

Assessment of Clinical Parameters and Histopathological Grading of Breast Cancer

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ABSTRACT

Introduction: Management of breast cancer depends on clinical and pathological prognostic and predictive factors that guides the selection of treatment options. The present study was undertaken to assess various clinical parameters and to evaluate correlation with histopathological grading in breast carcinoma patients.

Material and methods: The study was conducted on 50 cases of breast cancer received as lumpectomy or mastectomy specimens. The history and clinical findings were recorded. The histopathological grading of the breast carcinoma was done on the H and E sections according to the Nottingham modification of the Bloom Richardson grading system. Data so obtained was analyzed using the SPSS Version 17 software and was arranged according to characteristics and represented as a number and percentage.

Results: The size varied from 1.5 cm to 5.0 cm with maximum (70%) being 2-5cms. All the cases were infiltrating ductal carcinoma NOS (not otherwise specified). The grading was done according to Nottingham modification of Bloom Richardson system and maximum cases were of Grade III followed by Grade II tumors with no case in grade I. 30 cases had axillary lymph node metastasis out of 48 cases in which lymph nodes were recovered.

Conclusion: It should be noted that grade and type provide complementary information. The difference in the tumour grades may be due to lack of routine mammographic screening in our population coupled with the lack of awareness. Majority of cases with lymph node metastasis were grade III tumors.

Keywords: Breast Carcinoma; Metastasis; Tumors; Women

INTRODUCTION

While cancer account for high morbidity and high mortality rate throughout the world, breast carcinoma is common in women in developed countries and more than 40% of all breast cancer cases are found in developing countries.¹ Management of breast cancer depends on the clinical and pathological prognostic and predictive factors that further guides the selection of treatment strategies. The use of systemic therapy has to be determined for every patient in early-stage of breast cancer, lymph node status, tumor size, and histological grade are the three main prognostic determinants used in routine practice.² Breast tumors are classified histologically according to the location of origin. The ductal tumors develop in breast ducts and represent 80% of tumors. The lobular tumors develop inside the lobes and account for 10 to 15% of cases. Other subtypes represent less than 10% of cases diagnosed per year. Patients with invasive ductal carcinoma present higher lymphatic involvement and worse prognosis than less common types of breast carcinoma.³ The present study was undertaken to assess various clinical parameters and to evaluate correlation with histopathological grading in breast carcinoma patients.

MATERIAL AND METHODS

The study was conducted on 50 cases of operable breast cancer received as lumpectomy or mastectomy specimens in the Department of Pathology, at Sri Guru Ramdas Institute of Medical Sciences And Research. The history and relevant clinical findings regarding age, site, lymph node status and location of tumor within the breast were collected. The tissue was fixed in formalin, embedded in paraffin wax and was stained for Haematoxylin and Eosin for histopathological typing and grading. The tumors were confirmed to be breast cancers histologically and were classified accordingly. The histopathological grading of the breast carcinoma was done on the H and E sections according to the Nottingham modification of the Bloom Richardson grading system.

STATISTICAL ANALYSIS

Data so obtained was analyzed using the SPSS Version 17 software and was arranged according to characteristics and represented as a number and percentage.

RESULTS

All the patients were females. Age of the patients varied from 30-70 years. Maximum number of the patients were in the fourth and fifth decade of life comprising 64% of the total. Although no difference was observed between 5th and 6th decade of life (table 1).

Left side was more commonly involved (60% of cases) than the right side (40% of cases). Tumors were present mostly in upper outer quadrant comprising 84% of the cases with the least involvement being in lower inner quadrant comprising 2% only (table 2). The size of the tumour varied from 1 to 5 cm. In maximum number of cases size varied from 2-5 cm, comprising 70 % of the total cases (figure 1). All the 50 cases were of infiltrating ductal carcinoma NOS (not otherwise specified). Of all the 50 cases, which were infiltrating Duct Carcinoma (NOS) type, Nottingham modification of RBB scoring was done and 12 cases were reported as Grade II and 38 cases as Grade III. There was no case in Grade I (figure 2).

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Lymph nodes were recovered in 48 cases of radical mastectomy. Lymph nodes were not recovered in 2 cases which were simple lumpectomy specimens. Metastatic carcinomatous deposits were present in cases which included 13 cases of N1 Stage (1-3 positive nodes), 11 cases of N2 stage (4-9 positive nodes) and 6 cases of N3 stage (>10 positive nodes). 18 cases had reactive pathology in lymph nodes (table 3).

Correlation of the histopathological grades of the carcinoma with lymph node status: Out of 12 cases of grade II, carcinomatous deposits were present in 8 cases and reactive lymph nodes were recovered in 3 cases. In 1 case no lymph nodes were recovered(lumpectomy). Out of 38 cases of grade III, carcinomatous deposits were present in 22 cases and reactive lymph nodes were present in 15 cases. In 1 case no lymph nodes were recovered (table 4).

DISCUSSION

Carcinoma breast is the most frequent cancer in females throughout the world with 1.6 million cases diagnosed and 4,25,000 deaths reported in 2010. At this rate, new cases and deaths in next 25 years will be 41 million and 10.6 million respectively.⁴ More than 50% of the cases occur in developed world. In India though ranked second after carcinoma cervix at the moment, it is all set to overtake cervical cancer and become the most common cancer in Indian women by 2020. An ICMR release in 2011 showed an increase in incidence from 10 per 100,000 to 23 per 00,000 in just 10 years.⁵

Age Group (years)	Females	Percentage
31 – 40	11	22
41 – 50	17	34
51 – 60	15	30
61 – 70	15	30
Total	50	100

Table-1: Age distribution of breast carcinoma patients

Site	Left side	Right side	Total	Percentage
Upper outer quadrant (UOQ)	17	25	42	84 %
Lower outer quadrant (LOQ)	01	01	02	04%
Upper inner quadrant (UIQ)	02	03	05	10%
Lower inner quadrant (LIQ)	00	01	01	02 %
Total	20	30	50	
Percentage	40%	60%		100%

Table-2: Showing the site of the breast

Status of lymph nodes	No of cases	Percentage
Reactive (N0)	18	36
N1	13	26
N2	11	22
N3	06	12
Not recovered	02	04
Total	50	100%

Table-3: Status of Lymph Nodes

Node staging	Secondary deposits present	Reactive lymph nodes	Not recovered	Total cases	Percentage of involvement
Grade I	-	-	-	-	-
Grade II	08	03	01	12	72%
Grade III	22	15	01	38	60%

Table 4: Correlation of the histopathological grades of the carcinoma with lymph node status

In the present study, age of the patients varied from 31-70 years with maximum patients in the age group of 41-60 years comprising 64% of the total cases. Breast cancer incidence and death rates generally increase with age. Ninety-five percent of new cases and 97% of breast cancer deaths occur in women 40 years of age and older.⁶ The peak occurrence of breast cancer is above the age of 50 in developed countries whereas it is above

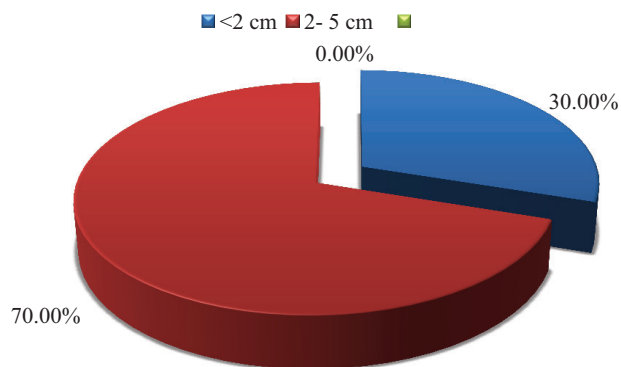


Figure-1: Showing size of the tumor

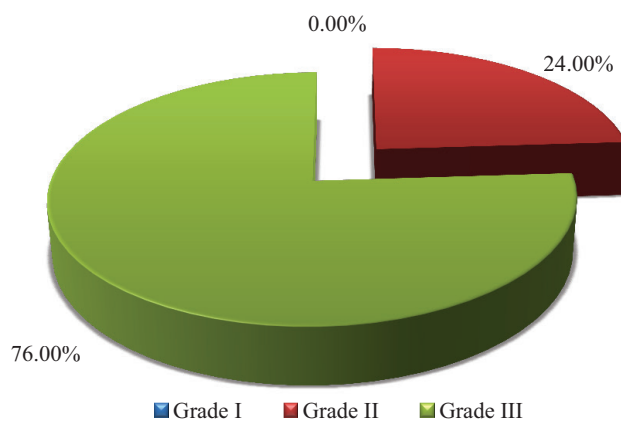


Figure-2: Grade of tumor

the age of 40 in India.⁷ The average age of 50-53 years has been reported of patients with breast cancer in various population-based studies conducted in different parts of the country. However, significant proportion of Indian breast cancer patients are younger than 35 years of age.⁸ During 2004-2008, among adult women, those 20-24 years of age had the lowest incidence rate, 1.5 cases per 100,000 women and the median age at the time of breast cancer diagnosis was 61 years. This means that 50% of women who developed breast cancer were 61 years of age or younger at the time of diagnosis.⁶ The age standardized rate (ASR) of female breast cancer is 37.13 which are highest among all cancers.⁹ Kaur G et al¹⁰ also noted that the female median age was 54 years with a peak age of 45 - 55 years in a study done on 177 cases.

In the present study, right side was more commonly involved (60% of cases) than the left side (40% of cases). A study carried out by Saleh F et al¹¹ on 166 patients of breast carcinoma found higher incidence of breast carcinoma on right side. Fatima N et al¹² also noted that the right sided Breast Carcinoma was observed in younger age group (46:52 years) and with a smaller overall survival than the left sided (3.43:4.15 cm). However, in older age group the left to right sided proportion was significantly higher.(59%:41%). On contrary to this, Amer MH¹³ found relative excess incidence of left over right breast cancer was noted in all age groups.

In the present study, there was definite preponderance for the upper outer quadrant with lowest involvement of the lower outer quadrant. This finding corroborated with the results from other parts of the world as well. Possible explanation is that the upper outer quadrant has a relatively larger volume of breast tissue.¹⁴⁻¹⁶ The size of tumour is one of the most important and well established prognostic factors in carcinoma breast.¹⁷ The size of the tumor varied from 1 cm to 5 cm and in 70% cases tumor size was between 2-5 cm constituting the largest group. Saleh F et al¹¹ evaluated 166 cases and observed that maximum cases (53.6%) had the tumor size between 2-5 cm. However, in the western country, Taucher S et al reported that the tumors were predominantly less than 2 cm in size which could be due to early detection programs prevalent in the western countries. The increased tumor size is a predictor of aggressive tumor behavior.^{17,18} An inverse relation of tumor size and survival rates has been noted. A ten year survival rate of about 90% was observed if tumor size was <1 cm and nodes were negative in a study by Carter CL et al.¹⁹

The American Joint Committee on Cancer (AJCC) recommend using the diameter of the largest tumor only for the purpose of obtaining a simple and consistent measurement. The actual tumor burden is underestimated because secondary tumor foci, which are often sizable, are not included.²⁰

The so-called invasive ductal carcinomas not otherwise specified (IDC-NOS) or of no special type (IDC-NST) is the commonest type of breast carcinoma, which is a diagnosis of exclusion and consists of adenocarcinomas that fail to show adequate features to classify them in one of the special types.²¹ In the present study, all the 50 tumors were infiltrating ductal carcinoma NOS (not otherwise specified). The incidence of IDC (NOS) was also higher in the studies of M Ambroise et al who reported it as 96.3%.²²

The special types of breast cancer comprises up to 25% of all

breast carcinomas and the World Health Organisation in their latest edition of the classification revealed the existence of at least 17 distinct histological special types. Even though grade recognizes prognostic subgroups among special types of breast cancer, but some subgroups that are by description of high histological grade e.g. medullary carcinomas have a relatively good prognosis.²¹

Tumour grade is an important prognostic marker.¹⁷ Grade II tumours were 12 (24%) and grade III tumours were 38 (76%) with no case in grade I which was in contrast to findings noted by Hanif M et al,⁹ who reported 5.6% of grade I tumours, 59% of grade II tumours and 35% of grade III tumours. Maximum number of grade II cases were also noted in studies conducted among population of Singapore, Malaysia, Pakistan and India. This difference in the tumour grades may be due to lack of routine mammographic screening in our population coupled with the lack of awareness.²²⁻²⁵

Lymph nodes were recovered in 48 cases of radical mastectomy. Metastatic carcinomatous deposits were present in 30 cases which included 13 cases of N1 Stage (1-3 positive nodes), 11 cases of N2 stage (4-9 positive nodes) and 6 cases of N3 stage (>10 positive nodes). 18 cases had reactive pathology in lymph node. In grade II, lymph nodes were recovered in 11 cases, out of which 8 cases showed metastatic deposits (72%). While in grade III, lymph nodes were recovered in 37 cases of which 22 cases showed secondary deposits(60%). Shokouh TZ et al²⁶ suggested a significant relationship between tumor grade and lymph node involvement as the study found that grade 3 tumors demonstrated the highest frequency (73.5%) of lymph node involvement. Kaur G et al¹⁰ noted that in grade III tumours lymph node metastasis was present in 57.6%. Ron IG et al²⁷ also reported the increased incidence of metastatic deposits in Grade II and III. Variation seen in the present study may be due to the small sample size.

Out of 15 cases with size <2 cm, 6 cases showed lymph node deposits and out of 35 cases with tumour with size 2-5 cm 21 lymph nodes showed carcinomatous deposits, which shows that as the size increased the lymph node involvement also increased. Study done by Shokouh TZ et al²⁶ showed that the mean size of tumors without lymph node involvement was 2.58 cm and the mean size of tumors involving lymph node was 3.28 cm, indicating a significant difference. A strong correlation between tumor size and the risk of axillary lymph nodes involvement has also been shown by Bojic T et al.²⁸

CONCLUSION

It should be noted that grade and type of tumour provide complementary information. All the cases were infiltrating ductal carcinoma NOS (not otherwise specified). The grading was done according to Nottingham modification of Bloom Richardson system and 38 cases(76%) were of Grade III (maximum) followed by 12 cases of Grade II tumors (24%) with no case in grade I. Thus, the difference in the tumour grades may be due to lack of routine mammographic screening in our population coupled with the lack of awareness. Majority of cases with lymph node metastasis were grade III tumors.

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