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Original Research Article

Assessment of Breast Cytology by Application of Modified Masood's Grading System

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Abstract:

Introduction: Breast cancer is becoming more common globally, with peak incidence over 50 years of age in Western nations and over 40 years in India. It is possible to distinguish between distinct benign and malignant breast lesions with fine-needle aspiration cytology (FNAC), which is a rapid, simple, and affordable diagnostic method.

Aims and Objectives: (1) to evaluate the Modified Masood's Scoring Index (MMSI)'s applicability to breast cytology. (2) To investigate the link between cytopathology and breast lesions. Sort the breast lesion according to its histology and MMSI after the FNAC.

Materials and Methods: At Pandit Raghunath Murmu Medical College and Hospital in Baripada, Odisha, 183 patients who were sent for FNAC from the surgery department to the cytology division of the pathology department underwent hospital-based prospective research from January 2023 to May 2024.

Results: The majority of cases (45.90%) in our analysis, with a mean age of 37±14.65, were in the 20–39 age range. With a mean MMSI score of 11.35±5.55, group II (proliferative breast disease [PBD] without atypia) included the majority of patients (60.6%). The results of the histological analysis revealed a connection of 89.52% with MMSI category II and 98.15% with MMSI category IV, whereas the cytological results demonstrated a correlation of 98.20% with MMSI in category II and 88.68% in category IV. With 120 cases (65.6%), fibroadenoma (FA) was the most often seen finding on histological examination.

Conclusion: When it comes to breast lesions, such as PBD with or without atypia and carcinomas, the MMSI is a useful tool to supplement cytomorphological diagnosis. Given that therapy choices might differ depending on the MMSI score, it is especially helpful in the early care and prognosis of patients.

Keywords: Breast lesion; Modified Masood's Scoring Index; Fine-needle aspiration cytology.

Introduction

Cervical cancer is the primary cause of cancer deaths among Indian women, with breast cancer coming in second. [1-3] with around 80,000 new cases identified each year, it is one of the primary causes of death. [4] Globally, the prevalence of breast cancer is rising, with Western nations seeing a peak incidence above the age of 50, whereas India has one above the age of 40. [5] Nulliparity or poor parity, delayed marriage, childbirth, and shorter nursing periods are associated with an increase in breast cancer cases.

Due to inadequate breast cancer screening programmes and diagnostic facilities, as well as a lack of awareness regarding female health in much of India, the majority of cancer patients have just recently received a diagnosis. It is challenging to identify if a suspicious mass is benign or cancerous based alone on a clinical examination. Thus, at the outpatient clinic, a conclusive and diagnostic test that can distinguish these breast tumours is required. This process needs to be repeatable, precise, and simple to carry out. [6]

One rapid, simple, and affordable method for diagnosing breast illness is fine-needle aspiration cytology (FNAC) and useful in distinguishing between distinct benign and malignant breast tumours. Because FNAC has a high rate of patient acceptability, little morbidity, and no particular equipment needs, it is an outpatient treatment. When it is challenging to identify the type of breast lumps by clinical examination, FNAC of breast lumps is a recognised and proven approach that can

identify the nature of breast lumps with a high degree of accuracy. [7] Since Martin and Ellis initially presented the use of FNAC in 1930 for the detection of palpable breast masses, it has become a recognised diagnostic technique for breast lesions. [8] FNAC is an extremely specific and sensitive method for differentiating between benign and cancerous breast lesions. It has been demonstrated that FNAC can lower the quantity of open breast biopsies performed. At any site, it is not possible to differentiate between benign and malignant cells using a single morphological characteristic. [9] In order to organise palpable breast lump aspirates into several categories, such as category I, II, III, and IV, Masood developed a cytological grading system based on cellular organisation, cellular pleomorphism, anisonucleosis, the presence of myoepithelial cells, nucleoli, and chromatin pattern. [10, 11].

Materials and Methods

Patients with clinically palpable breast lumps who were referred for FNAC from the surgery department to the pathology department's cytology division at the Pandit Raghunath Murmu Medical College & Hospital in Baripada (Odisha) were the subjects of the current research. In our PRM Medical College a hospital-based prospective cross-sectional study was conducted to examine the different cytomorphological patterns and frequency of breast lesions/lumps. Additionally, the MMSI was used to assess the lesions and determine their use. Whenever feasible, breast cytology and histopathology coincide.

Inclusion criteria

1. Female having a clinically palpable breast lump measuring more than 1 centimetre;
2. Age group: 18 to 75 years.
3. Patients providing informed consent for the trial.

Exclusion criteria

1. A clinically indiscernible breast lump
2. Patient consent is not obtained.

Ethical issues

This study will be conducted after getting informed consent from the patient. This is an observational study and thetechniques going to be used are mini-mally invasive, thus no such ethical issues are being created.

Statistical analysis

The current study's data will be input into computers, recorded, and checked for errors following adequate validation. SPSS 20 software for Windows will be used to assemble and analyse the decoded and coded data.

Additional statistical tests, such as the student's t-test for continuous data and Fisher's exact test or X2 test for categorical data, will be used if it is thought necessary to support the hypothesis. Appropriate univariate and bivariate analysis and descriptive statistics will be carried out.

The proportion is provided as a percentage (%) and the means are shown as mean ± standard deviation. The significance level of the results will be determined by using a critical value of ≤0.05.

Results

In this study, the age group of 20–39 years old accounted for the greatest number of cases (84) (45.90%), followed by the age group of 40–59 years old with 52 instances (28.42%). The study population's mean age was 37±14.65 years old (Table 1).

Table 1: Age-Wise Distribution of Cases

Age (years)	Frequency, n (%)
<20	34 (18.58)
20–39	84 (45.90)
40–59	52 (28.42)
≥60	13 (7.10)
Total	183 (100.00)

About 13 cases (7.1%) with MMSI category I (Figure 1) (score 6–8), or proliferative breast disease without atypia, comprise the bulk of cases in the current investigation. Only 6 instances (3.3%) were found to fall into Category III (Figure 3a and b) of MMSI (score: 15–18), followed by Category IV (Figure 4a and b) carcinoma in situ/carcinoma MMSI (score: 19–24), which accounted for 53 cases (28.9%) of MMSI (score: 9–14). Table 2 displays the mean MMSI score of 11.35±5.55.

Table 2: Modified Masood's Scoring Index

Grade	Category	MMSI score	Frequency (%)
I	NPBD	6–8	13 (7.1)
II	PBD without atypia	9–14	111 (60.6)

III	PBD with atypia	15–18	6 (3.3)
IV	Carcinoma in situ/carcinoma	19–24	53 (28.9)

Because we only obtained a minimal number of biopsy reports for this study, the concordance between cytology and MMSI in Category I is 72.22% (Table 3), whereas the concordance between histopathology and MMSI is 23.07% (Table 4).

Table 3: Correlation of Cytology Finding with Modified Masood's Scoring Index

Categories	FNAC findings	MMSI number of cases	Concordance (%)	Non-concordance (%)
NPBD (Category-I)	18	13	72.22	27.78
PBD without atypia (Category-II)	109	111	98.20	1.80
PBD with atypia (Category-III)	9	6	66.67	33.33
Carcinoma in situ/carcinoma (Category-IV)	47	53	88.68	11.32

98.15% correlation was shown in Categories-IV. The results of the Chi-square test indicate a highly significant (P<0.001) association (Table 4).

Table 4: Correlation Of Histopathological Findings With Modified Masood's Scoring Index

Category	MMSI No. of cases	HPR findings	Concordance (%)	Non-concordance (%)
NPBD (Category-I)	13	3	23.07	76.93
PBD without atypia (Category-II)	111	124	89.52	10.48
PBD with atypia (Category-III)	6	2	33.33	66.67
Carcinoma in situ/carcinoma (Category-IV)	53	54	98.15	1.85

Fibroadenoma was the most prevalent breast lesion in the current investigation. The histological findings and the cytological results agreed on 87.5% of the cases, whereas the results on breast ductal carcinoma agreed on 87.04% of the cases. It is discovered to be extremely substantially linked (P<0.001*) after using the Chi-square test (Table 5).

Table 5: Correlation of Cytological Findings with Histopathological Findings

FNAC findings	Number of cases	HPR findings	Concordance (%)	Non-concordance (%)
BBL	18	3	16.67	83.33
FA	105	120	87.5	12.5
ADH	9	2	22.22	77.78
Phyllodes	4	4	100.0	0.00
DCB	47	54	87.04	12.96

Discussion

183 patients, all female and ranging in age from 14 to 78, were included in the current study. The majority of the 136 cases (74.35%) belonged to the age range of 20 to 59. The majority of the patients in our research were between the ages of 20 and 39, with the youngest being 14 years old and the oldest being 78. The prevalent age group (20–39 years old) was impacted by benign breast diseases. Table 1 shows the mean age as 37±14.6% years. According to Cherath and Chithrabhanu's16 observations, 65.11% of patients had a mean age of 46.1 years, falling within the 26 to 55 year age range. According to Panjvani et al. (2008), 50.45% of the patients had an age group between 21 and 40 years old. Agrawal and colleagues [17] noted that the span of 41 to 70 years was the maximum number of instances. The majority of patients in this study that were categorised using the MMSI score fell into Category II (proliferative breast disease [PBD] without atypia), with 53 cases (28.9%) representing Category IV (carcinoma in situ/carcinoma). Just 6 instances (3.3%) were discovered in Category III (BPD with atypia), whereas the remaining 13 cases (7.1%) fall under Category I (NPBD) (Table 2). Shah and Code18 discovered that Category II accounted for the greatest number of instances (42%), with Category IV coming in second (34%). According to Agrawal et al. (2017), 47.8% of the cases were classified as belonging to Category IV.

Categorization I (NPBD) applied to 13 out of 183 instances. Seven instances were classified as having high MMSI scores between 9 and 14, which put them in Category-II (PBD without atypia). One case, on the other hand, was classified as having a high MMSI score between 15 and 18, which put it in Category-III (PBD with atypia). Given that 11 cases were moved to Category-II and 1 case was moved from Category-II, our histopathology-based MMSI appropriately categorised 3/183 patients in Category-I (NPBD). In comparison to Shah and

Code [18], our study revealed that 20/50 cases were classified as NPBD on cytology, and 11/50 cases fell under Category-I by MMSI based on FNAC aspirate. They also discovered that 10/50 cases had histopathology reports, and 10 of those cases were correctly placed under Category-I (NPBD) by MMSI because FNAC of breast lesions started as a screening procedure to Differentiate between benign and malignant tumours.

109/183 individuals with PBD without atypia were identified on FNAC in the current investigation; fibroadenoma was the most common diagnosis among these cases. By using MMSI on FNAC aspirates, 111/183 cases were classified as Category-II (PBD without atypia). This is because 7 cases had high MMSI scores (9–14) that were shifted from Category-I (NPBD) to Category-II (PBD without atypia), 2 cases had high MMSI scores [15–18] that were shifted from Category-II MMSI score [9–14], and 3 cases had high MMSI scores [6–8].

Because 1 case was moved to Category I, 11 cases from Category I, and 3 cases from Category III, HPR verified 124/183 cases under Category-II. Jayaram et al. [20] discovered the result and made the diagnosis. 144 instances in Category-II were identified by histology; 134 of these cases had cytology diagnoses and 140 had MMSI diagnoses. Shah and Code [18] discovered an additional finding, indicating that 12 out of 50 cases were detected by cytology. MMSI categories placed 21 out of 50 instances in this category. 22 out of 50 instances were confirmed on HPR.

Conclusion

We came to the conclusion from this study that FNAC is an easy, quick, low-invasive, dependable, and highly sensitive outpatient treatment that can provide an early and accurate diagnosis. When it comes to the early care and prognosis of patients, MMSI is helpful in conjunction with cytomorphological diagnosis in cases of breast lesions, PBD with or without atypia, and carcinomas. This is because the treatment options vary. Because there is a very minimal risk of malignancy, biopsy was not identified in the majority of patients in the current study, leading to negligible results in NPBD on cytology and MMSI.

References

1. Takiar R and Srivastav A. Time trend in breast and cervix cancer of women in India- (1990-2003). Asian Pac J Cancer Prev. 2008; 9(4):777-780.
2. Zagorianakou P, Fiaccavento S, Zagorianakou N, Makrydimas G, Stefanou D and Agnantis NJ. FNAC: Its role, limitations and perspective in the preoperative diagnosis of breast cancer. Eur JGynaecol Oncol. 2005; 26(2):143-149.
3. Dudgeon LS and Patrick CV. A new method for the rapid microscopical diagnosis of tumours: With an account of200 cases so examined. J Br Surg. 1927;15(58):250-261.
4. Sinha R, Anderson DE, McDonald SS and Greenwald P. Cancer risk and diet in India. J Postgrad Med. 2003; 49(3):222-228.
5. Nandakumar A. National Cancer Registry Programme. Consolidated Report of the Population Based Cancer Registries. Incidence and Distribution of Cancer: 1990-96. Vol. 125. New Delhi: Indian Council of Medical Research; 2019; 3184-3197.
6. Tiwari M. Role of fine needle aspiration cytology in diagnosis of breast lumps. Kathmandu Univ Med J (KUMJ). 2007; 5(2):215-217.
7. Hindle WH, Payne PA and Pan EY. The use of fine-needle aspiration in the evaluation of persistent palpable dominant breast masses. Am J Obstet Gynecol. 1993; 168(6 Pt 1):1814-1818.; discussion 1818-1819.
8. Panjvani SI, Parikh BJ, Parikh SB, Chaudhari BR, Patel KK, Gupta GS, et al. Utility of fine needle aspiration cytology in the evaluation of breast lesions. J Clin Diagn Res. 2013; 7(12): 2777-2779.
9. Gray W and Kocjan G. Diagnostic Cytopathology. 3rd ed. Churchill Livingstone Elsevier; 2010. p. 179-225.
10. Masood S, Frykberg ER, McLellan GL, Dee S and Bullard JB. Cytologic differentiation between proliferative and nonproliferative breast disease in mammographically guided fine-needle aspirates. Diag Cytopathol. 1991; 7(6):581-590.
11. Masood S. Cytomorphology of fibrocystic change, high-risk proliferative breast disease, and premalignant breast lesions. Clin Lab Med. 2005; 25(4):713-731.
12. Yong WS, Chia KH, Poh WT and Wong CY. A comparison of trucut biopsy with fine needle aspiration cytology in the diagnosis of breast cancer. Singapore Med J. 1999; 40(9):587-589.
13. Francis IM and Das DK. Role of fine needle aspiration, intraoperative imprint cytology and frozen section in the diagnosis of breast lumps and thyroid lesions. Med Princ Pract. 1999; 8(3):173-182.
14. Dutta SK, Chattopadhyaya A and Roy S. Evaluation of fine needle aspiration and imprint cytology in the early diagnosis of breast lesions with histopathological correlation. J Indian Med Assoc. 2001; 99(8):421-423.
15. Nandini NM, Rekha TS and Manjunath GV. Evaluation of scoring system in cytological diagnosis and management of breast lesion with review of literature. Indian J Cancer. 2011;48(2):240-245.
16. Cherath SK and Chithrabhanu SM. Evaluation

of Masood's and modified Masood's scoring systems in the cytological diagnosis of palpable breast lump aspirates. J Clin Diagn Res. 2017; 11(4):EC06-EC10.
17. Agrawal M, Khan N and Agrawal A. Masood's cytological scoringof breast lumps and it's histopathological comparison. Int J Contemp Med Res. 2020; 7(12):L1-L4.
18. Shah R and Code QR. Value of scoring system in classification of proliferative breast disease on fine needle aspiration cytology.Int J Biomed Res. 2017; 8(9):530-537.
19. William J, Masih K, Pradhan U, Kaur J, Singh U and Singh G. Efficacy of Modified Masood Scoring System (MMSS) in cytological diagnosis of breast lesions. Cureus. 2022;14(2):e22296.
20. Jayaram N, Harini V and Shivarudrappa AS. Significance of Masood's scoring index in cytological diagnosis of palpablebreast lumps: A 3 year's retrospective studies. Indian J Pathol Res Pract. 2018; 7(10):1069-1072.