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Cytological & Histopathological correlation of Breast lesions –A study of one hundred cases

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Abstract

Introduction: The present study was done to compare the diagnostic accuracy of Fine Needle Aspiration Cytology (FNAC) in differentiating the benign and malignant lesions of palpable breast lumps with histopathological correlation and alsoto study the accuracy of FNAC procedure.

Materials and Method: A retrospective and prospective study was done for a period of two years from June 2013 to May 2015.Cases were analyzed in detail regarding complete history, family history, clinical examination and other findings. FNAC and biopsy were done and results were correlated.

Results: The most common age group for benign lesions was between 21 to 30 years and for the malignant lesion was 50 to 60years. Fibroadenoma constituted highest number of cases among benign neoplasms and infiltrating ductal carcinoma (IDC) contributed highest number of cases among malignant neoplasms. Total benign cases were 86 and malignant were 14 out of total 100 cases.

Conclusion: FNAC of the breast lump is an easily performed outpatient diagnostic method for determining the nature of the breast mass. It is safe, atraumatic, painless, needs no anesthesia. The lumps can be aspirated in the outpatient department, with requiring only a few materials such as syringe, needle and glass slides and fixatives. It can be repeated if necessary.

Keywords: Fine Needle Aspiration Cytology, Benign, Malignant, Fibroadenoma, Infiltrating Ductal Carcinoma.

Introduction

FNAC has become an increasingly popular technique utilized in the diagnosis of palpable breast masses owing to its distinct advantages of being sensitive and specific, expedient, economical and safe. It is commonly used as a part of diagnostic triad, which in addition to the FNAC includes clinical breast examination and mammography. Martin and Ellis first introduced the application of FNAC for the diagnosis of the palpable breast masses in 1930 and since then it has been established as an important tool in the evaluation of breast lesions.[(1)] Many countries have breast cancer screening programs aimed at detecting early disease in asymptomatic women. The diagnostic process involves the "Triple test" consisting of clinical examination, mammography and FNAC.[(2)]

In recent times the FNAC has largely replaced excisional/incisional breast biopsy. Its distinct advantage is that it can be done during the outpatient visit without the need of the anaesthesia, thus eliminating the cost of outpatient surgery. It also allows discussion with the patient of various treatment plans for malignant mass on the same visit. This has been confirmed by earlier several studies that aspiration cytology is superior to tru-cut needle biopsy in establishing the diagnosis of clinically suspicious breast masses, however the sensitivity can be improved by increasing the number of core taken.

Materials and Method

Two years prospective and retrospective study was carried out involving patients admitted in the surgical wards during the period between June 2013 to May 2015. Though the majority of the patients were females, male patients presenting with breast lesions were also taken into the study (Fig. 1). The types of lesions studied include, benign and malignant lesions. The ages of the patients were between 10-72years. The chief complaint with which the patients were admitted included breast swelling (lump), pain in the breast or discharge from the nipple. FNAC was performed by using 23 gauge needle attached to 10ml disposable syringe. Slides were air dried, fixed, with etheralcohol and stained by Pap, Leishman's, haematoxylin and eosin and Giemsa. If fluid is aspirated then it is centrifuged and the sediment is then smeared. Following staining of the smear they were examined under light microscope, observations were made and recorded. The cytological smears were broadly classified using the classification by Gershergorn et al as Acellular smears, Inflammatory, Benign and Malignant smears. FNAC was followed by either biopsy or excision. The tissue obtained was fixed, processed and stained by H&E technique, followed by microscopic examination.

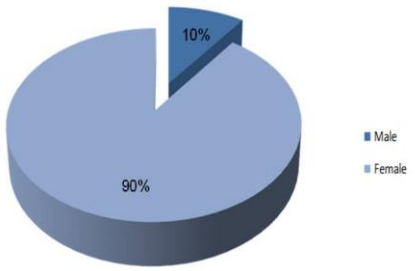

Fig. 1: Showing the sex distribution

Results

The age incidence was ranged from 10 to 72 years (mean age 30.92years). The age incidence for the benign lesions ranged from 10years to 60years (mean age 28.48years). The age incidence for the malignant lesions ranged from 20 to 62 years (mean age 45.93 years). The most common age group for benign lesions was between 21 to 30 years and for the malignant lesion was 50 to 60years. (Table 1 & 2). Among 100 patients, one patient of breast lump was having family history of breast carcinoma in mother (lobular carcinoma).

Table 1: Mean age calculation

Type	Mean	No. of cases
Benign	28.48	86
Malignant	45.93	14
Total	30.92	100

Table 2: Age range among Benign or malignant lesions

Age range	Benign or malignant		Total
	Benign	Malignant	
10 – 20	22	1	23
21 - 30	36	0	36
31 - 40	17	4	21
41 - 50	8	3	11
51 - 60	2	5	7
61 - 70	0	1	1
71+	1	0	1
Total	86	14	100

Table 3: Side of lesion

Side	Benign	Malignant
Right	48	06
Left	33	08
Bilateral	05	00
Total	86	14

Of the 86 benign cases reported by fine needle aspiration cytology, all 86 were confirmed by histopathology. False negatives were zero. False positive was zero. Of the total 14 cases of malignant lesions, FNAC reported 12 as malignant, 2 as benign and false negatives were 2 and false positive was zero. Two cases on FNAC were reported as benign. They later confirmed on histopathology as malignancy.

Among 2 cases of false negative, one case of left breast lump was diagnosed as fibroadenoma in a 35-year-old female depending on the presence of uniform cells in sheets with myoepithelial cells with minimal nuclear atypia on FNAC. On local excision biopsy, the histopathology confirmed as IDC. Later she underwent modified radical mastectomy on the same stay. Total duration hospital stay was 14 days. In another case of right breast lump in a 46-year female, which was diagnosed as benign proliferative breast disease with mild atypia by FNAC. On local excision biopsy of that breast lump, histopathology confirmed as IDC. Later she underwent modified radical mastectomy. Total duration of hospital stay was 10 days in this case. Various benign and malignant lesions in our study are shown in Table 4.

Table 4: Diagnosis chart of Benign and Malignant lesions

Diagnosis	Frequency	Percent
Fibroadenoma	51	51.0
Gynecomastia	10	10.0
Fibroadenosis	15	15.0
Fibrocystic disease	5	5.0
Phyllodes	5	5.0
Infiltrating duct cell carcinoma	10	10.0
Mucinouscarcinoma	01	1.0
Intraductal carcinoma	01	1.0
Lobular carcinoma	02	2.0
Total	100	100.0

Discussion

Breast is an important and popular site for fine needle aspiration cytology. There is an increasing tendency to confirm the diagnosis of the breast cancer at first consultation by some form of needle biopsy technique. This allows better investigation and wiser preoperative discussion than was possible when excision biopsy and frozen section confirmed the clinical diagnosis.

The present study confirms the accuracy and clinical utility of FNAC in the investigation of the patient with benign and malignant breast disease.

Various benign and non-neoplastic lesions of the breast may present for needle aspiration. The benign lesions include fibroadenoma, fibrocystic disease, cysts, adenoma, intraductal papilloma, traumatic fat necrosis, fat degeneration and serous cystadenoma, gynecomastia, phyllodes tumor, and inflammatory lesions. Benign lesions also include mesenchymal neoplasms such as lipoma and granular cell myoblastoma.

In present study the distribution of lesion was seen to be more in the right breast (54%) compared to left breast (41%) and bilateral lesions are (5%) (Table 3).

Benign lesions were more in the right breast (48%) and malignant lesions were more in the left breast (8%).Majority of the lesions were in the upper outer quadrant.

In present study we had 86 benign lesions (86%), fibroadenoma 51 cases (59.30%) being the most common benign lesion that presents for needle aspiration. This has been confirmed in other series also. Fibroadenoma form the 80% of the benign lesion aspirated for cytology. Fibroadenoma exhibits a smear pattern composed of large sheets and cluster of epithelial cells in honeycomb pattern with some degree of nuclear atypia. The key to the diagnosis of fibroadenoma is the detachment of oval naked nuclei from the cell clusters and sheets. The fibroadenoma has been considered a significant cause for the false positive diagnosis. The overall activity of the epithelial cell in this tumour is probably the reason. We had no cases of false positive reports in our study, and histopathology shows compressed and dilated ducts with surrounding stroma (Fig. 2).

Fibrocystic disease includes chronic cystic mastitis, mammary dysplasia and mazoplasia. Mammography is of little aid in the densely fibrotic breasts because micro calcification and increased vascularity are present both in chronic fibrocystic disease and carcinoma. We had 5(5%) cases of fibrocystic disease, age incidence is between 27 to 35 years.

FNAC of these revealed cyst macrophages, sheets of ductal epithelial cells of apocrine type, epithelial fragments of epithelial cells, scattered single bare bipolar nuclei, histopathology showed cysts lined by flattened and at places atrophic epithelium and increased fibrous stroma surrounding the cysts and variable degree of stromal lymphocytic infiltrate.

In present study there were 10 (10%) male patients showing gynecomastia in this two cases are bilateral. FNAC of gynecomastia showed moderately cellular smear, large epithelial sheets, many single bare nuclei, fragments of fibromyxoid stroma, and later they were confirmed by histopathology. Histopathology shows increase in dense collagenous connective tissue and marked micropapillary epithelial hyperplasia of the duct lining .The individual epithelial cells are fairly regular, columnar to cuboidal cells with regular nuclei, lobule formation is rare (Fig. 3).

In present study we had 15 cases of fibroadenosis (15%) age range is between 17 to 48 years. They were reported benign on FNAC and later confirmed on histopathology and in this 2 cases are bilateral, and histopathology reveals increased number of acini per unit lobule, with enlarged acini lined by tall columnarepithelium, calcifications may be present within the lumen.

In present study we had 5 cases of benign phyllodes tumour (5%) were recorded showing no malignant features. Age range is 17 to 55 yrs., although peakincidence is seen between 45 to 50 years. A phyllodestumor is a rare fibro epithelial breast tumor often distinguished from fibroadenoma by the presence of a more prominent and cellular mesenchymal component. Fnac of these lesions showed cellular smears with both stromal and epithelial elements, mainly highly cellular stromal fragments, stromal cell are very large and lacked pleomorphism.

Histopathology revealed a clearly defined margin, highly cellular stroma with increased mitotic rate of stromal cells and a benign epithelial portion similar to that of fibroadenoma.

Breast carcinoma is one of the most common malignancies among women. The breast lump is usually discovered by the patient. In premenopausal women, up to 80% are benign, where as in patients over the age of 60 approximately 90% of the breast lump are malignant. Most commonly the malignancy appears as a single, discrete, dominant lump in the upper outer quadrant of the breast, however vague masses and thickened cords may also be malignant. Other signs include induration, dimpling of the skin, nipple retraction serosanguinous or bloody nipple discharge and pain. Ulceration, skin fixation and lymphadenopathy can occur later. FNAC has become the investigation of choice for the diagnosis of the breast malignancy. The typical carcinoma presents a gritty resistance to the fine needle.[9,10] The aspirate is usually copious and blood stained.

In our study we had 14 malignant lesions (14%), IDC being the most common malignant lesion that presented for needle aspiration. It forms the 71.4% of the malignant lesion aspirated for cytology. Although its incidence peaks in the postmenopausal women, it is seen as early as in the second decade. For cytology it appears as much cellular smear, presents as single cells, loose aggregates and cohesive groups, often with necrotic background, monomorphic cell population with variable cell pattern including conspicuous loss of cellular cohesion, numerous isolated single cells and variable degree of anisonucleosis. Histopathology shows diffuse sheets, well defined nests, cords, or as individual tumour cells. Glandular or tubular differentiation may be well developed, barely detectable or altogether absent (Fig. 4). Among malignant lesions, infiltrating duct cell carcinoma was the most common, which coincided with the many authors.[3,4,5,6] There were 2 cases reported as lobular carcinoma in our study. Mainly diagnosed on histopathology, whereas cytology was able to explain the presence of malignancy only. Lobular carcinoma cannot be consistently differentiated from ductal carcinoma by cytology, but can often be suggested by the presence of low to moderate cell yield, individual epithelial cells, small chains, and small groups of cells uniform population of small to medium sized cells with mild atypia and inconspicuous nucleoli and occasional signet ring cells. Histopathology of classic type is characterized by the presence of small and relatively uniform tumor cells growing singly, Indian file, and in concentric

fashion around lobules involved by in situ lobular neoplasia (Fig. 5).

One case was reported as Mucinous carcinoma (7.1%). FNAC revealed high cellularity with poorly cohesive clusters and single cells with large, pleomorphic malignant nuclei in a background of mucin and confirmed on histopathology. Histopathology shows large tumor cells arranged in clusters and sheets in a pool of mucin (Fig. 6).

The present study confirms the accuracy and clinical utility of FNAC in the management of benign and malignant breast diseases. This high rate of accuracy in FNAC permitted us for definite preoperative planning and discussion with the patient in whom the fine needle aspiration is positive or suspicious for malignancy.

The accuracy of the fine needle aspiration cytology procedure was also studied in our series by comparing the normal glandular cell aspirate with the tumour cell aspirate. The unsatisfactory (inadequate) sampling in which there was little or no cellular material reported, we believe, to be an error in the technique of aspiration. In our study there were no unsatisfactory specimens. The proportion of inadequate sampling as reported by different studies varies from 9 to 18%.

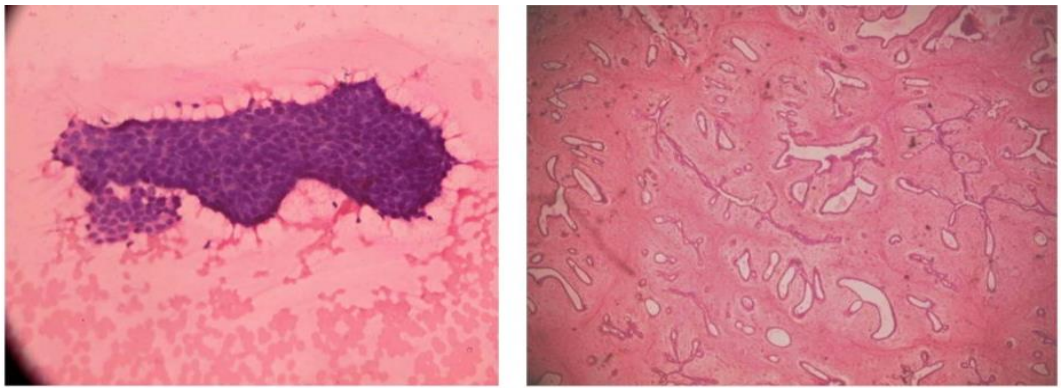

Fig. 2: Showing the microscopic picture of Fibroadenoma both on FNAC and HPE. (H&E, x 40)

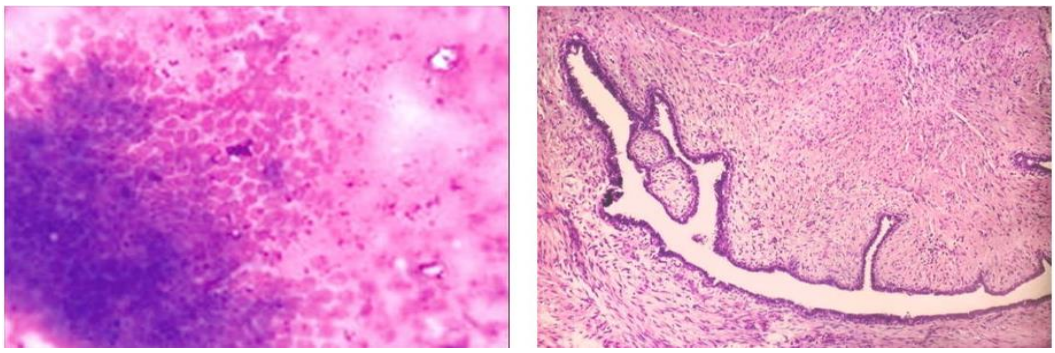

Fig. 3: Showing the microscopic picture of Gynecomastia both on FNAC and HPE.(H&E, x 100)

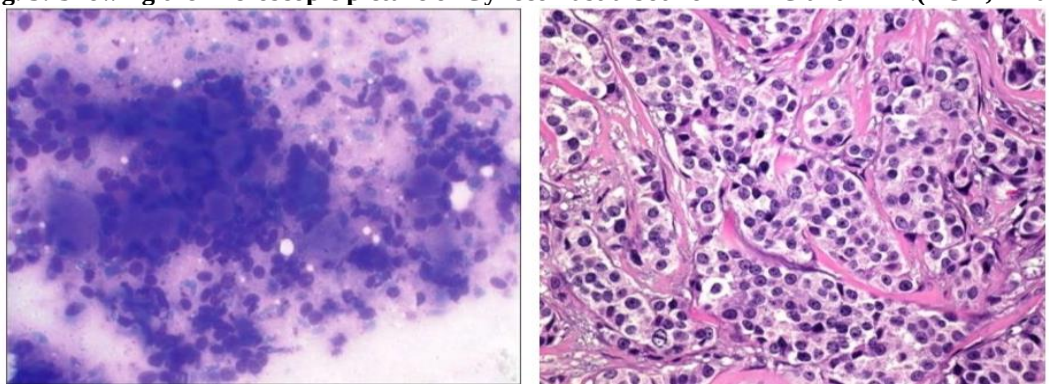

Fig. 4: Showing the microscopic picture of IDC both on FNAC and HPE.(H&E, x 40)

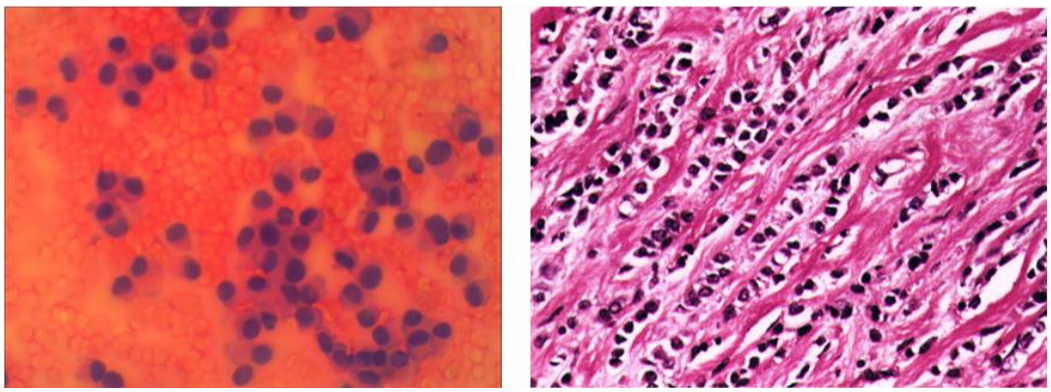

Fig. 5: Showing the microscopic picture of Lobular carcinoma both on FNAC and HPE.(H&E, x 100)

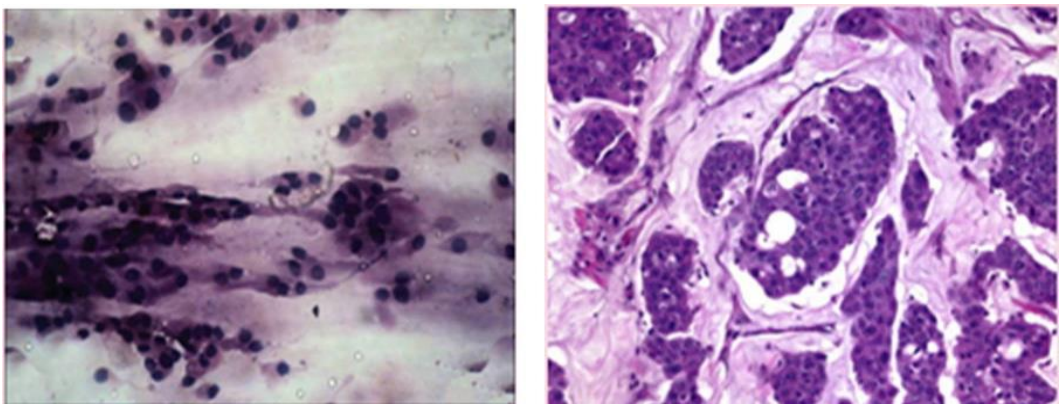

Fig. 6: Figure showing the microscopic picture of Mucinous carcinoma both on FNAC and HPE. [H&E, x 100]

Conclusion

FNAC is an important diagnostic adjunct in the management of patient with a breast lump. Recently FNAC has become an increasingly popular technique utilized in the diagnosis of palpable breast masses owing to its distinct advantages of being sensitive, specific, expedient, economical and safe. It greatly compliments the clinical and radiological examination and permits rapid diagnosis in more than 95% of the cases. Thus it is commonly used as a part of diagnostic triad in case of breast lump, which in addition to FNAC includes clinical breast examination and mammography. Considering patient's comfort, lack of requirement of anesthesia, rapid analysis and reporting and an absence of false positive results makes FNAC an ideal initial diagnostic modality in breast lumps. However, cytologically it is difficult to subcategorize the lesions without clinical and mammographical details. Adhering to the principle of Triple test, with the acquisition of technical, observational and interpretative skills will further enhance the diagnostic accuracy of lesions of the breast.[7]

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