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Clinical Application of Fine Needle Aspiration Cytology of the Breast Lesions in Today's Era- A Study Of 151 Cases

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ABSTRACT *Presently in today's era of advanced technology, accurate diagnosis of breast lesions depends on a triple assessment approach. Although histopathological examination is the standard method for definitive diagnosis. Along with clinical examination as well as imaging studies, fine needle aspiration cytology (FNAC) provides sufficient information. As proper reporting categorization of the FNAC smears gives clear message to clinician, treatment can be planned immediately without delay. Because of its accuracy and ease of use, still it is widely adopted for the preoperative pathologic assessment. This study aims to discuss the clinical use and application of FNAC and reporting categorization in various breast lesions.*

Introduction

Fine needle aspiration cytology (FNAC) has gained fame due to its fast and easy approach. In addition it is inexpensive, and can be performed with little complications in outpatient door even without any need of special equipment. That is why it has become popular as a valuable tool in preoperative assessment of breast masses. It shows high accuracy, sensitivity, and specificity too [1]. In the evaluation of breast masses, triple assessment with clinical, radiological, and pathological information is necessary to plan the treatment of the patient. But FNAC, together with core needle biopsy, is the initial pathological investigative method of choice by majority of the clinicians [2]. However, there are some borderline lesions where the differentiation of benign from malignant is not possible on FNAC such as atypical hyperplasia and low-grade carcinoma in situ, or in papillary lesions. To overcome these problematic areas of miscommunication between clinician and pathologist, cytological reporting five-tier system categorization is being used. This categorization helps both cytopathologists as well as the clinicians and helps to avoid unnecessary open biopsy [3].

Materials and Methods

In the present study analysis of 151 FNAC smears of breast swellings was done. In each studied case, brief clinical details were noted including age, sex, size, and duration of lesion with associated history of lactation etc. The smears of all cases were examined to determine the cytomorphological features. A five-tier system was used to categorize the cases on FNAC (Table 1) [2]. Cases were correlated with histopathological findings where ever needed.

Sr. no	Category Type	Cytomorphological findings
1	C1	Inadequate
2.	C2	Benign
3.	C3	Atypia probably benign
4.	C4	Suspicious of malignancy
5.	C5	Malignant

Table 1: Showing cytology reporting category.

Results

Among the 151 cases studied, 139 cases (92.0%) were females and 12 cases (7.9%) were males (Table 2).

Category type	Females		Males	
	Number	Average age and (SD)	Number	Average age and (SD)
C1	02	46.5(±2.1)	01	50
C2	73	37.0(±13.3)	10	48.5(±12.9)
C3	06	46.7(±5.8)	Nil	Nil
C4	02	52.5(±24.7)	Nil	Nil
C5	56	50.4(±12.1)	01	60

Table 2: Category, age and gender wise distribution of cases.

On five-tier system categorization cases were categorized into five categories. Majority of the cases fall under benign category (C2) (Table 3).

Category type	Percentage of cases
C1	1.9%
C2	54.9%
C3	3.9%
C4	1.3%
C5	37.7%

Table 3: Category wise percentage of the cases

In our experience FNAC showed 92.7% accuracy in all breast lesions, as in 141 cases diagnosis was given without subsequent investigation for diagnosis. Amongst the (C2) benign cases (83 out of total 151) lactational change was seen in two (2.4%). In one case only 20ml of pale yellow colored fluid was aspirated and swelling disappeared after that. Eleven (7.2%) of the total cases were associated with nipple discharge. Amongst that one was associated with carcinoma (0.6%). One case showed findings of papilloma and was kept under C3 category. Rest of the 9 cases (12.3%) suggested duct ectasia. Cases with atypia and prominent spindle cells were categorized under C3, were kept for histopathological examination. All the cases under category C4 were found to be malignant on subsequent tissue examination. All over FNAC done in malignant cases

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provided 96.6% accuracy including cases of C5 category. Cause of inadequate material in two cases was non-palpable or vague lumps.

Discussion

Fine-needle aspiration cytology is commonly used in the diagnosis of breast lesions, because it is safe and cost-effective diagnostic procedure. The most significant advantage of FNAC is the high degree of accuracy, rapid results, and a less invasive procedure than a tissue biopsy. On site immediate report, with minimal cost using inexpensive equipments and a simple technique provide an upper edge to it. FNAC of the breast can reduce the number of open breast biopsies if reported according to clinician's friendly categorization. [4-7].

The commonly used five-tier system categorization helps the cytopathologists to define the uncertain areas, and the clinicians to offer further investigation like excisional biopsy. This categorization was initiated by the national coordinating committee for breast screening and the UK national breast screening program [3].

As seen in the current study majority of the breast lesions diagnosed on FNAC were benign (54.9%). Ishikawa T et al (2007) also mentioned 47.6% of benign cases in total cases of FNAC [8]. Studies done by Rosa M et al (2011) and Day C et al (2008) also favors bulk of benign groups [9, 10]. Amongst the benign conditions FNAC diagnosis of fibroadenoma is highly accurate. Cytologically, aspirates are hypercellular with characteristic cohesive monolayered sheets of benign-looking epithelial cells mixed with myoepithelial cells in the background of numerous naked/bipolar nuclei (Figure 1). These sheets are described as staghorn with antler-like configuration on its edges (Figure 2). Accompanying the epithelial cells are the fibrillar stromal materials which may vary in cellularity and sometimes show myxoid change [3, 11]. Lopez-Ferrer P (1999) evaluated 362 fibroadenoma aspirates and reported a 79.3% predictive value with most diagnostic errors occurring in the older age group. On the whole, FNAC showed a high sensitivity of up to 68–97% in fibroadenomas [12, 13]. Ultimately categorization of fibroadenoma can be categorized under C2 and treatment can be planned accordingly.

Fibrocystic changes represent a common finding of cyst formation as seen our case. Problem arises especially in older age group when there is a significant epithelial proliferative component, sheets with nuclear overcrowding and overlapping. In addition to this, the presence of atypia in these cells may be prominent (Figure 3). Furthermore it is a well-known reality that fibroadenoma is difficult to distinguish from phyllodes tumor on aspiration cytology smears. Some characteristic findings that support its diagnosis to phyllodes tumors on cytology are cellular aspirate with numerous plump and spindly nuclei, stromal fragments, and presence of atypia. However, these differentiating features may not be present in all cases and must be put in category 3. Hence in 3.9% of the cases massage was conveyed to the clinician that this case will require further investigation with tissue biopsy [14].

Nipple discharge is one of the alarming complaints and prompts the patients for clinical consultation. As seen in the present study majority of the cases (12.3%) of nipple discharge showed foamy macrophages on microscopy of smear favoring duct ectasia (C2). But sometimes a papillary lesion involving one of the major lactiferous ducts may be present and FNAC may cause diagnostic problems [3]. Although intraductal papillomas are usually solitary and most often found in the subareolar region contributing for 2.5% of all excised breast lesions. The accuracy of FNAC in diagnosing papillary lesions and differentiating benign and malignant papillary lesions is low [15, 16]. To date, there have been no well-defined cytological criteria to differentiate between benign and malignant papillary lesions. This entity was categorized under C3 [17].

In our experience, FNAC results were reliable in (96.6%) malignant lesions and were categorized as C5 (Figure 4). Treatment of the patients was possible to plan immediately without any delay and wastage of time and expanses of histopathology of core needle biopsy. However the category of C4 needs histopathological evaluation before performing surgical measures. Self-assessment, mammography, and tru-cut biopsy were help in the accuracy of these lesions [3].

In a study done by Bukhari HM (2011) and associates showed 100% accuracy of FNAC in all benign and malignant report aspirates. In their study the sensitivity was 100%, and the specificity was only 98% because of false positives when compared with the histological reports [18].

FNAC is an essential component in the preoperative management of breast lesions. Keeping in view the accuracy, ease of use, and affordability it is still popular amongst the clinicians as immediate investigation of choice with quick results. The clinical expertise of the clinician as well as use of category reporting system by cytopathologist can contribute much to the patient service in developing countries.

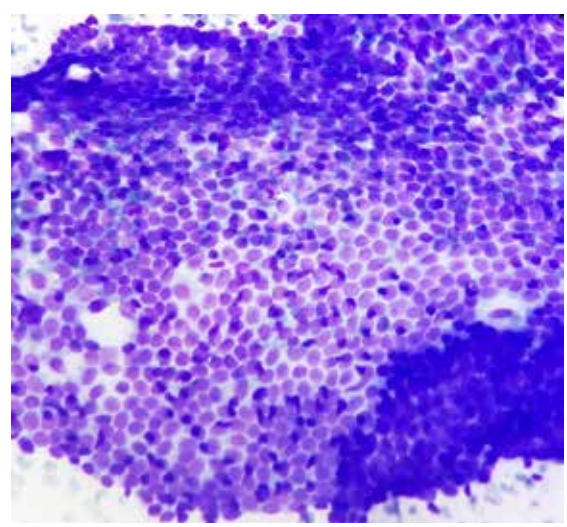

Figure 1: May grunwald giemsa (MGG) stained cytology smears showing monolayered sheets of benign ductal epithelial cells admixed with myeoepithelial cells (40X).

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Figure 2: Hemotoxylin & Eosin (H&E) stained cytology smears showing monolayer sheets exhibiting staghorn pattern (10X)

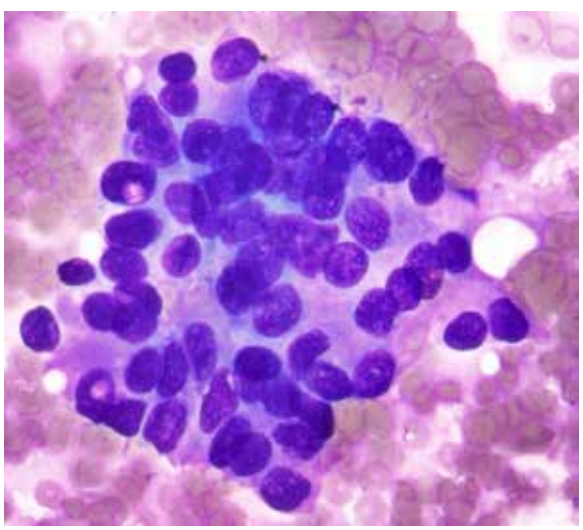

Figure 3: MGG stained cytology smears showing benign ductal epithelial cells exhibiting mild atypia (40X).

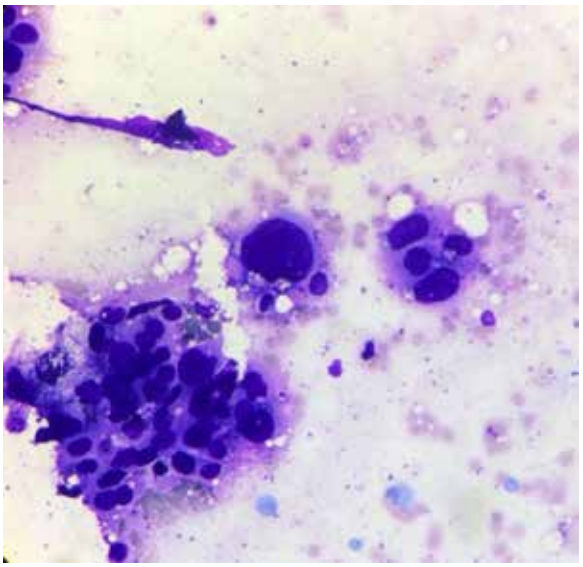

Figure 4: MGG stained cytology smears showing malignant ductal epithelial cells (40X).

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