The Clarion Volume 2 Number 2 (2013) PP 1-5

The Clarion

International Multidisciplinary Journal

ISSN : 2277-1697

Grading of breast cancer by fine needle aspiration cytology correlating with histopathologic grading in women of age group 30 (thirty) to 65 (sixty five) years

Ena Dowerah[1] and **K. L. Talukdar**[2]

1. Department of Pathology, Gauhati Medical College & Hospital, Guwahati, India.
2. Department of Anatomy, Gauhati Medical College, Guwahati, India.

Abstract

Breast cancer is a malignant disease of the breast. There are various investigative tools for its diagnosis. As fine needle aspiration cytology (FNAC) is an important investigation for the diagnosis of breast cancer, grading the malignant tumours cytologically can aid in the pre-operative evaluation of the tumour behaviour. The aim of the study was to diagnose breast tumours and grade the malignant tumours on cytological smears by FNAC technique and correlating the findings with histopathology on excised tissue sections. The present study was carried out in Gauhati Medical College & Hospital; Guwahati, Assam, India during the period from May 2011 to April 2012. Female patients presenting with breast lumps were selected for the study. FNAC materials were aspirated by using 10ml syringe with attached 22-23 gauze needle. Smears were stained by Papanicolaou (Pap) and May Grunwald Giemsa (MGG) stains. For histopathology, Hematoxylene and Eosin (H &E) stains were used. The age of the patients with malignant tumours were predominantly found below 50 years of age and most of them were infiltrating duct carcinoma with high grade features. The results showed a significant correlation between the cytologic and histopathologic grading of the malignant tumours with a concordance rate of 85.3%. Therefore, FNAC was found to be quite useful and reliable in grading malignant tumours of the breast and can be used as an important tool for the pre-operative evaluation of the tumour behaviour.

Keywords : Breast cancer, Fine needle aspiration cytology, Grading, Histopathology, Malignant, May Grunwald Giemsa, Papanicolaou.

1. Introduction

Breast cancer is a malignant disease with a heterogeneous prognosis. It is the most common cancer in the urban Indian population based on National Cancer Registry Programme, ICMR. In the North East region of India, it was reported that Kamrup urban districts showed the highest incidence of breast cancer according to the Population Based Cancer Registry, ICMR, Dibrugarh, Assam, India, 2008. Women over 30 years of age are especially prone to develop this type of cancer, but can happen to younger women also.

There are various prognostic factors that have been studied on invasive ductal carcinomas to predict the tumour behaviour and response to therapy. As FNAC of breast lumps is one of the baseline investigation done on outpatient basis, attempt to grade the tumour on cytology material is being studied. In the era of neoadjuvant chemotherapy (NAT), the FNA material is often an important investigation for preoperative evaluation. NAT is potentially advantageous to down stage the tumour. This necessitates grading of the tumor on the aspiration material obtained before surgery.

2. Materials and methods

The present study was carried out in Gauhati Medical College, Guwahati, Assam, India. This study was done from May, 2011 to April, 2012. The study was performed after permission from the

Corresponding author : ena.dowerah@gmail.com

Institutional Ethical Committee vide letter no MC/190/2007/Pt-I/60, dtd. 25.12.2010 on female patients above 30 years of age presenting with breast lump. The consent of the patients were taken prior to the procedure.

2.1. Demographic and Clinical details

The patient's history and clinical details were obtained :

1. Age of the patients.
2. Smoking.
3. Alcohol.
4. High fatty diet.
5. Obesity.
6. Early menarche.
7. Breast feeding.
8. Location of the tumours.
9. Size of the tumours.

2.2. Study Design

FNAC material diagnosed → malignant tumours graded → Histopathological examination done on excised tumours → malignant tumours are graded. For FNAC smears, multiple passes using disposable 10ml syringe with attached 22-23 gauze needle were carried out for aspirating the material and stated by Papanicolaou (PAP) and May Grunwald Giemsa (MGG) stain (Franzen *et. al.,* 1968). H & E stains were used for histopathology on tissue sections. Robinson's grading system for cytologic grading and modified Bloom Richardson system for histopathologic grading were followed. Statistical analysis was done by using Spearman correlation coefficient and Chi square tests.

3. Results

3.1. Out of 414 cases of breast lumps, 83 cases (20%) were non neoplastic, 253 cases (61%) benign neoplastic and 78cases (19%) were malignant neoplastic lesions.

Table -1 : Table showing cytological diagnosis.

FNAC diagnosis	No. of Cases	Percentage
Non neoplastic	83	20%
Benign neoplastic	253	61%
Malignant neoplastic	78	19%

3.2. Age distribution of malignant tumours

Most of the patients with malignant tumours were in the pre and perimenopausal age group (<47 years).

Table - 2 : Table showing Age distribution of the patients.

Age groups	Percentage of cases	Age in years
Pre & Perimenopausal	45%	<47
Menopausal	22%	47-52
Postmenopausal	33%	>52

Malignant tumours were found to be mostly in the upper outer quadrant.

Out of the malignant neoplastic lesions, 88.5% cases were reported as Duct carcinoma. Rest of the cases were Infiltrating duct carcinoma, Lobular carcinoma, Medullary carcinoma, Malignant phyllodes tumour, Metaplastic carcinoma and Mucinous carcinoma.

3.3. Grading of malignant tumours on cytology

Out of 78 malignant tumours, we found 54% to be high grade tumors, 30% intermediate grade and 16% low grade tumours.

3.4. Histopathological diagnosis

After excision of the tumours with or without mastectomy, 170 cases were evaluated for histopathological examination using the routine hematoxylene and eosin (H & E) stain. The detail gross and microscopic features were studied in each of the specimen. We reported the cases as 12% non neoplastic lesions, 64% benign neoplastic lesions and 24% as malignant neoplastic lesions. Out of the non neoplastic lesions, majority of the cases were fibrocystic disease. Fibroadenomas were predominant among the benign neoplastic lesions and infiltrating duct carcinoma NOS among the malignant neoplastic lesions.

All the malignant cases were further graded depending upon the histopathological features described by modified Bloom Richardson system. It was seen that 48% were high grade lesions, 34% of intermediate grade and 18% of low grade features.

3.5. Size of malignant tumours

The size of the malignant tumours were recorded by their gross features on histopathological examination. It was observed that malignant tumours of size >5cm were seen in 47.6% cases.

Table - 3 : Size of malignant tumours.

Size	No. of malignant tumours (42)
<2cm	6
2-5 cm	16
>5 cm	20

3.6. Lymph node metastasis

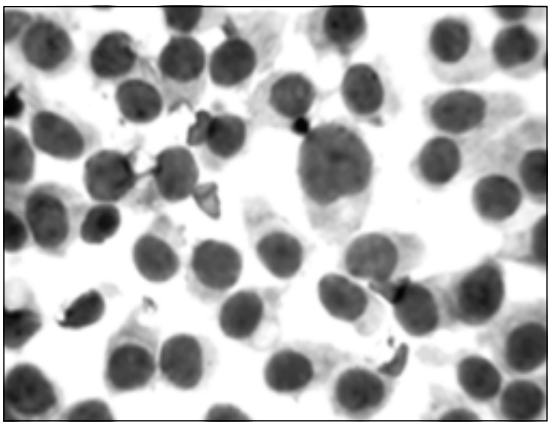
It was observed that 46% of the malignant tumours were positive for lymph node metastasis showing infiltration by duct carcinoma cells.

3.7. Correlation of Cyto-histopathologic grading

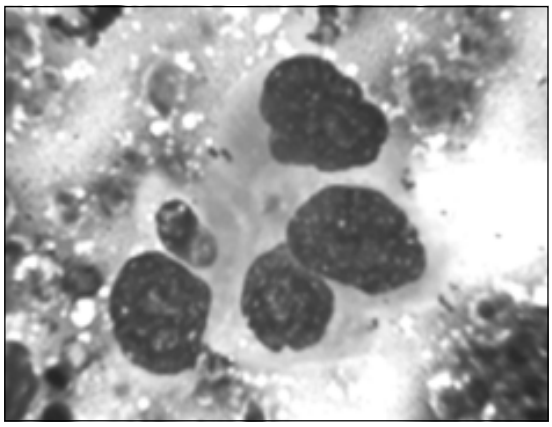
There was a significant correlation in the cytohistopathologic grade of the malignant tumours. The average concordance rate was found to be 85.3%.

Table - 4 : Correlation of Cyto-histopathologic grading.

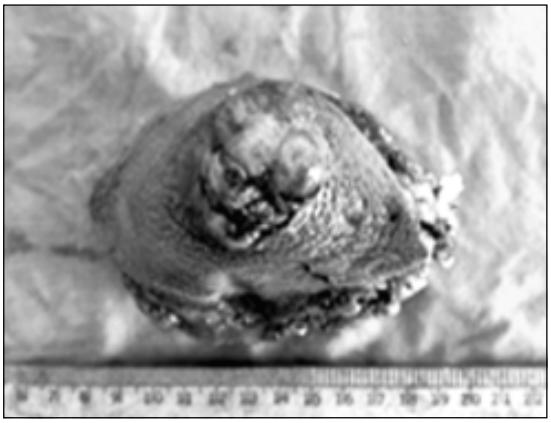
Cytologic grade		Histopathologic grade			Concordance rates (%)
		Gr. I	Gr. II	Gr. III	
Grade I	9	4	5	0	73.7%
Grade II	14	1	11	2	85.1%
Grade III	19	0	1	18	97.4%
Total	42	5	17	20	Av. - 85.3%



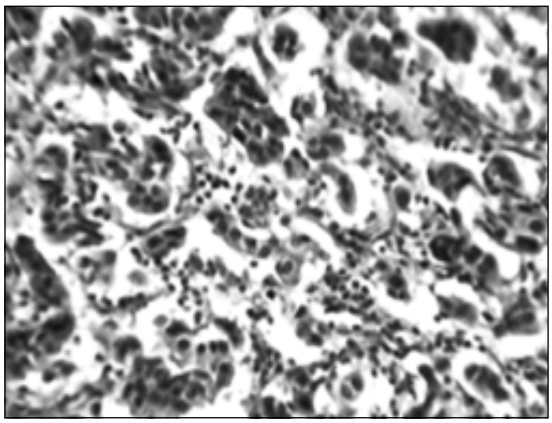
1



2



3



4

Figures : 1 & 2. Photomicrograph of FNAC smears- Duct carcinoma (High grade)
3. Photomicrograph of gross specimen of breast showing ulcerated growth.
4. Photomicrograph of Histopathology section-infiltrating duct carcinoma.

4. Discussion

Breast carcinomas are the most common type of breast cancer and are increasingly being diagnosed on the initial investigation by FNAC. As the grade of the tumour is a known prognostic factor, an attempt to grade them on FNA smears would provide us with useful information on the tumour behaviour preoperatively.

Considering the patient demographics, it was seen that age of the patient, size, location and lymph node metastasis had a significant correlation with the incidences of breast cancer. This observation correlated well with previous large studies (Rosenberg J *et al.,* 2005). Most of the cases of breast cancer occurred in the pre and perimenopausal age group which was found to be similar with the studies by Pratap *et. al.,* 1998 & Gann *et al.,* 1999.

In the present study, lymph node metastasis were observed in 48% of the malignant tumours of the breast. Sharif M *et al.,* 2009 found 65% of the tumors with lymph node metastasis. Size of the tumours >5cm showed increased nodal positivity which was similar to studies by Nouh *et al.,* 2004.

Correlating the data of cytologic with histopathologic grading gave a concordance rate of 85.3% in our study. The concordance rates of many other authors were 65% (Chabra *et al.,* 2005); 77.4% (Dash *et al.,* 2005) & 80% (Sauer *et al.,* 2004).

In the present study, there was some discrepancies in few cases regarding grading of tumours on cytology. This may be due to the fact that in cytologic grading, the nuclear features are predominantly considered for grading. Moreover large tumour size or tumour heterogeneity may be some other causes of the pitfalls. However, a significant correlation was achieved in grading the malignant tumours in the present study.

5. Conclusion

Breast cancer is significantly related with some demographic factors like smoking, early menarche, no breast feeding, high fatty diet, size, location and metastasis of the tumours. At recent time it was observed that breast cancer incidences are increasing in the age group below 50 years (pre and perimenopausal age group). So proper awareness and routine breast self examination (BSE) by women themselves, along with screening programmes are utmost necessary for early diagnosis and treatment.

FNAC is found to be an easy, safe, quick, useful and reliable procedure for diagnosis and grading the malignant tumours.

Therefore, highlighting the biological behaviour of breast cancer would aid the clinicians to adopt proper clinical management strategies and pave the way for a quality survival of the patients.

References

Bloom HJG, Richardson WW., 1957 : Histological grading and prognosis in breast cancer : a study of 1409 cases of which 359 have been followed for 15 years. Br J. Cancer, 11 : 359-377

Chhabra S, Singh PK, Agarwal A, Bhagoliwal A, Singh SN., 2005 : Cytological grading of breast carcinoma—A multivariate regression analysis. J Cyto, 22(2) : 62-65.

Dash A, Mohanty R, mallik R, Dash K., 2005 : Aspiration smear pattern as a predictor of biological behaviour in breast carcinoma. J Cyto, 2(1) :19-21.

Franzen S, Zajicek J., 1968 : Aspiration biopsy in the diagnosis of palpable lesions of the breast. Acta Radiologica, 7:241-263.

Gann PH, Collila SA, Gapstur SM, Winchester DJ, Winchester DP., 1999 : Factors associated with axillary lymph node metastasis from breast carcinoma. Descriptive and predictive analyses. Cancer, 86 : 1511-1519.

Indian Council of Medical Research, 2008.

Nouh MA, Ismail H, Ali El-Din NH, El-Bolkainy MN., 2004 : Lymph node metastasis in breast carcinoma : Clinicopathologic correlations in 3747 patients. J Egypt Natl Canc Inst, 16(1) : 50-56.

Population based cancer registry (PBCR) 2008, RMRC, ICMR, Dibrugarh-Assam, India.

Pratap R, Shousha S., 1998 : Breast carcinoma in woman under the age of 50 : Relationship between p53 immunostaning, tumor grade and axillary lymph node status. Breast cancer research and treatment, 49 : 35-39.

Rosai & Ackerman's Surgical Pathology 9th edition. Vol-2, Pg. 1763-1876.

Rosenberg J, Chia YL, Plevrits S., 2005 : The effect of age, race, tumour size, tumour grade and disease stage on invasive ductal breast cancer survival in the U.S. SEER data base. Breast cancer research and treatment, (89) : 47-54.

Robinson IA, McKee G, Nicholson A, D'Arcy J, Jackson PA, Cook MG *et. al.,* 1994 : Prognostic value of cytological grading of fine needle aspirates from breast carcinomas. Lancet, 343 : 947-949.

Sharif MA, MamoonN, Mushtaq S, Khadim MT., 2009 : Morphological profile and association of her2neu with prognostic markers in breast carcinoma in Northern Pakistan. J Coll Physicians Surg Pak. Feb; 19(2) : 99-103.

Sauer T, Karimzadeh M., 2004 : Characteristics cytological features of histological grade one (G1) breast carcinomas in line needle aspirations. Deptt. Of pathology, Ulleval University Hospital, oslo, Norway.