ORIGINAL ARTICLE

Diagnostic Accuracy of Fine Needle Aspiration Cytology in Palpable Breast Lump; Our Local Experience

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ABSTRACT

Objective: To Determine the Diagnostic Accuracy of Fine Needle Aspiration Cytology In Palpable Breast Lump.
Study Design: Descriptive Cross Sectional Study.
Place and Duration of Study: The study was carried out at a Private laboratory Abbottabad from 1st January 2014 to 31st December 2016.
Materials and Methods: This study was carried out at a private laboratory Abbottabad from 1st January 2014 to 31st December 2016. A total of 92 patients with palpable breast lump were included in the study. Fine Needle Aspiration Cytology of breast lump done and then histological examination was conducted on excised lumps after operation. The diagnostic sensitivity, specificity, diagnostic accuracy, positive predictive values, negative predictive value of Fine Needle Aspiration Cytology was determined by keeping the post operative histological results as gold standard.
Results: Out of 92, 4 cases (4.3%) C1, 06 (6.52%) C3, 07(7.60%) C4 were not included in study. Thus 75 cases with 41 (44.56%) C2 and34 (36.95%) C5 were included. It was calculated that Fine Needle Aspiration cytology for the diagnosis of breast lump has a diagnostic sensitivity of 97%, specificity of 100% with a diagnostic accuracy of 98.6%. Positive predictive and negative predictive values were 100% and 97% respectively.
Conclusion: Diagnostic accuracy of Fine Needle Aspiration Cytology is high, thus confirming that Fine Needle Aspiration Cytology of palpable breast lumps is a reliable method for early diagnosis and management of breast lump.

Key Words: Breast Carcinoma, Fine Needle Aspiration Cytology, Palpable Breast Lump.

Introduction

Breast lump is defined as any swelling present in the breast.[1]Different breast conditions ranging from benign to malignant can manifest themselves as breast lump.[2]   A palpable breast lump is a matter of concern both for the patients and the clinicians because the rate of breast carcinoma has been increasing worldwide and in Pakistan the prevalence is also high.[3]

Breast carcinoma is the commonest malignancy in females all over the world and the second leading cause of death in females.[4] Studies reveal that the incidence of breast carcinomas has significantly decreased amongst females in USA.[5] In Asia, Pakistan has the highest rate of breast cancer and approximately 1 in every 9 Pakistani women is likely to have breast cancer.[6,7]

Due to this reason all the efforts are made to make correct diagnosis of the palpable breast lumps. A complete history and examination is the key to reach the diagnosis. Investigations like ultrasound and mammogram are important imaging tools used for diagnosis as well as screening purpose.[8]

Histological diagnosis of the breast pathology is made either via trucut biopsy or FNAC. FNAC has been considered reliable, rapid and economical method when combined with clinical impression and radiological findings (mammogram/ultrasound) to accurately diagnose palpable breast masses.[8]This procedure is easy, quick to perform and virtually painless, hence it has been considered a standard and first line tool for diagnosis in breast lump.[9]

The present study was done to determine the diagnostic cytological accuracy of FNA for palpable breast lump taking post surgical histological findings as gold standard.

Materials and Methods

This descriptive study was performed at a private laboratory of Abbottabad over a period of 03 years

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from 1ˢᵗ January 2014 to 31ˢᵗ December 2016. The study included 92 female patients presenting with lump/lumps in one or both breasts. Patients were included by non probability consecutive sampling. All the male patients presented with breast lump were excluded from the study. Demographic features of patient i.e. name, age and address were recorded on the proforma. FNAC was performed using a 22-guage needle attached to a 10ml syringe after explaining procedure to the patients and obtaining their informedconsent.[10] The area to be aspirated was cleaned with spirit before aspiration and multiple hits were made within the lesion, with sufficient negative pressure; the needle was removed and the pressure was applied to the area of aspiration to ovoid bleeding or hematoma formation. The aspirated material was smeared on glass slide and stained.[11]

Atleast two smears were fixed with alcohol and two air dried. Alcohol fixed smears were stained by Papanicolaou method while the air dried smears were stained by May-Grunwald-Giemsa technique. All the smears were screened and reported by pathologists. The diagnosis was given along with categorization of the lesion using an internationally recommended NHSBSP guidelines supplemented by a descriptive report.[12] There are five categories according to this format. C1 represents a non diagnostic or inadequate aspirate. C2 is benign. C3 isatypia probably benign and C4 is suspicious for malignancy. C5 is mentioned in the report when there is definite evidence of malignancy.

The diagnosis given on FNAC was then recorded along with the diagnosis given on histopathology when the resected specimen was received later for each patient. Sensitivity, specificity and diagnostic accuracy were calculated using standard statistical formulas.[13]Those cases having C1, C3 and C4categorization on FNAC were excluded from calculation. Those cases which were found to be malignant by cytology as well as by histology were labeled as True Positive(TP).False positive (FP) were those diagnosed as malignant on cytology and turned to be benign on histology. True negative (TN) were benign on both cytology and histology. False negative (FN) were negative on cytology but positive for malignancy on histology. The diagnostic accuracy was calculated as (TP+TN)/ (TP+FP+TN+FN).[13]

154

Results

In this study 92 patients who presented with breast lump underwent FNA. All were females. Age of population studied ranged between 18-80 years with a median of 37 years.

In majority (81.56%) of cases, a definite diagnosis of either a benign or a malignant lesion was given. Total 41(44%) cases were reported as benign (C-2 category) and 34 (37%) cases as malignant (C-5 category), shown in table l.

Table I: Diagnostic Categories of FNAC

Diagnostic Category	No (%)
C-1, Non diagnostic	4 (4.34%)
C-2, Benign	41(44.56%)
C-3,Atypia, probably benign	6 (6.52%)
C-4, Suspicious for malignancy	7 (7.60%)
C-5, Malignant neoplasm	34 (36.95%)
Total	92

The patients with malignant breast lump had age more than 29 years, with the median age of 47 years. The cases with inadequate result on FNAC i.e. (C1) were 4 out of 92, so excluded from final evaluation. Cases with FNAC report of C3 and C4 were also excluded from the final evaluation.

There were no false positive cases while 1 false negative case was reported. This case was reported as benign inflammatory lesion on FNAC, later on lumpectomy was performed and histopathological examination revealed invasive ductal carcinoma. Forty patients had benign cytological findings by FNA cytology;these 40 were also confirmed as benign by histopathology examination which represents (TN cases). Among benign cases maximum there were fibrocystic (62.5%) followed by fibroadenoma disease (32.5%), chronic mastitis (2.5%), lactating adenoma (2.5%).
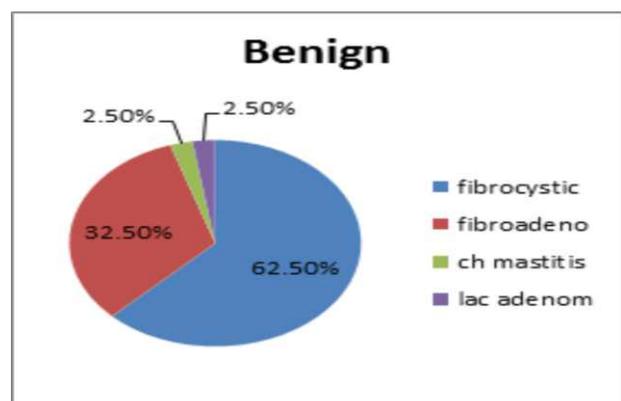

Fig 1: Causes of Benign Breast Lump

Thirty four cases that were diagnosed as malignant on FNA cytology as well as histopathology, thus considered (TP cases).Among malignant cases, most were invasive ductal carcinoma (94.11%), followed by lobular(2.94%) and mucinous carcinoma(2.94%).
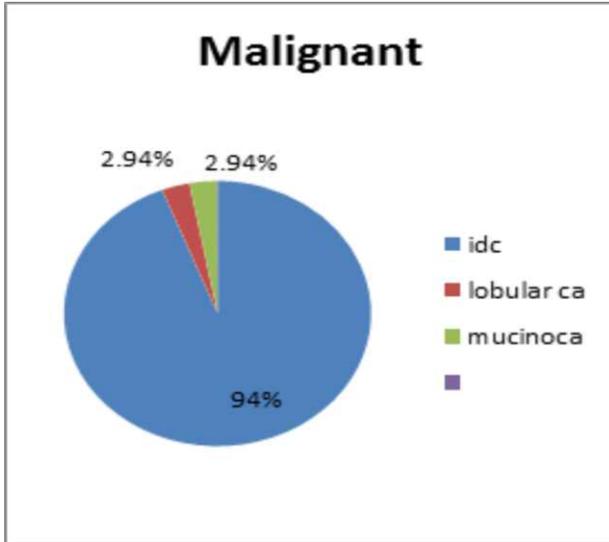

Fig 2: Causes of Malignant Breast Lump

Table II: Cytological and Histopathological Diagnosis

FNA cytology	Histopathology	
	benign	Malignant
benign	40(53.33%)(TN)	1(1.33%)(FN)
malignant	0 (0%) (FP)	34 (45.33%) (TP)

Sensitivity rate for breast FNA was 97% and specificity rate was 100%. Positive predictive value was 100% and negative predictive value was 97%. Diagnostic accuracy of FNA was calculated as 98.6%.

Discussion

Breast lump is the the most frequent clinical symptom which which the patients present in surgical department all over the world.[14] Most of the females with breast lumps have 80-85% benign lesions.[15]Still breast cancer is the leading cause of deaths worldwide and specially in developing Asian countries, it is emerging as the commonest malignanacy in females, which necessitates the use of an ideal i.e. quick, lesser invasive and accurate diagnostic tool.[16]FNAC has been considered an ideal initial diagnostic modality in breast lumps because it is less invasive, does not require anesthesia, thus comfortable to the patient and lacks false positive results.[17]The use of FNAC to find out the presence of malignancy before surgery has been well documented.[2]

For breast FNA cytology to be clinically useful, a satisfactory sample must be obtained. Smears from breast aspirates are considered satisfactory when the material is representative of the lesion, adequate in quantity and to cytopreparation is excellent. Our inadequate (C1) rate was 4.3%. In this study, we had a sensitivity rate of 97% and specificity rate of 100%, which gave diagnostic accuracy of 98.6%. Our false negative rate was 1.33% and there was no false positive result in our study. Positive predictive value and negative predictive value in this study was 100% and 97%.which is in comparable with previous

A study conducted by Ahmad F et al[18], found inadequate breast FNA smear(C1) reported to be 2.86% which is comparable to our study.

Our results are comparable with the study conducted by Bugti S et al on ; a comparative study of pre-operative FNAC with post operative histopathology in the diagnosis of breast lump in 2015, and obtained a sensitivity rate of 95%, specificity rate of 100%, which gives a diagnostic accuracy of 95%.our study supported this study.[2]

A study was published by Patel PJ et al in 2015[13] to evaluate sensitivity, specificity and accuracy of fine needle aspiration cytology of breast lump, calculated sensitivity 71.4%, specificity 100% and diagnostic accuracy of 94.6%.these results are similar to our study. A study was published by Ahmed S et al in 2010, they evaluate the accuracy of FNAC in palpable breast lumps at breast clinic of Abbasi Shaheed hospital Karachi, and they found sensitivity of 91.3%, specificity of 100%, with overall accuracy of 96.5%.[19] Another study conducted by Gupta R et al in 2017 analyzed utility of fine needle aspiration cytology as a screening tool in diagnosis of breast lumps. They found 85% sensitivity, 95.8% specificity and diagnostic accuracy of 93%.20 Our results are comparable with these studies.

A study conducted by Hamdani NR et al worked on fine needle aspiration cytology breast lesions-its concordance with histopathological examination of excised lesion in 2015, found sensitivity of 89%, specificity 100%, and diagnostic accuracy was found to be 97%.[12] The results of this study is in favor of our study.

A study done in 2011 by Tasneem S et al, and Hamdani NR et in 2015 also found false negative rate to be 1.92% and 2.7% respectively,[21,12] which shows

similarity with our results.

There was no false positive result in our study equivalent with study conducted by Hamdani NRet al.[12]Positive predictive value, and negative predictive value were found to be comparable with a previous study conducted by B Saira et al,[2] who found values 100% and 93.3% respectively.[2]

Conclusion

Diagnostic accuracy of FNAC is high, thus confirming that FNAC of palpable breast lumps is a reliable method for early diagnosis and management of breast lump. FNAC should be used as a routine diagnostic tool for breast lumps due to its cost effectiveness, quick results and high accuracy.

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