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Modified Masood Scoring System's Utility in Low Resource Setting for Diagnosis of Malignant Breast Lesion

Dr.Pushpa Batham[1], Dr.Jyoti Yadav[2],Dr.Atul Sharma[3], Dr.Deepti B Sharma[4]*

[1]Associate Professor, Department of Pathology, N.S.C.B. Medical College & Hospital, Jabalpur (M.P), India
[2]Postgraduate Resident, Department of Pathology, N.S.C.B. Medical College & Hospital, Jabalpur (M.P), India
[3]Assistant professor, SukhSagar medical college, Jabalpur (M.P), India
[4]Professor, Department of Surgery, N.S.C.B. Medical College & Hospital, Jabalpur (M.P), India

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***Corresponding Author**
Dr.Deepti B Sharma

Professor, Department of Surgery, N.S.C.B. Medical College & Hospital, Jabalpur (M.P), India

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A B S T R A C T

Background:Core needle biopsy is a gold standard for the diagnosis of breast lumps. Sometimes it is difficult for patients to afford its cost, especially in low- resource settings. Tissue processing is also not available at all hospitals and with all pathologists.We try to find out the concordance of MMSI (Modified Masood Scoring) in FNAC with histology and its utility in making better diagnoses thereby we can use it as a diagnostic procedure for malignant lesions in a low resource setting.***Method:*** All patients with clinically palpable breast lumps referred to the Pathology department for fine - needle aspiration cytology (FNAC) were included. The patient was thoroughly informed and after taking consent, FNAC was done from 3 sites. These specimens' lesions are also evaluated by applying Modified Masood's Scoring Index (MMSI) and to access its usefulness in breast cytology also correlate with Histopathology.***Results:*** The 89.52% and 98.15% of histological findings were correlated with MMSI category II and MMSI categories IV respectively. On applying the chi-square test, it is found to be highly significantly associated($p<0.001$). ***Conclusion:*** MMSI gives a good prediction of the identification of breast lesions so one can plan effective management planning in low resource settings when the availability and affordability of core needle biopsy facility are not available.

Keywords: Low resource settings, Breast lump, Modified Masood's Scoring Index (MMSI), Fine needle aspiration cytology.

INTRODUCTION

Core needle biopsy is a gold standard for the diagnosis of breast lumps. Its accuracy, sensitivity, and specificity are already established. It confirms the diagnosis with a positive predictive value of 100% and a sensitivity of 95.5% [1]. This procedure comes with problems like pain, haemorrhage [2] and comparatively high cost. The average cost of a biopsy is 4000 -8000 INR (50 – 95$). It is sometimes difficult for patients to afford this much cost, especially in low-resource settings. Tissue processing is also not available at all hospitals and with all pathologists.

Fine Needle Aspiration cytology (FNAC) is a rapid, economical method for the diagnosis of breast lumps. Its diagnostic accuracy is 74% [3]. FNAC has been found to have a sensitivity ranging from 81% to 97.5% and a specificity of more than 99% [4]. Importance of FNAC has been well documented in the diagnosis of breast lesions in the last 20 years. The only problem is the inter-observer variability to grade the lesion accurately[5, 6]. To overcome this problem of inter-observer variability ShahlaMasood [7] introduced a cytological grading system to categorize palpable breast lump aspirates based on cellular arrangement, cellular pleomorphism, anisonucleosis, presence of myoepithelial cells, nucleoli & chromatin pattern into different groups such as category I, II, III, IV.

Nandini*et al*., [8] found that simple modification in the Masood score increases the diagnostic accuracy of the breast lesions.We try to find out the concordance of MMSI with histology and its utility in making better diagnoses thereby we can use it as a diagnostic procedure for malignant lesions in a low resource setting.

Method

The present study was conducted in the Department of Pathology in the last one and a half years. All patients with clinically palpable breast lumps referred to the Pathology department for fine - needle aspiration cytology (FNAC) from the surgery department were included. The patient was thoroughly informed and after taking consent, FNAC was done from 3 sites. The aspirate was thinly spread on 4-5 clean dry glass slides. 2 smears were wet fixed for Pap stain & remaining were air dried for MGG stain. The stained smears were then examined under the microscope and the various cytomorphologicalpattern were assessed. These specimens' lesions are also evaluated by applying Modified Masood's Scoring Index (MMSI) and to access its usefulness in breast cytology also correlate with Histopathology.

Massod score and modified Masood score were calculated in each sample. Later on, scores were calculated and compared with histological diagnosis.

Statistical analysis-The data of the present study will be recorded / fed into the computers and after its proper validation, check for error; coding and decoding will be compiled and analyzed with the help of SPSS 20 software for windows. Appropriate univariate and bivariate analysis and the descriptive statistics will be carried out other statistical tests such as student's t-test for continuous data and fishers exact test or X2 test for categorical data will also be applied if the necessity felt to support the hypothesis if the necessity felt to support the hypothesis, sensitivity, specificity positive predictive and negative predictive value will also measured.

All means are expressed as mean ± standard deviation and proportion as in percentage (%). The critical value for the significance of the results will be considered at 0.05 level.

Observation and results

A total of 183 females with breast lumps were identified with an age range were 12 to 90 years (mean 37 ± 14.65). Maximum patients belong to the age group of 20 to 40 years (Table 2). FNAC aspirates were examined and cytological analysis was done.

18 specimens out of 183 cases were classified as NPBD on cytological analysis. When Modified Masood's Scoring Index (MMSI) was applied to it 13 cases fell under (cat-I) of NPBD, Because some cases placed in cat-II PBD without atypia and 1 case had high MMSI score placed in cat-III PBD atypia. The cytological findings were 98.20% correlated with modified masood's scoring index in category II and 88.68% with category IV. On applying the chi-square test, it is found to be significantly associated($P<0.001\%$)(Table 3).

The 89.52% and 98.15% of histological findings were correlated with MMSI category II and MMSI categories IV respectively. On applying the chi-square test, it is found to be highly significantly associated($p<0.001$) (Table 4).

When MMSI is applied to cytological findings, it was found that more specimens fell into category II and showed better concordance with histopathological diagnosis (Table 4).

MMSI score increased the number of specimens in category IV (Table 3). This score was found to be in concordance with histopathological diagnosis (Table 4). It states that MMSI gives better prediction of malignancy.

Table 1: Modified Masood Scoring System Modified Masood's Scoring Index (MMSI)

Cellular arrangment	**Cellular pleomorphism**	**Myoepithelial cells**	**Anisonucleosis**	**Nucleoli**	**Chromatin clumping**	**Score**
Monolayer	Absent	Many	Absent	Absent	Absent	1
Nuclear overlapping	Mild	Moderate	Mild	Micronucleoli	Rare	2
Clustering	Moderate	Few	Moderate	Micronucleoli&/or rare macronucleoli	Occasional	3
Loss of cohesion	Conspicuous	Absent	Conspicuous	Predominantly macronucleoli	Frequent	4
Total Score						
Category-I- Nonproliferative breast disease 6-8						
Category-II- Proliferative breast disease without atypia 9-14						
Category-III- Proliferative breast disease with atypia 15-18						
Category-IV- Carcinoma in situ/Carcinoma 19-24						

Table 2: Showing Age Wish Distribution of Cases

Age group (in years)	Frequency	Percent (%)
<20	34	18.58%
20-39	84	45.90%
40-59	52	28.42%
≥60	13	7.10%
Total	183	100.00%

Table 3: Correlation of cytology finding with modified masood's scoring index

Categories	FNAC findings	MMSI no, of cases	Concordance	Nonconcordance
Non-proliferative breast disease (NPBD) (cat-I)	18	13	**72.22%**	**27.78%**
Proliferative breast disease (PBD)without atypia (cat-II)	109	111	**98.20%**	**1.80%**
Proliferative breast disease (PBD)with atypia (cat-III)	9	6	**66.67%**	**33.33%**
Carcinoma (cat-IV)	47	53	**88.68%**	**11.32%**

Table 4: Correlation of histopathologicalfinidings with Modified Masood's Scoring Index (MMSI)

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

DISCUSSION

Fine Needle Aspiration cytology (FNAC) is a rapid, economical method for the diagnosis of breast lumps. The grading system in these specimens eliminate the inter-observer variability [7]. A simple modification in the Masood score increases the diagnostic accuracy of the breast lesions [8].

We found that after applying MMSI more specimens fall into category II. There was an increase in the number of specimens in category IV after the MMSI score application (Table 3).

Histopathological concordance was found better with MMSI category II (89.52) as compared to conventional cytology (Table-4). William [9] showed 100% with MMSI and 62.5% with conventional cytology. Nandini [8] and Mirdha [10] found a high correlation with HPE i.e. 97.4% each. We found 89.52 concordances in this study but Sneige and Staerkel [11] observed a slightly low concordance 60%. MMSI showed concordance with histology 66.67% in category III but Jayaramn*et al.*, [12] found 100% concordance between histopathology and MMSI.

Specimens that are coming in category IV showed a good cytology and MMSI concordance in 88.68% of histopathological findings and MMSI concordance was 98.15% (Table-4) as also showed by Agrawal, M *et al.*, [6], Cherath, S. K *et al*., [13] and William, J *et al*., [9] shows 100.0% concordance between histological and MMSI findings.

Kaur*et al.*, [14] found that a high rate of cyto-histological correlation is present with a high MMSI cytological grading system. Concordance rates were 96.6% in grade I malignancy and 90% in grade II with specimens of MMSI grade IV. Similar pictures are shown by other authors. MMSI can predict better diagnostic accuracy in breast lesions especially in malignancy [15].

MMSI of FNAC categorization gives better predictive value as compared to simple FNAC and can be used for diagnosing the malignancy in patients who are planned for wide local excision or breast conserving Surgery where core needle biopsy procedure is an additional, cost bearing process for diagnosis confirmation.

CONCLUSION

MMSI gives a good prediction of the identification of breast lesions so one can plan effective management planning in low resource settings when the availability and affordability of core needle biopsy facility are not available.

Declarations

Ethical approval and consent to participate.Ethical approval was taken from Peer review committee of Institution. There is no conflict in interest. Informed consent was taken from every patient.

Consent for publication: All authors has given their consent for publication.

Availability of data and material: Data is available with corresponding author

Conflict in Interest: No

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