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Robinson's cytological grading of breast carcinoma on fine needle aspirates and its correlation with Modified Bloom-Richardson histopathological grading for Breast carcinoma

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Robinson's cytological grading of breast carcinoma on fine needle aspirates and its correlation with Modified Bloom-Richardson histopathological grading for Breast carcinoma

Abstract

Introduction: Grading of breast carcinoma on fine needle aspiration cytology provides useful information about prognosis & also beneficial for selecting patients for neoadjuvant chemotherapy.

Aim: To grade the breast carcinoma on FNAC using Robinson grading system and to assess the concordance of cytological grading (CG) with histological grading (HG) using Elston-Ellis modification of Scarff-Bloom-Richardson grading system.

Material method: This prospective study was done in Department of pathology, B.J medical college & Hospital Ahmedabad from August 2016 to October 2018. A total of 200 cases of cytologically confirmed breast carcinoma were included in this study and correlated with histopathological findings. Robinson's cytological grading was done on cytology smears and modified Bloom-Richardson grading was done on histological sections.

Result: In the present study, majority (110) were Grade II tumors (55%) followed by 53 Grade I tumors (26.5%) and 37 Grade III tumors (18.5%) by cytological grading. Whereas majority (107 cases) of the tumors (53.5%) were Grade II, followed by 43 (21.5%) Grade I tumors and 50 (25%) Grade I tumors by Histological grading. The result showed overall 78% concordance of CG with HG, with grade II showing highest degree of concordance (86.36%), which is comparable to previous studies.

Conclusion: Cytologic grading method is Simple, non-invasive and comparable with histologic grading system. It provides information about aggressiveness of tumor and is also useful parameter while selecting neo adjuvant chemotherapy in patients of breast carcinoma.

Keywords

Breast carcinoma, FNAC, Modified Bloom-Richardson Histopathological grading, Robinson's cytological grading.

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INTRODUCTION

Breast cancer is the commonest cancer of urban Indian women and the second commonest cancer in the rural women next to cervical cancer. Owing to the lack of awareness of this disease and in absence of a breast cancer screening program, the majority of breast cancers are diagnosed at a relatively advanced stage[1]. Carcinoma of the breast is a leading cause of malignant death in women, with more than 1,000,000 cases occurring annually. Prognosis of breast carcinoma depends on various parameters, such as tumor type, histological grading (HG), hormone receptor status, DNA ploidy, cell proliferation markers and expression of different oncogenes [2]. HG of breast carcinoma using the Elston-Ellis modification of Scarff-Bloom-Richardson (SBR) grading system is a widely accepted tumor grading system and has been found to have good prognostic correlation [3]. Based on the cytological features, various grading systems have evolved. Of the different cytological grading methods corresponding to modified Bloom-Richardson grading, the Robinson's cytological grading was found to be useful in grading breast carcinoma in FNAC[4]. Cytological grading of breast carcinoma, which is a simple, feasible and reproducible method, can be used for selection of neoadjuvant therapy and would allow the assessment of the tumors without any surgical intervention so that the morbidity associated with overtreatment of low-grade tumors can be avoided[5]. Keeping this in mind, present study was undertaken with the objective to find the concordance of Cytological grading of breast carcinoma using Robinson method with Histological grading using modified Scarff-Bloom-Richardson method.

MATERIALS AND METHOD

This prospective study was carried out in 200 cases of carcinoma of breast for a period of almost 2 years from August 2016-October2018. This study was done in the department of pathology, B.J medical college, Ahemdabad. In all these cases the cytological diagnosis were confirmed by histological examination. Patients with palpable breast lumps and a clinical diagnosis of invasive breast carcinoma were selected and clinical details noted. FNAC was performed on patients with clinical suspicion of carcinoma. Whenever the cytological features favored malignancy, the patient underwent tumor excision and the biopsy specimens were processed for histopathological examination. Inclusion criteria were : (1) Patients having palpable breast lumps with clinical and cytological diagnosis of breast carcinoma and subsequent histopathological follow-up were included in the study. Exclusion criteria were:(1) Benign Breast lesions.(2) Patient who refused biopsy examination/Data of biopsy not available (3) patients having history of chemo or radiotherapy prior to mastectomy. Informed consent was obtained from every patient to participate in the study. Ethical Committee clearance of the institution was obtained prior to this study.

FNAC of breast lump was done with 22 gauge needle attached 10ml syringes. FNA made smears were stained with H & E, Pap and MGG stains. The cytological grading was done using Robinson's method in which the cell dissociation, nuclear size, cell uniformity, nucleoli, nuclear margins and the chromatin patterns were studied (Table 1). The lumpectomy and mastectomy specimens of the corresponding cases were fixed in 10% formalin, routinely processed and stained with H&E stain. Histopathological grading was done according to modiiied Bloom-Richardson grading method in which

tubule formation, nuclear pleomorphism and mitotic count were evaluated (Table 2). Correlation between Robinsons cytological and modified Bloom-Richardson histopathological grading was done.

RESULTS

A total number of 200 cases were included in this study. Cytological scores were analyzed using Robinson's cytological grade and Histological scores were analyzed by modified Bloom-Richardson histological grade.

In this study, using cytological grading, maximum number of carcinoma were grade II (55%), followed by grade I (26.5%) and grade III (18.5%) as shown in Table 3. Using histopathological grading, maximum numbers of cases were grade II (53.5%), followed by Grade III (25 %) and Grade I (21.5 %) as shown in Table 4. The absolute concordance rate was 78% (Table 5). The highest concordance rate of 86.3 % was found in Grade II tumor.

Table 1: Cytological grading according to Robinson's Grading system

Cells	Score 1	Score 2	Score 3
Cell dissociation	Mostly in cluster	Mixture of single & cell Clusters	Cells mostly Single
Cell size	1-2 x RBC size	3-4 x RBC size	>5 x RBC size
Cell uniformity	Monomorphic	Mildly Pleomorphic	Pleomorphic
Nucleoli	indistinct	Noticable	Prominent
Nuclear margin	smooth	Folds	Buds/Clefts
Chromatin	vesicular	Granular	Clumped and Cleared

Grade 1- score 6-11, grade 2- score 12-14, grade 3- score 15-18

Table 2: Elston and Ellis modified Bloom-Richardson grading system

Feature	Score 1	Score 2	Score 3
Tubule formation	>75%	10-75%	<10%
Nuclear pleomorphism	Small, regular uniform cells	Moderate variation in size/shape	Marked nuclear pleomorphism
Mitosis per 10 hpf in 44mm field diameter	0-5	6-10	>/=11

Histologic grade: Grade I – score 3-5 well differentiated; Grade II- score 6-7 moderately differentiated; Grade III – score 8-9 poorly differentiated.

Table 3: Distribution of cases according to Robinson’s cytological grading system

Cytological Grades	Number of cases	Percentage
Grade I	53	26.5%
Grade II	110	55 %
Grade III	37	18.5%
Total	200	100%

Table 4: Distribution of cases according to modified Bloom Richardson grading system

Histological Grades	Number of cases	Percentage
Grade I	43	21.5%
Grade II	107	53.5 %
Grade III	50	25 %
Total	200	100%

Table 5: Distribution of cases according to cytology and histology grading along with comparison between two grading system

Cytologic grade (CG)	Number of cases in cytologic grading (%)	Cases in histologic garding			Concordance rate (%)
		Grade I	Grade II	Grade III	
I	53 (26.5%)	34	8	11	64.1%
II	110 (55 %)	7	95	8	86.3%
III	37 (18.5%)	2	4	37	83.78%
Total	200 (100%)	43(21.5%)	107(53.5%)	50(25%)	
Absolute concordance					78%

Table 6: Comparison of concordance rates reported in different series

Authors	Concordance rate (%)
Robinson et al [11]	56.9
Das et al [12]	71.2
Chabbra et al [13]	65
Meena et al [14]	59.1
SK Sinha [15]	69.5
Nazoor Khan et al [9]	89.1
TS Rekha et al [14]	82
Present study	78

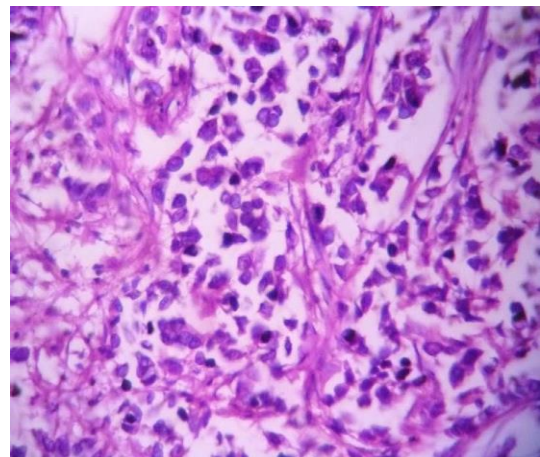
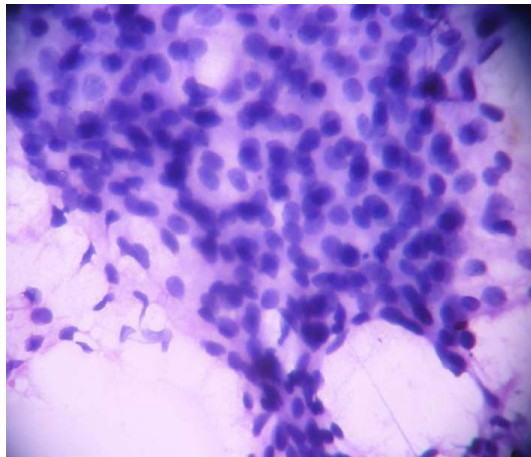


Figure 1(a): Robinson's grade I. Uniform cells with uniform nuclear chromatin, smooth nuclear margin and inconspicuous nucleoli (H&E Stain, X400). Figure 1(b): Modified Bloom-Richardson grade I, score 5 of the same patient showing tubules with mildly pleomorphic nuclei (H & E stain, X400).

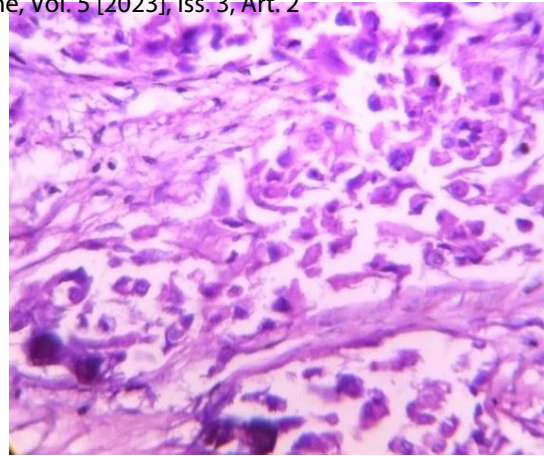
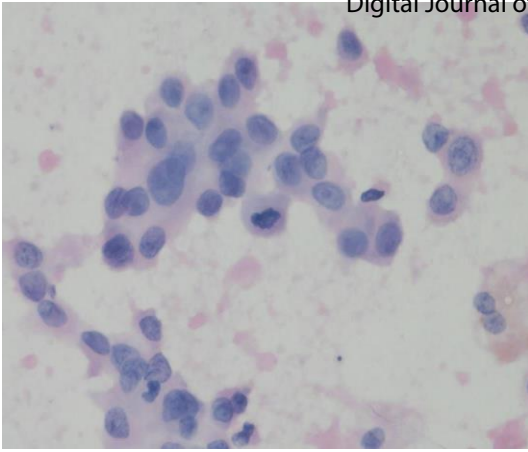


Figure 2(a): Robinson's grade II. Mildly pleomorphic cells with granular nuclear chromatin, slightly irregular nuclear margin and noticeable nucleoli in few cells (Giemsa Stain, X400). Figure 2(b): Modified Bloom-Richardson grade II, score 7 of the same patient showing absence of tubules with moderately pleomorphic nuclei and mitotic figure (H&E stain, X400).

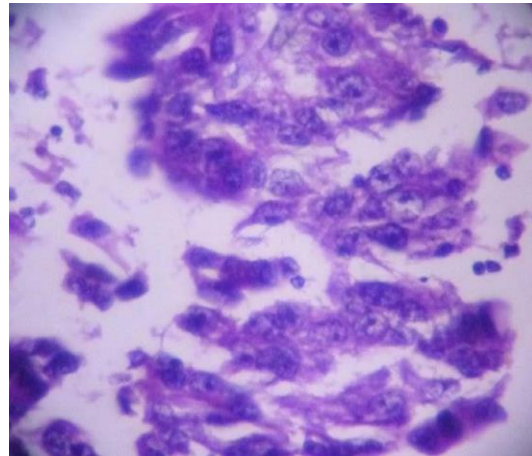
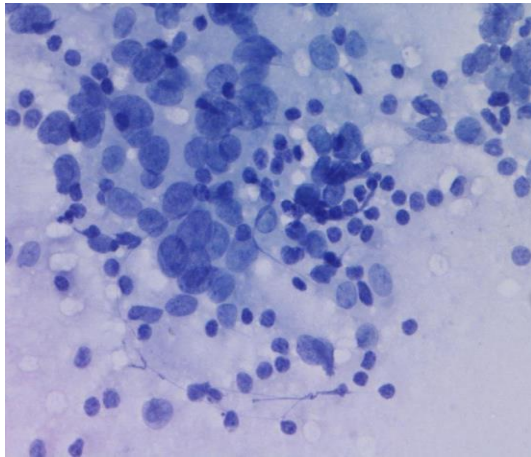


Figure 3(a): Robinson's grade III. Markedly pleomorphic cells with clumped nuclear chromatin, irregular nuclear margin and prominent nucleoli (Giemsa Stain, X400).

Figure 3(b): Modified Bloom-Richardson grade III, score 9 of the same patient showing absence of tubules with markedly pleomorphic nuclei (H and E stain, X400).

DISCUSSION-

Breast cancer is one of the most common causes of death in many developed countries in middle-aged women and is becoming frequent in developing countries. In India, breast cancer is the second most prevalent cancer in women after cervical cancer[6]. FNAC may be performed as the first-line investigation, specially in symptomatic and screening populations. The main purpose of FNAC of breast lumps is to confirm cancer preoperatively and to avoid unnecessary surgery[7]. Among the various cytological grading systems, Robinson's system is simple, more objective, takes little time and effort, is reproducible and correlates precisely with modified BloomRichardson histological grade[8].

Utility of cytologic grading is to detect fast growing grade III tumors which are more likely to respond to chemotherapy than low grade (slow growing) tumor. Slow growing tumor may be better suited to pretreatment with tamoxifen[9].Preoperative neo adjuvant chemotherapy is becoming common for treatment of breast cancer. So, it is desirable to grade tumor before surgery. So, most appropriate regime can be selected[10]

Histological grading was based on the degree of tubule formation, mitosis and nuclear pleomorphism. As tubule formation and mitotic index were difficult to assess on cytology, it might be the cause of discordance between cytological and HG systems[16-18].In Cytological grading, Main importance have been given to nuclear features like nuclear size, nucleoli, nuclear membrane and chromatin pattern in contrast to Histological grading; in which nuclear feature in only one component. This can also lead to cytohistological disparity in grading of breast carcinomas.

CONCLUSION

In Present study ,a high degree of concordance was seen between cytological and Histological Grading System.Cytological Grading is not only simple and non invasive but also comparable with Histological Grading System and provide useful information about Tumour aggressiveness and imporatatn parameter while selecting neoadjuvant chemotherpay in patients of breast carcinoma.

Ethics approval and informed consent: All patients who gave written consent were included in the study. All procedures performed were in accordance with the ethical standards of the institution.

Conflict of Interest: This work did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

Financial Support : There are no conflicts of interest to declare by any of the authors of this study.

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