

Cytomorphological classification of Breast lesion on basis of International Academy of Cytology (IAC) Standardized Reporting System in Tertiary health care hospital

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Abstract

Introduction: International Academy of Cytology (IAC) standardized system is established for breast fine-needle aspiration cytology (FNAC) reporting. They have five categories divided into C1 to C5. (C1-Insufficient material, C2-Benign lesion, C3- Atypical, C4-Suspicious & C5- Malignant lesion). **Aims and Objectives:** The aim of our study was to categorize breast lesions according to International Academy of Cytology (IAC) standardized reporting system. **Materials and Methods:** The present study was done during the period between January 2019 and December 2020 in the department of pathology VBCH, Silvassa. 10ml/5ml syringe and 23 gauge needles were used and two types of smears made. 1)Wet smears were stained by H&E stain and 2)dry smears were stained by Giemsa stain. **Results:** A total 275 cases of Breast were included in the study with 269 (97.82 %) females and 06 (2.18 %) males. We had a wide age group patient ranging from 11 years to 79 years. Most of the cases (60.5%) were in age group of 2nd and 3rd decade, with a predominance of right sided breast lesions. 58 (21.09%) malignant (C5), 192 (69.81%) were benign (C2), 09 cases (2.91%) were benign lesions but having nuclear atypia (C3), 04 cases (1.45%) were suspicious for malignancy (C4) and 12 cases (4.36%) were unsatisfactory for evaluation (C1). **Conclusion:** Fine needle aspiration is cost effective, rapid, simple and highly sensitive diagnostic tool. IAC standardized reporting system for breast cytology enhance the diagnostic accuracy of FNAC.

Keywords: Fine needle aspiration, Breast lesion, IAC Reporting System.

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Introduction

Fine needle aspiration cytology (FNAC) is simple, well established, fast, cost effective diagnostic method used for preoperative assessment and diagnosis of breast lumps. Most cases of breast lumps showing benign feature and Fibroadenoma is the most common pathological diagnosis. FNAC is the initial investigation done for determining various pathologies in breast.[1] FNAC is simple technique and the skillful preparation of direct smears, The International Academy of Cytology (IAC Standardized Reporting of Breast Fine-Needle Aspiration Biopsy Cytopathology (IAC Yokohama Reporting System) in 2019.[2,3] The IAC Yokohama Reporting System proposed a standardized reporting system with Five type system to classify breast FNAC, including (1) insufficient or inadequate, (2) benign lesion, (3) atypical, (4) suspicious for malignancy, and (5) malignant lesion. The IAC Yokohama Reporting System established for defined specific criteria or sets of criteria for reporting categories of breast lesion, each of which has a risk of malignancy and is linked to management options.(2) IAC has established a comprehensive and standardized system use for to categorize FNAC of breast lesions into C1 to C5.[4] Structured

Materials & Methods

- Place of the study: Department of Pathology, VBCH, Silvassa, Dadra and Nagar Haveli
 - Type of the study: Retrospective
 - Duration of the study: Two years (from Jan-19 to Dec-20).
- Total 275 cases carried out in patients with age range of 11 to 90 years.

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reporting can empower the clarity, quality, and reproducibility of reports across departments, improve breast health care and will assist patient management.[4,5,6] Histological grading of breast carcinoma using modified Scarff-Bloom-Richardson (SBR) grading system is a widely accepted carcinoma grading system. Hence, neo-adjuvant chemotherapy, grading of breast carcinoma should be incorporated in FNAC reports for prognostication.[7] IAC reporting system includes five categories from C1 to C5. Inadequate degree of cellularity of the epithelial cells comes under C1, this can be due to inadequate aspiration of material. C2- benign lesion showing the characteristic pattern of different benign lesions. Usually cellular smears with ductal epithelial cells, myoepithelial cells, bare bipolar nuclei and Inflammatory background may also present. Smears with features of highly cellular and low pleomorphism are categorized under C3 or atypical. Aspirate with features such as poor preservation, hypocellularity, benign components, precluding the diagnosis of malignancy, are comes under C4-suspicious of malignancy. Aspirates material present with strong malignant like highly pleomorphic features are categorized under C5[4,5,6].

- Sampling method: FNAC was done by using 10/5 cc syringes with 23 G needle under all aseptic precautions. Air dried smears were stained by Giemsa stain and wet smears were stained by H & E stain. Necessary & relevant data was collected from previous two years' cytology laboratory registers for further statistical analysis with some inclusion & exclusion criteria mentioned below:

- Inclusion criteria: 1. All female patients of different age groups who presented with a palpable breast lesion but with unknown primary diagnosis 2. Patients who underwent both FNAC at OPD basis & subsequent postoperative histopathological evaluation 3. Male patients with benign and malignant breast lesions
- Exclusion criteria: 1. Patients with history of recurrent malignancy 2. Patients with history of chemotherapy.
- Statistical Analysis: Data was collected and evaluated in terms of diagnostic accuracy, sensitivity, specificity, false positive & negative

rate and positive & negative predictive values. Results were presented in frequency tables. IAC has established method to produce standardized and comprehensive approach to FNAC reporting. They have included five categories from C1 to C5.

C1: Insufficient material

C2: Benign

C3: Atypical probably benign

C4: Suspicious, probably carcinoma in situ or invasive carcinoma

C5: Malignant

All C5 categories cases were graded cytologically using Robinson's criteria, compared with modified Bloom–Richardson grading system.

Results: During last two years (2019 & 2020), a total number of 275 patients were undergone the procedure of FNAC for various lesions & out of them, 269 patients (97.82%) were females and 06 (2.18%) males who presented with a palpable lump or mass in the breast. We had a wide age group patient ranging from 11 years to 79 years. Most of the cases (60.5%) were in age group of 2nd and 3rd decade, with a

predominance of right sided breast lesions 134 (48.73%) cases, followed by left side 133 (48.36%) cases and the bilateral 08 (2.91%) cases. Out of 275 cases, 12(4.36%) cases were included unsatisfactory or inadequate for evaluation (C1) while 192 (69.81%) were benign (C2) i.e. negative for malignant cells(**Figure 1**). 09 cases (2.91%) were benign lesions but having nuclear atypia (C3)(**Figure 2**) while 04 cases (1.45%) were suspicious for malignancy (C4)and 58 (21.09%) were unequivocally malignant (C5)(**Figure 3**). C3 lesion in our study included fibrocystic disease with mild atypia- 02 case, benign fibroepithelial lesion -03 cases, fibroadenoma with atypia- 02 cases, benign phyllodes tumor – 02 case. C4 lesions included 4 cases of suspicious for duct invasive carcinoma. C5 lesions included 58 cases of ductal carcinoma. Table no. 1& 2 shows age wise distribution of 275 patients or cases presented with breast lumps or masses for the procedure of FNAC. Table no.3 shows sub-classification of breast lumps or masses according to their cytology reports.

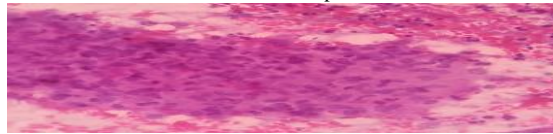


Figure 1: Cytomorphological smear showing well-defined epithelioid cells granuloma with acute inflammatory cells.(H&E stain,40x)

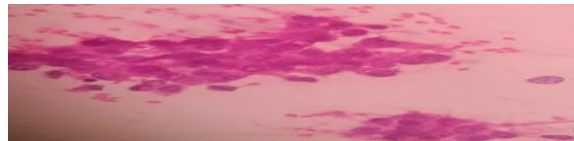


Figure 2: Cytomorphological smear showing sheets of tight epithelial cluster with nuclear overlap and mild degree of nuclear atypia.(H&E stain,40x)

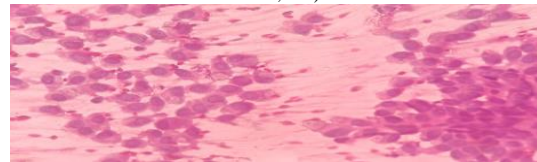


Figure 3: Cytomorphological smear showing tumor cells in discohesive cluster and scatter singly, marked atypia, prominent nucleoli and abundant eosinophilic cytoplasm.(H&E stain,40x)

Table 1: Age distribution of Patients

Age Group in years	Total	Frequency (%)
11-20	36	13.09
21-30	76	27.64
31-40	77	28
41-50	37	13.45
51-60	24	8.73
61-70	19	6.91
71-80	06	2.18
Total	275	

Table 2 : Age wise distribution of patients or cases presented with breast masses (n=275)

Age Group in years	Cytological Category Codes					Total
	C1	C2	C3	C4	C5	
11-20	00	34	02	00	00	36
21-30	05	70	01	00	00	76
31-40	04	56	03	01	13	77
41-50	02	18	03	01	13	37
51-60	00	07	00	02	15	24
61-70	01	04	00	00	14	19
71-80	00	03	00	00	03	06
Total	12	192	09	04	58	275

Table 3: Sub-classification of breast lumps according to their Cytological Category.

Category	Diagnosis	Frequency	Percentage(%)
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C1	Unsatisfactory or Inadequate aspirate	12	4.36
C2	Fibroadenoma	130	47.2
	Fibrocystic Disease	19	6.9
	Non-specific Mastitis	24	8.72
	Granulomatous Mastitis	02	0.72
	Benign Proliferative Breast Lesion without atypia	05	1.81
	Benign Cystic lesion	07	2.54
	Gynacomastia	05	1.81
C3	Fibrocystic disease with mild atypia	2	0.72
	Benign fibroepithelial lesion with atypia	3	1.09
	Fibroadenoma with atypia	2	0.72
	Benign phyllodes tumor	2	0.72
C4	suspicious for duct invasive carcinoma	04	1.45
C5	Invasive Ductal Carcinoma	58	21.09
		275	100

Only 144 smears (52.36%) out of 275 were sub-classified and definite diagnosis was given only in 70 cases of benign lesions (48.61%), 58 cases of malignant lesions (40.27%) and 4 cases of Suspicious, probably carcinoma in situ or invasive carcinoma (2.77%). 12 cases were not given any particular diagnosis on the basis of FNAC or in other words we can say that they remained unclassified. Fibroadenoma was the commonest diagnosis among all benign cases comprising of 47.63% of total sample load. Rests of All these findings mentioned above show a limited role of FNAC in sub-classification of various breast lumps, both benign & malignant. We can categorize breast masses according to their cell morphology & cytoarchitecture into various groups from C1 to C5 but definite diagnosis is possible only after histopathological evaluation & correlation between cytology & histopathology reports.

Discussion

The primary goal of FNA is to separate benign and malignant lesions so that early diagnosis helps in management and reduces morbidity and mortality. It is also helpful for clinician to choose a method diagnosis with high sensitivity and specificity⁽⁸⁾. Breast diseases are more common in women because estrogen cyclically stimulates breast during their reproductive life. Accurate diagnosis of breast cancer is made in 99% of cases by the combination of clinical examination, mammography, and simple, cost-effective departmental procedure—fine needle aspiration cytology (FNAC). Technique of FNAC has wide utility for the tumors which are easily palpable on external examination.^(9,10) Most common benign breast lesion was Fibroadenoma in the age group between 21-30 years which is similar to findings of Sidhaling Reddy et al.^(11,14,16). The peak age incidence for malignant breast lesions was 31-80 years in this study that is similar to finding of Eni UE et al and Kumar haesh et al⁽⁸⁾⁽¹²⁾. Our study showed involvement of right breast slightly higher than left breast which is similar to finding of Vyas A et al⁽¹³⁾. In this study In 5 cases of male patients, diagnosis of gynecomastia. The findings are very near to those observed by Badge SA et al⁽¹⁵⁾. In our study, 4.3% cases had inadequate aspirate which included in C1 category which was in concordance with studies done by Modi et al.⁽¹⁷⁾ (1.36%), Sunita et al.⁽¹⁸⁾. Our study had 69.8% (192) C2 lesions which included 47.64% fibroadenoma followed by 2.55% cases of benign proliferative breast disease, granulomatous mastitis (0.73%), fibrocystic disease (7.27%), and benign cystic lesion 2.55% cases. Studies done by Sunita et al.⁽¹⁸⁾ had 50% with fibroadenomas being most common (48.8%) benign lesion followed by fibrocystic disease (13.3%). Similar was the study conducted by Panwar H et al.⁽⁹⁾ 48% were fibroadenomas followed by fibrocystic disease (6.4%).

Conclusion

For diagnosing the nature of palpable breast lesions, FNAC is considered as a highly accurate procedure with sensitivity and specificity as high as 95%. Its use has been recommended in literature as preliminary treatment on outpatient basis. Early diagnosis is of paramount importance to decrease the mortality and morbidity associated with these lesions. The ability of FNA to differentiate benign and malignant lesions coupled with high sensitivity and specificity gives psychological relief to the patient. When in doubt the

investigations like mammography and truecut biopsy can be used to differentiate between benign and malignant lesions. Majority of the lesions in their study were benign with fibroadenoma being the most commonly diagnosed lesion. Although endocrine factors play a major role in etiology of benign breast lesions their exact role is still an enigma.

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