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DIAGNOSTIC ACCURACY OF CYTOLOGY IN BREAST LESIONS

Pathology

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ABSTRACT

Background: Fine needle aspiration cytology (FNAC) of breast lesions has an established role in preoperative diagnosis and management of patients.

Aim: The aim of the present study was to evaluate the spectrum of breast lesions in our setting and to assess the diagnostic accuracy of FNAC for breast lesions.

Material and Methods: In the present study, 169 cases were included in this study and cytohistological correlation was made in 52 cases only. FNA was performed from different sites of the breast lump using a 10 mL disposable syringe and 23/24-gauge needle without local anaesthesia. FNA air-dried smears were stained with Giemsa stain. Paraffin embedded tissue sections were stained with haematoxylin and eosin (H & E).

Results: Overall diagnostic accuracy of FNAC in our study was found to be 94.2% with 92.9% sensitivity and 94.7% specificity.

Conclusion: The high accuracy, sensitivity, and specificity of FNAC confirm that preoperative cytology is a useful, quick and reliable diagnostic technique indispensable for developing countries.

INTRODUCTION

The triple test which consists of FNAC of palpable breast masses along with clinical and radiological correlation is now considered the gold standard in the evaluation of breast lesions and is being increasingly used nowadays[1].

Although diagnostic accuracy of FNAC in the assessment of palpable breast lumps has been studied in various studies, it has not been widely assessed in our set up. The aim of the present study was to evaluate the spectrum of breast lesions in our setting and to assess the diagnostic accuracy of FNAC for palpable breast lumps.

MATERIAL AND METHODS

The present study was carried out in the Department of Pathology, Jawahar Lal Nehru Medical College, Bhagalpur (Bihar), retrospectively and prospectively during the period Oct 2014 to Oct 2016.

In the present study, 173 cases of breast lumps were included in which cytological and histological studies were done. Four cases were excluded due to scanty, inadequate aspirate on FNAC; thus only 169 cases were included in this study and cytohistological correlation was made in 52 cases only.

All patients were clinically evaluated by detailed history, clinical examination, and radiological investigations. FNA was performed from different sites of the breast lump using a 10 mL disposable syringe and 23/24-gauge needle without local anaesthesia. FNA air-dried smears were stained with Giemsa stain. These cases were reported using a five-tier system: C1 for inadequate; C2 for benign; C3 for suspicious, probably benign; C4 for suspicious, probably malignant; and C5 for malignant breast lesions2. Paraffin embedded tissue sections obtained from breast tissue were stained with Haematoxylin and Eosin (H & E).

Statistical analysis : The cytological and histological analysis was reported in terms of frequencies and percentages. Furthermore, diagnostic accuracy of FNAC for palpable breast lumps was measured using Histopathology as Gold Standard. All statistical calculations including sensitivity, specificity and diagnostic accuracy were performed using SPSS(IBM SPSS Statistics for Windows, Version 22.0,©1989,2013, SPSS Inc. an IBM Company).

RESULTS

In the present study 115 cases (66.5%) were benign (C2), malignancy (C5) was noted in 43 cases (24.9%), suspicious of malignancy (C4) in 5 cases (2.9%) and suspicious, probably benign (C3) 6 cases (3.5%).

Out of total 173 cases, female & male patients were 168 (97.1 %) and 5 (2.9 %) respectively. Male to female ratio in the study was 1:33.6. In the present study maximum number of cases was females. Amongst females, maximum cases were noted in 3rd decade i.e. 63 cases (37.5%).

Out of 173 patients who underwent FNAC, 4 cases (2.3%) were non-diagnostic (C1) due to lack of adequate material. A histopathological correlation was available in 52 cases. The remaining cases could not be correlated as few were lost to higher centres and so was difficult to follow up . Out of these, 13 cases were true positive, 2 was false positive, 1 was false negative and 36 were true negative.

In this study benign breast lesions were the most common lesions in young females, among which the fibroadenoma was the commonest one. The malignant lesions were common in fourth and fifth decades of life, among which infiltrating ductal carcinoma was the most common lesion.

In the present study out of 115 smears diagnosed as benign on cytology showed 72 as fibroadenomas, 40 as fibrocystic disease, 1 as tubular adenoma and 2 as granulomatous mastitis. 43 cases were diagnosed as malignant on cytology which showed infiltrating duct carcinoma in 40 cases, 1 as infiltrating lobular carcinoma, 1 as medulary carcinoma and 1 as intraductal carcinoma. Two cases were diagnosed as malignant on cytology which on histopathology revealed fibroadenoma. Suspicious for malignancy was made in 5 smears of which 3 were diagnosed as infiltrating duct carcinoma, 1 as ductal carcinoma in situ, and 1 as mucinous carcinoma. In remaining cases, gynaecomastia diagnosed in 2 cases on cytology and were confirmed on histology. One of the case diagnosed as suspicious,probably benign on cytology was diagnosed as low grade ductal carcinoma on histology.

Overall diagnostic accuracy of FNAC in our study was found to be 94.2% with 92.9% sensitivity and 94.7% specificity. The positive predictive value (PPV) and negative predictive value (NPV) was calculated to be 86.7 % and 97.3% respectively.

DISCUSSION

In the diagnosis of breast lesions, FNAC has gained the popularity as diagnostic tool due to its low cost and safe procedure with minimal risk to the patient and aid to the clinicians in the management planning. The main purpose of FNA of breast lumps is to confirm cancer preoperatively and to avoid unnecessary surgery in specific benign conditions. Definitive treatment can often be based on the cytological diagnosis without the need for histological confirmation, unless there is disagreement between cytology and clinical and/or mammographic assessment[3]. Our study explains the role of this procedure in our setup to diagnose breast lesions and the spectrum of disease pathology in our population.

The rate of unsatisfactory samples on FNAC is varied. In present study it was 2.3%. This difference may be due to the inexperience of the pathologist and sampling errors.

In the present study benign lesions accounted for 66.5 % with fibroadenoma constituting 62.6%. Fibrocystic cases made up 34.8 %.

Malignant lesions made up 24.9 % of the total cases. Among these, invasive duct carcinoma was about 93.0%.

A wide variation was seen in incidence of benign and malignant breast lesions reported by various previous authors that could be due to age of patients at which cases were reported, duration of lump and variation in population screened. Shrestha A et al [5] have reported 87.5% lesions as benign/atypical while 12.5% lesions as malignant/suspicious for malignancy in a large study[5]. Deshpande KA et al[4] and Mahajan NA et al[7] have reported 55.35%, 69.8%, 64.15% lesions as benign/atypical and 42.85%, 22.0%, 29.24% lesions as malignant/suspicious for malignancy respectively.

A review of literature revealed a good sensitivity and specificity of FNAC for breast lump in different populations and setups. Ariga R et al[6] have reported both sensitivity and specificity of 98%, PPV of 99% and NPV 91%. Singh A et al[8] have reported efficacy of FNAC as 92.3% with sensitivity 84.6% and specificity 100%. Mahajan NA et al [7] have reported efficacy of FNAC as 98.11% with sensitivity, specificity, PPV and NPV of 96.66%, 98.66%, 96.77% and 98.66% respectively.(Table 1)

Table 1: Comparison with other studies

Authors	Sensitivity	Specificity	PPV	NPV
Ariga et al	98%	98%	99%	91%
Mahajan NA et al	96.66%	98.66%	96.77%	98.66%
Hebbar A et al	93.1%	100%	100%	90.47%
Agrawal R et al[14]	89.5%	100%	100%	94.2%
Present study	92.9%	94.7%	86.7%	97.3%

We found an overall diagnostic accuracy of FNAC to be 94.2% .The false negative and false positive rates varied from 1% to 10% in various studies[9-12].

In our study there was one case of false negative diagnosis. This case diagnosed as suspicious, probably benign on cytology was diagnosed as low grade ductal carcinoma on histopathology. Tubular carcinoma can be a problem, since single, bare, stromal nuclei of benign type are often present in smears from such tumours and epithelial atypia may be minimal. In most cases, the overall architectural pattern is sufficiently atypical to suggest an open biopsy[3].

There were 2 cases of false positive diagnosis in this study. Two cases diagnosed as malignant on cytology revealed fibroadenoma on histopathology. Epithelial atypia can be extremely worrisome in some fibroadenomas. The myxoid stroma characteristic of fibroadenoma is a helpful sign, but similar stroma can occasionally be found in carcinoma of no special type. Highly cellular smears showing some loss of cell cohesion and variable nuclear atypia can raise a suspicion of malignancy, but the presence of clearly benign elements, in particular of single bare bipolar nuclei of benign type,

should prevent a cancer diagnosis[3].

Few studies conducted on FNA breast lumps yielded similar results as our study. Kamal Malukani et al [13] reported fibroadenoma as the most common benign lesion while invasive duct carcinoma was the most common malignant diagnosis.

CONCLUSION

In conclusion, we found a good concordance between FNAC and final histology. The high sensitivity, specificity and diagnostic accuracy of FNAC confirm its indispensable role in conjunction with clinical and radiological findings to provide the best possible initial assessment which in turn guide management options. Problems and pitfalls in diagnosis may be avoided if reported with caution. Moreover a word between the pathologist and the clinician aid in diagnosis as in any other case.

DECLARATIONS

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