

## Fine Needle Aspiration Cytology a Diagnostic Aid In Breast Lump In Ajims Mangalore

Dr. Manisha Narayana\*

### Abstract:

The study 'Fine Needle Aspiration Cytology A Diagnostic Aid In Breast Lump' was carried out in the department of general surgery of A J Institute of Medical Sciences and Research Centre, Mangalore over a period of two years from October 2016 to October 2018. The study group included 100 subjects who underwent FNAC.

The study extensively proves that FNAC is certainly a diagnostic modality for patients presenting with breast lump. It demonstrates a high accuracy 97.4% and sensitivity of 96.8% with clinical diagnosis and histopathology.

**Keywords:** Fine needle aspiration cytology (FNAC), palpable breast lump

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### I. Introduction:

Fine needle aspiration cytology (FNAC) is a technique which is routinely done on palpable lesions such as superficial growths of the skin, subcutaneous, soft tissues and organs such as thyroid, breast, salivary glands and superficial lymph nodes. It is a simple procedure that can be easily repeated. Modern imaging techniques like ultrasound and computed tomography applied to organs and deep seated lesions help in obtaining material through transthoracic and transperitoneal approaches. Techniques have been developed to perform FNAC under endoscopic guidance on stomach, pancreatic lesions and adjacent tissues<sup>1</sup>. Thus, it can be used on all organs of the body as a diagnostic procedure.

FNAC of the breast can be done on both palpable and nonpalpable lesions, the latter with the help of imaging techniques like ultrasound and mammography with stereotactic. The main purpose of FNAC of breast lesions is in the investigation of any palpable lump and to avoid unnecessary surgery in specific benign conditions<sup>1</sup>. The advantages are – it provides rapid and accurate diagnosis, is diagnostic as well as therapeutic in cystic conditions, permits a number of ancillary studies such as hormone receptor analysis, flow cytometry and molecular diagnostic studies<sup>2</sup>. The scope of cytology now extends into identifying the subtypes of benign and malignant breast lesions. Thus it plays major role as an important preoperative assessment procedure along with clinical correlation and imaging which are referred to as the "Triple assessment"<sup>3</sup>.

FNAC has been used extensively for the diagnosis of breast lesions over the past 25 years. Now tissue core needle biopsy has overtaken FNAC in the diagnosis of breast malignancies in palpable and nonpalpable lesions. This is perhaps due to the fact that grading of tumours and an ER and PR receptor status can easily be performed on a tissue core biopsy as compared to an FNAC and this knowledge is used by the treating clinician who wants to use chemotherapy as the first line of treatment for breast cancers. The limitations of FNAC is its inability to separate in situ and invasive carcinoma the foremost aim of core needle biopsy is to provide a diagnosis of a breast abnormality before, and in many cases avoiding the need for open surgical biopsy. Despite its advantages it is still used as an additional investigation tool when FNAC fails to produce a diagnosis<sup>4</sup>.

### II. Results:

This study was conducted for two years from October 2016 to October 2018. A total of 100 eligible patients presenting with palpable breast lump in the Department of General Surgery, A J Institute Of Medical Sciences, Mangalore were studied.

The data obtained was tabulated on excel spread sheet. The data was analysed and the final results were tabulated as below :

Number of cases aspirated	100
Number of smears with inadequate opinion	8
Number of cases operated subsequently	63
Number of cases correlated with HPE (Benign and Malignant)	60

Number of benign proliferative disease/Fibrocystic disease	24
Granulomatous mastitis	4
subareolar abscess with squamous metaplasia of lactiferous ducts	1

**AGE DISTRIBUTION:**

The age of the patient ranged from 15 to 80 years. There were 96 female patients and 4 male patients.

Taking the age of the subjects into consideration, it was found that 40 to 50 years age group patients were 33%, 22 patients in 30 to 40 years age group. 19 patients were of 50 to 60 years. Although the disease was least in the elderly group, 17 subjects belonged to less than 30 years of age.

Among the 100 study subjects, on analyzing the preponderance between the right and left breast involvement, it was found to be almost equal with 47 patients presenting with a lesion in the right breast and 43 in the left. 5 patients had bilateral disease. Study group contained only single member each in the class of bilateral disease with metastasis, induration of chest wall, involvement of axillary lymph nodes on either of the sides and subareolar lesions.

**CLINICAL FINDINGS:**

	Frequency	Valid Percent
Benign	22	35.5
Malignant	40	64.5
Total	62	100.0

Clinically out of 62 patients, suspicion of malignancy were in 64.5%. 22 of patients had clinical features of benign disease.

**FNAC-FINDINGS:**

	Frequency	Valid Percent
Benign	53	57.0
Malignant	40	43.0
Total	93	100.0

When 40 out of 93 Cytologies showed features of malignancy, 53 samples were in favour of benign disease.

**HISTOPATHOLOGY FINDINGS**

	Frequency	Valid Percent
Benign	26	41.3
Malignant	37	58.7
Total	63	100.0

Out of the evaluated 63 specimens, 58.7% of them were of malignant features, while 26 had benign characteristics.

**CLINICAL CORRELATION WITH FINE NEEDLE ASPIRATION BIOPSY**

			FNAC		Total
			Malignant	Benign	
Clinical	Malignant	Count	37	3	40
		%	97.4%	13.0%	65.6%

	Benign	Count	1	20	21
		%	2.6%	87.0%	34.4%
	Total	Count	38	23	61
		%	100.0%	100.0%	100.0%

Sensitivity=97.4% ; Specificity=87% ; Positive predictive value=92.5% ; Negative predictive value=95.2% ; Accuracy rate=93.4%

Sensitivity =  $37/38 \times 100 = 97.4\%$  ; Specificity =  $20/23 \times 100 = 87\%$  Positive predictive value =  $37/40 \times 100 = 92.5\%$  ; Negative predictive value =  $20/21 \times 100 = 95.2\%$  ;

Accuracy =  $([37+20]/61) \times 100 = 93.4\%$

On comparing clinical diagnosis with FNAC findings, out of 38 clinically diagnosed malignancy, 37 were proven by FNAC.

FNAC had a sensitivity of 97.4% and specificity of 92.5%, the positive predictive value of clinical diagnosis was 92.5% with a negative predictive value of 95.2%. Diagnostic accuracy of FNAC was 93.4%.

**Chi-Square Tests**

	Value	P
Pearson Chi-Square	45.131	.000

**FINE NEEDLE ASPIRATION CYTOLOGY CORRELATION WITH HISTOPATHOLOGY**

		Histopath		Total	
		Malignant	Benign		
FNAC	Malignant	Count	36	1	37
		%	97.3%	3.8%	58.7%
	Benign	Count	1	25	26
		%	2.7%	96.2%	41.3%
Total		Count	37	26	63
		%	100.0%	100.0%	100.0%

Sensitivity=97.3% ; Specificity=96.2% ; Positive predictive value=97.3% ; Negative predictive value=96.2% ; Accuracy rate=96.8%

Sensitivity =  $36/37 \times 100 = 97.3\%$  ; Specificity =  $25/26 \times 100 = 96.2\%$  ;

Positive predictive value =  $36/37 \times 100 = 97.3\%$  ; Negative predictive value =  $25/26 \times 100 = 96.2\%$  Accuracy =  $[(36+25)/72] \times 100 = 96.8\%$

The study showed that out of 37 patients who had malignant lesions, histopathology and FNAC correlated in 36 of them while FNAC was falsely negative in one of the malignant cases. FNAC was found to have a sensitivity of 97.3% and specificity of 96.2%, positive predictive value for FNAC was 97.3% and negative predictive value was 96,2%.

**Chi-Square Tests**

	Value	P
Pearson Chi-Square	55.019	.000

**FNAC**

Atypical ductal hyperplasia	3
Benign Phyllodes tumor	2
Benign proliferative disease	12
Benign proliferative disease with fat necrosis	1
Benign proliferative disease with suspicious for atypical hyperplasia	1
Benign proliferative with ductal hyperplasia	2
cystic changes with atypical ductal hyperplasia	1
Ductal carcinoma with atypical ductal hyperplasia	1
Ductal proliferative lesion with atypia	2
Fibroadenoma	16
Fibrocystic disease	8
Granulomatous mastitis	4
Gynaecomastia	4
Inadequate scanty cellularity	7
Inadequate scanty cellularity, lumpectomy	1
Infiltrating ductal carcinoma	22
Infiltrating ductal carcinoma with metastasis to axillary lymph node	3
Invasive ductal carcinoma	3
Papilloma with ductal hyperplasia	1
Phyllodes tumour	4
Subareolar abscess with squamous metaplasia of lactiferous ducts	1
Syringocystadenomapapilliferum	
	1
TOTAL	100

On cytological evaluation of the aspirates, 22% were reported as infiltrating ductal carcinoma, 16% were fibroadenoma, 12% benign proliferative disease. While 8 aspirates showed features of fibrocystic disease, granulomatous mastitis and gynaecomastia had 4 slides each. Invasive ductal carcinoma was 3% and phyllodes tumour 4%. 7 of the slides showed scanty cellularity turned non-diagnostic.

**TYPES OF SURGERY:**

Among the included subjects, 61 patients underwent surgical intervention. Most commonly done was lump excision and right Modified radical mastectomy with axillary clearance - 19% and 18% each. 15 cases were left Modified radical mastectomy with axillary clearance. Other procedures like simple mastectomy, lumpectomy were done in 4-5% of the cases. 39% of the cases had no surgical interventions.

## **HISTOPATHOLOGICAL EVALUATION:**

Histopathological evaluation of the operated specimens showed features of infiltrating ductal carcinoma in 31% . 16% of the specimens were of Fibroadenoma. 5% of the cases were of invasive ductal carcinoma. Other findings came across were those of phyllodes tumour, papilloma, mammary ductal ectasia – in 1-3% of the cases.

## **III. Discussion:**

Fine-needle aspiration cytology is widely used in the diagnosis of breast cancer because it is an excellent, safe, and cost effective diagnostic procedure. One can get on site immediate report with minimal cost using inexpensive equipments and a simple technique. The most significant advantage of FNAC is the high degree of accuracy, rapid results, and a less invasive procedure than a tissue biopsy. FNAC of the breast can reduce the number of open breast biopsies<sup>44-48</sup>.

The diagnoses of breast diseases by clinical methods were found to be inaccurate as it is subjective to the examiners expertise. Adequate definition between benign and malignant disease cannot be lineated based on clinical evidence. For the same repeated surgical excision biopsies were undesirable due to the tedious processes involved. Next reliable entity is a frozen section which can not be counted on due to non availability in all centres.

Though FNAC was introduced in the 18<sup>th</sup> century, it took over 100years to establish itself as a diagnostic discipline. FNAC may not provide histopathological nature of the disease, but its possible to predict the cell types.

This study involved 100 patients who presented with a breast lump and in whom fine needle aspiration was carried out for cytological analysis. 8 smears were irrelevant due to inadequate material. 63 out of the these subjects underwent surgical intervention. In 60 of these cases fine needle aspiration cytology correlated with histo-pathological finding. The study group included 4 male patients. The study group had 33% patients in the age group of 40-50 years while the incidence had a declining trend towards the extremities of age.

On considering preponderance to the laterality of the disease, incidence of the lump was equivocal in either of the breasts. Bilateral disease was noted in the patients , of which one was with metastatic disease. Among the study subjects, 10 presented with involvement of the nipple while 16 of them had bloody discharge from the same. 40 of the FNAC showed features favouring malignancy, while of the total 63 operated following the aspiration, 37 histopathologically were positive for malignancy.

On weighing clinical diagnosis with the FNAC, the latter had a sensitivity of 97.4% with an accuracy of 93.4%. simultaneously while comparing FNAC with histopathological findings, the sensitivtiy was 97.3% with an accuracy of 96.8%. Thereby the study proves Fine needle aspiration cytology a reliable diagnostic tool which is economical, simple, rapid, comparatively painless, repeatable and above all highly sensitive, specific and accurate.

## **IV. Conclusion:**

Fine needle aspiration is a diagnostic tool dispensed at ease and can be performed with minimal aid. The study aimed at proving FNAC a reliable diagnostic tool providing necessary information pertaining to the disease and light up the path in further evaluation and management. Though some discrepancies may prevail, FNAC has proven to be accurate by 96.8% and sensitive by 97.3% while comparing with histopathological features and with clinical diagnosis, 97.4% sensitive and 93.4% accurate.

FNAC has become a part of the defined algorithm for diagnosis of breast malignancies clubbed with clinical examination and imaging. Based on the study, we can encapsulate that FNAC is a reliable diagnostic tool and can be performed with minimal skills. Its sustenance with clinical diagnosis and histopathological findings further adds on to its merits.

FNAC should hence be of diagnosis or aid in lineating the pathway for management of a suspicious breast lump. The procedure owing to its simplicity is well accepted and can be implemented irrespective of age group as traumatic injury and pain is less compared to conventional trucut biopsies.

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