

A Descriptive Study of Reporting of breast Fine Needle Aspiration cytology Using International Academy of Cytology Yokohama System

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ABSTRACT

Background: The International Academy of Cytology (IAC) has established standardized approach for reporting breast FNAC by categorizing lesions in a five-tier system from C1 to C5.

Materials and Methods: From May 2020 to April 2021, a descriptive cross-sectional study was conducted in the cytology section of the Department of Pathology, SMS Medical College, Jaipur.

Results: The current study involved 335 cases of breast FNAC, with a maximum of 333 (99.40%) females and 2 (0.60%) males. Maximum cases were in the age range of 21-40 years. There were 79 (23.60%) cases in C1 (Insufficient) category, C2 (Benign) had 177 (52.80%) cases, C3 (Atypical) had 9 (2.70%) cases, C4 (Suspicious) had 16 (4.80%) cases, and C5 (Malignant) had 54 (16.10%) cases respectively. Fibroadenoma was the most prevalent benign lesion in our analysis, accounting for 45 of the 177 benign cases, whereas ductal carcinoma was the most common malignant lesion. In a total of 92 cases where histology was examined, 86 cases were found to be compatible with the cytological diagnosis. In a triple assessment, 103 (78.03%) of the 132 cases were concordant in the benign group, only 1 (12.50%) case showed concordance in the atypia category, and 21 (39.62%) of the 53 cases showed concordance in the suspicious or malignant category. The Risk Of Malignancy (ROM) was calculated as follows: inadequate 0%, benign 0%, atypia 0%, suspicious for malignancy 71.43%, and malignant 97.56% for each group.

Conclusion: This system is a valuable tool for breast cancer patient diagnosis and care. It also simplifies clinical audits and aids in improved coordination between pathologists, hospitals, and institutes.

KEYWORDS: IAC Yokohama system, Risk of Malignancy, Fine Needle Aspiration Cytology (FNAC).

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INTRODUCTION

Breast cancer affects 2.1 million women, accounting for one-quarter (25%) of all female cancer diagnoses in 2018¹. Breast cancer incidence varies between 19.3 and 89.7 per 100,000 women worldwide, depending on geographic location, environment, and nutritional influences². For women who appear with breast lumps, a clinicopathological evaluation is required. Breast cancer was the leading cancer among Indian females in 2012³, with an age-adjusted incidence rate of 25.8 per 100,000 women. According to the National Cancer Registry Program and GLOBOCAN 2018, India saw 1,62,468 new cases of breast cancer and 87,090

deaths from the disease in 2018⁴. Breast cancer is a broad term that refers to a variety of diseases ranging from ductal carcinoma in situ (DCIS) to extensive metastatic disease⁵.

In terms of pathological diagnosis, both Fine Needle Aspiration Cytology (FNAC) and Core Needle Biopsy (CNB) procedures are regarded to be extremely accurate in the assessment of breast lesions in the routine examination process. Breast FNAB is conducted all over the world with a high success rate in both palpable and nonpalpable lesions. The primary goal of FNAC for breast lumps is to confirm cancer prior to surgery and avoid

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surgery in certain benign conditions, as early detection can improve breast cancer survival rates. The major goal of FNAB in breast is to differentiate between benign and malignant lesions. In 1996 the National Cancer Institute (NCI) proposed a standardised reporting system. It consisted of five diagnostic categories to reduce the errors in overlapping diagnoses & to bring uniformity. A core group of cytopathologists launched a system for reporting breast lump by FNAB at the International Congress of Cytology in Yokohama in May 2016. The Breast group was formed after a review of recommendations from radiologists, surgeons, and oncologists who are experts in the therapy of breast lesions. Rapid on-site evaluation (ROSE) of the FNAB was proposed to reduce atypical, suspicious and insufficient rates with concomitant increase in the diagnosis of malignant breast lesions.

The system's goal was to standardise and improve breast cytology reporting, as well as to publish guidelines for better FNAB smear interpretation. In addition, the system advocated that cytopathologists and treating clinicians communicate more frequently so that the patient receives the best possible breast care. In addition to standardising the reporting method for FNAB breast, the system provides alternatives in its management algorithm for both developed countries that can employ the triple test (clinical, imaging, and FNAB) and developing countries that do not have easy access to imaging facilities. Following that, the current Yokohama system for reporting Breast cytopathology was devised, which classified lesions into the following groups: Category 1: Insufficient material, Category 2: Benign, Category 3: Atypical probably benign, Category 4: Suspicious, and Category 5: Malignant. The goal of this research is to develop a standardised system for reporting breast cytology that will ensure consistency across

pathologists and may be used to forecast the risk of malignancy [ROM] as well as serve as a management guide.

MATERIAL & METHODS

In the present study, a total of 335 FNAB cytology specimens from the Department of Pathology, SMS Medical College, Jaipur were studied from May 2020 to April 2021. The study used the Breast Fine Needle Aspiration Biopsy sample procedure, and samples were received by the Pathology Department.

RESULTS

A total of 335 cases of breast FNAC were included in the present study with a maximum of 333 (99.40%) females and 2 (0.60%) males. The maximum number of cases were seen in the age group of 21-40 years. Distribution of samples according to IAC Yokohama system was C1 (Insufficient/Inadequate) in 79 (23.60%) cases, C2 (Benign) in 177 (52.80%) cases, C3 (Atypical) in 9 (2.70%) cases, C4 (Suspicious) in 16 (4.80%) cases, and C5 (Malignant) in 54 (16.10%) cases respectively. Fibroadenoma was the commonest benign lesion found in our study in 45 cases out of 177 and ductal carcinoma was most common among malignant cases. Out of the total of 92 cases in which histopathology was followed, 86 cases were consistent with the cytological diagnosis. In triple assessment out of 132 cases, 103 (78.03%) cases were concordant in benign category, out of 8 cases only 1 (12.50%) case showed concordance in atypia category and in suspicious or malignant case, 21 (39.62%) cases showed concordance out of 53 cases. The risk of malignancy according to each category was as follows: insufficient 0%, benign 0%, atypia 0%, suspicious for malignancy 71.43% and malignant 97.56%.

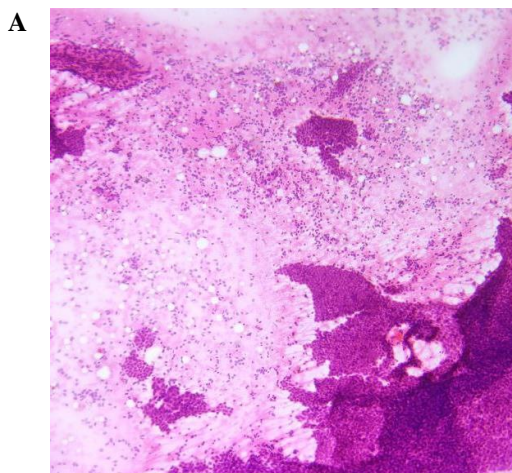


Figure 1. Examples of benign (C2 category). (A) [H & E, smear, 100X] photomicrograph showing benign ductal epithelial cells and myoepithelial cells arranged in large clusters, monolayered sheets and scattered singly. Numerous bipolar nuclei are seen.

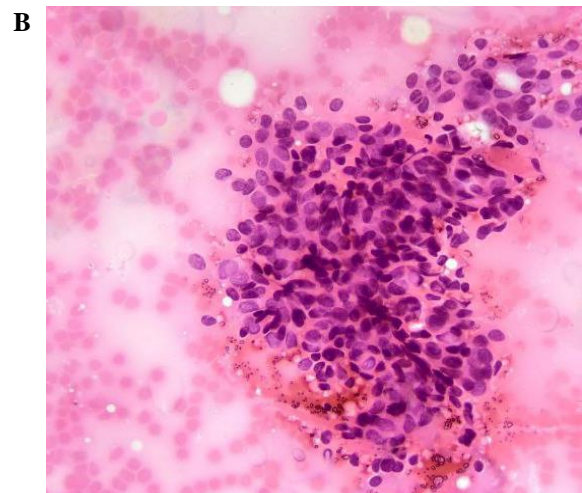


Figure 2. Example of Atypia (C3 category). (B) [H & E, smear 400X] photomicrograph showing clusters of cells with nuclear atypia and moderate amount of cytoplasm.

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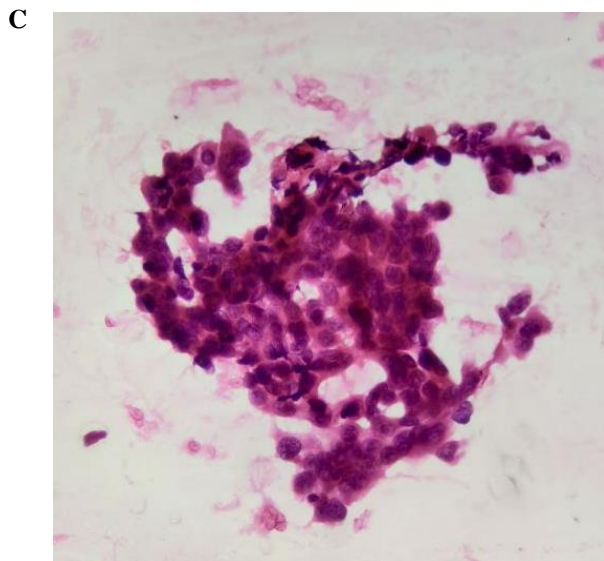


Figure 3. Example of suspicious for malignancy (C4 category). (C) [H & E, smear, 400X] photomicrograph showing clusters of cells with overlapping and overcrowding cells show hyperchromatic and pleomorphic nucleus with irregular nuclear membrane and moderate cytoplasm.

Breast cytology smears are classified as follows: category 1-insufficient; category 2-benign; category 3-atypical probably benign; category 4-suspicious for malignancy; and category 5-malignant according to the IAC Yokohama system⁶. The IAC Yokohama system distribution of our samples is comparable to research by Wong S et al.,⁷ and Kamatar P.V. et al.,⁸ [Table/Fig-5]. When compared to the Kamatar P.V.

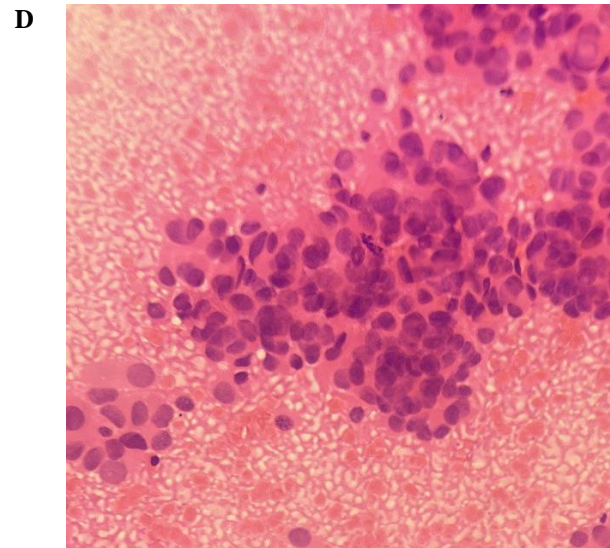


Figure 4. Examples of malignant (C5 category). (D) [H & E, smear, 400X] photomicrograph showing cells arranged in loosely cohesive clusters, acinar pattern and scattered singly. At (400X) tumor cells show moderate nuclear pleomorphism, coarse chromatin with irregular nuclear membrane and moderate cytoplasm. At places, mitosis is also seen.

et al., study, the percentage of benign (category 2) tumours in the current study is lower. There aren't many studies in the literature to compare with ours, as far as we know.

In this investigation, FNAB cytology was correlated with gold standard histopathology, and the risk of malignancy was estimated and compared to other studies [Table/Fig-6].

| Categories | Montezuma D et al. ⁹ | Wong S et al., ⁷ | Gupta A et al. ¹¹ | Kamatar P.V. et al., ⁸ | Present study |
|--------------------------|---------------------------------|-----------------------------|------------------------------|-----------------------------------|---------------|
| Insufficient | 209 (5.77%) | 301 (11%) | 05 (3.84%) | 22 (5%) | 79 (23.60%) |
| Benign | 2660 (73.38%) | 1937 (72%) | 92 (70.76%) | 332 (71%) | 177 (52.80%) |
| Atypical probably benign | 498 (13.74%) | 117 (4.30%) | 08 (6.15%) | 7 (1%) | 9 (2.70%) |
| Suspicious | 57 (1.57%) | 59 (2.20%) | 06 (4.60%) | 8 (2%) | 16 (4.80%) |
| Malignant | 201 (5.54%) | 278 (10%) | 21 (16.15%) | 101 (21%) | 54 (16.10%) |
| Total | 3625 | 2692 | 130 | 470 | 335 |

[Table/Fig-5]: Comparison of distribution of samples according to IAC Yokohama system with other study.

| Categories | Montezuma D et al. ⁹ | Hoda & Brachtel et al. ¹⁰ | Agarwal A et al. ¹² | Kamatar P.V. et al., ⁸ | Present study |
|--------------------------|---------------------------------|--------------------------------------|--------------------------------|-----------------------------------|---------------|
| Insufficient | 4.8% | 30.3% | 60.9% | 0% | 0% |
| Benign | 1.4% | 4.7% | 8.3% | 4% | 0% |
| Atypical probably benign | 13% | 51.5% | 17.3% | 66% | 0% |
| Suspicious | 97.1% | 85.4% | 77.8% | 83% | 71.43% |
| Malignant | 100% | 98.7% | 100% | 99% | 97.56% |

[Table/Fig-6]: Risk of malignancy was analysed and compared with the previous studies.

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LIMITATION

The study's main drawback was the small number of cases it included, as well as the fact that histopathological correlations were only achieved for a small number of cases and radiological findings were not acquired for all of them.

CONCLUSION

Breast lump cases are categorised into five categories in the new proposed Yokohama system for reporting cytopathology. This system is a great tool for breast cancer patient diagnosis and care. This method also makes clinical audits easier and allows for greater communication between pathologists, hospitals, and institutes. The addition of the Atypical category has resulted in improved diagnostic performance, minimising overtreatment of benign lesions but increasing the risk of cancer in suspicious lesions. As a result, FNAC with cytological diagnosis according to the Yokohama method appears to be the optimum option for a cost-effective and quick preoperative diagnosis of breast lesions.

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