ORIGINAL ARTICLE

Diagnostic Accuracy of Fine Needle Aspiration Cytology (FNAC) in patients with Breast Lump

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ABSTRACT

Aim: To find out the diagnostic accuracy of fine needle aspiration cytology (FNAC) in patients with breast lump by using histopathology as gold standard.
Methods: This cross sectional study was conducted at the Department of Surgery D.G Khan Hospital D.G Khan from June 2014 to May 2015. Total 100 female patients with breast lump diagnosed clinically, having age from 20 to 60 years were included in the study.
Results: Mean age of the patients was 36.15±9.75 years. Histopathological diagnosis of breast lesions showed 28(28%) malignant and 72(72%) benign cases. True positive (TP) were recorded as 25(25%), 9(9%) false positive (FP), 5(5%) false negative (FN) and 68(68%) as true negative (TN), sensitivity was 83.33%, specificity was 87.14%, positive predictive value (PPV) was 73.53% and negative predictive value (NPV) was 92.42%.
Conclusion:The evaluation of diagnostic accuracy of fine needle aspiration cytology in a breast lump using histopathology as gold standard shows a greater sensitivity and specificity, less invasive and cost effective procedure for the diagnosis.
Keywords:Diagnostic accuracy, breast lump, fine needle aspiration cytology

INTRODUCTION

In women, the most common cancer is the cancer of breast and about 1 million women suffer from breast cancer every year. In middle aged women, it is the most common cause of death[1].In Pakistan, 1 in every 9 women suffering with this cancer and it is the highest rate in Asia[2].

Breast lumps is the most common presenting complaint in an outpatient department (OPD) in Pakistan. Most of the cases are benign and have no serious consequences, but malignancy contributes a significant percentage of palpable lumps[3].

Early detection of abnormalities of breast are associated with improved outcome. A confident diagnosis can be established in more than 95% of cases utilizing triple assessment (examination, imaging and histological studies). Fine needle aspiration cytology (FNAC) appears currently to have most valuable test for palpable breast lesion and essential part of triple assessment. FNAC is a simple, reliable, economical and less complicated technique for the evaluation of mass lesions.[4]It can be easily repeated if an adequate sample is not obtained. It is reported in different studies that FNAC have 80% to 98% sensitivity and more than 99% specificity[5].

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This study was conducted to find out the sensitivity and specificity of FNAC by comparing the results with histopathology.

MATERIAL AND METHODS

This cross sectional study was conducted at the Department of Surgery D.G Khan Hospital D.G Khan from June 2014 to May 2015. An approval was taken from review committee of institution before commencing the study. Written informed consent was taken from every patient. Total 100 female patients with breast lump diagnosed clinically, having age from 20 to 60 years were included in the study. Patients with cellulites of breast, breast abscess and breast cysts were excluded from the study. After taking the history and examination, fine needle aspiration cytology was performed under aseptic conditions and smear was sent to laboratory for cytology. Excision biopsy was done for small tumors or lump found benign on fine needle aspiration cytology and histopathology of mastectomy. Specimen was included as tissue diagnosis. All the findings were filled on pre-designed proforma.

All the collected data was analyzed by using SPSS version 18. Mean and SD was calculated for numerical data and frequencies was calculated for categorical data. A 2x2 table was plotted to determine the sensitivity, specificity, accuracy, positive and negative predictive value for fine needle aspiration cytology taking histopathology as gold standard.

RESULTS

Total 100 patients with breast lump were included in this study. Mean age of the patients was 36.15±9.75 years. All the patients were divided into different age groups. Forty eight (48%) patients were belonged to age group 20-30 years, 27(27%) belonged to age group 31-40 years, 17(17%) were belonged to age group 41-50 years, 8(8%) were belonged age group 51-60 years (Table 1).Histopathological diagnosis of breast lesions are shown 28(28%) malignant and 72(72%) as benign (Table 2).Table 3 shows result of FNAC taking histopathology as gold standard. True positive (TP) were recorded as 25(25%), false positive (FP) 9(9%), false negative (FN) 5(5%) and true negative (TN) as 61(61%), sensitivity was 83.33%, specificity was 87.14%, positive predictive value (PPV) was 73.53% and negative predictive value (NPV) was 92.42%.

Table 1: Age distribution

Age	n	%
20-30	48	48
31-40	27	27
41-50	17	17
51-60	8	8

Table 2: Findings of breast lesions on histopathology

Breast Lesion	n	%
Malignant	28	28
Benign	72	72

Table 4: Results of FNAC(histopathology as gold standard)

Results of FNAC	Results of histopathology		Total
	Positive(%)	Negative(%)	
Positive	True +ve(a) 25 (25%)	False +ve(b) 9 (9%)	a+b 34(34%)
Negative	False -ve(c) 5 (5%)	True –ve(d) 61(61%)	c+d 66 (66%)
Total	A + c 30(30%)	b + d 70(70%)	100

Sensitivity = a / (a + c) x100= 83.33 %
Specificity = d / (d + b)x100= 87.14%
Positive predictive value+a / (a+b) x100=73.53%
Negative predictive value = d / (d + c)x100=92.42%

DISCUSSION

Lump in breast is very common presentation in OPD with growing awareness. Although most of the cases of breast lump are benign it causes anxiety regarding possible malignancy. Hence to reduce anxiety a quick diagnosis is essential[6].

Fine-needle aspiration cytology is widely used in the diagnosis of breast cancer because it is an excellent, safe, and cost-effective diagnostic procedure[7].One can get on site immediate report with minimal cost using inexpensive equipment 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[7].

In present study histopathological diagnosis of breast lesions showed malignant as 28(28%) and benign as 72(72%). But inconsistent findings were reported by MOSCHETTA et al, in their study malignant cases were 43% and benign was 56%[8].

In this study 100 FNA aspirations were correlated with histopathology to evaluate the diagnostic sensitivity, specificity, and accuracy of this diagnostic modality. True positive (TP) were recorded as 25(25%), false positive (FP) 9(9%), false negative (FN) 5(5%) and true negative (TN) 61(61%), sensitivity was 83.33%, specificity was 87.14%, positive predictive value (PPV) was 73.53% and negative predictive value (NPV) was 92.42%. Different studies have shown false positive results, ranging from 0-2% and false negative ranging from 7-22%[9,10].The different reasons given are usually the sampling errors, microscopy errors and the interpretative errors by the cytologists[11].In the literature the suspicious results range from 3-18%[12].In the study of Kamal et al the suspicious results were 3.39%[13].Thirty two cases were found benign both on FNAC and biopsy, and 1 case diagnosed as fibrocystic disease on FNAC turned out to be malignant on biopsy.The sensitivity and specificity of fine needle aspiration cytology in this study for malignant lumps was 91.66% and 96.96% respectively, while in the study of Ch TH et al[14] it was 85.13% and 88.46%, in the study of Hebbar et al[15] it was 93.10% and 100%, while in other studies it was 93% and 96.8% and 96.42% and 100%[16]. In the literature, the sensitivity ranges from 80 to 98% and the specificity may be up to 100%[17].

Dysplasia also has a role in the false negative results[18].Small size of the tumors and certain histological types (lobular carcinoma, mucinous, tubular or medullary carcinoma) may contribute to false negative results[19].Fine needle aspiration cytology is the simplest method to evaluate breast lesions, the results of this procedure are mostly dependent on the size of the lump, experience of the individual performing the procedure and the experience of the cytologist. FNAC has proven to be an effective diagnostic procedure in the evaluation of human breast lesions, and have a high degree of accuracy[20].

CONCLUSION

The sensitivity and specificity of fine needle aspiration cytology in this study was 83.33% and 87.14%. FNAC is recommended for the diagnosis of

breast lumps, however before going for definitive treatment, tissue diagnosis is necessary as there have been cases of false negative results for FNAC.

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