

# Masood's Cytological Scoring of Breast Lumps and it's Histopathological Comparison

Megha Agrawal<sup>1</sup>, Nausheen Khan<sup>2</sup>, Abhishek Agrawal<sup>3</sup>

## ABSTRACT

**Introduction:** FNAC plays a significant role in categorization of breast lesions with the assessment of various morphological parameters so that prognosis & management of each category could be done accordingly. Aim: Evaluation of Cytomorphological features of different breast lesions with MMSI & its histopathological correlation.

**Material and methods:** Cross sectional study was conducted in a tertiary care center including 69 cases having palpable breast lump which had undergone FNAC followed by excision biopsy for histopathology.

**Results:** MMSI has better diagnostic accuracy and good histopathological correlation for breast lump aspirates.

**Conclusion:** MMSI is a simple and reliable scoring system. It provide good histopathological correlation to decide on neoadjuvant chemotherapy, with minimal invasion.

**Keywords:** Fine Needle Aspiration Cytology, Modified Masood's Scoring Index.

## INTRODUCTION

Breast is not just a part of the female anatomy, it is a symbol of womanhood. Any lesion in the breast be it small or large, benign or malignant, directly affects the patient's psychology as it evokes in the patient a fear of mutilation & loss of femininity. Breast lump is a common diagnostic problem seen in clinical practice. FNAC is a quick, easy, & cost-effective diagnostic tool for breast diseases, and also helpful to differentiate between various benign & malignant lesions of breast. Most of the benign lesions can be treated without affecting the aesthetic appearance or normal physiology of the breast but few of them are precancerous & it is important to detect and treat them at an early stage in order to reduce the incidence of breast carcinoma thereby reducing the overall mortality. Moreover, breast cancer is now one of the leading causes of cancer in Indian women, being second only to cervical cancer.<sup>1-3</sup>

A single morphological feature cannot be relied upon to distinguish malignant cells from benign, be it any site.<sup>4</sup> So Masood 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.<sup>5,6</sup>

Nandini et al found that, modification in the original MSI by advocating rearrangement score of category I & II improves the diagnostic accuracy of both categories. The modified scoring system was named as MMSI.<sup>7</sup>

The overall aim of this study was to assess & compare the diagnostic accuracy of MMSI by comparing it with subsequent histopathology.

## MATERIAL AND METHODS

The cross sectional study was conducted in the department of pathology at a tertiary care hospital, over a period of 1 year from September 2014 to September 2015. Only female patients of age 15-75 yrs presenting with palpable breast lump were included in the study. The exclusion criteria were inadequate cytological aspirates & cases in which histopathology specimens were unavailable. Adequate sample comprising of at least 4-5 clusters of ductal epithelial cells; each made up of 5-6 cells with presence of bare nuclei in the background.

The procedure of FNAC was first explained to the patient, & informed consent was obtained. After fixing the lump by left hand FNAC was carried out with 23-gauge needle & 10ml syringe. USG guided FNAC was done in in non-palpable lesions with the help of expert radiologist. The aspirate was expressed and thinly spread on 4-5 clean dry glass slides. At least 2 smears were wet fixed for Pap stain & remaining were air dried for MGG stain. The stained smears were then examined under microscope & grouped into 4 categories using MMSI (Table 1).

The tissue sections of specimen received were prepared from formalin fixed, paraffin embedded blocks and stained with H & E stain. Each case was categorized mainly into 4 categories (Table 2) after that cytohistopathological correlation & concordance analysis was conducted.

The categorical data were analyzed in Microsoft excel programme & presented as frequencies & percentage. Age & total score were presented as mean & standard deviation(SD). The findings of MMSI, cytology & histopathology were compared using % of agreement, kappa statistics & chi-

<sup>1</sup>Assistant Professor, Department of Pathology, <sup>2</sup>Assistant Professor, Department of Pathology, <sup>3</sup>Assistant Professor, Department of Radiodiagnosis, Integral Institute of Medical Sciences & Research, Lucknow, UP, India

**Corresponding author:** Dr Abhishek Agrawal, 47/2A Shivaji Marg, Hewett Road, Hussainganj, Lucknow, Pincode- 226018, India

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square test to calculate sensitivity, specificity, predictive values & diagnostic accuracy.

**RESULTS**

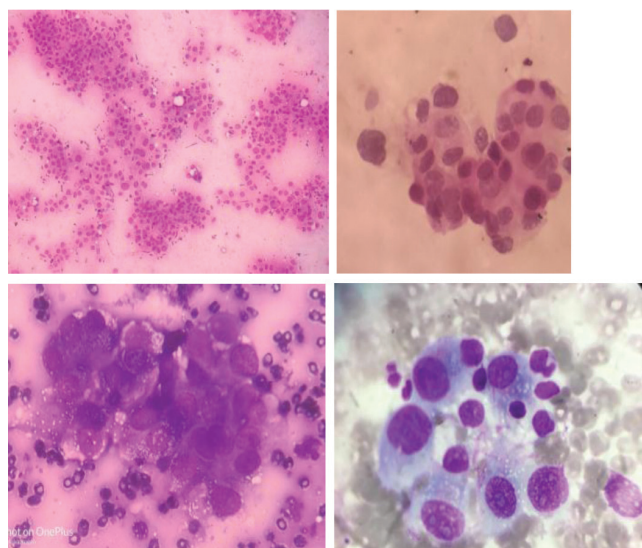
This study was conducted on 106 pateints in a duration of 1 year. A total 69 cases fulfills the inclusion & exclusion criteria and selected for study. Females in the age range of 15-75 yrs with a mean age 43.91(SD=16.31). The maximum no. of cases (41%) were in the age group of 41-70 yrs. Right sided breast lump are common than left (61.4%). Majority of cases was noted as unilateral breast lump(92.6%).

The maximum number of lumps was of particularly one quadrant i.e. upper outer (53.4%); irrespective of the side. Most of the cases undergone FNACs were from breast lump of size<3cm, (75.6%); nontender (90.4%), and of firm consistency(73.3%). USG-guided FNACs was done in 9.3% of cases.

MMSI was done for all the cytology cases based on six parameters. A total score ranging from 6-24 was obtained during the study with a mean of 13.04(SD=6.06)

All the four categories of MMSI were compared with histopathological findings (Table 3).

Category I had 29 cases. All were benign on follow up biopsy. Out of 29 cases 26 were fibroadenomas & 3 reported as phyllodes tumours.



**Figure-1:** (a) NPBD (Cat I) monolayer sheets of benign ductal epithelial cells with myoepithelial cells (MGGX10); (b) PBD without atypia (Cat III) nuclear overlapping, mild cellular pleomorphism & mild anisonucleosis, in sheets of ductal epithelial cells (MGGX40); (c) PBD with atypia (Cat III) moderate to high cellular smear with moderate cellular pleomorphism & anisonucleosis & chromatin clumping (MGGX40); (d) Ca in situ (Cat IV) discohesive cells with high N:C ratio, conspicuous nucleoli, pleomorphism & macronucleoli & absence of myoepithelial cells (MGGX40)

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

**Table-1:** Modified Masood's Scoring Index

MMSI	Histopathological diagnosis				Total
	CA	NPBD	PBD with atypia	PBD without atypia	
1	0	29	0	0	29
2	2	0	0	2	4
3	2	0	1	0	3
4	33	0	0	0	33
Total	37	29	1	2	69

**Table-2:** Comparison of MMSI vs histopathological diagnosis

Groups	Category	MMSI	Histopathology
1	NPBD	29	29
2	PBD without atypia	4	2
3	PBD with atypia	3	1
4	CA	33	37
	Total	69	69

**Table-3:** Comparison of MMSI with histopathological finding

Category II had 04 cases. On biopsy 02 cases was low grade carcinomas & 02 proliferative breast lesion.

Category III had 03 cases. Two is low grade IDC on histopathology.

Category IV had 33 cases. All were reported as carcinomas on biopsy.

Thus all cases in MMSI category I & II showed 100% histopathology correlation, which is major population (90.6%) in the present study.

Out of 37 carcinoma cases, MMSI could correctly diagnose 33 cases. The overall sensitivity, specificity, diagnostic accuracy, PPV, & NPV of MMSI were 89.1%, 100%, 94.2%, 100%, & 88.9% respectively.

Diagnostic accuracy has been increased & there is no false +ve cases of malignancy with the help of cytological scoring.

## DISCUSSION

FNAC of breast lesion began as a screening procedure to distinguish benign from malignant conditions. Cytological assessment helps segregate those cases where excision biopsy & detailed histological study are indicated, it is reported that NPBD carries no increased risk of carcinoma breast in future. The risk is 1.5-2 fold in females with proliferative lesions with atypia & 8-10 fold in females with DCIS.<sup>8-10</sup> All the FNAC lesions included in our study has been categorized into 4 groups based on MMSI are as follows-

**Nonproliferative breast disease (category I)** - 29 cases in our study majority of them are fibroadenomas & rest are phyllodes tumour. This confirms the accuracy of MMSI by Nandini et al.<sup>4</sup> who modified the NPBD score as 6-8 instead of 6-10. Cytological smear shows monolayered sheets of cells with mild pleomorphism and myoepithelial cells. (figure 1a)

**Proliferative breast disease without atypia (category II)** - 04 cases diagnosed by scoring are included in this category, of which two are carcinoma and two are of epithelial proliferative lesion on histopathology. Nandini et al.<sup>4</sup> and Masood et al.<sup>11</sup> reported no case of carcinoma in this category on histopathology follow-up in their studies, that is why our finding is in contrast to them. Smear is moderately cellular with mild nuclear overlapping and clumped chromatin. (figure 1b)

**Proliferative breast disease with atypia (category III)** - Least number of cases 03 are included in this category hence higher chances of them to be malignant on biopsy. Zhao et al.<sup>12</sup> observed that 37% of the cases diagnosed cytologically as PBD with atypia turned out to be malignant on histopathology. Cells exhibit moderate cellular pleomorphism, anisonucleosis and occasional macronucleoli. (figure 1c)

**Carcinoma in situ & invasive cancer (category IV)** - 33 cases diagnosed by scoring in this category. All the cases correlated with histopathology with similar concordance rate as previous study by Nandini et al.<sup>4</sup> Cytological features of this group includes loss of cohesiveness, severe nuclear

pleomorphism, clumped chromatin with presence of macronucleoli & absence of myoepithelial cells. (figure 1d)

## Diagnostic accuracy of MMSI

Out of the 37 cases of carcinoma confirmed by histologically 33 belonged to MMSI category IV, 02 cases scored as category III and another 02 cases as category II. The overall diagnostic accuracy, sensitivity, and specificity of MMSI in diagnosing malignant breast lesions are 94.2%, 89.1% & 100%, respectively.

This study showed 100% histopathology correlation in category I and IV. A 100% cyto-histopathological correlation is observed with cytology alone in other studies by Panjvani et al.,<sup>13</sup> Qin et al.,<sup>14</sup> Mohammad et al.,<sup>15</sup> and Tiwari.<sup>16</sup>

A recent study<sup>17</sup> proposing expansion of Masood's cytologic index (MCI) for carcinoma group into further subtypes based on selected cytological features showed 86% concordance with histopathological (Bloom-Richardson) grading.

## CONCLUSION

This study shows that Modified Masood scoring index has better diagnostic accuracy for palpable breast lumps.

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