

Correlation of Cytological Grading with Histopathological Grading in Malignant Neoplasms of Breast

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Abstract:

Background: Carcinoma breast is the most common non-skin malignancy in females with annual incidence of 10,00,000 cases and contributing to 25.8% of total new cases diagnosed in 2020. Fine needle aspiration cytology (FNAC) is a simple, less invasive and cost effective procedure.

Methods: Grading of breast carcinoma by Robinson criteria was done on FNAC smears, followed by histological grading by modified Scarff-Bloom-Richardson (SBR) grading system for histopathology specimens of breast carcinoma and comparison was made

Results: Out of 65 cases of carcinoma breast, all were female patients; most common age of presentation was 4th and 5th decades. Correlation of cytological and histological grading for grade 1 lesions was 80%, grade 2 lesions were 97.8% and for grade 3 was 66.7%.

Conclusion: Cytological grading of the breast carcinomas is a feasible procedure and can be carried out by any laboratory and pathologist with ease. Cytological grading correlated well with histological grading can be incorporated with cytology reporting benefitting the patient in the era of neo-adjuvant chemotherapy.

Keywords: Breast carcinoma, Robinson's cytological grading, Scarff-Bloom-Richardson (SBR) grading.

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Introduction

Breast carcinoma is the most common non-skin malignancy [1] in females with more than 10,00,000 cases annually contributing to 25.8% of total new cases diagnosed in 2020 and leading cause of cancer death in females. [2] Fine-needle aspiration cytology (FNAC) is routinely used for preoperative diagnosis of breast carcinoma as the technique is less invasive and more cost effective.

Cytological grading of breast carcinoma by Robinson's method [3] was widely accepted and should be incorporated in FNAC reports for neo adjuvant therapy, prognostication and in older patients and patients with chronic debilitating diseases and comorbidities not suitable for surgery. [4,5]

The Elston - Ellis modification of Scarff- Bloom-Richardson (SBR) histological grading of breast carcinoma is a widely accepted grading system and has been found to have good prognostic correlation. [6]. The present study was undertaken with the objective to find the

concordance of Cytological grading of breast carcinoma using Robinson method with histological using modified Scarff-Bloom-Richardson (SBR) method.

Aim and Objectives

Aim: To compare cytological grading with histopathological grading in malignant neoplasms of breast

Objectives:

1. To grade fine needle aspiration cytology smears by Robinson's method.
2. To grade mastectomy specimens by Nottingham modification of Scarff- Bloom- Richardson method.
3. To assess the concordance of cytological grading with histopathological grading.

Materials and Methods

The present study was done in 65 female patients of malignant breast carcinoma having both

cytological and histopathological confirmation, in the Department of Pathology, Andhra Medical College from May 2019 to April 2020 over a period of one year.

FNAC was performed on patients with clinical suspicion of carcinoma with 23 G needle and 10 ml syringe. Aspirated smears were fixed in isopropyl alcohol and stained with Haematoxylin & Eosin (H&E) stain, and Papinocolau stain, and air dried smears were stained with May Graunwald geimsa (MGG) stain. If cytological features favoured malignancy, grading was given by Robinson criteria. Later patient underwent mastectomy and the specimens were examined histopathologically.

Mastectomy specimens were grossed as per protocol and tissue bits from representative areas were given, formalin fixed and paraffin embedded tissue blocks were cut in 3-4 microns thick and stained with Haematoxylin & Eosin (H&E) stain. Special stains like Alcian blue was used for highlighting mucin wherever necessary. Histopathological examination was done and graded as per Nottingham modification of Scarff-Bloom-Richardson (SBR) method.

Robinson's Cytological grading system uses six parameters namely cell dissociation, nuclear size, cell uniformity, nucleolus, nuclear margin and chromatin pattern. Each of these parameters was given a score of 1-3 and scores were added to get the final score. Carcinomas with scores in the range

of 6-11 were graded I, scores of 12-14 were graded II and grade III was given for a score ranging from 15 to 18.

Histopathological grading with SBR grading system uses 3 parameters namely tubule formation, nuclear pleomorphism and mitotic count. Mitotic count was done under 40X objective with a field diameter of 0.65 mm. Each of these parameters was assigned a score ranging from 1 to 3 and then added together for a final score that ranges between 3 and 9. Scores 3-5 were graded I, 6-7 were graded II and score 8-9 were graded as III.

Inclusion Criteria:

1. All newly diagnosed cases of Carcinoma of Breast
2. Female patients of all age groups

Exclusion Criteria:

1. Benign Breast Lesions
2. Cases without histopathology correlation
3. Recurrent breast carcinoma
4. Patients without consent
5. Male breast cancers

Results

In the present study, a total of 65 cases with cytological and histopathological diagnosis of carcinoma breast were studied. All were female patients with age range from 23- 85 years and most cases were in the fourth and fifth decade.

Table 1: Age distribution of carcinoma breast

Age	No of Cases (65)	Percentage (100%)
10-20	-	-
20-30	2	3.07
30-40	12	18.46
40-50	22	33.80
50-60	15	23.07
60-70	8	12.3
70-80	2	3.07
80-90	4	6.15

Table 2: Distribution of Cases according to Cytological Grading (Robinson's Grading)

Grade	No. of Cases	Percentage (%)
I	15	23.07%
II	47	72.3%
III	3	4.61%

Table 3: Distribution of cases according to Histological Grade (Nottingham's modification of Bloom Richardson's Grading)

Grade	No. of Cases (65)	Percentage (100%)
I	12	18.4%
II	50	76.9%
III	3	4.61%

Table 4: Correlation of cytological grading with histopathological grading

Cytological Grade and cases (65 cases)	Histopathological Grade & Cases (65 cases)		
	Grade I	Grade II	Grade III
Grade I - 15	12	3	-
Grade II - 47	-	46	1
Grade III - 3	-	1	2

Grade I correlation; Out of 15 cases reported in cytology, 12 cases correlated well in histopathology. Correlation percentage is 80 %. 3 cases didn't correlate (20%).

Grade II correlation: Out of 47 cases reported in cytology, 46 cases correlated well in histopathology. Correlation percentage was 97.8 %.

1 case didn't correlate (2.2 %) and was graded as grade III in histopathology.

Grade III correlation: Out of 3 cases reported in cytology as Grade III, 2 cases correlated well in histopathology(66.67%). 1 case reported in cytology as Grade III was graded as Grade II (33.33%)in histopathology.

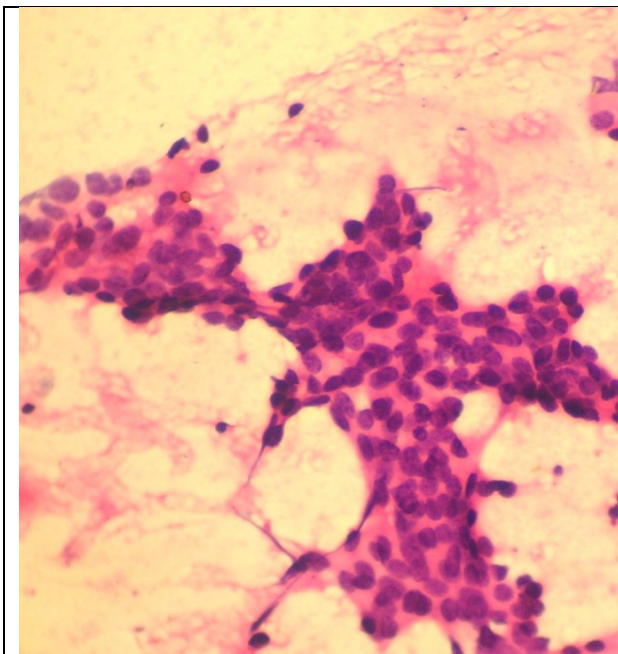


Figure 1: FNAC (Grade 1) -monomorphic cells in sheets with smooth nuclear margins and indistinct nucleoli (H&E 40X)

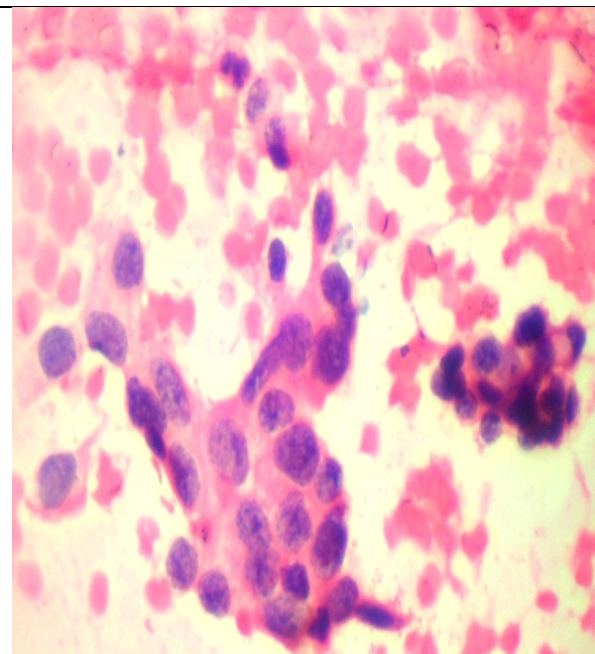


Figure 2: FNAC (Grade 2)- Cells in clusters and singles with granular chromatin and noticeable nucleoli (H&E 40X)

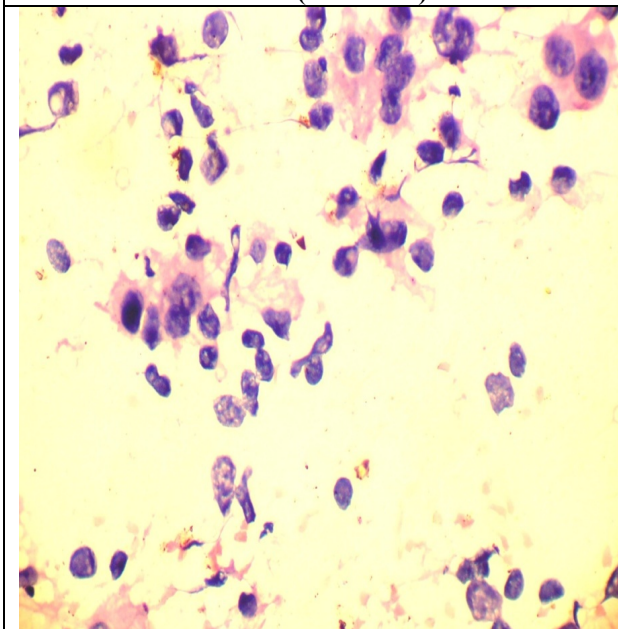


Figure 3: FNAC -Grade 3 Single cells with pleomorphic nuclei, clumped chromatin and prominent nucleoli(H&E 40X)

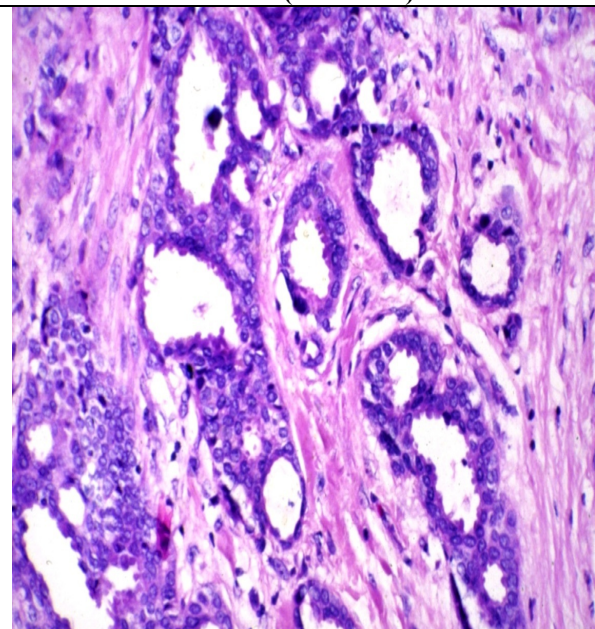


Figure 4: HPE, Grade 1, Mostly tubules with mild nuclear pleomorphism, occasional mitotic figures and without necrosis (H&E 40X)

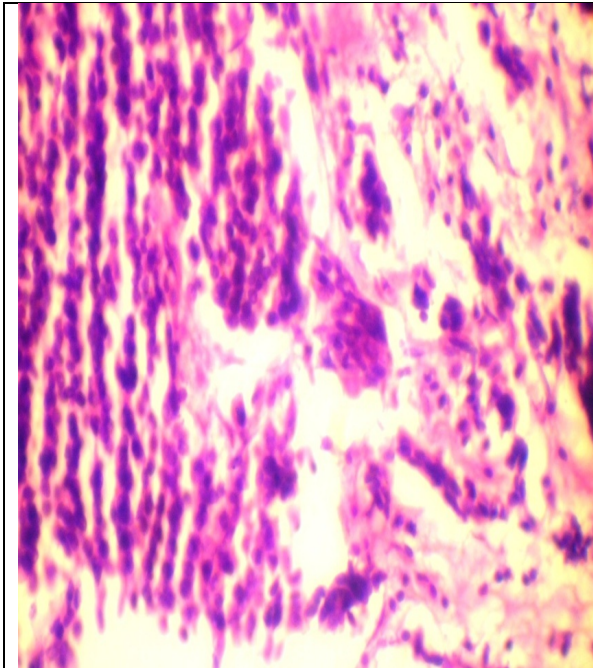


Figure 5: (HPE) Grade 2- tubules, cords and sheets with noticeable mitosis, moderate nuclear pleomorphism (H&E 40X)

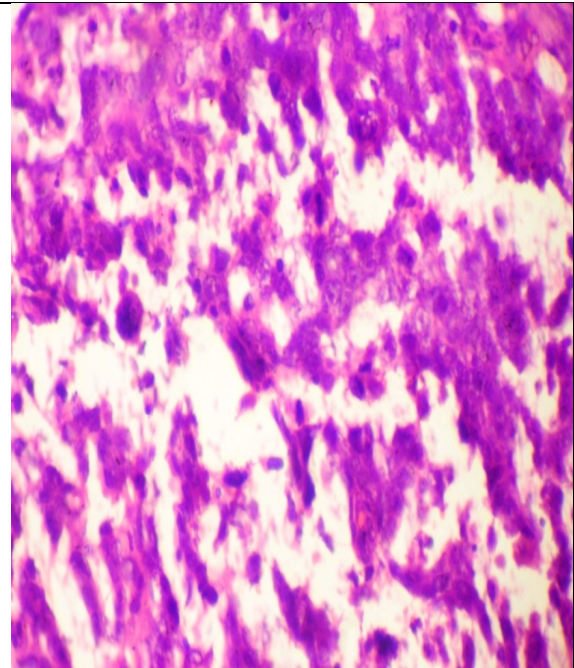


Figure 6: (HPE) grade 3 diffuse sheets with marked nuclear pleomorphism and necrosis.(H&E 40X)

Discussion

out of 65 cases, 58 were diagnosed as Invasive breast Carcinoma- no special type (NST) in histopathology, 1 case was Mucinous Carcinoma, Invasive lobular carcinoma 2 cases and one each of Papillary, Pagets, Tubular and Mixed Carcinoma variants.

Lobular carcinoma: One case diagnosed as Invasive breast Carcinoma- no special type (NST) in cytology with Grade I was diagnosed as Lobular carcinoma in histopathology. Smear pattern was of poor cell yield and cells were single and in small clusters. Single files of uniform size are observed and intracytoplasmic lumina in few cells.

Paget's disease: One case was diagnosed as Paget's disease. Smears were of high cell yield with cells arranged in poorly cohesive clusters, singles with large pleomorphic cells with prominent nucleoli and abundant pale cytoplasm with distinct borders and was graded as Grade-III by cytological grading.

Papillary carcinoma: One case was diagnosed as papillary carcinoma show invasive carcinoma with more than 90% papillary architecture with cells showing pleomorphism. Papillary Carcinoma was considered to have good prognosis. In this study, the case diagnosed as papillary carcinoma was cytologically graded as Grade-I.

Tubular carcinoma: One case was diagnosed as Tubular Carcinoma. Cells are moderately cellular and in cohesive clusters and epithelial fragments are in angular or tubular shape. This case was

diagnosed as Invasive breast carcinoma in cytology with Grade-I features. Pure Tubular Carcinomas carry a good prognosis.

The most common pattern observed was Grade -II which comprises of cells arranged in mixture of single and clusters, cell size is 3 to 4 times the RBC size, cells are mildly pleomorphic, nuclear margins are folded and chromatin is granular.

Among all Grades, Grade-II comprised the majority of cases (79.3%). Grade-II cases correlated well when compared to other Grades (97.8%). Grade I correlation percentage is (80%).Grade III correlation percentage is (66.67%). In the present study, Grade II cases correlated well, when compared to study by Meena et al [7] in which Grade III cases correlated well.

Discordance was found only in one degree, similar to study of Pandit and Prateek [9]

Studies done by Das AK [8] found that Robinsons grading and Moriquands grading was preferred because of its simplicity.

Out of 65 cases, 5 cases didn't correlate (7.69%). Fine needle aspiration cytology is done only from 1 or 2 sites and since histopathology sections deals with more than one representative area the accurate grade is possible.

The second reason is probably due to delay in surgery. The delay in surgery will lead to progression of Grade.

But the discordance of degree is upto 1 grade which is acceptable. Cytological grading is very

helpful in patients inoperable for surgery and the patient can be subjected to appropriate therapy without delay. On grading the tumour cytologically, a brief idea of the tumour aggressiveness is possible. So in addition to giving a diagnosis as a duct cell neoplasm if the Grade of tumour is given, the surgeon can have an idea of tumour he is dealing with.

The other criteria like size and external appearance of tumour may not give a complete idea since some tumours though may be small may be aggressive. It is ideal that every tumour should be graded cytologically and the Grade of the tumour given along with the report.

Conclusion

Cytological grading of the breast carcinomas is a feasible procedure that can be carried out by any laboratory and pathologist with ease. It requires no special technique, except for some expertise. Better performance by Robinson's System is because of multi factorial nature of the system.

Here attempt has been made to correlate cytological grade with histological grade, since histological grading is also subjective, prospective studies with direct relation with patient out-come with or with-out neo-adjuvant therapy is advocated. It should be practiced routinely in correlation with other prognostic markers such as size of tumour histologic type, lymph node status and metastasis should be considered

References

1. Aamdal S, Borner O, Jorgenson, Host H, Eliassen g, Kaalhus O, Pihl A. "Estrogen receptors and long term prognosis in breast cancer", *Cancer*. 1984; 53: 2525-2529.
2. Page DL, Anderson TJ, "Diagnostic Histopathology of The Breast", New York, Churchill Livingstone, 1987.
3. Robinson IA, Kissin W, "Typing and Grading of breast carcinoma on fine needle aspiration. Is this clinically useful information?" *Diag cytopathol*, 1995;13:260-265.
4. Bueton GV, Flowers, Cox E B, "Estrogen Receptor Determination by monoclonal antibody in Fine Needle Aspiration Breast Cancer cytologies A Marker of Hormone response", *Breast Cancer. Tret*. 10: 287 -291.
5. Kiss R et al, "Comparison of biochemical and immunocytochemical macro methods and new immunocytochemical micromethod for assessing estrogen receptors in human breast carcinomas", *Acta Cytoll*. 32: 816-824.
6. Garne J P, Aspergren K, Linell F, Rank F, Ranstam J. "Primary prognostic factors in invasive breast cancer with special reference to ductal carcinoma and histologic malignancy grade". *Cancer*. 1994, 73;1438-1448.
7. Sudha Panka, Meena, Deepika K, "Comparative and Evaluative Study of Cytological and Histopathological grading system in profile in malignant neoplasms of breast -an important prognostic factor", *Indian J Pathol and Micro boil*, 2005; 49(2): 199-202
8. Das AK, "Comparative evaluation of grading by breast carcinomas in fine needle aspirates by two methods", *Indian council of medical research* dec 2003.
9. Pandit AA, Pareekh HJ, "Cytologic Grading of Breast Carcinoma. Comparison of four Grading Systems" *J. Cytol*, 2000; 17(1): 39-44.