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ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY AS "ONE STOP" DIAGNOSIS FOR ASSESSMENT OF BREAST LUMPS IN WOMEN

KUMAR HARSH [1], BUCH ARCHANA C [2]*, PAL SUKANYA[3], CHANDANWALE SHIRISH S [4] AND JOSHI ROHAN V [5]

Department(s) and institution(s) : Dept. of Pathology, Dr. D.Y. Patil Medical College Pimpri, Pune-411018

ABSTRACT

Breast lumps in women are a common clinical problem that requires rapid and accurate diagnosis with an important aim of excluding any malignancy. Careful evaluation, exact diagnosis and definite treatment are mandatory for managing breast lumps. This study was conducted to evaluate the efficacy of fine needle aspiration cytology (FNAC) for diagnosis of breast lumps in women. 100 patients were evaluated by FNAC from July 2012 to September 2014 and results were compared with histopathology. Sensitivity, specificity, positive and negative predictive value and accuracy were calculated. Out of 100 patients (n=100), 65% were diagnosed as benign disease by FNAC and 35% as malignant. On histopathology 2 cases turned out to be false negative. FNAC showed a sensitivity of 94.59% and specificity of 100% with a positive predictive value of 100%, negative predictive value of 96.2% and accuracy rate of 98%. FNAC showed 100% diagnostic accuracy for malignancy. It helps to minimize delay in diagnosis. It reduces anxiety in patients and avoids unnecessary open biopsy. FNAC plays an important role to provide a "one stop" diagnosis for assessment of breast lumps in women.

Keywords: Breast lumps, FNAC, histopathology

INTRODUCTION

Breasts are the integral part of the female reproductive system. Breast tissues, due to abnormal hormonal variations, are subjected to a number of pathological conditions - both benign and malignant. Benign diseases form the majority of pathologies. In India, cancer of breast is the second most common cancer in women.[1] It is sometimes difficult to determine clinically whether a suspicious lump is benign or malignant. FNAC can provide cytomorphological diagnosis of palpable breast lumps.[2] The aim of the study is to establish the role of FNAC as "one-stop"diagnostic procedure for breast lumps.

MATERIALS AND METHODS

The present prospective study included 115 randomly selected female patients presenting with a breast lump in the period from July 2012 to September 2014. Clearance was obtained from Institute ethics committee before the start of the study. Clinical work-up was done and written informed consent was taken before doing FNAC. All the patients underwent a diagnostic FNAC followed by a definitive excisional surgical procedure. The excised specimens were subjected to histopathology. The standard method and asesptic technique were followed during the procedure. Both Leishman and Haematoxylin and Eosin (H&E) stains were used. The FNA smears were carefully studied and provisional diagnosis was made. Pre-operative FNAC results were compared with histopathological diagnosis. Statistical analysis was done by calculating sensitivity, specificity, positive predictive value and negative predictive value. The diagnostic accuracy of FNAC was calculated by correlating with histopathological results. Cohen's kappa was calculated to show the agreement between FNAC and histopathology results.

RESULTS

Out of 115 cases, samples were inadequate for evaluation in 10 cases, due to the presence of blood and the paucity of cellular elements. Another 5 patients were lost to follow-up. These 15 cases were excluded from the study. The total number of patients included in the study was 100. The patients ranged in age from 12 years to 85 years. The maximum number of cases was in the age group of 21-30 years in benign breast lesion and in the age group of 41-50 years in malignant breast lesion. Benign diseases were common in 2nd to 4th decade of life, whereas the incidence of malignancy starts to rise from the 4th decade. In FNAC, 65 cases (65%) were benign, malignancy was noted in 34 cases and 1 case was found to be suspicious for malignancy. The most common causes of breast lump were fibroadenoma accounting for 51% of the total cases. FNAC diagnoses of breast lumps are shown in Figure 1. Out of 100 histological samples, 63 cases were confirmed as benign breast disease and 37 cases were malignant lesions. Most common cases were fibroadenoma followed by fibrocystic disease in benign breast lesion. Infiltrating duct carcinoma was the commonest malignant breast lesion. (Figure: 2, 3) The FNAC report was correlated with the final histopathology reported in 100 cases. The cytohistopathological correlation was done to see the accuracy of cytological diagnosis. 51 cases were diagnosed as fibroadenoma cytologically, out of which 50 were consistent histopathologically and 1 was diagnosed as adenomyoepithelioma on histopathology. 5 cases were diagnosed as fibrocystic disease on cytology, 3 were confirmed histopathologically and 2 turned out to be malignant – infiltrating ductal carcinoma. Out of 5 cases diagnosed cytologically as benign breast disease, 3 were diagnosed as fibrocystic disease, 1 case was diagnosed as tubular adenoma and 1 as fibroadenoma on histopathology. The case of benign phyllodes tumor was consistent histopathologically. Two cases of lipoma were diagnosed cytologically, which were consistent with histopathological diagnosis. There was 100% concordance in FNAC and histopathology diagnosis in all cases of malignancy. In two cases, FNAC showed fibrocystic disease and biopsy proved these to be malignant lesions. Thus, there were 35 true positives, 2 false negatives, and 63 true negatives in our study. There was no false positive, case. So sensitivity, specificity, positive predictive value and negative predictive value of breast FNAC were found to be 94.59%, 100%, 100% and 96.2% respectively. Diagnostic accuracy was 98 %. Cohen Kappa was 0.95 (CI=0.76-1). There was a significant correlation between FNAC and histopathology diagnosis.

DISCUSSION

FNA is widely accepted as a reliable technique in the initial evaluation of palpable breast lumps. [3,4,5,6] It is simple, safe, cost-effective, minimally invasive, rapid and as sensitive as biopsy. [7,8,9] The application of FNAC for the diagnosis of palpable breast masses was first introduced by Martin and Ellis in 1930 and since then has been established as an important tool in the evaluation of breast lesions. [10] Primary goal of FNA is to separate benign lesions from malignant lesions for the purpose of planning the therapeutic protocol and uneventful follow-up. It is the aim of the clinician to choose a method of pathological diagnosis with high sensitivity and specificity. In the actual clinical setting, this is difficult to come by. When a tool is too sensitive, it will produce a lot of false positive results and reduces specificity. False positive results can cause over- treatment and increase anxiety and morbidity to the patients. Conversely, when it is too specific, sensitivity will drop with high rate of false negative. False negative results will cause delay in diagnosis and subsequent morbidity to patients. [11] The advantages of FNA cytology are: the possible availability of results within a few hours, few complications and good patient acceptability.[12,13,14] Nowadays, Core needle biopsy (CNB) is increasingly replacing FNAC in many centers in developed countries.[12] However, CNB requires local anesthesia and may result in more discomfort post-procedure, and its results usually take longer to be obtained due to adequate fixation and processing. Displacement of the epithelium and needle tract implantation is potential complication of CNB. CNB also need small stab incision over skin of breast that may lead to bleeding or hematoma formation. Disposables and equipment required to perform FNA are less expensive and to perform FNAC one require less experience than CNB. In developing country like ours, FNAC is a better choice. The relative disadvantages of FNAC, compared with CNB, include: definitive diagnosis of some lesions can be difficult to make on the basis of FNA cytology. These include atypical ductal hyperplasia (ADH), low- grade ductal carcinoma in situ (DCIS), some tubular carcinomas and some

invasive lobular carcinomas. But it is still difficult to distinguish ADH from low- grade DCIS on core biopsy. FNAC may not be the sampling technique of choice for lesions that are relatively hypocellular and yield scanty epithelial material. These include sclerotic fibroadenomas, sclerosing ductal carcinoma, and infiltrating lobular carcinoma. [11, 15,16,17] In our study, two cases of malignancy were misdiagnosed on FNAC as fibrocystic disease. We fail to diagnose these two cases as malignancy was masked by the presence of cystic degeneration. Aspiration should be repeated after aspiration of breast cysts, especially if there is a residual mass. Malignancy may also be masked by the presence of infection and inflammation. In another case, adenomyoepithelioma was reported as fibroadenoma due to scanty number of myoepithelial cells on FNAC smear. Adenomyoepithelioma is an uncommon biphasic tumor. It is important to recognize this entity as the radiologic and cytologic features can mimic malignancy. But, this tumor is rarely diagnosed definitively on FNAC due to overlapping features with fibroadenoma, phyllodes tumor, myoepithelioma and tubular carcinoma. [18] In this study, five cases of benign disease could not be subtyped on FNAC due to scanty epithelial components. The case of tubular adenoma could not be diagnosed due to absence of tubular structures on cytology smear. The cases of fibrocystic disease were not reported due to absence of apocrine cells in the cytology smear. Currently, accurate diagnosis of breast lesions depends on a triple assessment approach comprising clinical, imaging and pathologic examinations. FNAC is widely adopted for the pathologic assessment because of its accuracy and ease of use. Though histopathological diagnosis is a universally accepted confirmatory mode of diagnosis and follows up, FNAC of breast lumps is an important part of triple assessment (clinical examination, imaging, and FNAC) of palpable breast lumps.[4] It has been shown that, FNAC can reduce the number of open breast biopsies.[19] Breast cytology has a role for both screening and diagnostic purposes. FNAC has been found to have sensitivity ranging from 84% to 97.5% and specificity of more than 99%.[20] The scope of cytology now extends into identifying the subtypes of malignant lesions, benign lesions, and minimal residual disease for the purpose of planning the therapeutic protocol and eventual follow-up. [21, 22] A definite diagnosis of a benign breast lesion will alleviate patient's anxiety and avoids surgery in majority of cases, while a positive diagnosis of carcinoma with proper immunocytochemistry allows preoperative discussion with the patient regarding management options and treatment planning. Single-stage surgery can be planned in many cases. Frozen section can be avoided when malignancy is confirmed preoperatively. [23] Thus, it plays a major role as an important preoperative assessment along with clinical and mammography examination.

Figure 1

Distribution of various breast lesions according toFNAC diagnosis

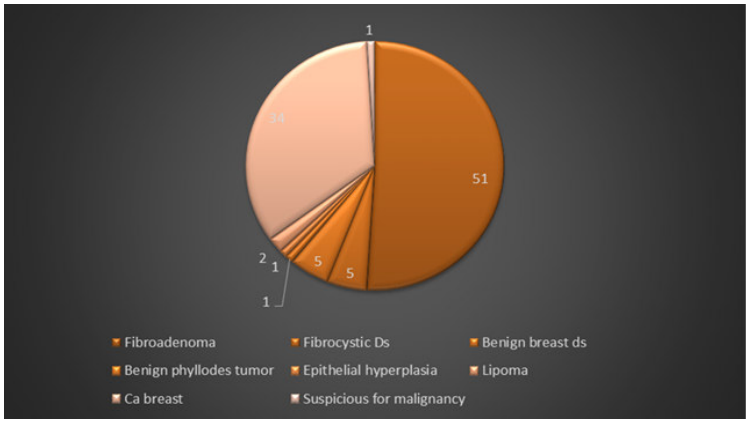


Figure 2

A: FNAC smear of Fibroadenoma of breast showing cohesive ductal cells (Leishman, x400) B: FNAC smear of fibrocystic disease of breast showing benign ductal cells and cyst macrophages, arrow (Leishman x 400)

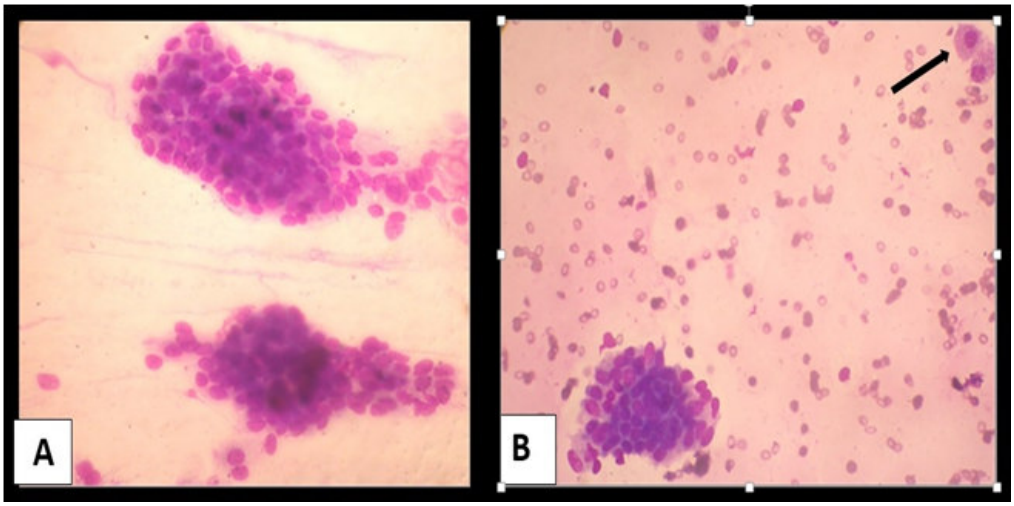
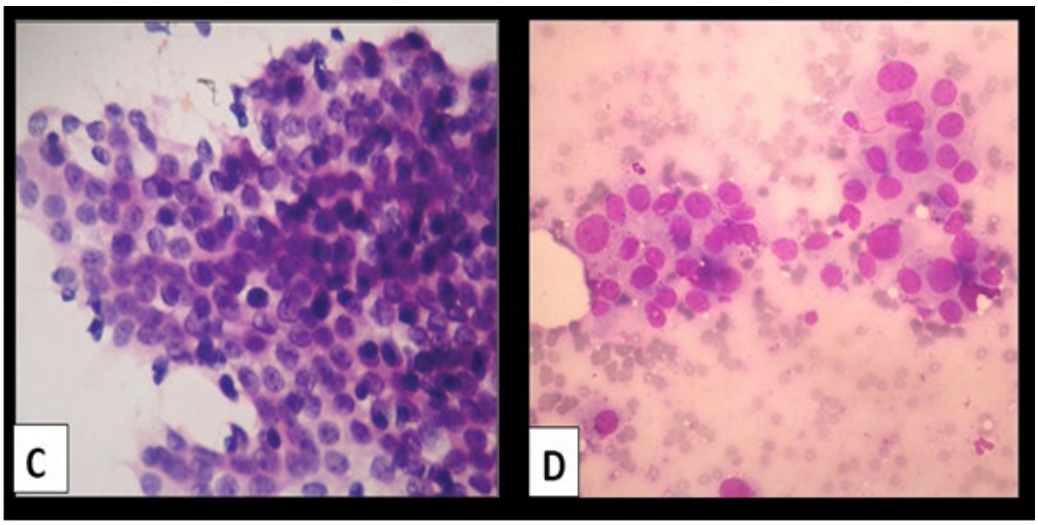


Figure 3

C: FNAC smear of ductal hyperplasia showing ductal cellswithout atypia (Leishman, x400) D: FNAC smear of carcinoma of breast showing dispersed malignant cells, nuclear enlargement, pleomorphism, open chromatin (Leishman, x400)



CONCLUSION

This study reaffirms that FNAC is a very effective adjunct to the clinical evaluation of breast lesions and has a definitive role in the early diagnosis and treatment of palpable breast lumps. The use of FNAC in the evaluation of a breast lump in symptomatic women seeking medical care deserves acceptance. It helps to reduce delay in treatment when malignancy is suspected and avoids unnecessary surgical exploration when a benign lesion is suspected. We conclude that to minimize delay in treatment, to reduce anxiety in patients and to avoid an open biopsy, FNAC provides a “one stop” diagnostic tool that proves to be highly beneficial for the patients.

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