CYTOMORPHOLOGICAL SCORING OF BREAST LESIONS AND ITS HISTOPATHOLOGICAL CORRELATION

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ABSTRACT

It is possible to diagnose benign & malignant breast lesions with the aid of fine needle aspiration cytology. Masood created a scoring method known as the Modified Masood's Scoring Index to help classify breast lesions. To estimate the cytological scoring of breast masses and correlation of findings with histological diagnosis. This study was done in the Cyto-Histology Department, Integral Hospital Lucknow for the duration of two years. The results were compared with gold standard histological diagnosis and classified using Modified Masood's Scoring Index. A total of 105 cases, females aged 15 to 70 with a mean age of 25.37 (SD=9.71) years were examined. On the left side, breast lumps were more common (547.1%) than on the right. The highest number of benign instances (84%) discovered in the younger age group, but malignant cases were more common in those over 35. Cytological analysis revealed that 73 (69.5%) of the cases had proliferative breast disease without atypia. Modified Masood's Scoring Index's overall sensitivity, specificity, diagnostic accuracy, positive predictive value, and negative predictive value were 100%, 97.87%, 98.1%, 84.62%, and 100%, respectively. A valuable diagnostic technique for breast masses is fine needle aspiration cytology, which offers a quick and precise diagnosis. Masood's Modified Scoring Index demonstrated a strong histopathological correlation.

KEYWORDS: Breast lesions, Fine-needle aspiration cytology, Modified masood's scoring index, BIRADS.

INTRODUCTION

The ability to differentiate benign from malignant breast lumps is crucial for surgical pathologists, as surgeons often struggle to recognize palpable breast tumors (1). As with other clinical conditions, a history, physical examination, & pathology examination, which may comprise of cytological or histological confirmation, can be used to identify breast diseases (2). Therefore, a woman who feels a mass in her breast needs to get a proper evaluation and imaging (3).

Originally, a screening method called fine needle aspiration cytology was employed to differentiate between benign & malignant breast tumors Aspiration cytology can be very helpful to clinicians in identifying and treating breast lumps quickly. It is less invasive, economical, and can avoid unnecessary surgery. It can give clinicians a new perspective on therapeutic management of breast masses by directing them to start with definitive therapy (2).

The use of cytological examination aids in the identification of cases that require a thorough histological analysis and an excision biopsy. In most cases, it prevents needless biopsies. Any single morphological feature cannot be used to identify benign and malignant cells, be it at any site (4-5). In order to classify breast lumps into four categories—non-proliferative breast disease, proliferative breast disease without atypia, proliferative breast disease with atypia, and malignancy, respectively—Masood created a Scoring Index. Based on cellular organisation, high nuclear cytoplasmic ratio, presence of myoepithelial cells, nucleoli, and chromatin patterning, the lesions are categorised using the six cytological characteristics (6). The initial pathological assessment process of the identification of palpable breast lesions with the help of Masood's Scoring Index.

The prognosis differs significantly between category I and II, so Nandini et al (7). Adjusted the values to allow for a more precise diagnosis. The Modified Masood's Scoring Index is the term given to this modified scoring system.

It would not be acceptable to routinely remove every breast lump, even though the removed tissue is evaluated histologically to obtain the final diagnosis, as up to 80% of lumps are benign (8). As a result, it is necessary to use a less intrusive and economical approach or methods of diagnosis rather than depending on a more invasive and unpleasant surgical biopsy (9).

Estimating the cytomorphological grading of breast masses and compared the findings with the histological diagnosed lesions was the purpose of this study.

MATERIAL AND METHODS

This two years observational study was executed in the Department of Pathology, Integral Institute of Medical Sciences and Research, Lucknow. Patients sent to pathology department for aspiration cytology of breast lump. Core biopsy & excision biopsy samples sent from Department of Surgery for further confirmation for histopathological examination.

Inclusion criteria

- All females of 15-70 years age group presenting with lump or nodularity in breast.

- All females of 15-70 years age group with history of nipple discharge.

- All specimens of breast received from the department of General Surgery, within the last two years which shows benign or malignant lesions.

Exclusion criteria

- Insufficient aspirates and cases in which histopathology specimens were not available.

Procedure

Following informed consent, aspiration was performed by inserting a 22-gauge needle into each patient's palpable lesion on the breast mass and removing the lesion from the palpable mass. After aspirating the cellular component, it was spread out on grease-free, spotless slides. The final two smears were stained using the May Grunwald-Giemsa after the first two are fixed with 95% alcohol and Hematoxylin and Eosin stain. Using Modified Masood's Scoring Index, the stained slides were examined under a microscope and divided into four categories (10).

Haematoxylin and Eosin stain was used to create the tissue slices of the receiving material from blocks that had been paraffin embedded and fixed in formalin. Under a microscope, the dyed slides were examined to classify the breast lesions (10).

Ethical consideration

The study protocol was approved by ethical committee. (No: IEC/IIMS&R/2022/013)

Statistical Analysis

The information for this study was collected and tabulated in Microsoft Excel (Version -21) and analysed by using SPSS (version-22). Data were presented in number & percentage.

RESULTS

Over the course of 24 months, this observational study was carried out in the Cyto-Histology Department. Fine needle aspiration diagnosed 105 cases of breast lumps in total; all of these cases were subsequently investigated by histopathology. The mean age of women in the 15–70 age group is 25.37±9.7 years. There were 43 cases (40.6%) in the 20–30 age group, and 38 cases (35.8%) in the 10–20 age group. 57.1% of cases of breast lumps are on the left side. The majority of cases (94.2%) had a unilateral breast lump.

Based on six criteria, Modified Masood's Scoring Index was used for each cytology case. In this study, a mean score of 11.7 ± 4.9 was recorded, with a total score ranging from 6 to 24.

Out of 105 cases, maximum cases categorised as proliferative lesions without atypia 73(69.5%) followed by non-proliferative 20(19.0%), whereas 11(10.4%) cases were carcinoma and one case of proliferation breast disease with atypia.

Histopathology showed 100% agreement between Categories I and III. 73 cases were in Category II. Based on biopsies, 04 cases had atypical ductal hyperplasia and 02 cases had low grade carcinomas. There were eleven cases in Category IV. Upon biopsy, all were determined to be carcinomas (Table 3). Modified Masood's Scoring Index's overall sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were 100%, 97.87%, 84.62%, 100%, and 98.1%, respectively.

The agreement between histopathological and cytological grading systems was calculated for each diagnostic category using Cohen's Kappa coefficient. Modified Masood's Scoring Index and Histopathology have a concordance of 0.887, or around 88.7%, indicating a high grade of agreement between the two methods of diagnosis.

Cytopathology	Histopathology					
Category	No of cases	Lipoma/ Galactocele/ Breast abscess	Fibroadenoma	Atypical Ductal Hyperplasia	Breast Carcinoma	p-value
NPBD	20	20	-	-	-	

Table 1: Correlation of Cyto-histopathology findings (n=105)

PBD without atypia	73	-	67	04	02	
PBD with atypia	01	-	-	01	-	**<0.01**
Carcinoma	11	-	-	-	11	
Total	105	20	67	05	13	

Cont. Table 1: Correlation of Cyto-histopathology findings (n=105)

Category	Cytopathology cases	Histopathology cases
I	20	20
II	73	67
III	01	05
IV	11	13
Total	105	105

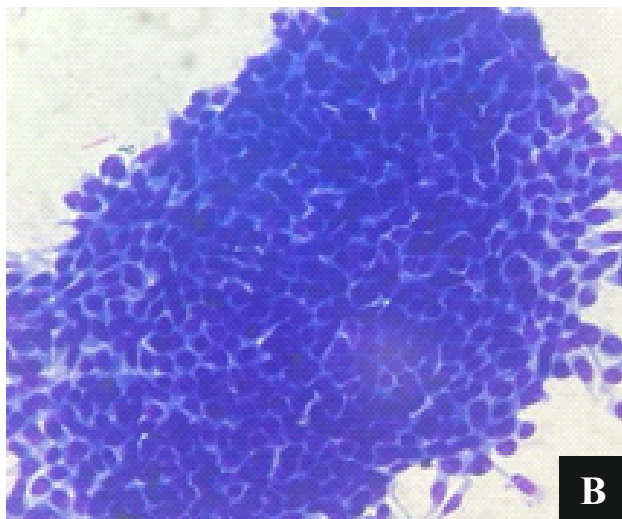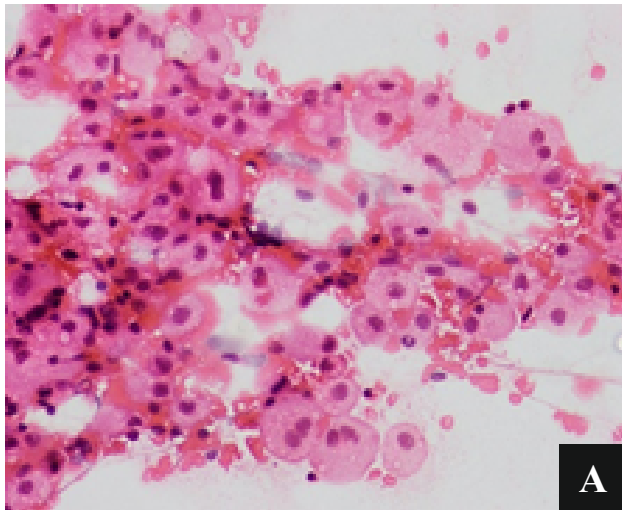*Table 2: Histopathology & Modified Masood's Scoring Index Comparison (n=105)*
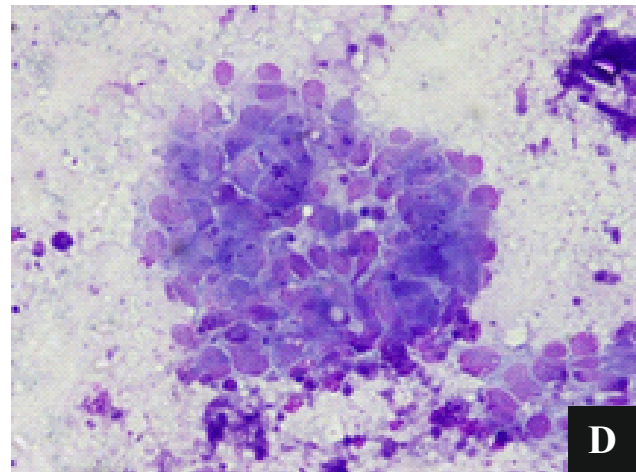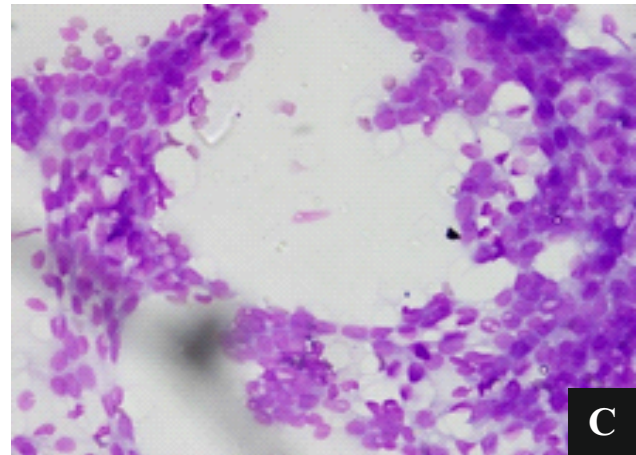
Fig.1: (A) Galactocele (Cat I) Cellular smear shows scattered macrophages and ductal cells with apocrine change on a proteinaceous background. (MGG 40X); (B) Fibroadenoma (Cat II) Cellular smear shows cluster of benign ductal epithelial cells interspersed with myoepithelial cells. (MGG 40X); (C) Proliferative Breast disease with Atypia (Cat III) Cellular smear shows sheet of ductal epithelial cells with interspersed myoepithelial cells. Cells show mild nuclear atypia and overcrowding. (H&E40X); (D) Infiltrative ductal carcinoma (Cat IV) Cellular smear shows singly scattered and loosely cohesive clusters of atypical ductal cells showing increases N:C ratio, nuclear enlargement, and conspicuous nucleoli. (MGG 40X)

DISCUSSION

Aspiration cytology is essential in contemplation of assessing breast lumps since it helps the surgeon decide on additional therapeutic measures. With the use of a scoring index, breast lumps were classified. The risk of breast cancer is increased in patients with proliferative breast disease. In category II, the risk of breast cancer is 1.3 times higher, but in category III, the risk is 4.3 times higher (7). In proliferative breast disease without atypia, nuclear congestion & overlap are intermittently present in the cellular arrangement in sheets. Nucleoli and nuclear overlaps are abundant in closely spaced cell clusters linked to proliferative breast disease with atypia. The chromatin is coarsely clumped, the cells are loosely arranged, and there is obvious nuclear pleomorphism with an uneven nuclear membrane and prominent macronuclei in malignant lesions. Myoepithelial cells are absent in malignant tumors. Myoepithelial cells were vital for separating benign lesions from malignant ones (6).

According to the Modified Masood's Scoring Index, 99 (94.2%) of the 105 breast aspirate cases in the current study demonstrated concordance with the histopathological diagnosis. The Modified Masood's Scoring Index categorise I and IV demonstrated a high concordance rate (100%) with the diagnosis of histopathology. Mridha AR et al. (11), Joseph MT (12), Abraham B and Sarojini TR (13) and Aggarwal M et al. (14) likewise saw 100% concordance in this category, indicating a similar outcome. In the current study, category IV demonstrated 100% concordance with histological diagnosis, similar findings observed in other studies. (6-7) Using Modified Masood's Scoring Index, 73 (69.5%) of the patients came into Category II on cytology. Histopathology verified 67 out of 73 cases in Category II, while investigation of the histopathology revealed two cases of carcinoma and four instances of non-proliferative breast disease with atypia. Aggarwal M [(45)] and Abraham B & Sarojni TR [(68)] found similar results in category II. Our results, however, are at odds with those of Nandini et al. (7) and Masood et al. (6), who both found no cancer cases in this category on histopathological investigations.

Diagnostic accuracy of Modified Masood's Scoring Index

Eleven of the thirteen cancer cases that were histologically verified fell into category IV of the Modified Masood's Scoring Index. When it comes to identifying malignant breast lesions, the scoring index has an overall diagnostic accuracy, sensitivity, and specificity of 98.1%, 100%, and 97.8%, respectively. Aggarwal C et al. (18) and Abraham B & Sarojini TR (12) made similar observations. In categories I and IV,

this study demonstrated a 100% histopathological association. In additional research, Qin Z. (15), Mohammad et al. (16), Panjvani (17), and Tiwari M. (9) found a 100% cyto-histopathological association using cytology alone.

Limitations

Compared to other categories, a comparatively fewer samples were found in category III.

Conclusion

Our study's findings indicate that aspiration cytology is an effective diagnostic method that may quick & reliable diagnose breast lesions. The scoring system is straightforward, dependable, and easily repeatable. These cytological scoring methods exhibit strong correlations with histological diagnosis and have good specificity, sensitivity, negative predictive value, and positive predictive value.

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