

Fine-Needle Aspiration Cytology of Clinically Palpable Breast Masses With Histopathologic Correlation

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Abstract

Background: The purpose of the study is to know the diagnostic accuracy of fine needle aspiration cytology over histopathological examination in clinically palpable breast masses and its reliability in planning definitive surgical treatment.

Methods: A prospective study conducted in 50 female patients admitted with clinically palpable breast masses in all surgical units at ESI Medical College, Gulbarga, during the study period of 18 months (from January 2018 to September 2019). All women underwent FNAC with subsequent Histopathological correlation. The cytological diagnoses were classified as: malignant, suspicious, benign or unsatisfactory. Histopathological correlation was based on either, an excisional biopsy, or a mastectomy specimen.

Results: A total of 50 fine-needle aspirations performed during the study period, on women being evaluated for a clinically palpable breast mass were included in the study. Out of 50 cases there were 19 (38%) malignant FNAC diagnoses, 2 (4%) cases diagnosed as suspicious on FNAC and histopathology revealed as malignant. There were no false-positive cases. Of the 27 (54%) cases interpreted as benign, only 1 (2%) was false negative, which later on histopathology diagnosed as infiltrating duct carcinoma. Two cases (4%) had unsatisfactory samples.

Conclusions: The study showed a very high sensitivity (95.45%), specificity (100%), positive predictive value (100%), and negative predictive value (96.29%), with minimal false-negative rates (4.54%) and without any false positive rates. The overall accuracy was 96 percent. This study, confirms that FNAC is safe, simple, quick, cost-effective, reliable and accurate method in the initial diagnosis of clinically palpable breast masses. When correctly performed and interpreted by an experienced cytopathologist FNAC can be a valuable tool in the diagnosis of breast masses, hence to plan definite treatment.

Keyword: Fine Needle aspiration; Histopathology; Breast Mass.

Introduction

The breast has always been a symbol of womanhood of ultimate fertility. Mammary glands or breasts are a distinguishing feature of mammals. They have evolved as milk producing organs to provide nourishment to the offspring which are born in a relatively immature and dependent state. The act of nursing the young provides physiological benefit to the mother by aiding in postpartum uterine involution and to the young in transference of passive immunity.

The three most commonly diagnosed types of cancer among women in 2009 will be cancers of the breast, lung and bronchus, and colon and rectum, accounting for 51% of estimated cancer cases in women. Breast cancer alone is expected to account for 27% (192, 370) of all new cancer cases among

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women. Breast cancer is the most common site-specific cancer in women and is the leading cause of death from cancer for women age 40 to 44 years. Breast cancer is the second commonest malignancy of females in our country and is the leading cause of mortality in prime of their lives.¹

Along with complete medical history and good clinical examination, a need for a less invasive, cosmetically approved and more accurate method for diagnosing the breast lesions is vital. Fine needle aspiration cytology is a least invasive technique for obtaining a cell diagnosis and is very accurate if both operator and cytologists are experienced.

By using FNAC in the routine examination of breast, unnecessary open biopsy of cystic changes is avoidable. It also allows the surgeon to triage which patients should have a 1-stage inpatient procedure with frozen section and which patients should have an excisional biopsy as an out-patient under local Anesthesia.

Aims and Objective

To study the diagnostic accuracy of fine needle aspiration cytology over histopathological examination in palpable breast masses and its reliability in planning definitive treatment.

Materials and Methods

The present study emphasizes the role of Fine Needle Aspiration Cytology in the diagnosis of clinically palpable breast masses. Out of 367 cases admitted with clinically palpable Breast masses during the study period, only 50 cases satisfied all the criteria's for the study.

We performed a prospective study of 50 Fine needle aspiration cytology and further Histopathological correlation, performed in female patients admitted with clinically palpable breast masses in all surgical units at ESI Medical College, Gulbarga .During a study period of 18 months (from Jan 2018 to September 2019).

On admission, detailed medical history of the patient and thorough clinical examination were elicited and the details were entered in a precised proforma. The procedure was explained to the patients including the reliability, limitations and complications with consent obtained in each case. No prior preparation of the patient is required and the procedure can be performed even on an out-patient basis.

Requirements

1. Syringe: 10-20 ml disposable and of strong rigid material to provide good negative pressure.
2. Needle: 23-22 G with 2.54 to 3.8 cm length.
3. Glass slides: Clean, dry, free of grease and dirt.
4. Ethyl alcohol fixative
5. Gloves.
6. Skin disinfectants, cotton swabs, and sterile dressings.

Procedure

The patient is made to lie in a supine position and the breast mass immobilized with thumb and index finger of left hand, with the overlying skin stretched and cleaned with a sterile swab.

The needle attached to the syringe is inserted in to the lesion and when it enters the target site there is a change in consistency of feel to the needle. Adequate negative pressure is applied (to hold the tissue against the sharp cutting edge of needle) and needle is moved back and forth in various directions. Usually 4-6 passes through the lesion are adequate, indicated by the appearance of the material in the hub of the needle.

The negative pressure is released before the needle is withdrawn from the lesion site. In large lesions, aspirations were performed from multiple sites. After the procedure, pressure was applied to the site of aspiration to minimize the formation of local hematoma.

The material is then expressed on clean, grease free microscope slides taking care to avoid splashing. The material is spread by using another slide or a 4 mm cover slip. The slides are immediately wet-fixed in alcohol for papanicolaou's stain and few air-dried for Giemsa stain.

The cytological diagnoses were classified as malignant, suspicious, benign or unsatisfactory. Malignant and benign diagnoses were rendered in cases which unequivocally had either the presence or absence of cancerous cells respectively. A suspicious diagnosis was assigned if the cytological features were suggestive but did not completely fulfil the criteria for being malignant (i.e., high nuclear to cytoplasmic ratio, prominent nucleoli, hyperchromasia, thick irregular nuclear membrane) and unsatisfactory if the specimens were inadequate.

The tissue for Histopathological correlation was obtained by Biopsy, Lumpectomy or Mastectomy specimens. And the specimens were been send to Pathology department for histopathological examination. Tissue processing: The bits of tissue were fixed, dehydrated, cleared and embedded in paraffin. Sections of 4-5 microns thickness were cut, flattened and fixed on slides and stained with Haematoxylin and Eosin.

Results

Present study included 50 patients out of 367 patients full filing all the criteria. Patients underwent for Fine needle aspiration cytology of clinically palpable Breast masses with Histopathologic correlation of 50 breast lesions selected randomly from patients admitted in all surgical units.

The youngest and oldest patients in the study were of 17 years and 75 years respectively with a mean age of 46 years (Table 1).

Table 1: Age distribution of patients according to type of breast lesion

Age in years	Benign		Malignant	
	No. of cases (n = 27)	Percent	No. of cases (n = 23)	Percent
15-25	13	48.15	-	-
26-35	9	33.33	3	13.05
36-45	5	18.52	9	39.13
46-55	-	-	10	43.47
56-65	-	-	-	-
66-75	-	-	1	4.35
Age at Menarche				
<13	5	18.52	8	34.78
13-15	20	74.07	15	65.22
>15	2	7.41	0	0
Age at menopause				
Reproductive	22	81.48	3	13.04
35-40	4	14.81	2	8.70
41-45	1	3.70	8	34.78
46-50	-	-	10	43.47
Marital status				
Married	16	59.26	21	91.3
Unmarried	11	40.74	2	8.7
Parity				
0	12	44.44	6	26.09
1	10	37.04	13	56.52
2	4	14.81	2	8.69
3	1	3.71	1	4.35
4	-	-	1	4.35

Present study, out of 50 cases Fibro-adenoma was the most common benign lesions diagnosed in 21 cases (42 percent), followed by Fibrocystic changes in 4 cases (8 percent) and Benign phyllodes tumor in

2 cases. Out of 23 malignant cases diagnosed almost all the cases where diagnosed as Duct carcinoma in 22 cases, except for one case of inflammatory carcinoma (Table 2).

Table 2: Incidence of Various type of Breast lesions

Type of lesion	No. of cases	Percentage
Benign lesion	27	54
Fibroadenoma	21	42
Fibrocystic change	4	8

Type of lesion	No. of cases	Percentage
Benign phyllodes tumor	2	4
Malignant lesion	23	46
Duct carcinoma	22	44
Inflammatory carcinoma	1	2
Total	50	100

In 27 cases with a benign diagnosis, smallest and largest lesion sizes were of 1.5 cm and 16 cm respectively with a mean size of 8.75 cm (Table 3).

In benign cases diagnosed, surgery was advised to prevent complications, know the nature of the lesion and in few cases for cosmetic reasons.

21 cases of fibro-adenomas were diagnosed cytologically histopathological correlation was done in all cases. All except one proven to be benign on histopathological correlation, 1 case with unsatisfactory sample also turned to be fibro-adenoma on histology (Table 4).

Table 3: Size of Breast Lumps

Sl. No.	Lesion	<2 cm	2-4.99 cm	5-9.99 cm	>10 cm	Total
		No. of cases (Percent)	No. of cases (Percent)	No. of cases (Percent)	No. of cases (Percent)	No. of cases (Percent)
Benign Lesion						
1.	Fibra-denoma	6 (22.22)	15 (55.56)	-	-	21 (77.78)
2.	Fibro-cystic change	2 (7.41)	2 (7.41)	-	-	4 (14.82)
3.	Benign phyllodes tumor	-	-	1 (3.7)	1 (3.7)	2 (7.40)
Total Benign		8 (29.63)	17 (62.97)	1 (3.7)	1 (3.7)	27 (100)
Malignant Lesion						
1.	Duct carcinoma	-	8 (34.78)	13 (56.52)	1 (4.35)	22 (95.65)
2.	Inflammatory carcinoma	-	-	-	1 (4.35)	1 (4.35)
Total Malignant		0 (0)	8 (34.78)	13 (56.52)	2 (8.7)	23 (100)

Table 4: Cytohistological correlation in present study

Lesions	HPE Benign	Cytological diagnosis				
		Malignant	Suspicious	Unsatisfactory		
Benign						
1.	Fibroadenoma	21	20	0	0	1
2.	Fibro cystic changes	4	4	0	0	0
3.	Phylloides	2	2	0	0	0
Malignant (carcinoma)						
1.	Ductal	22	1	18	2	1
2.	Inflammatory	1	0	1	0	0
Total		50	27	19	2	2

Final histopathological correlation was available in all 50 cases which revealed 21 cases as truly positive, 26 cases as truly negative. One case was falsely negative but no case was falsely positive. A sensitivity of 95.45 percent and specificity of 100 percent was obtained. The single false negative

case was diagnosed as fibro-adenoma cytologically, proved to be infiltrating duct carcinoma histologically, resulting in a negative predictive value of 96.29 percent. The overall diagnostic accuracy of this study was 96 percent (Table 5).

Table 5: Specificity and sensitivity of FNAC with clinical diagnosis.

Statistical indices	Result (Percent)
Sensitivity	95.45%
Specificity	100%
Positive predictive value	100%
Negative predictive value	96.29%
False positive ratio	0%
False negative ratio	4.54%
Diagnostic accuracy (efficacy)	96%

Discussion

The present study includes 50 cases of breast aspirations performed during the period of 18 months (Jan 2018 to September 2019). All aspirations were performed under aseptic precautions and guided manually. Although rare complications like hematoma and pneumothorax have been reported in literature,^{2,3} no complications were observed in our study. Palpable breast lesions occurred between 17 years to 75 years with a mean age of 46 years. Usually the breast lesions occur during the reproductive period and later. This is in accordance with various studies described in literature. The benign lesions occurred with a high frequency in both nulli-parous and multi-parous women, whereas the malignant lesions were more common in women who were nulli-parous or of low order parity.^{4,5}

Among 27 benign cases in females only 5 cases (18.52%) had menarche before 13 years, whereas out of 23 malignant cases in females 8 cases (34.78%) had menarche before 13 years (Table 4). This is consistent with the literature that early age of menarche predisposes to cancer.^{4,5}

In the present study, maximum number of lumps were located in upper outer quadrant in 23 cases (46%) followed by upper inner quadrant and lower outer quadrant in 7 cases each (14%) and lower inner quadrant in 3 cases (6%). Similar observations were also made by A Kim et al.⁶ Maximum number of lumps were located in upper outer quadrant in 23 cases (46%) followed by upper inner quadrant and lower outer quadrant in 7 cases each (14%) and lower inner quadrant in 3 cases (6%).⁶

In the present study, fibro-adenoma was the most common benign lesion diagnosed in 21 cases (42%) which is in comparison other studies. In the study by Rocha et al.⁷ fibro-cystic changes was the commonest lesion observed in 285 cases (34.05%), but in our study is was second commonest Benign lesion found in 4 cases (8%).

The results of the various studies show a fairly wide range of sensitivity (91.66–98%), specificity (78%–100%), positive predictive value (92–100%), negative predictive value (91–98%) and diagnostic accuracy (87.5–99%).^{8,9}

In the present study, sensitivity was 95.45%, approximately equivalent to Sneige and JF Silverman et al.¹⁰ The highest sensitivity of 98% was reported by Reshma et al.¹¹ As far as the specificity is concerned, the present study showed 100% specificity as that of JF Silverman et al.,¹⁰ Sreenivas et al.¹²

The diagnostic accuracy of the present study was 96%, which is comparable with other studies. The present study confirms the view, that FNAC of breast is one of the most valuable diagnostic tools in the assessment and management of benign and malignant breast lesions and diagnosis of cancer by FNA appears to be as safe as diagnosis by open biopsy.

Conclusion

It is an important diagnostic toll in management of patients presenting with palpable breast lump. In recent years FNAC has grown by many folds and has become valuable tool for diagnosing the palpable breast masses. This adds to advantage of being sensitive, specific, expedient, economical and relatively safe. This method is beneficial to patients by absolutely avoiding requirement of local or general Anesthesia making them more comfortable.

FNAC technique is free from complications, except in few cases where slight haematoma is seen. The quickness in the aspiration, staining, and reporting makes it unique in the diagnosis of Breast lesions. Procedure can be performed several time. Rapidness of the technique helps in early diagnosis, so that the treatment can be started at an early stage depending on the results of FNAC.

FNAC is safe, simple, quick, cost-effective, reliable and accurate method in the initial diagnosis

of clinically palpable breast masses Thus it is commonly used as part of diagnostic triad in cases with palpable breast lump, which in addition with FNAC included clinical breast examination and mammography.

References

1. SR Orell, GF Sterret, Max N-I Walters, D Whitaker. Manual and Atlas of Fine Needle Aspiration Cytology. 3rd edition. London: Churchill Livingstone 1999,pp.1-8.
2. Shanta Krishnamurthy. Fine needle aspiration cytology-An overview. In. Aspiration Cytology for Clinicians and pathologists. Ed. S. Krishnamurthy. Mumbai. Tata Memorial Hospital, Professional Education Division 1991,pp.1-9
3. Smith T.J, Safali H, Foster E.A and Reinhold R.B, Accuracy and cost-effectiveness of fine needle aspiration biopsy. American Journal of Surgery 1985;149(4):540-45.
4. Christopher D M. Fletcher, Diagnostic Histopathology of Tumors. Third edition, Churchill Livingstone 2007,pp.903-70.
5. Juan Rosai. Rosai and Ackerman's Surgical Pathology. 9th edition, Vol 2. New York: Mosby Publications 2004,pp.1763-876.
6. A Kim, J Lee, JS Choi, AH Won, Bum HK. Fine needle aspiration Cytology of the breast: Experience at an out-patient breast clinic. Acta Cytol 2000;44(3):361-67.
7. Rocha PD, Nadkarni NS, Menezes S. Fine needle aspiration biopsy of breast lesion and histopathologic correlations, an Analyzis of 837 cases in four years. Acta cytol 1997;41:1131-7.
8. Kujur P. Fine-Needle Aspiration Cytology of the Palpable Breast Lump of 106 Cases and Correlation with Histologic Diagnosis: A Prospective Analyzis. Int J Sci Stud 2015;3(9):111-5.
9. Farida Begum, P. Ravi Kumar. Diagnostic correlation of palpable breast masses by cytology and histopathology: A prospective study. IAIM 2018;5(11):44-9.
10. Silverman JF, Masood S, Ducatman BS, et al. Can FNA biopsy separate atypical hyperplasia, carcinoma in situ, and invasive carcinoma of the breast?: Cytomorphologic criteria and limitations in diagnosis. Diagn Cytopathol 1993 Dec;9(6):713-28
11. Reshma Ariga et al. Fine needle aspiration of clinically suspicious palpable breast mass with histopathological correlation. American Journal of Surgery 2002;184:410-3.
12. Sreenivas M, Kumar GH, Reddy SJ, et al. Role of fine needle aspiration cytology in the diagnosis of breast lumps and its histopathological correlation. Ind J Pathol Microbial 1989;32:133-7.