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Robinson's cytological grading on fine needle aspirates (FNAC) of breast cancers and its correlation with histopathological grading

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Abstract

Background: Breast cancer is one of the most common cancers in females. Fine needle aspiration cytology plays an important role in the management of these patients.

Aims and objectives: 1) To study Robinson's cytological grading on preoperative FNAC smears in cases of breast carcinoma. 2) To correlate Robinson's cytological grading with modified Scarff Bloom Richardson histopathological grading.

Methods: A retrospective study was done on 50 patients of breast carcinoma over the period of 2 years from 1st January 2018 to 31st December 2019 at a tertiary care center.

Results: Groups II and group III cases of breast carcinomas were correlated very well on cytological and histopathological grading. The sensitivity of cytological grading in the present study were 66.66%, 75% and 85.71 respectively. Specificity were 85%, 76.92% and 90.90% respectively i.e. maximum in grade III. The k value for present study showed 0.62 i.e. substantial agreement.

Conclusion: Cytological grading of breast carcinomas is a useful prognostic marker in the management of breast carcinoma. It is helpful in selecting the patients for modified radical mastectomy with axillary dissection and neoadjuvant chemotherapy.

Keywords: Robinson's grading, breast carcinoma, elston- ellis scarff – bloom richardson's histopathological grading

Introduction

Breast carcinoma (BR Ca) is a leading cause of death among women, with more than 1,000,000 cases occurring annually. Combination of clinical examination, imaging studies, and fine needle aspiration cytology can offer accurate diagnosis in 99% of cancer cases^[1].

A complete history, family history, clinical examination, tumor size, nodal status, metastasis, tumor type, radio imaging, immunohistochemistry analysis of estrogen [ER] progesterone [PR] receptors, Her 2 status, cell proliferation markers along with histopathological grading is important in diagnostic evaluation of and prognosis in breast carcinomas^[2].

The National Cancer Institute (NCI), Bethesda, sponsored conference had recommended that, tumor grading on preoperative fine needle aspiration cytology report should also be incorporated in the parameters for prognostication of the case^[3]. In recent past, Robinsons Cytological Grading (RCG) for FNAC is widely used as preoperative evaluation in classifying various grades into Grade I to III of breast carcinoma. Histopathology is a gold standard in validating the diagnostic criteria and is accepted worldwide. Elston- Ellis modification of Scarff- Bloom Richardson (EESBR) histopathological grading it is widely used. It is based on architectural and cytological features and has been found to have good prognostic correlation. RCG and EESBR have been reported to have significant correlation between the cytological and the histological grades (4, 5), hence the same is adopted in the preset study to evaluate the significance and practical application.

Aims and objectives

1) To study Robinson's cytological grading on preoperative FNAC smears in cases of breast carcinoma.

2) To correlate Robinson’s cytological grading with modified Scarff Bloom Richardson histopathological grading.

Materials and method

A retrospective study was undertaken on 50 patients of breast carcinomas over the period of 2 years from 1st January 2018 to 31st December 2019 at a tertiary care center. Cytological evaluation and its comparison with histopathological diagnosis has been highlighted. After detail history and clinical examination, consent from each and every patient was taken. FNAC was done by using 22 or 24 gauge needle and 10 ml syringe and slides were prepared. After drying Leishman Staining was done us and few cases Papanicolaou stain was also employed. After cytological observations according to the Robinson’s grading the tumor were classified as grade I, II, III. Post operative gross specimen was examined thoroughly in the pathology department and representative areas sampled, tissue processing done, and the sections were stained with Hematoxylin and Eosin (H&E) stain. The diagnosis and histopathological slides as well as FNAC smears were

reviewed independently and final conclusion arrived at.

Inclusion criteria

- All Patients presenting with breast carcinomas, attending OPD or admitted to tertiary care hospital.
- Informed consent taken from each patient.

Exclusion criteria

- In individuals where only FNAC had been done without histopathology.
- Cases receiving neoadjuvant chemotherapy were exclude.

Results

In the present study a total 50 cases of breast carcinoma were included. The age ranged from 24 to 75 years, with mean age was 49.5 year. Maximum number of patients belonged to the AE group of 60-69 years. Robinson’s cytological grading is based on dissociation of cells, nuclear size, cell uniformity, nucleoli, nuclear margins and nuclear chromatin (Table 1). In this series, all the FNA smears were categorized into score 1, 2, 3.

Table 1: Robinson’s cytological grading. ^[5]

Features	Score 1	Score2	Score3
Dissociation	Cells in clusters	Single, with cell clusters	Mostly single cells
Nuclear size	1-2 x RBC	3-4 x RBC	≥5x RBC size
Cell uniformity	Monomorphic	Mildly pleomorphic	Highly pleomorphic
Nucleoli	Indistinct	Noticeable	Prominent/Abnormal
Nuclear margins	Smooth	Folds	Clefts/ Buds
Chromatin	Vesicular	Granular	Clumped and clear

Based on the above parameters it was observed that, 12 case were in grade I, 24 and 14 were in grade II and III respectively. All these cases correlated well with gold standard histopathological grade as per EESRB. A total

score in the range of 6-11 was given grade I, 12-14 as grade II and 15-18 as grade III. Grade I- smears score in the range 6-11 [Fig :A], Grade II- smear scored in the range 12-1, and Grade III- smear scored in the range 15-18. [Fig :C]

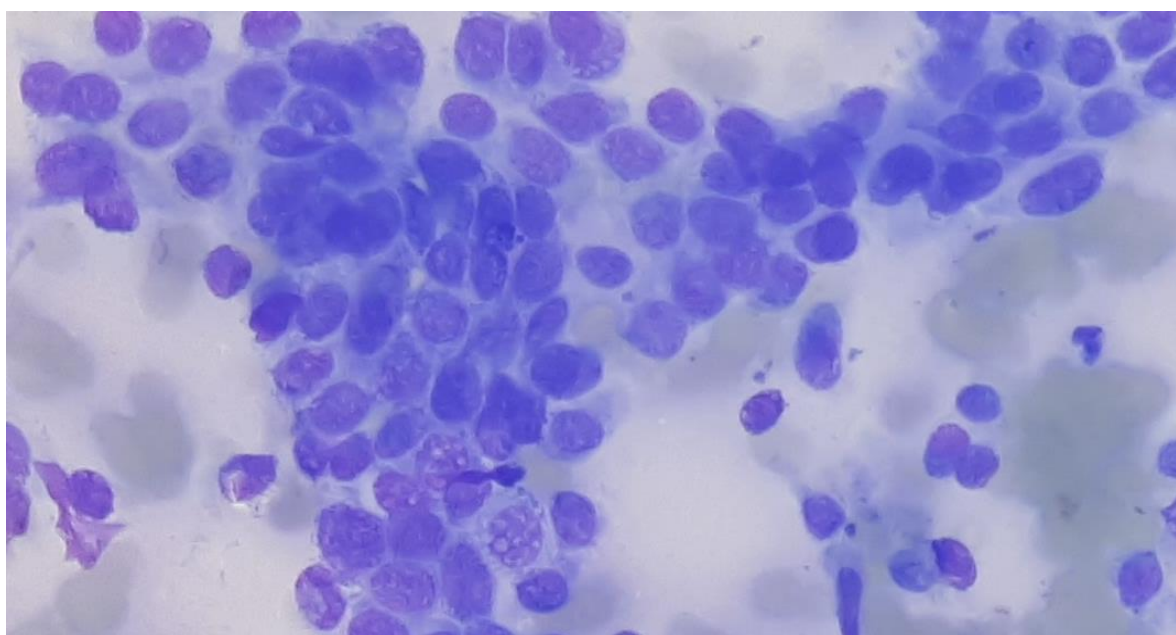


Fig A: Photomicrograph showing Robinson’s Cytological Grade 1 carcinoma. The cells are in loosely cohesive clumps Nuclei show mild enlargement and pleomorphism. The nuclear margins are smooth with inconspicuous nucleoli. (Leishman x 400)

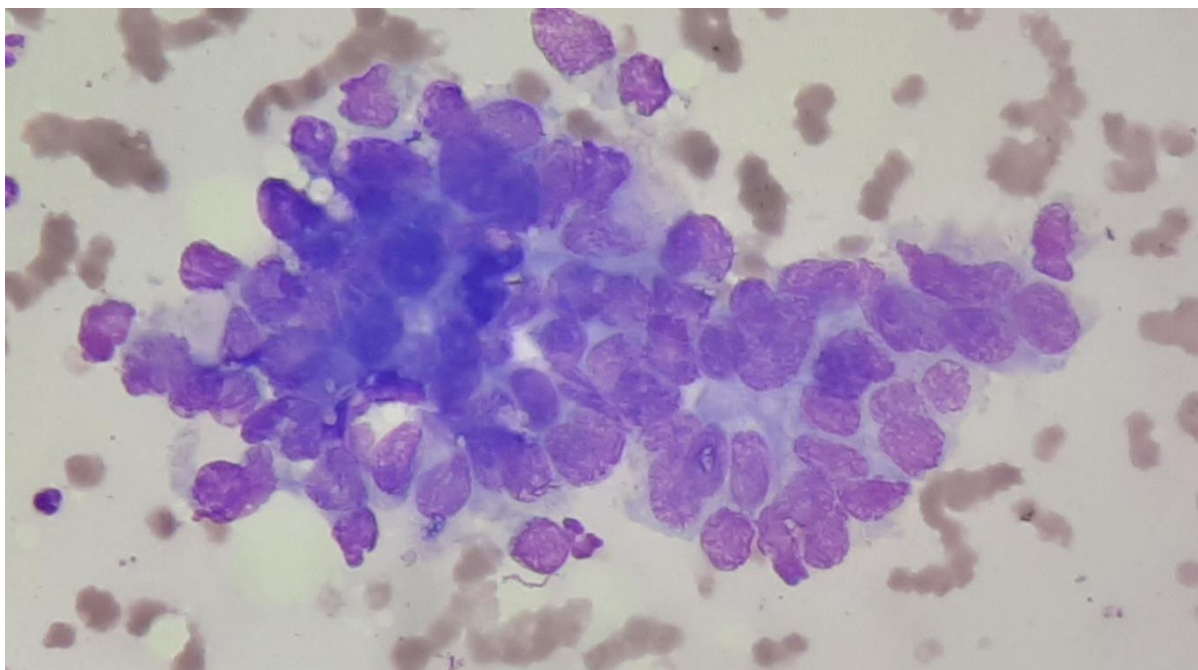


Fig B: Photomicrograph showing Robinson's Cytological Grade II carcinoma. The cells show irregular nuclear margins with folds, granular chromatin and indistinct nucleoli. (Leishman x 400)

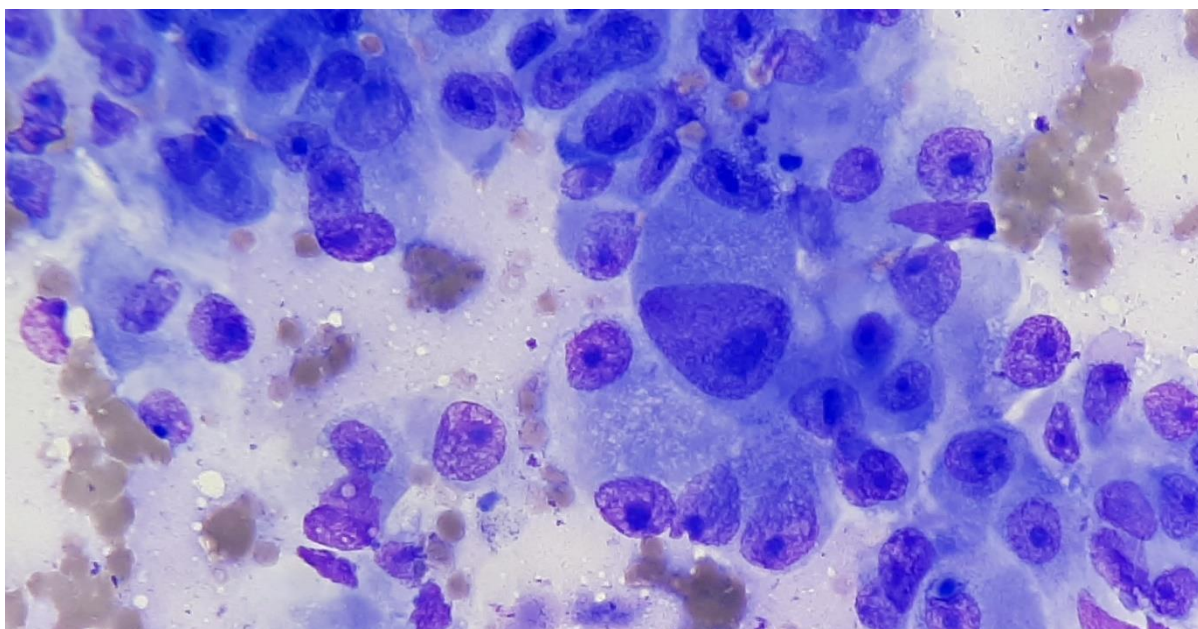


Fig C: Photomicrograph showing Robinson's Cytological Grade III carcinoma. The cells are singly scattered, marked pleomorphism, and distinct large nucleoli. (Leishman x 400)

Table 2: Correlation of Robinson's cytological grading with Elston-Ellis modification of Scarff-Bloom Richardson (EESBR) histopathological grading

Robinsons cytological grading (RCG)	Histological grading (EESBR)			Number of cases (%)	Concordance rate (%)
	Grade I	Grade II	Grade III		
I	8	3	1	12 (24%)	66.66%
II	2	18	4	24 (48%)	75.0%
III	0	2	12	14 (28%)	85.71%
Total	10	23	17	50 (100%)	75.79%

Using Robinson's cytological grading system 12 cases (24%) belonged to grade I, while 24 (48%) and 14 (28%) were in grade II and grade III respectively. As per Elston-Ellis modification of Scarff- Bloom Richardson histopathological grading post-operative histopathological

grading concordant cases 8 (16%) graded as I, 18 i.e. (36%) and 12 (24%) graded as II and III respectively. Agreement/ concordance was arrived by Kappa (k) measurement of agreement. In the present study concordance rate was 66.66%, 75% and 85.71%

respectively with overall concordance of 75.79%. This study revealed that concordance of cases was more in grade II and maximum in grade III. The k value for present study showed 0.62 i.e. substantial agreement.

Discussion

Cytological scoring based on FNA smear is of great significance as it is a cost-effective method to predict prognosis of breast carcinoma. Evaluation of cytological grade is quick, easy procedure which, correlates well with histopathological nuclear grade.

One of the reported study showed a statically significant association between cytologic and histologic grades ($r=0.97$; $p<0.01$) with sensitivity and specificity 100% and 93.95% respectively.^[7] In another series of cases studied also showed good correlation of cytology and histopathological grading and substantial kappa value of agreement i.e. $k=0.737$ ^[8].

The results of this study are in agreement with above observations. In the present study the minimum concordance was observed in grade I cases. We had reported these as suspicious of malignancy and suggested histopathological confirmation.

Another study conducted at tertiary care center revealed cyto-histopathological correlation in i.e. 82.76 % (n=48) cases and they found cytological grading of infiltrating duct carcinoma as well as special verities of breast carcinoma correlates well with histopathological grading^[9].

We feel, that RCG grading should be included as routine practice in the FNAC reports. Some workers suggest that cytological prognostic grading should be evaluated as a semi-quantitative additional tool in initial workup as well as for continuous monitoring of therapy effect during treatment^[1].

One may encounter limitation of FNAC in some situations like differentiation between intraductal and invasive tumour, as the diagnosis of intraductal carcinoma requires the careful observation of architecture and basement membrane integrity that can be assessed only on histopathological study^[11].

Conclusion

Robinson's cytological grading of breast carcinoma correlates well with histopathological grading in 75 % of cases.

Robinson's cytological grading could be the best way for early i.e. Preoperative evaluation of breast carcinoma as it is an additional tool for better management of the case.

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