Original Research Article

Histopathology and Fine Needle Aspiration Cytology in Palpable Breast Lesions

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Abstract:

Background and Aims: The diagnostic efficacy of fine needle aspiration cytology (FNAC) and the gold standard of histopathological diagnosis in breast lesions were evaluated in this study.

Methods: The Pathology Department of D Y Patil Medical College, Navi Mumbai, collaborated with the Surgery Department to conduct this descriptive cross-sectional study from July 2012 to December 2012. We performed 44 FNACs on palpable breast lesions in total, and we compared the results with the corresponding histological findings. A previously created proforma was used to record the patient's age, the location of the breast lesion, and other significant information. A cytopathologist prepared, processed, stained, and reported on the slides for cytology. Biopsies were processed in order to carry out a diagnostic and histological study. All female patients with breast lesions, regardless of age, were included, and those without a histological report were excluded. The Statistical Package for Social Sciences (SPSS) version 11 was used to compute the mean and standard deviation. Additionally, frequencies with percentages were computed. The specificity, sensitivity, diagnostic accuracy, positive predictive value, and negative predictive value were also determined using algorithms.

Results: In this study, participants ranged in age from 16 to 80, with a mean age of 28.58±17.34 years. The most common age group was 26 to 35, followed by 36 to 45. The sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy parameters for the current study were 83.33%, 100%, 100%, and correspondingly.

Conclusion: A rapid, inexpensive, painless, and almost accurate diagnostic method for both palpable and non-palpable breast lesions is the FNAC breast.

Keywords: FNAC; Breast Lesions; Mastitis; Fibroadenoma; Invasive Ductal Carcinoma.

Introduction

Since there has been a substantial change in clinical practise over the past ten years, more patients are being referred for fine needle aspiration cytology (FNAC) preoperative diagnosis of breast lumps. The increasing sensitivity of patients to conventional medical treatment is what has led to this phenomenon.[1] The FNAC has a sensitivity of 90–95% for breast diagnosis in lengthy investigations. You should aim for a sensitivity of at least 95%, and a cytopathologist's expertise can

help you do that.[2] Competence, experience, readiness, and smear interpretation are some of the factors that affect the accuracy of breast FNAC diagnosis. Accuracy can be improved with experience. For the best results, the cytopathologist who read the FNAC should also report histology.[3,4]A breast lump is one of the normal findings in females of any age. A number of non-invasive and invasive techniques are available to assist the clinical diagnosis, depending on the patient's budget.[5] While accurate, biopsy is frequently unnecessary and mutilating. FNAC is the fastest, least expensive, non-invasive, and easiest diagnostic technique. The advantages of FNAC include their simplicity, speedy patient acceptance, and cosmetic invisibility.[6,7]Surgery is normally not required after a benign disease diagnosis; instead, conservative treatment is usually required. In contrast, the presence of a tumour allows for preoperative preparation, discussion, and effective care with little morbidity.[8] Aspiration Using Fine Needles When carried out by a skilled hand, cytology is a method that yields very accurate results in numerous series.

This ensures its durability in practical applications. Due to FNAC's inherent limitations or, rarely, a lack of access to sufficient data, definitive diagnosis is occasionally not possible with FNAC alone. In some situations, FNAC may be assumed. FNAC does not replace open biopsy or tru-cut biopsy. For the definitive diagnosis, tissue must undergo histological investigation.[9] The current study assesses the FNAC's diagnostic sensitivity, specificity, accuracy, positive predictive value, and negative predictive value in cases of palpable breast lesions and their relationship to histological diagnosis.[10] Because of its accuracy in diagnosis, fine needle aspiration cytology has greatly decreased the incidence of open breast operations.

Open biopsy is still the recommended course of action in most areas due to the scarcity of cytologists or the fact that breast FNAC has a sensitivity range of 80% to 98% and a specificity of 99-100%. The rate of inaccurate breast cancer diagnoses has been greatly decreased by the use of the triple test (FNAC, mammographic findings, and clinical findings).[11] The purpose of this study was to evaluate the diagnostic utility of FNAC in breast lesions.

Material and Methods

The Pathology Department of D Y Patil Medical College, Navi Mumbai, collaborated with the Surgery Department to conduct this descriptive cross-sectional study from July 2012 to December 2012. The related histology results of 44 FNAC reports of palpable breast tumours were compared. The patient's age, the location of the breast lesion, and other important information were recorded on a pre-made proforma. For FNAC, disposable 10 ml syringes were employed. The prepared slides were stained with Giemsa and H&E before being mounted, labelled, and reported by a cytopathologist. The lesions were categorised into five groups based on the breast cytology five tier reporting system (C1-C5): inadequate, benign, suspicious likely benign, suspicious likely malignant, and C5. Relevant biopsies were processed in order to conduct a diagnostic and histological study. All female patients with breast lesions, regardless of age, were included, and those without a histological report were excluded. Utilising SPSS-20, the frequencies with percentages and means with standard deviation were calculated. Additionally, specificity, sensitivity, diagnostic accuracy, positive predictive value, and negative predictive value were calculated using the following formulas.

Sensitivity = TP/TP+FN × 100.
Specificity = TN/TN+FP × 100.

Positive Predictive Value = TP/TP+FP × 100.

Negative Predictive Value = TN/TN+FN × 100

Diagnostic Accuracy = TP+TN/TP+FN+FP+TN×100.

False Positive Rate=FP/FP+TP×100.

False Negative Rates=FN/FN+TP×100.

TP = True Positive, TN = True Negative, FN = False

Negative, FP = False Positive.

Results

The age range in this study was 16 to 80 years, with a mean age of 28.58±17.34 years. Ages 26 to 35 were the most prevalent, followed by 36 to 45.

Among the 44 instances on FNAC, 32 (72.72%) were classified as benign (C-2) and 8 (18.18%) as malignant (C-5). There were no cases of poor reporting. 2 (4.54%) of the suspected cases were classified as suspiciously probable malignant, while 2 (4.54%) were evaluated as suspicious possibly benign. The final results did not include these C-3 and C-4 cases. There were no FP cases, but one FN case (C-2) that was initially described as benign but later revealed to be medullar carcinoma.32(80.0%) of the 40 breast FNAC definitive diagnoses were confirmed as benign by histopathology and represented TN cases, while 8 (20.0%) cases were diagnosed by FNAC as malignant and confirmed by histopathology as representing TP cases. The sensitivity (94.44%), specificity (100%), positive predictive value (100%), negative predictive value (98.46%), and diagnostic accuracy (98.78%) for this investigation of breast FNAC were all high. False Negative Rate was 1.53%, while False Positive Rate was 0%.

Table 1: Cytological correlation with gold standard of histopathology of breast lesions (n=41)

FNA Cytology	Histopathology	
	Benign	**Malignant**
Benign	32 (80.0%) TN	01 (1.23%) FN
Malignant	00 (0%) FP	8 (20.0%) TP

Table 2: Cytological diagnosis of breast lesions based on (C1-C5) five tier system (n=44)

Cytologic category	No. of cases	Percentage
C-1 (Inadequate)	00	00
C-2 (Benign)	32	72.72%
C-3 (Suspicious probably benign)	02	4.54%
C-4 (Suspicious probably malignant)	02	4.54%
C-5 (Malignant)	8	18.18%
Total	44	100%

Table 3: Histopathological diagnosis of palpable breast lesions (n=44)

Breast lesion type	Histologic diagnosis	No. of patients	Percentage	Cumulative percentage
Inflammatory	Acute mastitis	01	03(6.82%)	34(77.27%)
	Chronic mastitis	01		
	Chronic granulomatous mastitis	01		
Benign	Fibroadenoma	22	31(70.45%)	
	Fibrocystic disease	03		
	Lactating adenoma	03		

	Ductal papilloma	02		
	Duct ectasia	01		
Malignant	Invasive ductal carcinoma	7	10(22.73%)	10(22.73%)
	Invasive lobular carcinoma	01		
	Mucinous carcinoma	01		
	Medullary carcinoma	01		
Total		44	100%	100%

Discussion

A common clinical diagnosis is a breast lump. In the past, excisional biopsy was the technique of choice. Preoperative benefits of using FNAC over open biopsy include quicker diagnosis, a defined treatment plan with the patient's informed consent, avoiding superfluous procedures, especially in benign cases, and a reduced need for frozen sections.[11]

The major objective of FNAC is to detect malignant lesions before to surgery and avoid treating benign lesions needlessly. Currently, breast FNAC is a reliable first-line diagnostic method for assessing breast lesions, both palpable and non-palpable.[12] The study sample population ranged in age from 16 to 80, with a mean age of 28.58±17.34 years. The most common age group was 26 to 35, followed by 36 to 45. In a study by Rathi et al.[13], the age range was 16 to 64. The oldest and youngest age groups were 30 and 39. In a study by Vasavada et al., the average age group was 20–40 years, and the study's sensitivity, specificity, positive predictive value, and negative predictive value were all 100%. The study age range was 12-73 years.

The sensitivity was found to be, successively, 97.7%, 100%, 95.4%, 96.6%, 95.23%, 93.8%, and 95.45% in studies by Vasavada et al., Pandy et al., Daramola et al.[16], Chauhan et al.[17], Srilakshami et al., Mehra et al., and Paramesh et al. The specificity was 98.8%, 89.5%, 88.9%, 100%, 100%, and 100% in the aforementioned research.

In studies 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 values were 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%, according to studies by Vasavada et al., Pandy et al., Srilakshami et al., Mehra et al., and Paramesh et al.

All of these trials show relatively similar rates of sensitivity, specificity, positive predictive value, and negative predictive value. The diagnostic' accuracy was 98.78%. False Positive Rate was 0%, and False Negative Rate was 1.53%.The aforementioned investigations all had basically the same levels of diagnostic accuracy. While studies by Vasavada et al. and Bukhari et al. had false positive rates of 2.27% and 2.38%, respectively, the majority of the research mentioned above had false positive rates of zero.

The false negative rate was essentially the same in all of the aforementioned investigations, with the exception of Mehra et al high's rate and Bukhari et al zero's rate.

Conclusion

A rapid, inexpensive, painless, and almost accurate diagnostic method for both palpable and non-palpable breast lesions is the FNAC breast.

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