

Role of Fine Needle Aspiration Cytology in the Diagnosis of Palpable Breast Lesions and Its Correlation with Histopathologic Basis

Suhas K Thazha¹, Hilda Fernandez², Charlie P. Cruz³, Jonas P. Cruz¹

¹Shaqra University, Shaqra, KSA,

²Father Muller's Medical College, Karnataka, India,

³University of Wyoming, USA,

Corresponding Author: Suhas K Thazha

ABSTRACT

Aim and Objectives: To ascertain the efficiency of fine needle aspiration cytology in the examination of palpable breast lesions and to investigate the correlation between cytological and histopathological examination.

Materials and Methods: The present study was a retrospective study conducted in the Department of pathology, 300 bedded capacity tertiary hospital, Riyadh province, KSA from April 2015 to November 2016. Sixty five patients were studied. It includes only those patient who had FNAC followed by histopathological examination were available in records of pathology department.

Results: Out of 65 cases 21 cases were diagnosed as benign breast lesions and 44 cases were diagnosed as malignant breast lesions on cytology. On histological examination out of 21 benign lesions only one shows carcinoma while all malignant lesions were confirmed. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy was 95.2%, 100%, 100%, 95.2% and 98.4% respectively.

Conclusion: In conclusion, the simplicity, rapidity, lack of morbidity, a high sensitivity, a high specificity and economical effectiveness of FNAC makes it the maximum treasured tool within the evaluation of the breast lesions.

Keywords: Breast lumps, Fine needle aspiration cytology (FNAC), open biopsy

INTRODUCTION

Over the past century a higher progress has been made in the diagnosis, treatment and prevention of breast cancer. Breast cancer incidence is higher in developed countries as compared to its incidence in underdeveloped countries except in Japan. [1] In Saudi Arabia, the age incidence of breast cancer seen in various population and it ranges between 10 - 20 per 1,00,000 persons as per the record of international agency for research on cancer. [2] The incidence of breast cancer is increasing in Saudi Arabia and the potential

curability of disease if detected early has underscored the need for quick and reliable diagnostic method. FNAC carried out by a well trained cytopathologist is a reliable, economical and simple diagnostic procedure for the palpable breast lesions. [3,4] It can be used as an OPD procedure without the necessary to hospitalize the patient. It is safe and can be repeated very easily and the result become available while patient's first visit to the hospital and it may avoid the necessary for open biopsy. [5] However, the diagnosis by fine needle aspiration cytology may be presumptive in various cases. The

final diagnosis in those cases is concluded by histopathological examination of the tissue take out surgically. [6] Therefore, FNAC should not take the place of clinical decision or eliminate suggested tissue biopsy. Majority of cases Aspiration Cytology diagnosis perhaps replaced for biopsy diagnosis. It is consequently, very significant to assess the potency of fine needle aspiration cytology, that can be done by comparing cytological conclusion with histopathological diagnosis. The present study was designed to assess the efficiency of FNAC by corresponding it with histopathological findings in breast lesions.

MATERIALS AND METHODS

Framework:

It's a retrospective study conducted at Pathology department of a tertiary hospital, Riyadh province, KSA

Study duration:

The study conducted for 20 months from April 2015 to November 2016.

Sample Size:

Sixty Five cases were included in the study.

Inclusion benchmark:

All patients with unrecognized initial diagnosis of breast mass / lumps bear FNAC pursued by excision biopsy / lumpectomy or mastectomy

Exclusion benchmark:

- Patients with intermittent malignancy
- Patient who bear FNAC but did not experience successive histopathological diagnosis
- Patients go through chemotherapeutic treatment

In retrospective cases, FNAC was done and cytological smears were stained with papanicolaou stain and histological sections were stained with haematoxylin and eosin stain. Cytological diagnosis was classified in the successive categories - malignant, suspicious, unsatisfactory, benign and atypia.

Cytological examination:

FNAC was done in the outpatient department by consultant pathologist /

concerned doctor by using 5 ml / 10 ml syringe. The cellular materials were aspirated and expelled on to slides. Minimum of 6-8 slides were prepared. Half of the smears were wet fixed in 95% alcohol and the remaining were air dried. Wet fixed smears were stained by papanicolaou stain and air dried was stained by Giemsa stain.

Histopathological examination:

The biopsy specimens were fixed in 10% formalin. Gross examination was done by pathologist. Tissue blocks were prepared with selected bits. Cut the tissue section by microtome and Stained with H & E stain.

Cytological findings were correlated with histological findings and accuracy of cytological diagnosis are planning to assess by calculating the complete sensitivity, absolute sensitivity, predictive value, false negative and false positive value.

OBSERVATION AND DISCUSSION

This study comprises 65 cases suggesting with a palpable breast lump which were administered to fine needle aspiration. The cases studied comprise 64 females and 01 male. Histopathological confirmation was accessible for all cases. For benign cases which were diagnosed on cytology, histological correlation was accessible in all cases. Out of 08 cases of benign breast lesions 02 were fibroadenoma, 03 were fibrocystic disease, 02 were benign Phyllodes tumour and 01 was Sclerosing adenosis. Thus all cases diagnosed as benign breast lesions on cytology also exhibited benign lesions on histology yielding an accuracy rate of 100%. Out of 45 cases one diagnosed as benign breast lesion on cytology had morphology of infiltrating duct carcinoma on histology. Out of 44 remaining cases 42 had histology of infiltrating duct carcinoma, one had histology of medullary carcinoma and one had histology of cribriform carcinoma. Thus out of 45 cases, in 44 cases cytological diagnosis was persistent with histological diagnosis giving accuracy rate of 97.77%.

Table - 1 : Cyto-histological correlation of benign lesions

Cytological Diagnosis	Histological diagnosis				Total
	Fibroadenoma	Fibrocystic disease	Phyllodes Tumour	Sclerosing Adenosis	
Benign breast lesions	02	03	02	01	08
Fibroadenoma	11	00	00	00	11
Non specific Inflammation	00	01	00	00	01
Total	13	04	02	01	20

Table - 2 : Cyto-histological correlation of malignant lesions

Cytological Diagnosis	Histological diagnosis			Total
	Infiltrating duct carcinoma	Medullary carcinoma	Cribiform carcinoma	
Benign breast Lesions	01	00	00	01
Mammary Carcinoma	42	01	01	44
Total	43	01	01	45

Table - 3: Cyto-histological correlation of all breast lesions

Cytological Diagnosis	Histological diagnosis		Total
	Benign breast lesions	Malignant breast lesions	
Benign breast lesions	20	01	21
Malignant breast lesions	00	44	44
Total	20	45	65

Out of 65 cases 21 cases were diagnosed as benign breast lesions and 44 cases were diagnosed as malignant breast lesions on cytology. On histological examination out of 21 benign lesions only one shows carcinoma while all malignant lesions were confirmed.

Analysis of the results of the present study shows the following:

True positive: 44
 False positive: 00
 True negative: 20
 False negative: 01
 Sensitivity = $[\text{TP} / (\text{TP} + \text{FN})] \times 100$: 95.23%
 Specificity = $[\text{TN} / (\text{TN} + \text{FP})] \times 100$: 100%
 Positive predictive value = $[\text{TP} / (\text{TP} + \text{FP})] \times 100$: 100%
 Negative predictive value = $[\text{TN} / (\text{TN} + \text{FN})] \times 100$: 95.23%
 Accuracy rate = $[(\text{TP} + \text{TN}) / (\text{TP} + \text{TN} + \text{FP} + \text{FN})] \times 100$: 98.46%.

The sensitivity of 95.2% in the present investigation is proportionate to that obtained by Willis [7] (90%), Suen [8] (95%) and Ritu [9] (96.5%).

Suen MWM and Chan MKM [8] in their investigation declared that the positive predictive value for malignancy should be higher than 95% with a false positive rate of lower than 1% and false negative rate of

lower than 5%. In present study, the positive predictive value for malignancy was 100% with no false positive and false negative rate was 1.5% which accommodates the benchmark cited by Suen.

In present study, there was no false positive offering specificity of 100% and positive predictive value of 100% which is proportionate with Wollenberg, [10] Barrow, [11] Silver man, [12] Ritu [9] and Tiwari. [13] Thus false positive diagnosis is approximately rare in breast FNA if the analysis is made by competent cytopathologists.

Yeoh and Chan [14] in their investigation described six cases as false negative which consists one densely bloodstained smear that had blended cytological features, which was interpreted as a cyst, two misdiagnoses due to well differentiated tumors in the benign grade, and three cases that were described as atypical. False negative diagnosis perhaps due to technical failure, misdiagnosis, or the existence of blended benign and malignant cytological characteristics. Technical failure include acellular or inadequate cellular material, densely blood stained smears, insufficient air drying, and smearing artifact resulting in cell disruption.

Bell [15] had declared that aspiration cytology was accurate, rapid and of value in the evaluation and administration of patient in office practice. Authentication of the presence of breast cancer by FNAC might counteract the requirement for a two stage procedure in the surgical administration of breast cancer. In our institution also FNAC

is being used as basic test for surgical administration of malignant breast lesions; after surgery the whole specimen is send for histopathological examination and confirmation of malignancy.

Halevy [16] has stated that in order to conclude good results, three rules must be carried in mind. First, a well experienced cytopathologists should carry out the FNAC and investigate the result. Second, close assistance between surgeon and

cytopathologists is essential. Lastly, a negative FNAC conclusion does not reject malignant circumstances.

Triple diagnosis is the consolidation of clinical examination, mammography and FNA. The use of all three approaches in parallel has provoked further improvement of preoperative diagnosis. If all three investigations are in compliance that a lesion is benign or malignant, diagnostic accuracy is over 99%. [17]

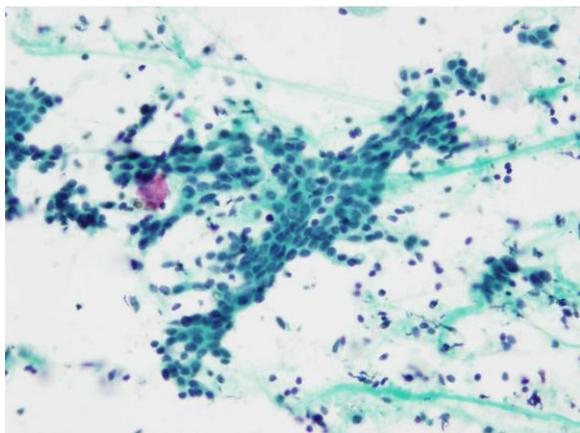


Fig-1: Fibroadenoma –pap stain-10x

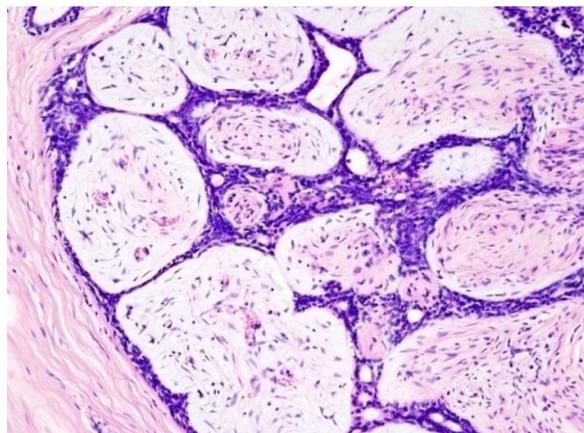


Fig-2: Fibroadenoma- H&E stain -10x

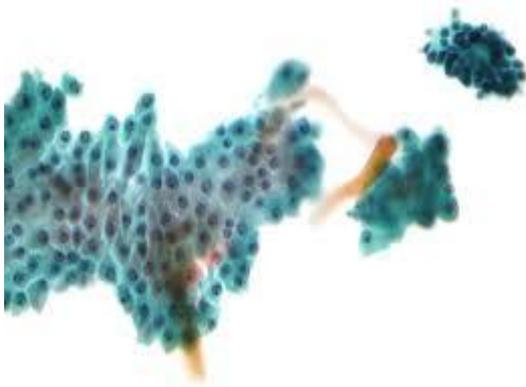


Fig-3: Fibrocystic disease-pap stain-10x

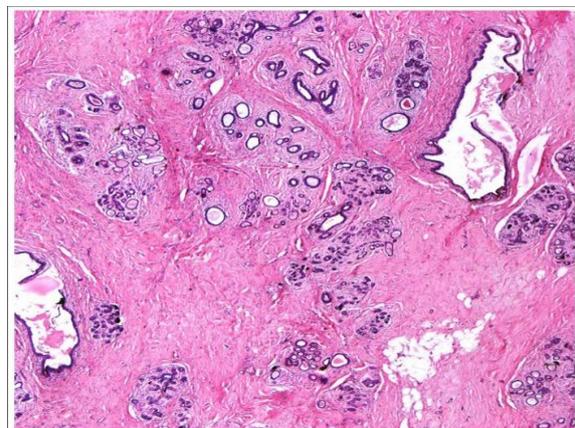


Fig-4: Fibrocystic disease- H&E stain-10x

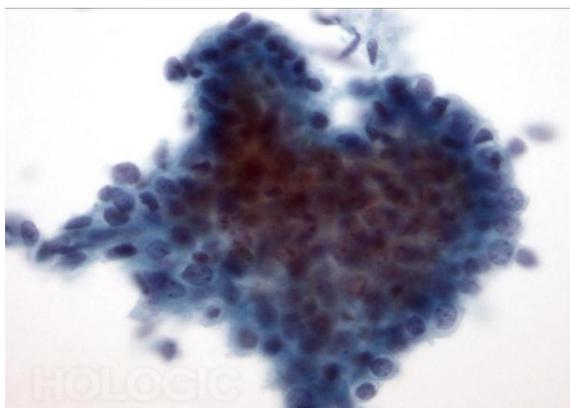


Fig-5: Phyllodes tumor-pap stain -40x

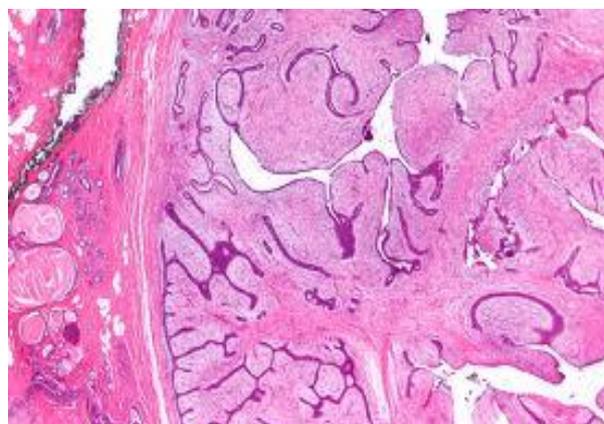


Fig-6: Phyllodes tumor-H&E stain-10x

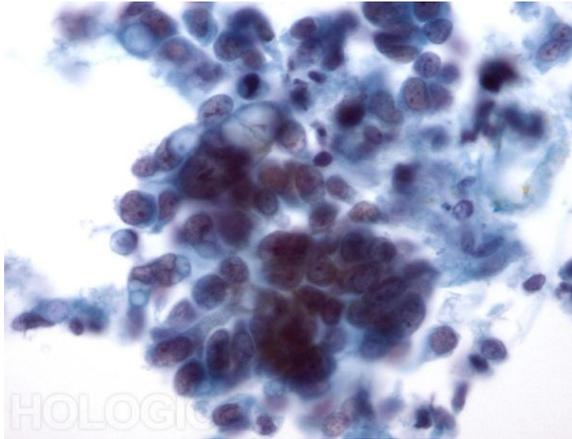


Fig-7: Ductal carcinoma-pap stain -40x

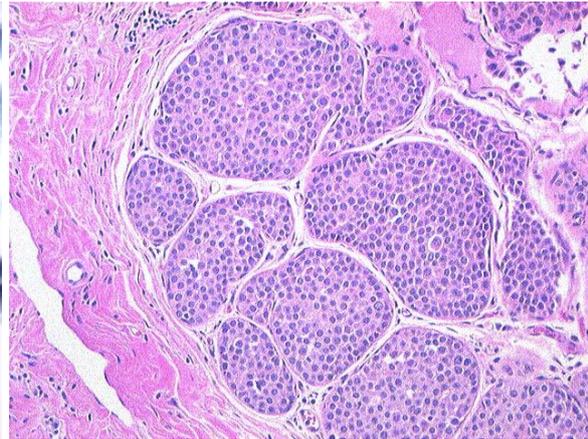


Fig-8: Ductal Carcinoma-H&E stain-10x

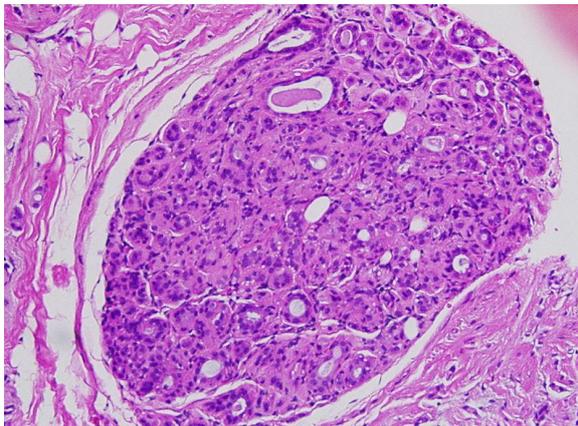


Fig-9: Cribriform carcinoma-H&Estain -10x

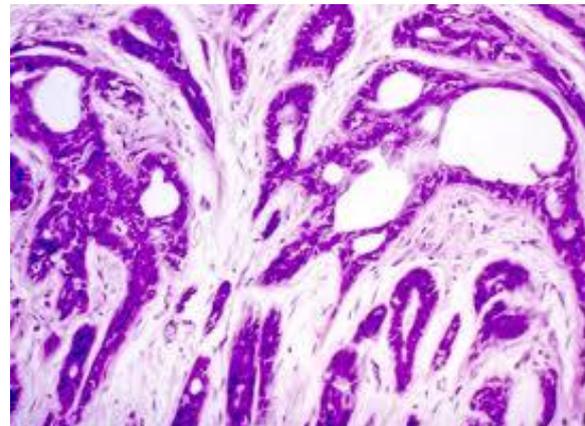


Fig-10: Sclerosing adenosis-H&E stain-10x

CONCLUSION

In conclusion, the simplicity, rapidity, loss of morbidity, a greater sensitivity, a greater specificity and cost efficiency of FNAC makes it the most beneficial appliance in the assessment of the breast lesions. Nevertheless due to the false negative cytologic diagnosis seen in majority of cases, all clinically malignant or suspicious masses should have a biopsy in the face of a benign cytology. In addition, since definitive therapy consists mastectomy is carry out on the basis of the FNA, a traditional approach is assured. There should be no uncertainty in advising surgical biopsy or frozen section for the batch of smears that are atypical or suspicious for malignancy, thus observing the false positive rate as close to zero as achievable. This assures that patients persist to receive the benefits of FNA beyond the risks.

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