Original Article

Evaluation of Clinical and Cytological Profile of Breast Lesions at Tertiary Care Hospital, Bhavnagar

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Abstract

Background

Breast lump is the common presentation of various breast lesions. Fine needle aspiration cytology (FNAC) is becoming popular as screening and diagnostic method for breast lesions due to its high sensitivity, specificity, low expenditure, conveniency and safety. The aim is to evaluate the demographic distribution and cytological diagnosis of breast lesions and correlate cytological diagnosis with histopathological diagnosis.

Methods

The present retrospective study was conducted on patients of breast lesion at Cytology Section, Pathology Department of Sir T General Hospital, Bhavnagar from 1st July 2021 to 30th June 2022. Data of FNAC findings of breast lump lesions from 1st January 2019 to 31st December 2020 was collected from reporting registers and statistical analysis was done.

Result

Data of 284 cases was available. Of which, 208 (73.23%) cases were diagnosed as benign of which Fibroadenoma was the most common, found in 116 (40.8%) cases with majority of the patients in 21- 40 year age group. Malignant lesions were found in 76 (26.76%) cases, of which Ductal carcinoma was the most common with 52 (18.30%) cases. Data of 64 cases were available for histopathological correlation. Sensitivity of FNAC was found to be 97.36% and specificity 100%.

Conclusion

As FNAC is a simple, easy, OPD based, cost effective procedure with high accuracy in diagnosis of breast lumps it should be used as preliminary investigation for early diagnosis of malignant lesions which can significantly reduce the morbidity and mortality associated with malignancy.

Keywords:

FNAC, Sensitivity, Specificity, Cytology

Introduction

The breast is a modified skin appendage composed of epithelial and stromal components that may give rise to a variety of benign and malignant conditions. Various breast lesions can present clinically as a breast lump, pain, or nipple discharge, or they may be

detected accidentally during a screening program in asymptomatic women. Different diagnostic approaches to deal with patients with breast lesions include physical examination, FNAC, mammography, ultrasound, core needle biopsy, and open excision biopsy [1].

In triple assessment [clinical examination, imaging, and FNAC] of palpable breast lumps, FNAC is used as an important screening procedure for diagnosis [2]. FNAC has various benefits over open tissue biopsy [3]. It is a rapid, simple, reliable, inexpensive, virtually painless procedure and highly sensitive, specific, and accurate. According to the World Cancer Report 2020, the most efficient intervention for breast cancer control is early detection and prompt treatment [4]. Early detection of breast cancer can be achieved by creating awareness in the population about the implementation of screening programs, resulting in a reduction in the mortality and morbidity associated with the disease. The aim of this study is to determine the demographic distribution and etiology of breast lesions in our institute.

Materials and Methods

The present retrospective study was conducted on patients with breast lesions at the Cytology Section, Pathology Department of Sir T General Hospital, Bhavnagar, from 1st July 2021 to 30th June 2022, after obtaining Ethical Committee clearance from our institution. Data on cases of breast lesions were collected from the cytopathology reporting register from 1st January 2019 to 31st December 2020. Relevant clinical information regarding age, gender, site, size, including obstetric and gynecological history, and cytological findings were obtained from the cytopathological reporting register. Smears with inadequate aspirate were excluded from the study.

Correlation of cytopathological findings and histopathological findings was done after the collection of data from histopathology reporting registers, whenever possible. Data were collected and compiled in a Microsoft Excel sheet. The findings of cases were analyzed and expressed as frequencies and percentages.

Results

Cytomorphological findings of fine needle aspiration from a total of 284 cases of breast lesions have been included in this study, conducted between 1st January 2019 and 31st December 2020 at the Cytology Section, Pathology Department, Sir T General Hospital, Bhavnagar.

The age of the patients varied from nine years to 90 years, with a mean age of 35.85 years. The maximum number of cases, 149 (52.5%), were seen in the age range of 21-40 years. Out of 284 patients, 272 (95.77%) were female and 12 (4.23%) were male. Involvement of the left breast was found in 137 (48.24%) patients, which is slightly higher than the number of patients with right-sided breast involvement, 135 (47.54%). Only 12 (4.23%) presented with bilateral breast lesions. The majority of the breast lesions (79.23%) were in the size range of 0-5 cm. The size range of lumps observed in this study was from 0.5 cm to 21 cm. Larger breast lumps (>5 cm) were noted in 33 (11.62%) patients, of which 16 cases were malignant and 17 were benign.

Various types of aspirates were observed in FNAC of breast lesions, with the most common being cellular aspirate in 236 (83.10%) cases. Other aspirates included pus, oily, and milky, seen in 20 (7.04%), 13 (4.58%), and 11 (3.87%) cases, respectively. Fluidic aspirate was the least common, seen in four (1.40%) cases, all of which showed the cytomorphology of fibrocystic disease. Overall, benign breast lesions were more common, with 208 (73.23%) cases, compared to 76 (26.76%) malignant lesions.

Fibroadenoma was the most common benign lesion, mainly affecting females in the 21-40 years age group, followed by fibrocystic

disease, galactocele, and granulomatous mastitis. Ductal carcinoma was most commonly seen in adult females in the 41-60 years age group. Benign lesions are more common in the 21-40 years age group, and the incidence of malignant lesions increases with age, as shown in Table 1.

Table 1: Age wise distribution of various breast lesions

Cyto Diagnosis	Age group					
	0-20	21-40	41-60	61-80	81-100	Total
Inflammatory lesions	04	17	04	-	-	25
Fat necrosis	-	05	02	-	-	07
Granulomatous lesion	-	11	-	-	-	11
Fibroadenoma	37	71	08	-	-	116
Phyllodes tumor	-	05	02	-	-	07
Fibrocystic disease	02	13	05	-	-	20
Galactocele	-	04	01	-	-	05
Gynecomastia	04	05	01	-	-	10
Papillary neoplasm	-	-	01	01	-	02
Atypical ductal hyperplasia	-	01	02	02	-	05
Malignant	-	17	45	10	04	76
Total	**36**	**134**	**84**	**24**	**06**	**284**

Of the 284 cases of breast lesions, radiological findings were available in 138 cases. The radiological diagnosis in 96.36% of cases correlated well with the cytological diagnosis. Four benign cases on radiology turned out to be malignant on cytology smears. A comparison of cytological diagnosis and histopathological diagnosis of 64 cases was available and is shown in Table 2.

Table 2: Correlation between Cytological and Histopathological Diagnosis

Cytological Diagnosis	Histopathological Diagnosis		Total
	Malignant	Benign	
Malignant	26 (TP)	00 (FP)	**26**
Benign	01 (FN)	37 (TN)	**38**
Total	**27**	**37**	**64**

In our study, the sensitivity of FNAC in breast lesions is 97.43%, specificity is 100%, positive predictive value is 100%, and negative predictive value is 97.36%. Further, the Chi-square test was applied, which shows a p-value of <.001, which is highly significant.

Discussion

In the present study, the youngest patient was nine years old and the oldest was 90 years old. The majority of the patients referred for FNAC were 149 (52.5%) in the age group of 21-40 years. Similar observations were found in studies conducted by Mane PS et al. [5] and Badge et al. [6], where the most common age group of presentation was also 21-40 years, with 62.4% and 61.36% of cases, respectively. In the present study, benign etiology (208 cases, 73.23%) is more common compared to malignant lesions (76 cases, 26.76%), which is in concordance with various other studies done by Mane PS et al. [5] and Badge et al. [6], with 85.22% and 73.64% benign lesions and 14.77% and 26.36% malignant lesions, respectively.
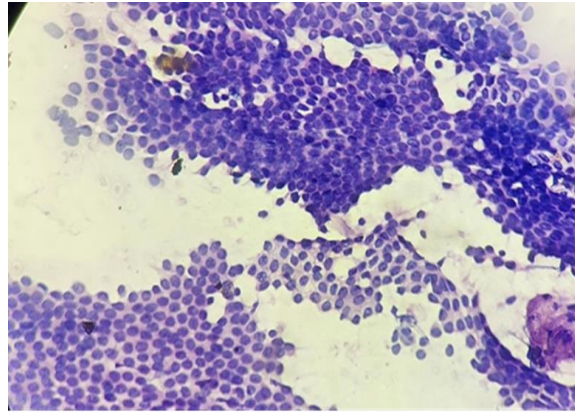
Figure 1: Cytology smear of Fibroadenoma showing benign ductal epithelial honeycomb sheets, myoepithelial cells and stroma (H & E stain, high power view)
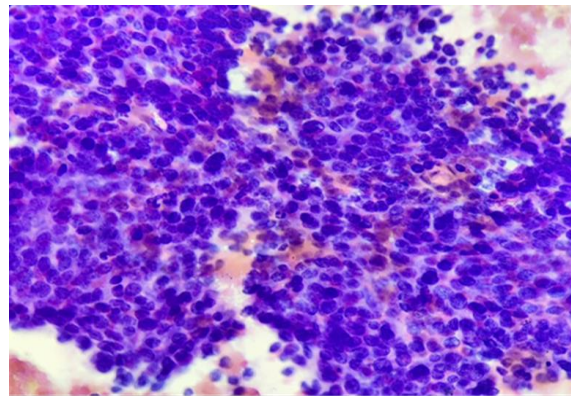

Figure 2: Cytology smear of Ductal carcinoma showing atypia with large, irregular nuclei and coarse granular chromatin (H & E stain, high power view)
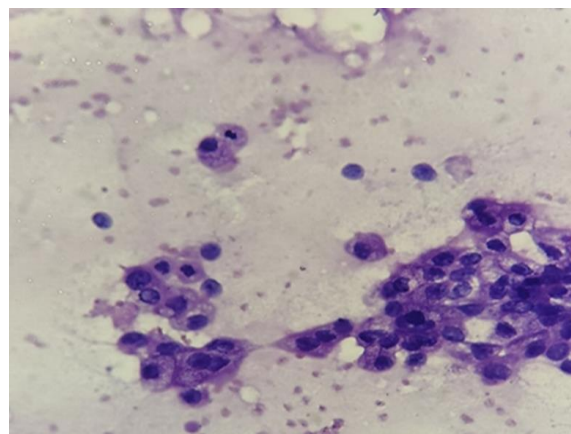

Figure 3: Cytology of mucinous carcinoma of breast showing ductal cells with atypia in pool of mucin and foamy macrophages (H & E stain, high power view)
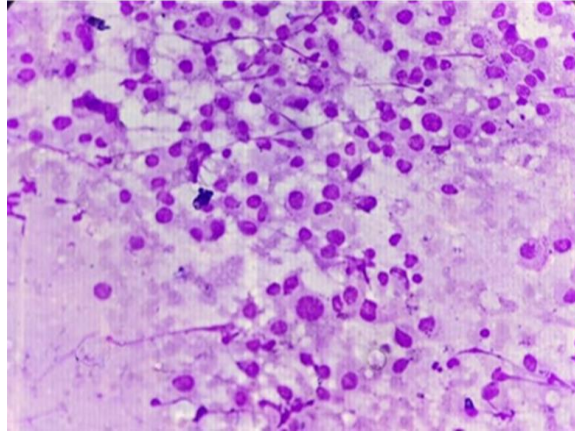
Figure 4: Cytology smear of Lobular carcinoma showing discohesive single file pattern of malignant ductal cells (H & E stain, high power view)

Various benign and malignant lesions in our study are comparable with other studies, as shown in Table 3. Other malignant lesions were diagnosed in 19 (6.69%) cases that were not typified. This is because in cytology smears, the architecture is not maintained, and classification is mainly based on the cytoarchitecture of the lesion in the breast. Hence, the features of malignancy are identified but could not be classified into any specific category based on cytology smears [7].

The main causes for FNAC to be false negative or inadequate include poor cellularity due to lack of technical experience in performing FNA and preparation. Additionally, FNA of ill-defined masses, lesions with hyalinization, and deeply situated lumps may also contribute to inconclusive diagnoses [1].

However, only 64 cases were available for comparison with histopathological diagnosis, as many of the benign cases are treated without any excisional or trucut biopsy, and some malignant cases were referred to higher centers with advanced facilities. Thus, comparing the available cytological diagnoses with histopathological diagnoses, the sensitivity of FNAC in our study was 97.43%, which was similar to other studies, as shown in Table 4. Specificity, positive predictive value, and negative predictive value in our study are also in concordance with other studies.

Table 3: Comparison of cytological diagnosis of breast lesions in the present study and other studies

Cytological Diagnosis	Present study	Mane PS et al. [5]	Badge, et al [6]
Inflammatory lesions	8.80%	9.09%	5.45%
Fat necrosis	2.46%	1.14%	-
Granulomatous lesion	3.87%	3.40%	-
Fibroadenoma	40.84%	61.36%	55%
Phyllodes tumor	2.46%	-	0.90%
Fibrocystic disease	7.04%	3.40%	6.36%
Galactocele	1.76%	2.27%	1.36%
Gynecomastia	3.52%	3.40%	2.73%
Papillary neoplasm	0.70%	-	1.36%
Atypical ductal hyperplasia	1.76%	6.81%	-
Ductal carcinoma	18.30%	1.13%	24.09%
Lobular carcinoma	1.05%	-	0.90%
Mucinous carcinoma	0.7%	-	-
Other malignant lesions	6.69%	6.81%	-

Table 4: Comparison of Sensitivity, Specificity, Positive predictive value and Negative predictive value of present study with other studies

Study	Sensitivity	Specificity	Positive Predictive value	Negative Predictive value
Present Study	97.43%	100%	100%	97.36%
Mane PS et al [5]	85%	100%	100%	96.3%
Panjvani S et al [10]	97.8%	100%	100%	97.8%

In our study, one histopathologically diagnosed case of invasive ductal carcinoma was diagnosed on cytology as a differential diagnosis of epithelial hyperplasia with atypia or fibroadenoma with atypia. The possible reason could be the overlapping features of fibroadenoma, epithelial hyperplasia, and low-grade ductal carcinoma. Additionally, different studies have documented fibroadenoma as being one of the most commonly misdiagnosed lesions that appear as a grey zone lesion [8, 9].

Conclusion

FNAC is a simple, easy, OPD-based, cost-effective procedure with high sensitivity, specificity, and accuracy for the diagnosis of breast lesions. Additionally, the utilization of the same aspirate for ancillary molecular testing further increases the sensitivity and specificity of FNAC. Being an important component of triple assessment, it can be used as a preliminary tool for the early detection of malignancy, determining the proper management protocol, and ultimately reducing morbidity and mortality, particularly in younger women. However, histopathological examination remains the gold standard for diagnosis.

Abbreviations:

FNAC: Fine Needle Aspiration Cytology

H&E stain: Hematoxylin and eosin stain

ADH: Atypical ductal hyperplasia

DCIS: Ductal carcinoma in situ

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