ORIGINAL ARTICLE
ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY IN DIAGNOSIS OF PALPABLE BREAST LESIONS AND THEIR COMPARISON WITH HISTOPATHOLOGY

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Background: The aim of this study was to compare the diagnostic utility of fine needle aspiration cytology (FNAC) in breast lesion with gold standard of histopathological diagnosis. **Methods**: This descriptive cross-sectional study was conducted in Pathology department of Bannu Medical College in collaboration with Surgery Department of Khalifa Gul Nawaz Teaching Hospital Bannu as well as other private surgical hospitals of the territory. A total of 88 FNAC of palpable breast lesions were performed and compared with their corresponding histopathological reports. Patients age, location of lesion in breast, and other necessary findings were recorded on predesigned proforma, FNAC performed by using 10 ml syringes. Slides prepared and processed for cytological staining and reported by cytopathologist. Corresponding biopsies were processed for histopathological examination and diagnosis. All female patients of any age with breast lesions were included, and those breast lesions for which no histopathological report was available were excluded. Statistical Package for Social Sciences (SPSS) version 20 was used for calculation of frequencies with percentages and mean with standard deviation. Also, specificity, sensitivity, diagnostic accuracy, positive predictive value and negative predictive value were calculated by using formulas. **Results**: In this study the mean age was 34.44±21.57 years and age range was from 16 to 80 years. The most common age group was 26–35 years followed by 36–45 years. In this study sensitivity was (83.33%), specificity was (100 %), positive predictive value was (100 %), negative predictive value was (99.27%) and diagnostic accuracy was 99.30%. **Conclusion**: FNAC breast is an easily approachable, less invasive, cheap, rapid and almost accurate diagnostic tool in the diagnosis of palpable as well as non palpable breast lesions.
Keywords: FNAC; Breast lesions; Mastitis; Fibroadenoma; Invasive ductal carcinoma

INTRODUCTION

The dramatic change in clinical practice in last decade is the increase referral of breast lump patients for preoperative diagnosis by Fine Needle Aspiration Cytology (FNAC). This trend is due to development of patient's awareness towards conservative treatment.[1] The sensitivity of FNAC in breast diagnosis is 90–95% in large series of studies. The objective of sensitivity should not be less than 95%, the same can be achieved by expertise of cytopathologist.[2] Multiple factors affect the diagnostic accuracy of breast FNAC like skill, experience, preparation and reading of smears. Accuracy can be improved by experience. The best results can be achieved if the cytopathologist who read the FNAC also report histopathology as well.[3,4]

Breast lump is one of the common findings in females at any age. Clinically diagnosis of palpable breast lump is usually misleading. To support the clinical diagnosis, a number of non-invasive and invasive techniques are available depending on patient economy.[5] On the other hand, biopsy though accurate is mutilating and at times unnecessary. The simplest, most cost effective, non-invasive, rapid and cheap diagnostic technique is FNAC. The advantage of FNAC lies in the fact that they are simple to perform rapidly accepted b the patient, and cosmetically non disfiguring.[6,7]

In most cases of benign diagnosis, conservative treatment is required and surgery is usually not required, where as in cases of malignancy preoperative planning, discussion and proper management with minimum morbidity is made possible.[8] Fine Needle Aspiration Cytology in experienced hand is highly accurate procedure in many series. This ensures its reliability in day to day practice.[9] Definitive diagnosis is sometimes not possible on FNAC alone, either due to indigenous limitations of FNAC or sometimes inability to obtain adequate material. In such cases FNAC can be presumptive. FNAC is not replacement of either tru-cut or open biopsy. For final diagnosis histological examination of tissue is required. The present study evaluates the sensitivity, specificity, diagnostic accuracy, positive predictive value and negative predictive value of FNAC in cases of palpable breast lesions and their correlation with histological diagnosis.[10] Fine Needle Aspiration Cytology because of its diagnostic accuracy has significantly reduced the number of open breast surgeries. However, open biopsy is still a preferred procedure in most places because of unavailability of cytologist or lack

of cytologist expertise. Different studies have determined that breast FNAC has a sensitivity ranging from 80% to 98% and a specificity of 99–100%. The combination of triple test (FNAC, mammographic findings and clinical findings) has considerably decreased false diagnostic rate of breast cancer.[11] The aim of this study was to see the diagnostic role of FNAC in breast lesions in the backward area of southern district of KPK, Pakistan.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted in Pathology department of Bannu Medical College in collaboration with Surgery Department of Khalifa Gul Nawaz Teaching Hospital Bannu as well as other private surgical hospitals of the territory. A total of 88 FNAC reports of palpable breast lesions were performed and compared with their corresponding histopathological reports. Patients age, location of lesion in breast, and other necessary findings were recorded on predesigned proforma, FNAC was performed by using 10 ml disposable syringes. Slides prepared were fixed in ethanol, stained with Giemsa and H&E stain, mounted, labeled and reported by cytopathologist. The lesions were categorized according to five tire reporting system of breast cytology (C1-C5), where C1 for inadequate, C2 for benign, C3 for suspicious most probably benign, C4 for suspicious most probably malignant and C5 malignant. Corresponding biopsies were processed for histopathological examination and diagnosis. All female patients of any age with breast lesions were included, and those breast lesions for which no histopathological report was available were excluded. SPSS-20 was used for calculation of frequencies with percentages and mean with standard deviation. Also, specificity, sensitivity, diagnostic accuracy, positive predictive value and negative predictive value were calculated by using the following formulas.

Sensitivity = TP/TP+FN X 100.
Specificity = TN/TN+FP X 100.
Positive Predictive Value = TP/TP+FP X 100.
Negative Predictive Value = TN/TN+FN X 100
Diagnostic Accuracy = TP+TN/TP+FN+FP+TNX100.
False Positive Rate=FP/FP+TPX100.

False Negative Rates=FN/FN+TPX100.
TP = True Positive, TN = True Negative, FN = False Negative, FP = False Positive.

RESULTS

In this study the mean age was 28.58±17.34 years and the age range was from 16–80 years. The most common age group was 26–35 years followed by 36–45 years.

On FNAC amongst the 88 cases 64 (72.72%) were reported as benign (C-2) and 17 (19.31%) were reported as malignant (C-5). No inadequate case was reported. Amongst the suspicious cases 3 (3.40%) were reported as suspicious probably benign and 4 (4.54%) cases were reported as suspicious likely malignant. These C-3 and C-4 cases were not included in the final results. There was no FP case, where as one FN case was reported benign (C-2) which turned medullar carcinoma on histopathology.

Amongst the 81 breast FNAC definitive diagnosis of 64 (79.01%) cases were reported as benign and were confirmed by histopathology representing TN cases, where as 17 (20.98%) cases were reported as malignant by FNAC and were confirmed by histopathology representing TP cases.

In this study of breast FNAC the sensitivity was (94.44%), specificity (100%), positive predictive value (100%), negative predictive value (98.46%) and Diagnostic Accuracy was 98.78%. The False Positive Rate was 0% and False Negative Rate was 1.53%.

Table-1: Cytological correlation with gold standard of histopathology of breast lesions (n=81).

FNA Cytology	Histopathology	
	Benign	**Malignant**
Benign	64 (79.01%) TN	01 (1.23%) FN
Malignant	00 (0%) FP	17 (20.98%) TP

Table-2: Cytological diagnosis of breast lesions based on (C1-C5) five tire system (n=88).

Cytologic category	No. of cases.	Percentage
C-1 (Inadequate)	00	00
C-2 (Benign)	64	72.72
C-3 (Suspicious probably benign)	03	3.40
C-4 (Suspicious probably malignant)	04	4.54
C-5 (Malignant)	17	19.31
Total	88	100

Table-3: Histopathological diagnosis of palpable breast lesions (n=88).

Breast lesion type	Histologic diagnosis	No. of patients	Percentages	Cumulative percentages
Inflammatory	Acute mastitis	03	05 (5.68%)	67 (76.14%)
	Chronic mastitis	01		
	Chronic granulomatous mastitis	01		
Benign	Fibroadenoma	45	62 (70.45%)	
	Fibrocystic disease	05		
	Lactating adenoma	05		
	Ductal papilloma	04		
	Duct ectasia	03		
Malignant	Invasive ductal carcinoma	15	21 (23.86%)	21 (23.86%)
	Invasive lobular carcinoma	04		
	Mucinous carcinoma	01		
	Medullary carcinoma	01		
Total		88	100%	100%

Table-4: Comparison of diagnostic values of different studies.

Breast FNAC studies	Diagnostic Accuracy	False Positive Rate	False Negative Rate
Present study	98.78%.	0.00%	1.53%.
Vasavada et al[14] 2017	98.50%	2.27%	1.11%
Pandy et al[15] 2017	96.66%	0.00%	4.65%
Srilakshami et al[18] 2013	98.48%	0.00%	4.76%
Mehra et al[19] 2016	96.3%	0.00%	8.57
Paramesh et al[20] 2015	98.18%	0.00%	2.94%
Bukhari et al[21] 2011	98.00%	2.38%	0.00%

DISCUSSION

Breast lump is a common diagnostic for clinician. In the past excisional biopsy was the acceptable tool. Introduction of FNAC have several preoperative advantages over open biopsy like immediate diagnosis, definitive treatment plane with informed consent of patient, avoidance of un necessary surgeries in benign cases especially as well as need for frozen sections are reduced.[11] The main purpose of FNAC is to diagnose malignancy preoperatively and to avoid un necessary surgery in benign lesions. Breast FNAC of palpable as well as non palpable breast lesion is currently an acceptable first line diagnostic tool in evaluation of the lesions in breast.[12]

In this study the age range was from 16-80 years with mean age of 28.58±17.34 years. The most common age group was 26–35 years followed by 36–45 years. In as study conducted by Rathi et al[13]the age range was from 16–64 years. The most age group was from 30–39 years. In a study conducted by Vasavada et al the age range was from 12–73 years and the common age group was from 20–40 years,

In this study the sensitivity was (94.44%), specificity (100%), positive predictive value (100%), negative predictive value was (98.46%).

In studies conducted by Vasavada et at, Pandy et al, Daramola et al[16] Chauhan et al[17], Srilakshami et al, Mehra et al and Paramesh et al show the sensitivity was 97.7%, 100%, 95.4%, 96.6%, 95.23%, 93.8% and 95.45% respectively.

The specificity in these above studies was 98.8%,89.5%,88.9%,100%, 100%,100% and 100% respectively.

In studies conducted by Vasavada et al, Pandy et al, Daramola et al, Chohan et al, Srilakshami et al, Mehra et al and Paramesh et al the positive predictive value was 97.7%, 95.3%, 99.6%, 100%, 100% and 100% respectively.

The negative predictive value was 98.8%, 100%, 95.23, 91.45 and 96.06% in studies conducted by Vasavada et al, Pandy et al, Srilakshami et al, Mehra et al and Paramesh et al respectively.

All these studies reveal almost similar percentages of sensitivity, specificity, positive predictive value and negative predictive value.

Diagnostic Accuracy was 98.78%. The False Positive Rate was 0% and False Negative Rate was 1.53%. All the above studies have almost same diagnostic accuracy. The false positive rates was zero in most studies of the above studies, whereas study conducted by Vasavada et al and Bukhari et al false positive rate was 2.27% and 2.38% respectively. The false negative rate was almost same in the above studies with the exception of high rate in Mehra et al, whereas in Bukhari et al it was zero.

CONCLUSION

FNAC breast is an easily approachable, less invasive, cheap, rapid and almost accurate diagnostic tool in the diagnosis of palpable as well as non-palpable breast lesions.

AUTHORS' CONTRIBUTION

MSK: Literature search, study design, data collection, analysis, interpretation and writing. FA: literature search, reading, data analysis. KUR: Study design, data collection, proof reading.

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