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COMPARATIVE EVALUATION OF FIVE 3- TIERED CYTOLOGICAL GRADING SYSTEMS OF BREAST CANCER.

Pathology

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ABSTRACT

Background: Aim to compare and assess cytomorphological grading systems of Breast malignancy with that of histologheal grading system.
Materials and Methods: 63 cases of Breast malignancies were included in the present study. Fine Needle aspiration smears stained were perused and allocated gradings by two pathologists independently. Results of 5 grading systems were compared with that of Nottingham modification of SRB histopathological grading system.
Results: The spearman's rank order correlation coefficient show statistically significant values for Moriquands, Khan, Taniguchi and Robinson. It shows a strong R value of 0.64787 for Moriquands followed by R value of 0.5404 for Robinsons. R value of Khan is 0.39467 which is not statistically significant. High concordance rate was observed for Moriquands.
Conclusion: In our study except for SRB all the other four cytological grading systems were equated with histopathological grading system, hence cytological grading should be incorporated in the cytological reporting of breast cancers to decide the strategy of the treatment .

KEYWORDS

Breast neoplasms, cytomorphological grading, histomorphological grading.

INTRODUCTION

In our country, breast cancer is one of the most common neoplasms in females. Early diagnosis and timely management are most important factors to increase the survival rate of the patients. Cytological diagnosis with nuclear grading is used for neoadjuvant therapy which can reduce the morbidity of the patient [1,2].Cytomorphological grading of breast malignancies in Fine Needle Aspiration Cytology (FNAC) reports for prognostication was endorsed by National cancer institute of Bethasda [3]. Black *et al* in 1955 introduced nuclear grading concept [4] which was later altered by Fisher *et al* [5]. Thus the cytoprognostic grading will provide valuable information to the oncologist to plan the management. There are various methods of cytomorphological grading systems, but there is no single system which is universally accepted and followed as excellence to evaluate the breast malignancies.

In the present study five three tier cytological grading systems were studied and compared with histological grading system of Nottingham modification of Scarff – Bloom- Richardson (SBR method.)

Materials and Methods

This is a retrospective analysis conducted in a tertiary care centre. This study comprised 192 cases which were diagnosed as carcinoma of breast or highly suspicious of breast carcinoma in FNAC from January 2016 to December 2017. Among 192 cytology cases, 63 cases had histopathological correlation and included in the present study. FNAC's smears stained by Haematoxylin and Eosin stain were scrutinised and allocated gradings by two pathologists independently. Results of 5 grading systems namely Robinsons cytological grading system, Scarf Bloom Richardson cancer grading system, Khan *et al* grading system, Fisher's simplification of Black's nuclear grading scheme, Moriquands cytological grading system, Taniguchi *et al* grading method were compared with that of Nottingham modification of SBR histopathological grading system and the results were tabulated. The association between each cytological grading and histological grading was assessed. The correlations were done by spearman's correlation coefficient (r) and concordance was assessed by concordance rate.

RESULTS:

The present study included 63 cases of Ductal carcinoma of breast in FNAC smears.

In histology the more number of cases comes under grade II subsequently followed by III and I. The distribution of cases among histology and various cytological grading systems were tabulated in Table: 1

TABLE: 1. DISTRIBUTION OF CASES ACCORDING TO CYTOLOGICAL AND HISTOLOGICAL GRADING

Grade	Robinson's	Moriquand's	Khan's	Taniguhi's	SBR	Histopathology
I	15(23.8%)	5(8%)	6(9.52%)	6(9.52%)	25(39.7%)	7(11.1%)
II	39(61.9%)	41(65%)	16(25.4%)	20(31.75%)	36(57.1%)	43(68.3%)
III	9(14.3%)	17(27%)	41(65.07%)	37(58.73%)	2(3.2%)	13(20.6%)
TOTAL	63	63	63	63	63	63

The spearman's rank order correlation coefficient show statistically significant values for Moriquands, Khan, Taniguchi and Robinson. It shows a strong R value of 0.64787 for Moriquands followed by R value of 0.5404 for Robinsons. R value of Khan is 0.39467 which is not statistically significant. The spearman's rank order correlation coefficient values were tabulated in Table: 2.

High concordance was observed for Moriquands 49/63 (77.8%) followed by Robinson 41/63 (65%). The highest disconcordant rate of 63.5 % was found in SBR breast cancer grading system. The concordance values were tabulated in Table 2.

TABLE: 2. CORRELATION AND CONCORDANCE BETWEEN CYTOLOGY AND HISTROPATHOLOGY GRADING SYSTEM

SPEARMAN'S RANK CORRELATION COEFFICIENT	R – 0.5404 P – 0.0000	R – 0.64787 P – 0.0000	R – 0.39467 P - 0.00000	R – 0.46834 P - 0.00000	R – 0.24371 P - 0.00000
CONCORDANCE	41/63	49/63	28/63	34/63	23/63
CONCORDANCE RATE	65%	77.78%	44.4%	54%	36.5%

Spearman's rank correlation significance level. 0.00-0.19 - very weak, 0.2-0.39 -weak, 0.4-0.59 -moderate, 0.6-0.79 - strong, 0.8-1 - very strong.
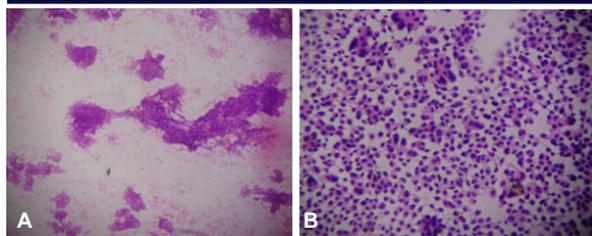
Figure: 1. Photomicrograph showing cytological features of cellularity and cell dissociation

A. Abundant cellularity (Khan score 3) and mostly in clusters (Robinson score 1). B. Abundant cellularity (Khan score 3) and mostly as discrete cells (Moriquands score 3). H&E. 45X
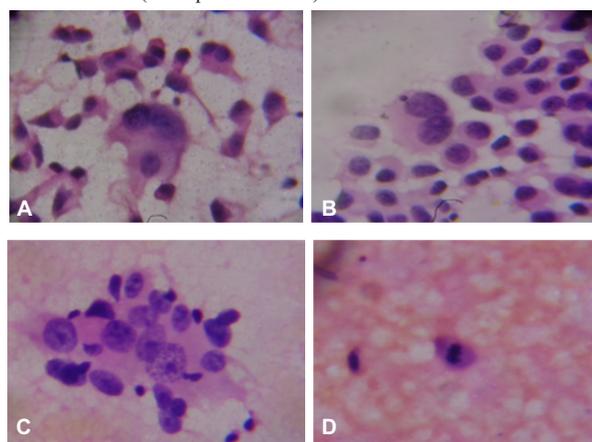

Figure: 2. Photomicrograph showing cytological features of nuclear pleomorphism.

A.Irregular nuclear membrane. Robinsons score 2.   B.Granular chromatin. Taniguchi score 2. C. Prominent nucleoli. Robinsons score 3. D. Mitosis. H&E. 45X

DISCUSSION
Breast carcinoma is the most prevalent cancer in women accounting of a percentage of   22   in the year 2003 [6]. In India it is in the 2nd position, incidence wise only to be preceded by cancer cervix. Age standardized incidence being 9 – 28.6 per 100000 women [7]. According to the Surveillance Epidemiology and End Results (SEER) data, 178, 480 women were diagnosed with invasive breast cancer in 2007 and the number of women with breast cancer is expected to increase by about a third over the next 20 years [8]

FNAC is one of the paramount tools in the identification of breast malignancies. Histological grading of breast cancer is generally exercised and it is one of the prognostic marker of breast cancer. Cytomorphological grading of breast cancer can be routinely practiced to imply the neoadjuvant chemotherapy so that morbidity and mortality can be reduced.

In our study grade II tumors were more in number (68.3 %) succeeded by III and I. This was correlated with Farooq [9] et al., in which they observed preponderance of grade II tumors follow in order by grades III and I. But Chhabra et al., [10] Robles et al., [11] reported majority of grade II tumors and subsequently grades I and III tumors.

In our study the concordance rate for Robinson cytological grading was 65 % which is akin to Das et al., 71.2% [12] and Lingegowda et al., [13] which showed a concordance of 64%. The concordance rate of Moriquands cytological grading was 77.8 % which is congruous to studies conducted by Arul et al., [14] and Saha et al., [15] in which the concordance rate were 77.7% and 77.19 % respectively.

In our study Taniguchi grading system revealed a concordance rate of 54% whereas Taniguchi et al., [1] and Einstein et al., [16] showed 44.4 % and 66.6 % respectively.

In our study the concordance rate of Khans grading system was 44.4% whereas Khan et al., [17] and Einstein et al., [16] showed 97.14 % and 72.2% of concordance rate respectively.

In SBR cytological grading system majority of cases falls under grade II   (57.1 %) succeeded by grades I and III which is comparable to the study conducted by Bhargava et al., [12].

The correlation coefficient analysis showed a R value of 0.64787 for Moriquands cytological grading system and 0.5404 for Robinson grading system. Saha et al., [18] revealed a P value of 0.715 for Moriquands and 0.799 for Robinson's grading system

In Moriquands cytological grading system 65% were grade II tumors ensued by grade III (17%) and grade I (8%) which were well equated with histological grading system.

In our study Moriquands and Robinson cytomorphological grading system showed a high degree of correlation with the histology.

CONCLUSION
FNAC is one of the cost effective simple and fastest method in the detection of breast neoplasm. So cytological grading should be subsumed to increase the definitude of the diagnosis. Cytological grading would be helpful for neoadjuvant chemotherapy and proper planning of the treatment.

In our study on analyzing five three tiered cytological grading systems, except for SBR all the other four are statistically correlated but Moriquands showed a high degree of concordance. So cytological grading should be routinely practiced in the detection of breast neoplasms.

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