CYTOLOGICAL GRADING OF BREAST CANCER ACCORDING TO ROBINSON’S GRADING SYSTEM

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ABSTRACT

Objective: To see the correlation between cytological parameters and grading of breast cancer according to Robinson’s grading system on Fine needle aspiration smears. Study design: It was a correlational descriptive study.

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Place and Duration of Study: It was conducted in the Histopathology Department, Army Medical College, National University of Sciences and Technology (NUST), Rawalpindi, Pakistan from Nov 2012 to Nov 2013.

Material and Methods: All cases diagnosed as breast cancer (C 5) or suspicious of breast cancer (C 4), on Fine needle aspiration cytology, were included in the study and women already taking treatment were excluded. A total of 102 samples were included in the study through non probability convenience sampling.

Result: The cytological parameters of Robinson’s grading system including cell dissociation, nuclear margins and nuclear chromatin showed weak correlation with tumor grade. While cell size, cell uniformity and nucleoli showed moderate correlation. All the parameters were statistically significant with p-value<0.05.

Conclusion: This study concludes that all the cytological parameters of Robinson’s grading system have correlation with tumor grade.

Keywords: Anaplasia, Breast, Carcinoma, Chromatin, Ductal, Fine Needle Aspiration, Pakistan.

INTRODUCTION

The incidence rate of carcinoma breast in Pakistani women is 50.1 per 100,000 per year, which is the highest rate among most of Asian countries. Determination of histological grade is one of the best established prognostic factors that help the clinician in decision making to choose a suitable treatment option. Modified Scarf Bloom Richardson Grading System is considered as a gold standard procedure for grading breast cancer on biopsy. However, histological grading on breast biopsy is expensive and time consuming. In resource limited situations, as in Pakistan there is a need to replace core or excision biopsy by Fine Needle Aspiration Cytology, which is a simple, quick procedure, does not require expensive equipment, and is affordable. As grading system on biopsy, there is no recommended grading system on FNA that can be followed. Breast cancers have been graded cytologically on FNA in West but not in our setup. The present study used Robinson’s method to determine the tumor grade on fine needle aspiration smears. Such an assessment of grade will be of immense value for preoperative treatment.

MATERIAL AND METHODS

This study was conducted in the Department of Pathology, Army Medical College, National University of Sciences and Technology, Rawalpindi, Pakistan. Permission from the college ethical committee was taken. A total of 102 female patients with a diagnosis of ductal carcinoma on FNAC of breast, seen consecutively over a period of one year, November 2012 to November 2013, were included in the study. Aspirate from breast lump was taken using 10 ml disposable syringe and 22/23 gauge needle without local anesthesia. Wet fixed smears were stained with Papanicolaou and Haematoxylin and Eosin stains (H&E). Cytological grade of the...
tumor was assessed by Robinson’s grading system (table-1).6

Grading was reported qualitatively in terms of percentages. Correlation between the cytological parameters and tumor grade was evaluated by Spearman rank correlation. The most influential parameters in determining the tumor grade were assessed by Multiple regression analysis. Results were considered significant with p-value less than 0.05 (p<0.05).

RESULTS

The mean age of the patient was 51 years with standard deviation of 11.072. The present study revealed 30 (29.4%) cases graded as cytological grade I, 51 (50%) cases graded as grade II, and 21 (20.6%) cases as grade III.

The parameters including cell dissociation, nuclear margins and nuclear chromatin showed weak correlation with tumor grade. While cell size, cell uniformity and nucleoli showed moderate correlation (table-2). Nucleoli, nuclear chromatin pattern and cell dissociation were considered most influential features (table-3). All the parameters were statistically significant with p<0.05.

DISCUSSION

The present study was aimed to grade breast cancer on fine needle aspiration, which has many advantages over biopsy5 and can be helpful in determination of treatment plan2.

The mean age of patients was 51 years. This finding was similar to the age reported by other studies in Pakistan i.e. an average age of 48 years was observed at the time of diagnosis8.

Many studies have been carried out in past on Robinson’s grading system9-17, after the initial

<table>
<thead>
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<th>Parameters</th>
<th>Score 1</th>
<th>Score 2</th>
<th>Score 3</th>
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<tbody>
<tr>
<td>Cell dissociation</td>
<td>Mostly in clusters</td>
<td>Mixture of single &amp; cell clusters</td>
<td>Cells mostly single</td>
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<tr>
<td>Cell size</td>
<td>1-2 x RBC size</td>
<td>3-4 x RBC size</td>
<td>&gt; 5 x RBC size</td>
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<tr>
<td>Cell uniformity</td>
<td>Monomorphic</td>
<td>Mildly pleomorphic</td>
<td>Pleomorphic</td>
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<tr>
<td>Nucleoli</td>
<td>Indistinct</td>
<td>Noticeable</td>
<td>Prominent</td>
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<tr>
<td>Nuclear margins</td>
<td>Smooth</td>
<td>Folds</td>
<td>Buds/ Clefts</td>
</tr>
<tr>
<td>Nuclear chromatin</td>
<td>Vesicular</td>
<td>Granular/ Clumped</td>
<td>Cleaved</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Parameters</th>
<th>Spearman’s rank correlation coefficient r-value</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Cell dissociation</td>
<td>0.416</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Cell size</td>
<td>0.662</td>
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<tr>
<td>Cell uniformity</td>
<td>0.655</td>
<td>&lt; 0.001</td>
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<tr>
<td>Nucleoli</td>
<td>0.739</td>
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<td>Nuclear margin</td>
<td>0.355</td>
<td>&lt; 0.001</td>
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<tr>
<td>Nuclear chromatin</td>
<td>0.488</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Adjusted R2 = 0.894
Cytological Grading Of Breast Cancer


research by Robinson in 1994. All these studies, including the present study, revealed grade II tumors to be the predominant group.

However, the literature shows conflicting results regarding the frequency of grade I and grade III tumors. Das et al9 reported maximum number of cases as grade II (46.2%) followed by grade I (28.8%) and grade III (25%). Pandya et al13 also reported predominance of grade II tumors (44.07%) followed by grade I (40.68%) and grade III (15.25%). However, in our study, grade III tumors (29.4%) formed the second largest group and grade I tumors (20.6%) were least common. The most probable reason for the grade III tumors forming the second largest group could be the late presentation of the patients in our setup18.

On cytology, the loss of cell cohesion is represented by the extent of cell dissociation and at molecular level, by reduced E- Cadherin/ Catenin expression19,20. A study conducted by Suciuet al21, at Romania proved association of reduced E-Cadherin expression, and thus loss of cell cohesion, with high histological grade.

In the present study, we found a weak significant correlation between cell dissociation and tumor grade. This finding is similar to results by Robles et al22.

Variation in cell sizes and shape i.e. loss of cell uniformity is characteristic of neoplastic cells. The nuclear cytoplasmic ratio is variably increased and may approach 1:1. The neoplastic cells may assume bizarre shape and large cell size. The chromatin is usually coarse and clumped, and nucleoli may be of astounding size. Loss of differentiation is considered a hallmark of aggressive tumors23.

Cangiarella24 observed that all the cytological parameters had a strong correlation with cytological grade. However, in the present study, moderate correlation was found between cell size, cell uniformity, presence of nucleoli and tumor aggressiveness. We also found significant weak correlation between cell dissociation, nuclear margins, nuclear chromatin and tumor grade.

In multiple regression analysis, nucleoli, nuclear chromatin and cell dissociation appeared to be the most influential features. While a study conducted by Saha et al in 201325 concluded that all the cytological parameters except cell size and nucleoli had high significance in predicting the tumor grade.

CONCLUSION

All the cytological parameters of Robinson’s grading system have correlation with tumor grade. In resource limited situations, Robinson’s grading system can be considered for grading breast cancer on FNA smears.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

REFERENCES


