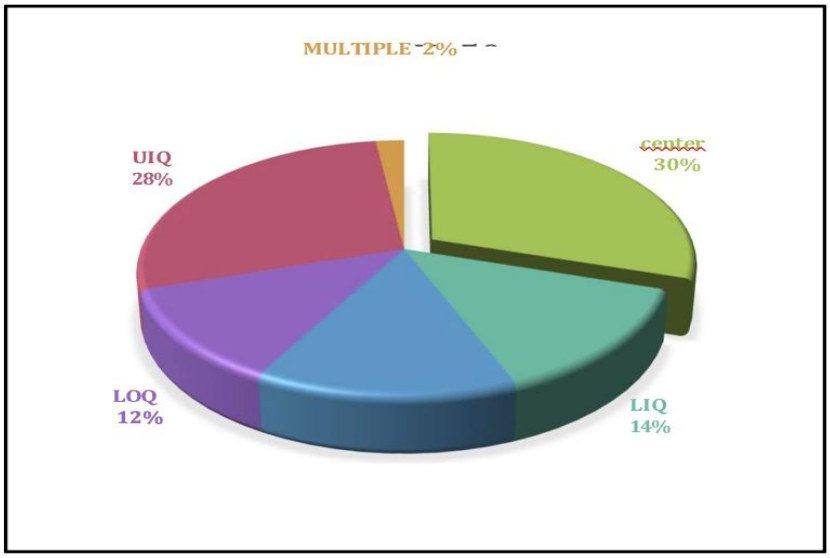


GRAPH 4 :

In our study the incidence of both benign and malignant lesions were found more common in the left breast as compared to right.

Table 5: Distribution of Patient according to Quadrant involved

		Frequency
Quadrant	Centre	15
	LIQ	7
	UOQ	7
	LOQ	6
	UIQ	14
	Multiple	1
	Total	50

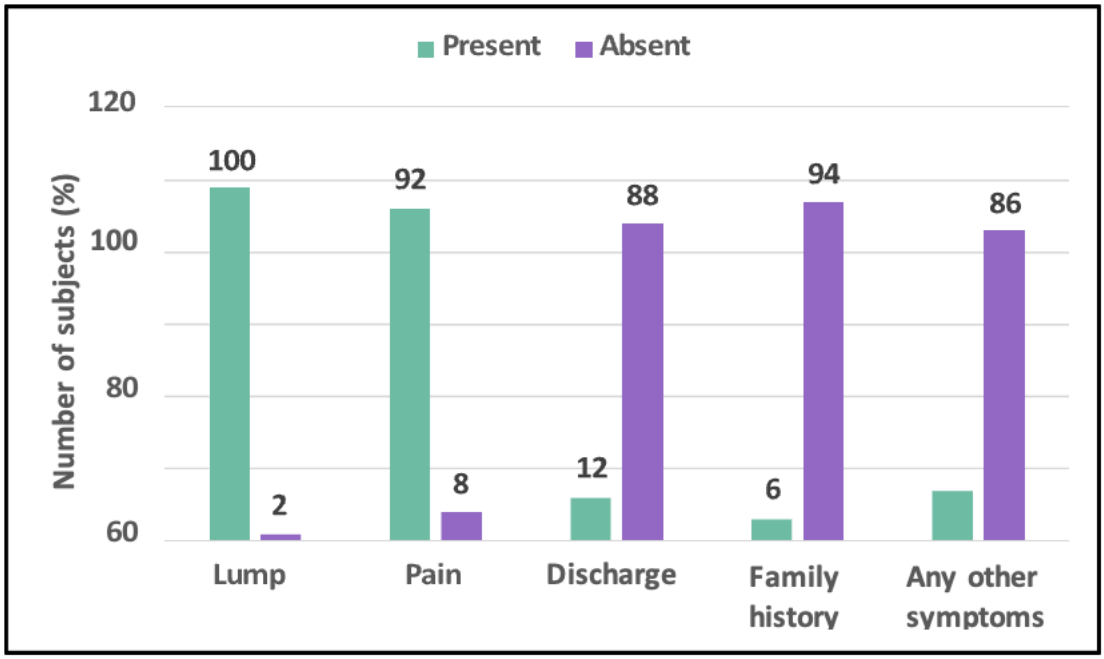


GRAPH 5 :

In our study out of 50 patients with palpable breast lump 15 (30%) patients had lump in the centre, 14 patients (28%) had lump in upper inner quadrant and only 1 patient had lump involving multiple quadrant.

Table 6. Distribution of patients according to presenting complaints

		Present		Absent	
		Frequency	**Percent**	**Frequency**	**Percent**
Clinical features	Lump	50	100.0	0	0.0
	Pain	46	92.0	4	8.0
	Discharge	6	12.0	44	88.0
	Family history	3	6.0	47	94.0
	Any othersymptoms	7	14.0	43	86.0



GRAPH 6 :

- In the present study of 50 patients all the cases presented with lump in the breast.
- 2ND most common symptom was pain.
- 42 (92) % patients presented with pain and breast lump.
- 6 (12%) patients had discharge from nipple along with breast lump.
- 7 cases (14%) had other symptoms like peau d'orange and ulceration along with breast lump.

ANNEXURES

Figure 7 : Gross specimen of fibroadenoma

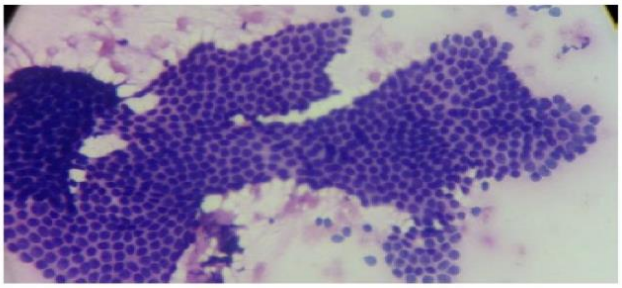


Figure 8 : FNAC Fibroadenoma - Smear showing tight clusters of uniform ductal epithelial cell with bare nuclei in the background. (H&E, x400)

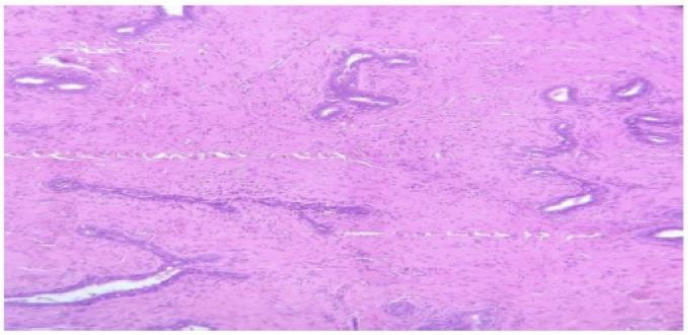


Fig 9. Histopathological appearance of Fibroadenoma intracanalicular type (H&E, x100)

Figure : 10. Patient with left breast lump with peau d'orange appearance and discharge from nipple.

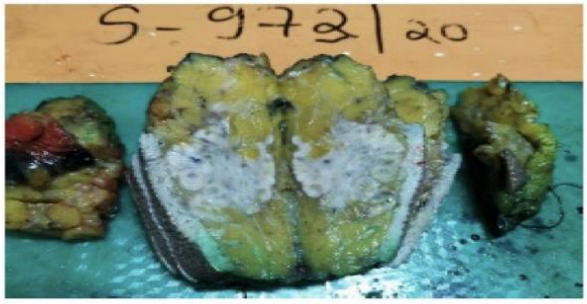


Fig 11. Gross picture of Infiltrating Ductal Carcinoma showing greyish white tumour

Fig12. Axillary lymph node dissection showing metastatic deposits

Discussion

This study was done to compare Fine needle aspiration cytology with Histopathology to validate accurate diagnosis of palpable breast lump. The histopathological diagnosis was considered to be the Gold Standard.Our study was conducted on 50 female patients with a palpable breast lump each of them underwent a fine-needle aspiration cytology of the lump

followed by excisional surgery either in the form of a lumpectomy or a definitive surgical procedure like a mastectomy, depending on the diagnosis at aspiration cytology. In patients with inconclusive diagnosis on FNAC patient was advised incisional or true cut biopsy for confirmation. The aspiration cytology findings were then matched with the final histology report to see as to how accurate FNAC was as compared to open biopsy i.e., to assess the cytohistologic correlation.In the 50 women selected for our study, the age ranged from 15 years to 70 years with an average of 38.50 years. The age incidence for the benign lesions ranged from 15 years to 45 years (mean age 26.55 years). The incidence for the malignant lesions ranged from 30 to 70 years (mean age 52.66 years). The most common age group for benign lesions was between 25 to 34 years and for the malignant lesion was 45 to 64 years. The study done by A. Khemka et al [12] , the age range was 14 to 61 years with overall mean age was 37.5 years, peak incidence for benign lesion in 2nd and 3rd decade of life respectively and malignant lesions above the age of 40 years and peak incidence in between 40-44 years. Similar studies done by Homesh et al[6], Tiwari [13] , Alam et al[11] and Ghimire et al [14] showed similar age patterns.In our study, the left breast was involved in 30 patients while the right breast was involved in 18 patients. Bilateral involvement was seen in only 2 patients. Both benign and malignant lesions were found more common in the left breast as compared to right. A.Khemka et al.[12] in their study, showed left breast involvement in 28 patients while in the other 22, the right breast was involved. In our study central quadrant was the commonest site of lump (15 patients, 30%) followed by upper inner quadrant (14 patients, 28%). In our study benign lumps were more common in upper inner quadrant, which included 11(42.3%) cases out of 26 (100%) total benign cases. Malignant lumps were common in centre followed by upper inner and upper outer quadrant, out of total 24 cases 14 (58.33%) cases had breast lump in centrally. In a study by O.N. Alema et al[15] , out of total 85 cases 49 cases had lump in Upper outer quadrant and out of them 6 cases (12.2%) were malignant. Hussain[16], in his series, had 29 patients (58%) with a lump in the upper and outer quadrant and 9 had lump in the upper and inner quadrant while 4 patients had palpable lump in the lower and outer quadrant. In our study of all the subjects presented with palpable lump, 46 patients had pain along with palpable lump, followed by discharge (6 patients), 7 patients had other symptoms along with palpable lump like ulceration , retraction of nipple and peau d' orange appearance. In concurrence with this study, breast lump was the main presenting symptom in the study by Raina V et al.[17] Among 50 patients, 3 patients were having family history of breast carcinoma in first degree relative (in mother and sister). Two patient's mother were diagnosed for carcinoma breast, one patient's sister had been operated for carcinoma breast 6years back. All these 3 patients were diagnosed as Infiltrating duct carcinoma by histopathological report. After FNAC cytological cases were categorised according to NHSBSP criteria. 50 cases were analysed and categorized into 5 categories from C1 to C5. There was1 case in C1 category, 21 cases in C2 category, 4 cases in C3 category, 5 case in C4 category and 19 cases in C5 category. On FNAC 25 (52%) patients were diagnosed to have benign lump and 24 patients (48%) were diagnosed to have malignant lump. Only one case (2%) was reported as inadequate, which had scant cellularity even on repeated aspiration therefore Tru cut biopsy was done and it was reported as infiltrating ductal carcinoma poorly differentiated on HPE. The percentage of inadequate sampling rate reported in study by Lamb J et al varied from 9% to 18%.[20] Out of 24 malignant cases 4 were reported as suspicious of malignancy 3 were reported as positive for malignancy which required histopathological examination for confirmation. In our study FNAC fibroadenoma was most common lesion, (21 patients, 42%). In a study by Tiwari et al[13] on 91 patients showed the most common lesion to be fibroadenoma (39.6%). Sumaira Zareef et al[19] and Ashwin[7] also found the fibroadenoma common breast lesion in their study. Fibroadenoma smear are cellular composed of large sheets and tight cluster of epithelial cells in honeycomb

and Antler horn pattern with some degree of nuclear atypia. The key for diagnosis of fibroadenoma is the detachment of oval naked nuclei from the cell clusters and sheets. Fibroadenoma is regarded as important cause of false positive diagnosis. In our study False negative case was zero and false positive cases were four. Out of four, 2 cases were benign phyllodes and 2 cases were diagnosed PASH on histopathological examination.

CONCLUSION

The Fine needle aspiration cytology is an important diagnostic tool in the management of patient with a breast lump. It is an effective and valid tool as the first line diagnostic modality in the preoperative diagnosis of both benign and malignant palpable breast lump. When performed by an expert hands, the diagnostic accuracy of FNAC is very high. FNAC procedure is an easy, reliable, repeatable, patient friendly and simple diagnostic test which can be implemented in busy clinic settings and does not call for too much preparation or expensive equipment.

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