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# CYTOHISTOLOGICAL SPECTRUM OF BREAST LESIONS WITH RESPECT TO THE IAC YOKOHAMA SYSTEM FOR REPORTING BREAST FINE ASPIRATION CYTOLOGY-A TWO YEAR TERTIARY CARE CENTER EXPERIENCE.

Pathology

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## ABSTRACT

**Introduction:** The new International Academy of Cytology (IAC) Yokohama System for Reporting Breast FNABC, supported by IAC and developed by an International "Breast Group", was proposed to establish a comprehensive structured approach so as to standardize the diagnostic approach and improve reproducibility. **Aim:** To categorize the breast FNAB samples according to this new system of Reporting and to assess various statistical parameters including Risk of Malignancy. **Materials And Method:** Breast FNAB specimens obtained in the cytology section of the Department of Pathology, AMCH were reported using the newly proposed IAC Yokohama System. The statistical parameters were calculated taking Histopathology as the Gold Standard. **Results And Observation** A total of 280 Cases with breast lesions were included, of which 16 of the Cases were categorized as Inadequate, 152 as benign, 5 as atypical, 16 as suspicious for malignancy and 91 as malignant. The ROM for each category was obtained. Considering Malignant and Suspicious for Malignancy cases as true positives, the Sensitivity was 95.05%, Specificity 98.46%, PPV 97.96%, NPV 96.24% and Diagnostic Accuracy 96.97%. **Conclusion** The IAC Yokohama system for Reporting Breast FNAB cytology effectively stratifies breast lesions thus providing guidance to both cytopathologists and clinicians leading to better patient care.

## KEYWORDS

Breast, FNAC, Yokohama

## INTRODUCTION

With a mortality rate of 13 per 100,000 women and an incidence rate of 26 per 100,000 women, breast carcinoma has surpassed cervical cancer in India.[1].Fine Needle Aspiration Biopsy serves as a straightforward, affordable, and relatively painless outpatient procedure with prompt results.At the Yokohama International Congress of Cytology in 2016, the International Academy of Cytology (IAC) Breast Group was established with the goal of creating a globally standardised reporting system that would specify best practises for the use of FNAB in more consistently and accurately diagnosing breast lesions.[2].The System has developed standardised terminology for five distinct kinds of breast FNAB with ranked associated malignancy risks (ROM) and treatment suggestions.[3]. The IAC Yokohama system contains five categories that can each be subdivided based on their risk of malignancy (ROM), and each category is given guidance inside a management algorithm. Insufficient/inadequate, benign; atypical, presumably benign; suggestive of malignancy; likely in situ or invasive cancer; and malignant are the criteria listed. The Fine Needle Aspiration Biopsy Cytology Report is combined with the clinical and imaging results during a triple test procedure, producing very high positive predictive value (PPV) and negative predictive value (NPV), which forms the basis for therapeutic choices.

Taking into account the potential availability of imaging, Fine Needle Aspiration Biopsy, surgical pathology, and therapeutic choices, it will produce best practise protocols for indicated management of each of five groups with varying risks of malignancy also keeping in mind the fact that the management options accessible in wealthy nations are frequently different from those in low- and middle-income nations, particularly in the availability of imaging and CNB [4].

## MATERIAL AND METHODS

**Study design:** Observational study

**Place of study:** Assam Medical College and Hospital, Dibrugarh

**Source of data and cases:**
Women with breast lump and reporting to department of pathology and undergoing Fine Needle Aspiration Cytology for the evaluation of the lesion.

**Duration of study**:
1 year (1st December 2020 to 1st December 2022).

**Inclusion Criteria**

- All patients irrespective of age with breast lump reporting to Department of Pathology, Assam Medical College and Hospital, Dibrugarh.

**Exclusion Criteria**

- Lactating breast
- Non cooperative patients.

The recently proposed Yokohama system of reporting breast cytology was used to classify the fine needle aspiration cytology that was received. The gold standard was determined using histological samples of the appropriate breast Fine Needle Aspiration Cytology. The ratio of confirmed malignant cases to all cases in the diagnostic category was used to compute the Risk of Malignancy (ROM) for each category.

Personal information and clinical history, including age, the size, position, and history of any nipple discharge, as well as pain, adherence to nearby structures, physical examination, and, if applicable, an evaluation of mammographic findings, were all taken into consideration in each instance. The MGG and PAP-stained smears were then examined under a microscope. All the slides were then routinely checked by the chief reviewer and reported using the recently developed IAC Yokohama system of reporting breast cytology (C1-C5) category.

**Procedure For Histopathological Examination**
Breast samples were preserved in buffered formalin at a 10% concentration. Gross characteristics were noted. The following specimen bits were given: Nipple, 3 bits from the tumour for lesions under 5 cm, plus extra bits for lesions beyond 5 cm, i.e., 1 bit for every 1 cm of tumour, 2 bits from non-tumor regions of unaffected quadrants, and bits from all surgical margins.

The specimen contained lymph nodes, and samples of each lymph node were provided. For lymph nodes smaller than 5 mm, the full piece was supplied; for bigger lymph nodes, the tissue was divided in half and taken for sectioning. Haematoxylin and eosin was used routinely to prepare and stain the samples.

## RESULTS AND OBSERVATIONS:

It was seen that majority of the study population belonged to the age group of 21 to 30 years of age. The ages ranged from 13 years to 66 years with the mean being 42 years. The major study population comprised of females (96.7%) with 3.3 percent being males who presented with breast lumps.

It was seen that out of 280 cases, 10 cases had bilateral masses, whereas 126 cases had masses on their left side and 144 cases presented with masses on their right breast. The total of 280 cases were distributed according to the IAC Yokohama reporting system as insufficient material (n =16), benign (n = 152), atypical (n = 5), suspicious for malignancy (n =16), malignant (n = 91).

Most of the cases belonged to the Yokohama Category 2, i.e., Benign comprising of 152 cases(54.2 %) followed by Category 5 ,i.e., Malignant comprising of 91 cases(32.5%).Most of the benign cases fell in the 21-30 years age group whereas most of the malignant cases were in the 51-60 years group clearly showing a preponderance of malignancy in the older age group.The most common benign lesion was Fibroadenoma whereas the most common malignant lesion was Invasive Breast Carcinoma.

**Table 1 : Distribution Of Cases Based Of Yokohama System After Fnac :**

| YOKOHAMA CATEGORY | DESIGNATION | NO. OF CASES | % OF CASES |
|---|---|---|---|
| C1 | INADEQUATE | 16 | 5.7 |
| C2 | BENIGN | 152 | 54.2 |
| C3 | ATYPICAL | 5 | 1.7 |
| C4 | SUSPICIOUS FOR MALIGNANCY | 16 | 5.7 |
| C5 | MALIGNANT | 91 | 32.5 |
| TOTAL | | 280 | 100 |

Histopathological correlation was available for 231 out of the 280 FNAC cases.Risk of malignancy was obtained for each of the Yokohama categories.

**Table 2: Histocytological Correlation And Risk Of Malignancy In Each Category.**

| TOTAL NO. OF CASES (FNAC) | | MATCHED HPE CASES | | | | ROM (%) |
|---|---|---|---|---|---|---|
| YOKOHAMA CATEGORY | DESIGNATION | NO. OF CASES | NO. OF CASES | BENIGN | MALIGNANT | |
| C1 | INADEQUATE | 16 | 04 | 04 | 00 | 0 |
| C2 | BENIGN | 152 | 124 | 120 | 04 | 3.2 |
| C3 | ATYPICAL | 5 | 5 | 04 | 01 | 20 |
| C4 | SUSPICIOUS FOR MALIGNANCY | 16 | 16 | 01 | 15 | 93.7 |
| C5 | MALIGNANT | 91 | 82 | 01 | 81 | 98.7 |

The respective ROM for each category was 0% for category 1 (insufficient material), 3.2% for category 2 (benign), 20% for category 3 (atypical),93.7% for category 4 (suspicious for malignancy), and 98.7% for category 5 (malignant).

While considering only category 5 as true positive will effectively give higher values on diagnostic test evaluation, it will undermine the gravity of a “suspicious of malignancy” lesion from a diagnostic point of view. Similarly considering categories 3,4,5 as positives negates the importance of considering the high number of benign lesions which can be atypical on FNAC.

Therefore, considering only categories 4 and 5 as true positives the sensitivity, specificity, PPV, NPV and diagnostic accuracy were calculated to be 95.05%, 98.46%, 97.96%,96.24%,96.97% respectively.

## DISCUSSION

Out of the 280 cases of FNAC, HPE diagnosis was available for 231 cases only. It can be assumed that cases lost for follow up was due to the ongoing COVID 19 situation during the study period, its restrictions and unavailability of adequate healthcare in the wake of a pandemic. The ROM of our study is comparatively studies to other similar studies as depicted in the table below. It seems that our study had a fair similarity to these studies.

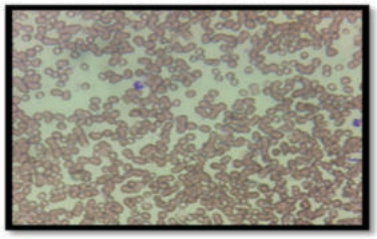
**Table 3 : Rom Compared To Other Similar Studies**

| Studies | Insufficient | Benign | Atypical | SOM | Malignant |
|---|---|---|---|---|---|
| S Wong[4] | 2.6% | 1.7% | 15.7% | 84.6% | 99.5% |
| Agarwal[5] | 3% | 0.15% | 0.25% | 71% | 99% |
| Montezuma [6] | 4.8% | 1.4% | 13% | 97.1% | 100% |
| Marabi[7] | 8.8% | 0.5% | 22.6% | 89.2% | 100% |
| Present Study | 0% | 3.2% | 20% | 93.7% | 98.7% |

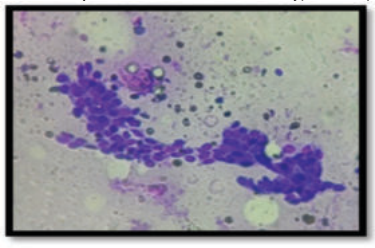
## CONCLUSION:

We believe that the risk of malignancy in each category makes it useful to have a uniform reporting system for the classification and diagnosis of breast lesions. Our study's primary limitations were its limited sample size and the absence of repeat aspiration in C1 category lesions. Another drawback is that while our facility provides tertiary care, the majority of patients in this region come from rural populations and have severe disease stages when they first arrive. As a result, the present study's drawback was a lack of health education that resulted in patients with benign breast lumps or minor lesions being lost to follow-up.

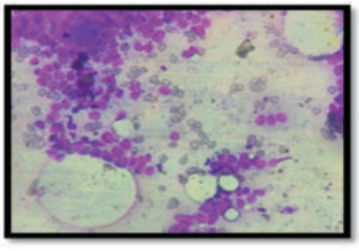
## Figures



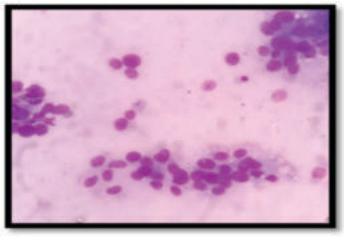
**Category 1:** INSUFFICIENT; Microphotograph showing dispersed erythrocytes with no epithelial cells or tissue fragments. (MGG; 40X)



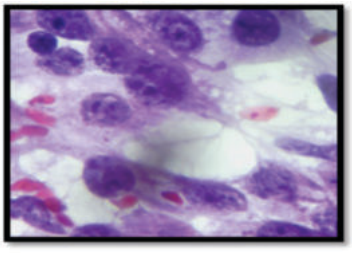
**Category 2:** BENIGN. Microphotograph of Fibroadenoma showing cohesive 'staghorn' epithelial cell tissue fragments with myoepithelial cells and bare bipolar nuclei in a background of fibromyxoid stroma. (MGG; 40X)



**Category 3:** ATYPICAL. Microphotograph showing epithelial fragment of ductal epithelial cells and myoepithelial cells with bland granular chromatin and mild nuclear pleomorphism and atypia. (MGG; 40X)



**Category 4:** SUSPICIOUS OF MALIGNANCY. Microphotograph showing an epithelial fragment with mild nuclear enlargement and pleomorphism with occasional vacuoles



**Category 5:** MALIGNANT. Microphotograph showing High Grade

Invasive Breast showing small tissue fragments consisting of cells with high N:C ratio and highly pleomorphic nuclei along with nuclear overlapping. (PAP 100X)

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