

Reliability of Fine Needle Aspiration Cytology (FNAC) for Diagnosis of Breast Lumps Using Triple Test Assessment

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ABSTRACT

Objective: The aim of this study was to correlate the Fine Needle Aspiration Cytology (FNAC) diagnosis of breast lumps with clinical examination and breast imaging (ultrasound and mammogram) and to assess the reliability of FNAC to differentiate between benign and malignant lesions of breast in available histopathological specimen

Materials and Methods: This is a retrospective study of FNAC of breast lumps done in pathology department BMSI from 1st January to 30th June, 2019

Results: From 950 FNAC cases, FNAC of palpable breast lump constituted 115(12.3%). fibro adenoma was most common diagnosis 25 cases (25.4%) among the younger age group with mean age 25.6 years. 51 cases were diagnosed as suspicious, atypical or malignant on FNAC showed average age 45 years. Two cases with suspicion of phyllodes tumor on ultrasound was confirmed on FNAC

Conclusion: FNAC in association with clinical assessment and breast imaging (Ultrasound and Mammogram) is helpful for surgery planning and further management of breast lump.

Keywords: Fine Needle Aspiration Cytology, mammogram, malignant phyllodes

INTRODUCTION

The first written evidence of breast cancer dates back from 3000 to 2500 BC from ancient Egypt in the Edwin Smith Papyrus.⁽¹⁻²⁾ There is an increasing incidence of breast cancer; it was reported to have caused over a quarter (28%) of all the deaths in the UK in 2017.⁽³⁾ It is imperative to develop new approaches for the early detection of cancer to improve survival and to decrease the burden on health care professionals.⁽⁴⁾

The breast lump can be asymptomatic or present as nipple discharge or as palpable pain full or pain less lump. Mass in breast is a cause of psychological disturbance and state of anxiety for the patient and her family, definitive preoperative diagnosis relieves the patient's anxiety and uncertainty. Palpable breast masses, mastalgia, and nipple discharge are commonly encountered symptoms in outpatient practice, causing significant patient anxiety and precipitating medical consultation.⁽⁵⁾

Fine needle aspiration cytology is the simplest, reliable and accurate method to label the breast lump as benign, inflammatory or Malignant-Triple test assessment i.e clinical assessment, breast imaging (ultrasound or mammogram) and FNAC diagnosis is helpful for surgical planning and curative treatment.⁽⁶⁾

In 1930 martin (clinician) and Stewart (pathologist) with the assistance of Ellis (technologist) marked the commencement of FNAC for systematic study. FNAC is a simple, cost-effective, less traumatic, in expensive and rapid OPD procedure and does not require admission or pretest preparation, virtually has no contraindication. It can be used for confirmation of recurrence or inoperable breast cancers prior to radiotherapy, chemotherapy or hormonal manipulation. Also suitable for breast lump of unknown origin and helpful for planning of surgery.⁽⁷⁾

Inadequate aspirate and inappropriate interpretation of cell morphology are main drawback of FNAC, properly fixed high quality thin smear without blood clot and adequate clinical information of the patient may be very helpful to avoid the pitfalls in FNAC.⁽⁸⁾

The aim of this study was to correlate the clinical assessment and breast imaging (ultrasound or mammogram) of breast lump with FNAC diagnosis and to assess the accuracy of FNAC in diagnosis of available histopathological specimen of breast lump received after FNAC.

MATERIAL AND METHODS

This is a retrospective study of FNAC of breast lump done in pathology department, BMSI from 1st January to 30th June 2019-

FNAC findings were correlated with clinical assessment and breast imaging (ultrasound or mammogram). In patients younger than 35 years of age ultrasound was mostly done while in older women mammogram findings available for all cases.

The FNA was done with 22-24 gauge needle, aspirated material was smeared on glass slides and fixed with 95% ethanol - 4 slides were prepared for each case, 3 fixed slides were stained with hematoxylin and eosin and one fixed slide was stained with field stain (diff quick stain), which was screened at the time of aspiration to assess the adequacy of aspirated material - Repeat aspiration done in cases which showed low cellularity on field stained slide-cytological diagnosis were categorized as neoplastic and non-neoplastic lesion. Data entered and analyzed by statistical software SPSS 21.

RESULTS

During study period total 115 samples of breast lumps were aspirated including 4 male patients clinically assessed as gynaecomastia.

Table 1: Breast Lesions Diagnosed in FNA

Breast Lesions	No Of Cases	Total
Neoplastic Lesions	82 / (71.30%)	115
Non Neoplastic Lesions	33 / (28.69%)	

Table 2: Types of Lesions Diagnosed in FNA

Non Neoplastic Diagnosis	No of Cases%	Total Cases
Inflammatory lesion	22(C2)	33
Cystic lesion	4(C2)	
Galactocele	1(C2)	
Fat necrosis	1(C2)	
Apocrine change	1(C2)	
No Atypical cells seen	1(C2)	
Inconclusive	3-(C1)	
Neoplastic lesion		82
Suspicious cell+atypical / malignant cells	51 (C4+C5)	
Fibro adenoma	25(C2)	
Phyllodes	2(C4)	
Gynaecomastia	4-(C2)	

FNAC of breast lump constituted 12.3% of all FNAC age group of patients ranged from 14-70 years. Fibro adenoma(c2) was most common diagnosis among younger age group with mean age of 25.6 years, these cases were also committed as benign pathology or fibro adenoma on ultrasound. 51 Cases committed as

suspicious, atypical /malignant cells (c4+c5)on FNAC with mean age of 45 years were labeled as neoplastic lesions on ultrasound or BIRADS 1V on mammogram and clinically were described as neoplastic masses .Two cases with suspicion of phyllodes tumor on ultrasound were aspirated and diagnosed as phyllodes tumor

on FNAC - Clinical and breast imaging diagnosis of 20 inflammatory lesions confirmed as abscess, chronic granulomatous inflammation and acute and chronic inflammation on FNAC

Table 3:Groups in Different Lesion

Diseases	Inflammatory lesion	Fibroadenoma	Malagnant	Cystic Lesion	Phyllodes	Inadequate /Inconclusive	Grand Total
10-20	3	12	-	-	2	1	18
21-30	8	7	3	2	-	-	20
31-40	8	5	15	2	-	1	31
41-50	2	1	21	-	-	1	25
51-60	1	1	7	-	-	-	9
61-70	1	1	4	-	-	-	6
>70	1	-	1	-	-	-	2
Total	24	27	51	4	2	3	111

Table 4:Clinical Imaging and FNA Correlation

S.No	Clinical and Radiological Finding	FNA	No of Cases
1	Moble Swelling Benign Pathology on U/S BIRADS II or III on mamogram	Suggestive of Fibro adenoma	25
2	Moble Swelling Benign Pathology on U/S BIRADS II or III on mamogram	Suggestive of Phyllodes	02
3	Fixed Swelling Neoplastic lesion on U/S BIRADS IV on mamograph	Atypical /Suspicious cells/ malignant cell	51
4	Swelling with discrete cyst complexedmass with cystic changes on U/S BIRAS O on mamograph	Benign Cystic Diseases	4
5	Swelling with red to purple skin Abscess on U/S BIRAD O - IV on magmogen	Inflammatory lesion/ Abscess /chronic granulomatous lesion	22

DISCUSSION

The Triple test initially described in the mid1970s, is the evaluation of palpable breast masses by physical examination, breast imaging and Fine needle aspiration. (9) In our study FNAC reporting was done according to IAC standardized reporting system (c1; inadequate /insufficient material, c2; benignnc3; atypical probably benign,c4;suspicious probably insitu or invasive carcinoma , c5;malignant)as reported in various studies. (10)

Triple test assessment includes both ultrasound and Mammogram, those patients who were clinically and sonologically labeled as neoplastic lesions and were advised to proceed for mammogram. usually the patients under 35 years of age, clinically and sonologically diagnosed as benign pathology or fibroadenoma were advised not to proceed for mammogram due to hazards of parenchymal tissue damage.

In our study cases showed ultrasound findings as inflammatory lesions or abscess along with clinical information of benign lesion or tender lumps was diagnosed on FNAC as abscess or inflammatory lesions with 100%concordant TT .These cases revealed paucity of epithelial cells on FNAC despite multiple attempts and were labeled as inflammatory lesions due to presence of inflammatory cells –Two out of total 22 cases of this group were diagnosed as granulomatous mastitis where the degenerating epithelial cells showed atypical nuclear changes along with multinucleated giant cells and necrotic inflammatory back ground.

According to the results found by Koo, Lioeand Spence (2006), they observed fourteen cases (64%) underwent surgical biopsy for histological assessment. a definitive diagnosis on FNAC with ancillary investigations was achieved in 82% (18 out of 22) of the cases: four Hodgkin's lymphoma, two non-Hodgkin's lymphoma (NHL), five tuberculosis (TB), two toxoplasmosis, one sarcoidosis and four benign reactive changes. (11-13)

Three cases with BIRADS IV on Mammogram in patients older than 35 years of age, were diagnosed as inflammatory lesion on FNAC and one case clinically and on ultrasound was labeled as neoplastic lesion was diagnosed on FNAC as fat necrosis TT test was non-concordantin these cases. Study conducted by of Veerendrasagar and Nandish (2020), they found the most common affected age group was 40-49 years with preponderance on right side. Considering the Cytomorphological spectrum, the most common lesion was Fibroadenoma followed by Ductal carcinoma, fibrocystic disease, acute suppurative inflammatory lesion, benign

breast lesion, granulomatous mastitis and atypical ductal hyperplasia. discussed these kind of changes in their studies. (14)

History of lactation was very helpful for diagnosis of inflammatory galactocele where reactive ductal cells closely resembled atypical cells same finding shows in study of Yu et. al and Sharif et. al(2020), they concluded that breast lesions that are detected during pregnancy or nursing are not very different from those detected in non-pregnant women. But, it is difficult to diagnose these lesions in pregnant women due to the hormone-induced physiological changes occurring in the breast. (15-16)

All 04 cases clinically labeled as discrete cysts along with cystic lesion on ultrasound was diagnosed as cystic lesion on FNAC showed degenerating ductal cells with apocrine changes in a proteinaceous back ground with 100%concordant TT, findings supported by Rosen et. al (2011)

All the thirty case those were clinically and sonologically labeled as benign pathology or fibroadenoma were also committed as fibroadenoma on FNAC (c2)100% concordant TT. Comparable with results of research conducted by Jan et. al (2010), Sharif (2020),Mitra and Dev (2016). (6,15,18)

The lesions that were labeled as neoplastic lesions clinically and sonologically and showed BIRADS iv and above on Mammogram which included all cases showed suspicious, atypical/malignant cells on FNAC (C4,C5) and two cases with suspicion of phyllodes tumor on ultrasound was confirmed on FNAC as same 100%concordant TT.

Four male patients were presented with benign breast lesion clinically with gynaeomastia on ultrasound were diagnosed as suggestive of gynecomastiaon FNAC 100% concordant TT.

Histopathological correlation was possible for limited available cases during study time period.Only lumpectomy specimen of 07 cases of fibroadenomawas received after FNAC reporting and all these cases were conformed as fibroadenoma. Hitopathological correlation was available for 11cases of suspicious, atypicalor malignant cells of FNAC, 10 cases were conformed as malignant (invasive ductal carcinoma 7, invasive lobular carcinoma3) and one was papilloma. Two cases of phyllodes reported on FNAC were received for histopathology and diagnosed as low grade phyllodes and high grade phyllodes respectively. Both cases of granulomatous mastitis on FNAC report were diagnosed same on histopathology. 4 cases of cystic lesions were available for histopathology and diagnosed as cyst lesion on biopsy. Sankaye and Dongre (2014) reports similar study Seventy-six cases were available for histological correlation. Of 29

cytological benign cases, 26 were confirmed as benign, but 3 turned out to be malignant. Out of 36 cytological malignant cases, 35 were confirmed as malignant. FNAC was 88.37% sensitive and 96.42% specific in diagnosing malignant lesions.⁽¹⁹⁾

CONCLUSION

Triple test assessment is helpful for surgery planning and curative treatment of breast lump

Limitation of study: The major drawback of our study is non availability of histopathology for cases diagnosed on FNAC, due to the availability of multiple histopathology reporting centers, with lack of central registry, poor coordination between the clinician, the patient and histopathologist. The lack of patients awareness regarding the disease also has a role to play, moreover myths associated with surgery /biopsy leading to poor compliance of patients for histopathology -Also one of the major factor is classic faith of Asian population on alternative medicines eg .Hakim,Taveez etc.

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Conflict of Interest: None.

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