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The role of fine needle aspiration cytology as a first line investigation in the diagnosis of palpable breast masses: A rural population study.

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Abstract:
Background
Breast cancer is one of the commonest malignancies in women worldwide and the preoperative evaluation of breast lumps is an essential part of management of breast carcinoma. Diagnostic accuracy of FNAC is further increased with cell block preparations. In addition to its high diagnostic accuracy, FNAC offers advantages such as minimal invasiveness, less discomfort, cost effectiveness, and rapidity of result. Breast FNACs compare very well with histology for excision biopsies.
Aim*: To determine the diagnostic accuracy of FNAC in the evaluation of palpable breast lumps among rural population.*
Methodology*: This combined retrospective and prospective study on palpable breast lumps was carried out in the departments of General surgery and Pathology at Karpaga Vinayaga institute of medical sciences, from june2015- june2018 for a period of three years.*
Results*:*
Of the 73 cases of benign report by fine needle aspiration cytology, 72 were confirmed by histopathology. False negative were 1 case. False positive was zero. Of the total 22 cases of malignant lesions, fine needle aspiration cytology reported 22 as malignant. False negative and false positive was zero. Sensitivity was 95% and specifity was 100%.
Conclusion*:*
FNAC is a fast, simple and cheap outpatient procedure in diagnosis of breast lumps. FNAC is a very important preliminary diagnostic test in palpable breast lumps, and if done by expert hands, the results show a high degree of correlation with the final histopathology report. In rural population it's very affordable, cost effective and a reliable investigation.
Keywords: *FNAC, Breast lumps, triple assessment, rural population.*

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I. Introduction

One of the most common cancers is breast cancer and it has a high incidence rate in all countries. It includes 1.7 million new cases per year and 25% of all types of cancers and is the second common cancer.[1] Role of non-operative diagnosis in malignancy is an attempt to provide a definitive diagnosis that allows rapid referral for treatment; especially in rural population.[2] Definitive non-operative diagnosis of benign conditions is also useful in planning surgery. The highest levels of diagnostic accuracy in the non-operative diagnosis of breast disease are achieved by using a triple approach which combines the results of imaging and clinical examination with FNAC and/or core biopsy[3].Currently, aspiration cytology of palpable breast lesions has gained wide acceptance. Today, FNA biopsy is regarded as a minimally invasive, cost effective technique with diagnostic accuracy in the range of 90% to 99%[4]. The diagnostic sensitivity and specificity of FNAC biopsy depends on several factors, including the experience of the aspirator, the quality of the specimen preparation; and the diagnostic skills of the pathologist.[4] Various studies have reported greater accuracy in diagnosis when the same person performs the aspiration procedure, prepares the smears, and provides the interpretation. The false-positive diagnosis rate varies by site but is generally very low. False-negative diagnoses may occur when there is insufficient representative material on the slide due to a flawed sampling technique[5] Cytology is a well established method of investigating breast lesions in symptomatic patients, but there is little documentation about its reliability as part of a breast screening programme. This study analysis the results of fine needle aspiration cytology FNAC in our teaching hospital, which caters mainly to surrounding rural population. In this

study we analysed both prospective and retrospective accuracy of fine needle aspiration cytology in preoperative diagnosis of breast cancer and its correlation with histopathological examination.

II. Materials and method

The study was a prospective (one year) and retrospective (two years) analytical study conducted on fine needle aspiration cytology smears, and excised lumpectomy specimen of breast lumps received in the department of pathology, KIMS. The quality assurance statistics were calculated according to UK NHSBSP guidelines. The validity of the results of the FNAC of the breast lesions in terms of sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated. The false positive rate (FER), false negative rate (FNR) and the suspicious rate (SR) were also determined. The decision to go for core needle biopsy, based on clinical and radiological investigations, was decided during surgical consultation.

Inclusion criteria

All female patients with unknown primary diagnosis of palpable lump underwent FNAC followed by excision biopsy/lumpectomies or mastectomies.

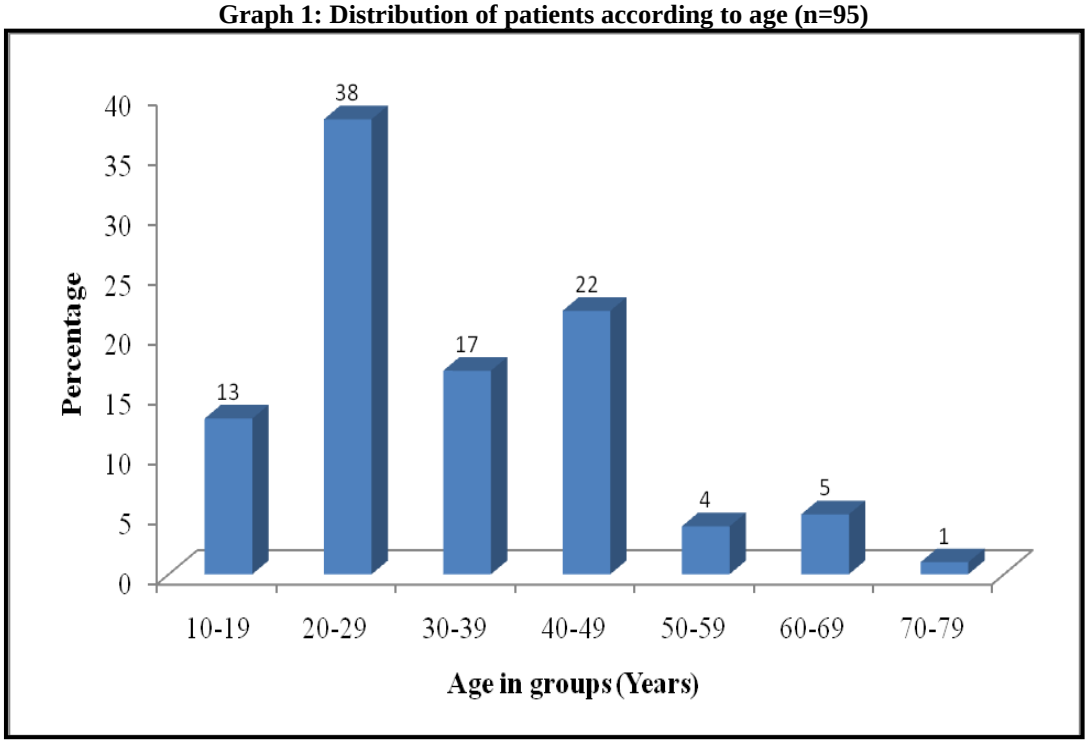
Exclusion criteria

1. Patient with recurrent malignancy
2. Patient with who underwent FNAC but subsequently did not undergo histopathological examination
3. Patient undergoing treatment.

III. Results

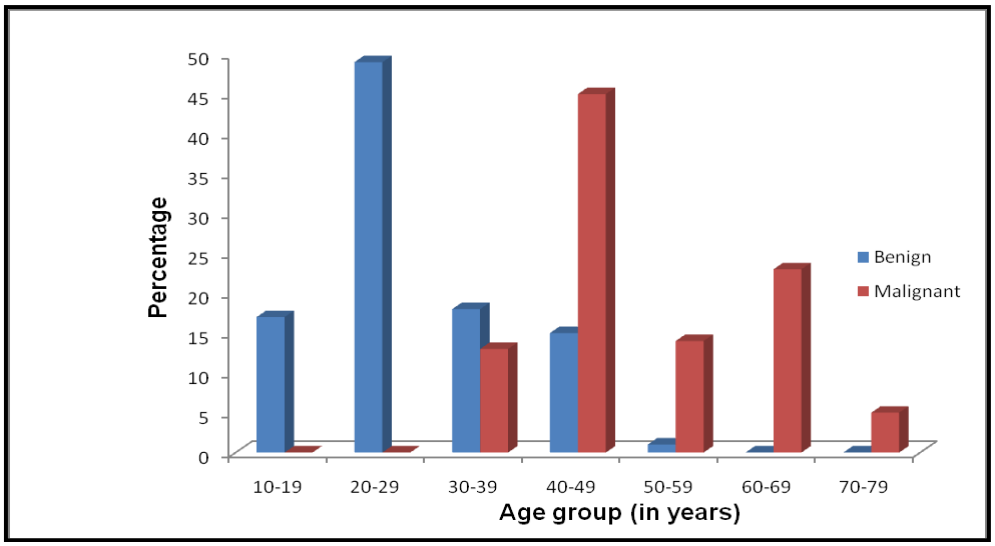
A total of 225 cytology reports of palpable breast lesions were studied during the period of 2015-2018, Out of which 95 had histological confirmation in our hospital where the initial cytology diagnoses were made.

Graph 1: Distribution of patients according to age (n=95)



Out of 95 women studied, age incidence ranged from 10-79 years, 73 patients had benign lesions and 22 had malignant tumours**.**

The benign lesions were observed between 10-59 years of age group, while the malignant tumours were observed between the age group 30-79 years. The most common age group having breast lump was 20-29 years (38%).

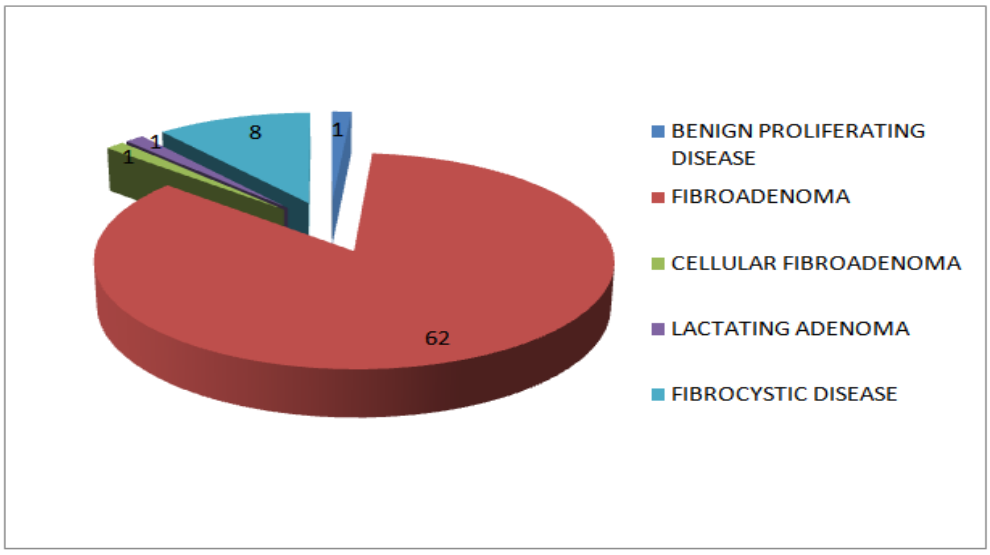


Graph 2: Age wise distribution of patients having benign and malignant breast lump

The benign lesions were observed between 10-59 years of age group, while the malignant tumours were observed between the age group 30-79 years. The most common age group for benign lesions was 20-29 years; 49% of all the benign lesions were observed in this age group. The most common age group for malignant tumours was 40-49 years; 45% of all the malignant tumours were observed in this age group. Out of 95 patients, 49 (51.58%) patients had lump in right breast, 40 (42.10%) had lump in left breast and 6(6.32%) patients had lump in both breasts. Both benign (47.83%) and malignant lesions (52.17%) were found more commonly in right breast in this study. Six patients were had bilateral breast lumps, all were found to be benign lesions.

Most of the benign lesions (n=25, 34.7%) and malignant tumours (n=8, 34.78%) were observed in upper outer quadrant of the breast. Out of 95 patients 73 patients diagnosed as benign lesions and 23 as malignant lesions**.** Seventy two of the histologically confirmed benign lesions had been correctly interpreted as such on cytology. There was 1 false negative case reported. Analysis of 22 histologically confirmed malignant cases show that all 22 cases were reported to be malignant by cytology. There was no false positive report.

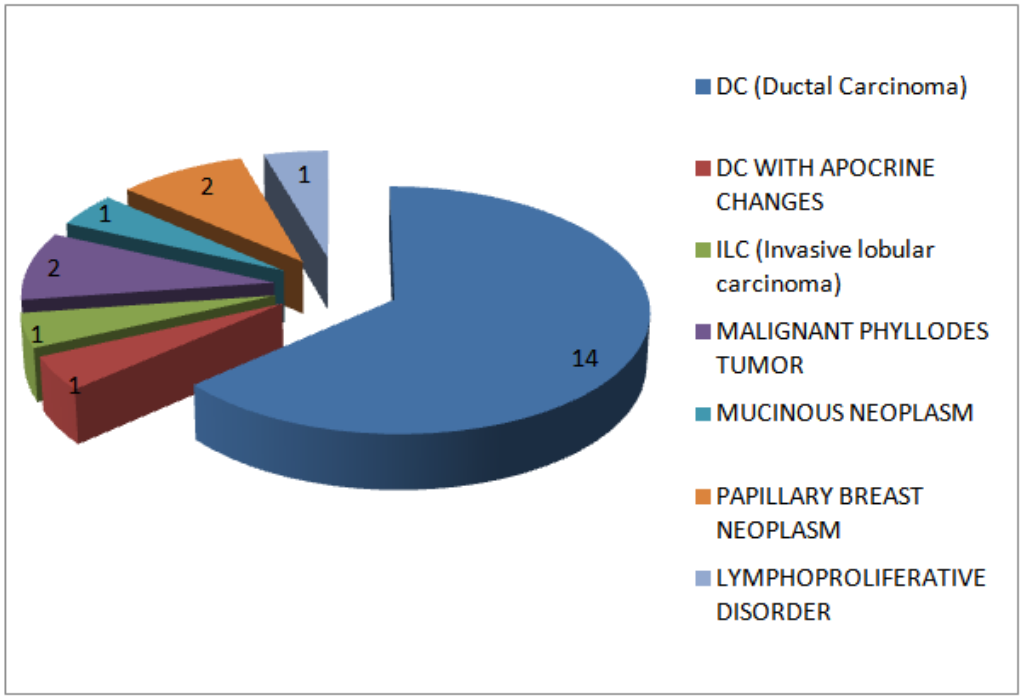
Graph 3 : The FNAC **Results of the benign breast lesions (n= 73)**



On FNA cytology, out of 73 benign lesions 62 (84.93%) were fibroadenoma, 8 (11.11%) were FCD, 1 (1.36%) benign proliferating disease, 1(1.36%) lactating adenoma, and 1(1.36%) cellular fibroadenoma.

On histopathology, out of 23 malignant breast lesions 1 was DCIS (4.34%), 8 turned out IDC (34.78%) 3 papillary carcinoma (13.04%) (Fig.17), 2 infiltrating mucinous carcinoma (8.69%) (Fig. 25), 2 IDC with medullary features (8.69%) (Fig. 27), 1IDC with apocrine change (4.34%) (Fig.21), 1 metaplastic carcinoma (4.34%), 2 ILC (8.69%), 2 malignant phyllodes (8.69%) (Fig.31) and 1NHL (4.34%)

Graph 4: Malignant breast lesions (n= 22)



IV. Discussion

A lump in the breast is a common complaint presenting in the surgical out- patient department of all major hospitals, with anxiety regarding a possible malignancy being extremely common. Accurate diagnosis of cancer has been a diagnostic dilemma since long. A differential diagnosis of the benign, traumatic and malignant lesions is very essential in early stages of the disease. There is an increasing tendency to confirm the diagnosis of the breast cancer at first consultation by some form of needle biopsy technique. FNAC of the palpable breast lesions has proven to be useful in screening for breast pathology[6]. The primary goal of FNA is to separate benign and malignant lesions so that early diagnosis helps in management and reduces morbidity and mortality. The present study showed involvement of right breast in 51.58% patients while left breast involved in 42.10% patients. Bilateral involvement was observed in 6.32% of the patients. A. Khemka et al in their study, showed right breast involvement in 56% patients and 44% in left breast while the study conducted by S.Srikanth et al study, showed right breast involvement in 54% patients and 41% in left breast. Bilateral involvement is seen in 5% cases. Thus the finding in the present study regarding involvement of the side of the breast is comparable with other studies. Upper outer quadrant was the most commonly involved quadrant in the present study, which is comparable with that of O.N. Alema et al and Hussian et al. The least commonly involved area in the breast was lower outer quadrant which is comparable with the observation quoted by Hussian et al. This finding observed in the present study is in correlation with that of S.Srikanth et al, M. Rahman et al, Ghimre et al irrespective of total number of cases. Early diagnose and treatment of breast cancers is crucial as it improves survival rate and reduce mortality.[7]. Therefore, it is essential to evaluate tissue diagnosis in clinically suspicious breast masses. Radiological imaging facilitated an increase in assessment, and in this way has the number of breast biopsies has seen a rise[8]

In the present study, FNAC outcome revealed that out of 95 breast lesions cases, 73 patients were benign and 22 patients were malignant.

et al Daramola et al and Aslam et al where higher incidence of benign cases were noted. The FNR in the present study (4.34%), though is little higher than the preferred value proposed by UK NHSBSP (<4%), is well within minimum range proposed by UK NHSBSP (<6%). The FNR in the present study (4.34%), though is little higher than the preferred value proposed by UK NHSBSP (<4%), is well within minimum range proposed by UK NHSBSP (<6%). In developed countries and in many institutions there is decrease in use of FNAC of breast which is replaced by core biopsies.(yusuf main study.. Berener et al ,) However in developing countries FNAC is still utilise either alone or part of triple test approach to pre-operative diagnosis of palpable breast lesions[9]. The European projects included three series which used FNA cytology in second stage screening, while in a study conducted in Edinburgh such assessment can be made and shows clearly that FNA cytology contributes substantially to a retrospective and restricted selection, when combined with clinic assessment category[10], the yield of tumour is then maximised with greater than 50% reduction in benign biopsy specimens.

It is well documented that biopsy in early breast lump may be influenced by several other factors including size, quadrant, age etc. The surgical policy adopted for symptomatic women to biopsy all palpable discrete lumps may be followed. There is also awareness that many of the changes noted in early breast diseases are insignificant and may not be perceived by another consultant at a separate procedure for aspiration. In case of occult lesions, where diagnosis is inconclusive in the triple assessment, requires specialised stereotactic device for the cytology to achieve adequate levels of sensitivity[11]. In India FNAC still remains the cheapest and fastest alternative for first line patient management. This may be due to its relative cost effectiveness in relation to core needle and open biopsy. Though some studies suggest core needle biopsy to be more accurate than FNAC, they are also more invasive, associated with greater potential for complications, consumes more time and are more expensive[12]. A multidisciplinary approach involving the pathologist, clinicians and radiologists ideally operating in a breast clinic will significantly improve the quality of pre-operative diagnoses of breast lesions

V. Conclusion

The presence of budget constraints and personnel shortage, hospitals are required to demonstrate even great cost effectiveness. Thus, FNAC is a very important preliminary diagnostic test in palpable breast lumps, and if done by expert hands, the results show high degree of correlation with histopathology report . It is an easy, reliable, repeatable, fast, and accurate simple and diagnostic accuracy of FNAC is very high. The present study shows that FNAC helps to confirm the clinical diagnosis without the need for open biopsy. FNAC should be practiced as a routine procedure as there is high degree of correlation with histopathological findings. In the presence of budget constraints and personnel shortage, hospitals are required to demonstrate even great cost effectiveness. Thus, FNAC is a very important preliminary diagnostic test in palpable breast Lumps, and if done by expert hands, the results show a high degree of correlation with the final histopathology report.

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