Original Research Paper

Pathology

EVALUATION OF GRADING OF BREAST MALIGNANCIES ON FINE NEEDLE ASPIRATES AND COMPARISON OF TWO GRADING SYSTEMS AT A TERTIARY CARE HOSPITAL OF NORTH INDIA

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ABSTRACT **AIM:** To evaluate and compare the cytograding of breast cancers using Robinson's and Moriquand's grading methods

MATERIAL AND METHODS: This study was a cross-sectional retrospective study conducted over a period of three years w. e .f October 2014 to October 2017 and includes diagnosed or highly suspicious malignant cases of breast carcinoma. Slides were retrieved from the cytology section of Department of Pathology, GMC Jammu. A total of 84 cases of breast cancers were studied and grading was done using Robinson's and Mouriquand's methods and the two grading methods were then compared.

RESULTS: Out of 84 cases of breast cancers , on using Robinson's grading method , 11 cases [13.10%] were graded as grade 1, 65 cases [77.38%] were graded as grade 2 and 8 cases [9.52%] cases as grade 3. 9 (10.71%) cases are graded as Grade I by Mouriquand's method with score less than 5. 68(80.95%) cases were graded as Grade II with score 5-9 and 7 (8.33%) were graded ad Grade III with score ≥10. On doing comparison between the two cytograding methods, we found a high degree of concordance between the two systems [96.42%] . The relationship observed between the scores obtained by the two methods was also seen to be highly significant.

CONCLUSION: There is possibility of comprehensive cytograding of breast cancers by using the two different methods proposed by Robinson's and Moriquand's but out of the two methods inspite of a high degree of concordance between the two methods , the grading system of Robinson's because of its more objective set of criterias and easy reproducibility has been found to be easier and better.

KEYWORDS : Cytograding , Breast Cancers, Fine Needle Aspiration Cytology

INTRODUCTION

Breast cancer is the most common type of cancer in India and accounts for 27% of all cancers in women [1,2]. Globally over the last several years ,there is increase in the incidence of breast cancer and the greatest increase has been seen in the Asian countries, where breast cancer incidence peaks among women in their forties, whereas in the United States and Europe, it peaks among women in their sixties [3]. It is hardly surprising that the majority of breast cancer patients in India are still treated at locally advanced and metastatic stages [4]. Accurate diagnosis of breast cancer is made in 99.3 % of the cases by the combination of self palpation, meticulous clinical examination including axillary lymph node status, mammography, simple noninvasive, cost effective, outpatient department procedure FNAC; trucut biopsy and open excisional biopsy**.** Triple assessment is a very useful diagnostic tool to evaluate patients with breast lumps and to detect patients with breast cancers with an overall accuracy of 99.3%. In the United States, there has been a sharp increase in the detection of breast carcinoma, largely due to wide spread use of mammography[5] **.** Most of these cases have been localized, measuring less than 2cm in diameter and /or in situ [6]. As far as the diagnosis of breast cancer is concerned, FNAC has opened up new dimensions. It should be combined with other clinical and radiological modalities such as physical examination, ultrasonography and mammography. On cytological examination though it is difficult to distinguish between the ductal carcinoma and lobular carcinomas yet small number of lobular carcinomas have shown same spectrum of severity of cytological abnormalities as seen in ductal carcinomas **.** The incidence curve starts rising at puberty, increases steeply upto menopausal age, and levels off afterwards. However breast cancer can develop at any age from childhood to old age. Almost all greater than 90% of the breast malignancies are adenocarcinomas that first arise in the duct/lobular system as carcinoma in situ, at the time of clinical detection, majority at least 70% have already breached the basement membrane and invaded the stroma.

The invasive lobular carcinoma being the most common of the mammary cancers representing 10% and other special types accounting for less than 1 to 5% each[7] **.** The purpose of cytoprognostic grading is to identify fast growing tumors (Grade III) which are more likely to respond to chemotherapy than low grade, slow growing tumors, which may be better suited to pretreatment with tamoxifen. Assessment of biological aggressiveness by cytological grading without removing the tumour would, therefore, be of immense value**.** Various grading systems have been devised for the cytological grading of breast cancer. For example; Modified Black, Moriquand's Method [8], Robinson's Method [9]etc.

AIMS AND OBJECTIVES: To evaluate and compare the cytograding of breast cancers using Robinson's and Moriquand's grading methods.

MATERIAL AND METHODS: This study was conducted as observational retrospective study in the cytology section of Department of Pathology Government Medical College, Jammu for a period of three years. After obtaining clearance from the institutional ethics committee, all records regarding diagnosed or highly suspicious breast cancer were retrieved from the cytopathology section. Patient's age, sex, stage of cancer and lymph node status was taken into consideration. FNAC was performed two different sites of the lesion. Two smears were fixed in 95% ethyl alcohol immediately and were subsequently stained with Papanicolaou stain. The other two stains were air dried and stained with May-Grunwald-Giemsa (MGG) staining.

Grading of breast carcinoma was done according to Robinson's and Mouriquand's methods by two independent observers. Robinson's method takes into account the following criteria: cell dissociation (clusters/single cells), cell size (1–2/3–4/≥5×RBC size), cell uniformity (monomorphic/ mildly pleomorphic/pleomorphic), nucleoli (indistinct/ noticeable/prominent), nuclear margins (smooth/folds/buds

or tufts) and nuclear chromatin (vesicular/granular/clumped or cleaved). Each of the above criteria was given scores 1–3 and total sum of scores of all the criteria were used to grade the tumors[10] . Based on the above-mentioned criteria, breast cancers were graded into grade I (score 6–11), grade II (score 12–14) and grade III (score 15–18), respectively. Mouriquand's method takes into account the following criteria: cellular characters (clustering, 0/isolated cells, 3), nuclear features (anisokaryosis, 2/large size, 3/budding, 2/ naked, 3/hyperchromasia, 2/hypochromasia, 3), nucleoli (blue, 2/red, 3) and number of mitoses ($\geq$3/slide=1, $\geq$6/slide=3)[11] . Based on these criteria, breast cancers were graded into grade I (score<5), grade II (score 5–9) and grade III (score$\geq$10).

RESULTS:

A total of 84 cases of breast cancer were included, 81(96.43%) cases were females and only 3(3.57%) cases were males(fig.1).

The ages of the patients ranged from <_30 years (minimum age 14 years) to > 60 years (maximum age 80 years). The maximum number of cases of breast carcinoma were reported in the age group of 41-50 years of age, which were 36 (42.86%), 21(25.00%) cases in the age group 50-60 years of age, followed by 12(14.29%) cases in the age group of >60 years of age, 9(10.71%) cases in the age group of 31-40 years of age and only 6(7.14%) cases in the age group <_30 years of age.
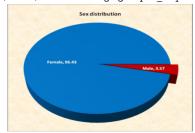

Fig.1: Showing Distribution Of Cases Of Breast Cancer According To Sex

Most of the breast carcinomas were seen in the left breast, with majority of them seen in the left upper outer quadrant 22 (26.19%) followed by left lower outer quadrant having 9(10.71%) and then left upper inner quadrant with 8(9.52%) cases. Other sites of the breast like axillary tail, sub aereolar and periaereolar region were involved by breast carcinoma in overall 20 (23.81%) of the cases. The size of the tumor was <_4cm in 71 (84.52%) cases and >4cm in 13(15.48%) cases. Skin involvement was seen in 23(27.38%) of the cases. Fixity to the underlying skin was present in 11(13.10%) cases. Nipple discharge was present in 6(7.14%) cases. History of recurrence was present in 2(2.38%) cases. lymph node were palpable in 31(36.90%) of the patients and in 53(63.10%) of the cases lymph nodes were not palpable. Here the grading was done using the six criterias: Cell dissociation, Cell uniformity ,Cell size Nucleoli ,Nuclear membrane ,Character of chromatin. Out of the 84 cases, 10(11.90%) showed cell dissociation of <25% and were given score 1. 67(79.76%) showed 25-75% dissociation of cells and were given score 2. Only 7(8.33%) showed more than 75% dissociation of cells and were given score 3.

4(4.76%) cases showed cell size which was 1-2 of the RBC size and were given score 1. 76(90.48%) cases showed a cell size which was 3-4 of the RBC size and were given score 2 and 4(4.76%) cases showed a cell size which was >_5 of the RBC size and was given score 3.

Out of 84 cases, 11(13.10%) were grade 1 with score of 6-11. 65(77.38%) were grade 2 with score of 12- 14 and 8(9.52%) were grade 3 with score of 15-18(Table 1).

Table 1: Distribution Of Cases According Robinson's Grading

Grade	Total score	Number of cases	Percentage
I	6-11	11	13.10
II	12-14	65	77.38
III	15-18	8	9.52

Out of 84 cases, 9 (10.71%) cases are graded as Grade I by Mouriquand's method with score less than 5. 68(80.95%) cases were graded as Grade II with score 5-9 and 7 (8.33%) were graded ad Grade III with score greater than are equal to 10(Table 2).

Table 2: Distribution Of Cases According Mouriquand's Grading

Grade	Total score	Number of cases	Percentage
I	<5	9	10.71
II	5-9	68	80.95
III	$\geq$10	7	8.33

Out of 84 cases, 11(13.10) cases were graded as Grade I by Robinson's method, out of these 11 cases, 9 cases were graded as Grade I by Mouriquand's method, whereas 2 cases were over graded by Mouriquand's method as Grade II.

Most of the discordance was seen in Grade II tumors. Out of 84 cases, 65(77.38%) cases were graded as Grade II by Robinson's method. Out of these 65 cases, 64 cases were graded as Grade II by Mouriquand's method whereas 1 case were over graded as Grade III by Mouriquand's method. Out of 84 cases 8 cases were graded as Grade III by Robinson's method, out of these 8 cases, 6 cases were graded as Grade III by Mouriquand's method also whereas 2 cases were under graded as Grade II by Mouriquand's method(Table 3).

High degree of concordance between Mouriquand's and Robinson's method was observed in our study. There was total agreement in 96.42% of the cases.

Table 3: Comparison Of Robinson's And Mouriquand's Grading

Mouriquand's grading	Robinson's grading			Total
	I	II	III	
I	09	-	-	09(10.71%)
II	02	64	02	68(80.95%)
III	-	01	06	07(8.33%)
TOTAL	11(13.09%)	65(77.38%)	08(9.52%)	84

DISCUSSION

Breast cancer is the second most prevalent cancer among Indian women, the first being cervical cancer[12].Our study shows predominance of Grade II tumors, which is in corroboration with previous studies. Robinson et al [10] reported Grade II tumors (44%) comprising of largest group. Chhabra et al[13] also reported maximum cases as Grade II(52%) followed by Grade I (30%) and Grade III (18%). Roble et al [14] also reported predominance of Grade II tumors (39%) followed by Grade I(33%) and Grade III (28%). Grade III tumors formed the second largest group in our study. In our study, Out of 84 cases graded by Mouriquand's method, 9 (10.71%) cases were Grade I, 68(80.95%) cases were Grade II, 7 (8.33%) were Grade III. In this study, Mouriquand's grading showed the greatest no. of cases as Grade II, this corroborates with the previous studies. Das et al [15]also showed predominant grouping of cases as Grade II (69.2%), followed by Grade III (21.2%) and Grade I (9.6%). Pandit et al [16]also showed predominant grouping of cases into Grade II. In the literature no information is provided about the comparison of Robinson's and Mouriquand's method. Only two studies are done in the past on comparison of these two grading methods. One study done by Das et al [15]shows agreement in grading by

both the methods in 76.9% of the cases. In our study there is also a high degree of agreement seen in between the two grading methods. And another study was done by Wani FA et al [17] which also showed a high degree of agreement in between the two grading methods. Discordance was seen in all the grades between the two grading methods, with highest degree of discordance seen in Grade II tumors. Out of 11 (13.10%) cases graded as Grade I by Robinson method 9 (10.71%) were graded as Grade I by Mouriquand's method whereas 2 (2.38%) cases were overgraded as Grade II by Mouriquand's method. out of 65 Cases graded as Grade II by Robinson's method, 64(76.19%) were graded as Grade II by Mouriquand's method whereas 1(1.19%) cases were over graded as Grade III by Mouriquand's method. Out of 8 cases graded as Grade III by Robinson's method, 6(7.14%) cases were graded as Grade III by Mouriquand's method whereas 2(2.38%) cases were under graded as Grade II by Mouriquand's method. The reason for discordance is the presence of mitosis. Mitosis is a parameter which is considered in Mouriquand's grading method but not by Robinson's grading method. In the study done by Das et al [15]the greatest majority of discordance was seen in Grade II tumors and less discordance in Grade I and III tumors. Our study also shows the highest discordance in Grade II tumors.

CONCLUSION

Inspite of high degree of concordance between the two grading systems, the grading of breast carcinoma by Robinson's method has been found to be easier and better because of more objective criterias and easy reproducibility.
Thus it is therefore suggested that a conscious effort should be made to include the cytograding of all cases of breast cancers in fine needle aspiration smears, so that an appropriate decision could be taken regarding the preoperative neoadjuvant chemotherapy and to avoid over treatment in low grade cancers

Source Of Support: Nil
Conflict Of Interest: None declared

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