

# Correlation of Tumor Size and Grade With Axillary Lymph Node Status in Carcinoma Breast

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## ABSTRACT

**Objectives:** To evaluate the size and grade of carcinoma breast and to correlate these with the axillary lymph node status. **Design and place of study:** It was a case series observational study conducted in the Department of Histopathology, Shaikh Zayed Hospital, Lahore. **Subjects and methods:** The study comprised convenient sampling of 30 female patients of age over thirty years undergoing modified radical mastectomy for breast carcinoma during six months from December 2004 to May 2005. **Results:** In all, 56.25% of cases of tumor size >5cm had >9 axillary nodes positive for metastatic breast carcinoma while 69.2% of grade 3 neoplasms had >9 positive axillary nodes. There was a significant correlation ( $P < 0.01$ ) of tumor size and grade with number of positive nodes. **Conclusion:** Greater the tumor size and grade, more was the number of axillary lymph nodes positive for metastatic breast carcinoma.

**Key words:** Breast carcinoma, mastectomy, lymph nodes, metastasis.

## INTRODUCTION

Breast carcinoma is the commonest female malignancy and about 250,000 women worldwide die of this disease every year<sup>1, 2</sup>. The incidence of this disease is on the rise in our society and is also increasing in all the Western countries. This increased incidence can be due in part to more aged people in general population, because increasing age is one of the strongest risk factors for breast carcinoma<sup>3, 4</sup>.

Lesions of the breast are mostly confined to the females and so is breast carcinoma because the greater breast volume, the more complex breast structure and the extreme sensitivity to endocrine influences, all predispose this organ to a number of pathological conditions<sup>5, 6</sup>. Breast cancer is a very serious disease and an important cause of premature mortality and morbidity<sup>7</sup>. It is uncommon before twenty five years of age but then there is a steady rise throughout life<sup>8</sup>.

Histological tumor grade is a statistically significant prognostic factor for overall survival<sup>9, 10</sup>. Nottingham grading is done by assessing the nuclear grade, architectural grade and mitotic count<sup>11</sup>.

The histological grades of carcinoma breast are:

- Grade 1: Well differentiated carcinoma
- Grade 2: Moderately differentiated carcinoma
- Grade 3: Poorly differentiated carcinoma

There is a close connection between the tumor size and grade with the axillary lymph node status<sup>12, 13</sup>. Axillary lymph node involvement remains an essential prognostic factor for breast carcinoma patients as it implies the necessity of systemic adjuvant treatment and loco-regional recurrence<sup>14</sup>. Grade is an estimate of the pace of growth. It is generally considered that the higher grade tumors have an increased frequency of lymphovascular invasion and lower survival rate. Tumors with a greater number of axillary lymph nodes positive for breast cancer metastasis are associated with poor prognosis.

Modified radical mastectomy removes the entire breast, including the breast tissue, skin, areola and nipple, and most of the axillary lymph nodes. This procedure may be recommended for large tumors or if the cancer has spread to the lymph nodes.

The purpose of this study was to evaluate the size and grade of carcinoma breast and correlate them with axillary lymph node status in modified radical mastectomy specimens received at Shaikh Zayed Hospital, Lahore. This is a pilot study with an aim to do further studies to assess prognosis of carcinoma breast. This study is a further step towards helping the oncologist to decide about treatment modality, whether chemotherapy or radiotherapy be given, and the intensity of therapy depending upon the number of positive axillary lymph nodes.

### OBJECTIVES

The objectives of my study were to;

- 1) Measure the size of the tumor in the mastectomy specimens.
- 2) Assess the grade of breast carcinoma.
- 3) Correlate the size and grade of tumor with the status of axillary lymph nodes isolated from the modified radical mastectomy specimens.

### MATERIALS AND METHODS

The study was conducted in the Department of Histopathology, Shaikh Zayed Hospital, Lahore which is tertiary care 700 bedded teaching hospital. This was a case series descriptive study comprising convenient sampling of thirty modified radical mastectomy specimens undergoing histopathological evaluation of tumor size, grade and number of lymph nodes involved in breast carcinoma. Female patients of ages over 30 years were included. Thirty samples were easily collected in six months period.

The following cases were excluded from the study:

- 1) Lumpectomies for carcinoma breast and for benign tumors.
- 2) Mastectomy specimens without lymph nodes.
- 3) Pure in situ carcinomas.

The mastectomy specimens were fixed in 10% formalin after surgery and brought to the Histopathology Department. Detailed gross examination of the specimens with serial one centimetre thick slicing was done measuring the

gross dimensions of the tumour. The axillary fat was thoroughly examined for the number of enlarged lymph nodes. All lymph nodes isolated were embedded for examination under the microscope. After processing, multiple slides were made from paraffin-embedded tissue blocks of the tumour with thickness ranging from 3 to 5 microns and stained with haematoxylin and eosin stain. For tumors smaller than 2 cms in greatest dimension, microscopic measurement were made.

Grading of all the cases was also done. Lymph nodes involved by tumour for each case were counted and correlated with the measured size of tumour and grade.

The patient's descriptive data was expressed as mean  $\pm$  Standard deviation. The outcome variables of tumor size and tumor grade were correlated with status of corresponding axillary lymph nodes. Chi-square analysis was used to test the comparison. P value was taken as  $< \text{or} = 0.05$ . Spearman's and Pearson's correlation coefficients were used for correlation analysis.

### RESULTS

A total of 30 formalin fixed modified radical mastectomy specimens were included in this study. As for the size of tumor, 16 of 30 cases were  $>5\text{cm}$  in maximum dimension as shown in Table 1. Regarding Nottingham's histological grading, about 57% were grade 2 carcinomas (Table 2, Fig. 1).

**Table 1: Distribution of cases by tumor size (n=30)**

Size (cm)	Number	%
$<2$	2	6.67
2-5	12	40.00
$>5$	16	53.33
Total	30	100.00

**Table 2: Distribution Of Cases By Tumor Grade (n=30)**

Grade	Number	%
2	17	56.67
3	13	43.33
Total	30	100.00

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In all, 10 cases had >9 axillary lymph nodes positive for metastatic carcinoma (Table 3). Approximately 56% of the cases of tumor size >5cm (T3) had >9 axillary nodes positive for metastatic carcinoma (Table 4, Fig. 2).

Most of the grade 3 tumors had >9 axillary nodes positive for metastatic carcinoma (Table 5). Pearson correlation showed a significant correlation (0.69) between tumor grade and number of positive lymph nodes ( $P<0.01$ ) and also between tumor size and number of positive lymph nodes ( $P<0.01$ ).

**Table 3:** Distribution of cases by number of axillary lymph nodes positive for metastatic breast carcinoma (n=30)

Positive nodes	Number	%
0	6	20.00
1-3	7	23.33
4-9	7	23.33
> 9	10	33.34
Total	30	100.00

**Table 4a:** Distribution of cases by relationship between tumor size and axillary lymph node status (n=30)

Size (cm)	No positive nodes	1-3 positive nodes	4-9 positive nodes	>9 positive nodes	Total
<2	2	0	0	0	2
2-5	4	4	3	1	12
>5	0	3	4	9	16

**Table 4b:** Distribution of cases by relationship between tumor size and axillary lymph node status (n=30)

		Tumor size	Lymph nodes
Tumor size	Pearson Correlation	1	0.640
	Sig. (2-tailed)	.	.000
	N	30	30
Lymph nodes	Pearson Correlation	0.640	1
	Sig. (2-tailed)	.000	.
	N	30	30

Correlation is significant at the 0.01 level (2-tailed)

**Table 5a:** Distribution of cases by correlation between tumor grade and axillary lymph node status (n=30)

Grade	No positive nodes	1-3 positive nodes	4-9 positive nodes	>9 positive nodes	Total
2	6	6	4	1	17
3	0	1	3	9	13
Total	6	7	7	10	30

**Table 5b:** Distribution of cases by correlation between tumor grade and axillary lymph node status. (n=30)

		Lymph nodes	Tumor grade
Tumor size	Pearson Correlation	1	0.690(**)
	Sig. (2-tailed)	.	.000
	N	30	30
Lymph nodes	Pearson Correlation	0.690(**)	1
	Sig. (2-tailed)	.000	.
	N	30	30

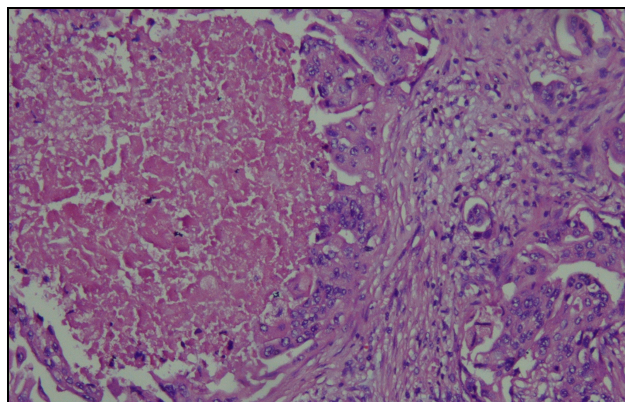
\*\* Correlation is significant at the 0.01 level (2-tailed).

## DISCUSSION

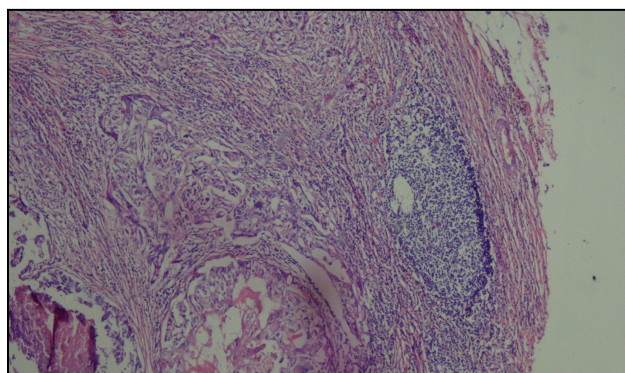
Breast carcinoma is the commonest malignancy and the fourth leading cause of death among women worldwide. All women above 30 years of age are at increased risk of developing this disease. Our study was focused on correlation of tumor size and grade with axillary lymph node status in thirty mastectomy specimens. Although it has been suggested that microscopic tumor size is a better predictor of axillary lymph node status than macroscopic tumor size, the rate of axillary lymph node metastasis does not differ significantly from that associated with microscopic tumor size<sup>15</sup>.

In our study, T3 breast neoplasms (>5cm size) were the most frequent being 53.33% comparable to two local studies<sup>16, 17</sup> but in contrast to an Egyptian study<sup>18</sup> in which T2 neoplasms (2-5cm) were the commonest. This may be due to late presentation of patients in our country owing to lack of awareness and public education<sup>7</sup>.

In our study, grade 2 neoplasms were the commonest *i.e.* 56.67%. This finding is also comparable to two other local studies<sup>19, 20</sup>.



**Fig. 1: Foci of intraductal comedo [thick arrow] and Grade 2 [thin arrow] invasive ductal carcinoma (H&E stainx 115)**



**Fig. 7: Metastatic ductal carcinoma [arrows] in axillary lymph node (H&E stainx 115)**

Greater the size of the tumor, more is the number of lymph nodes containing metastatic breast carcinoma<sup>21</sup> as shown also by our study in which there was 33.3% axillary node positivity of 1-3 nodes and a similar percentage of positivity of 4-9 axillary nodes for T2 tumors. For T3 tumors, >9 nodes were positive in 56.25% cases. Seventeen of the 28 patients (60.7%) with T2 and T3 tumors had >3 positive axillary lymph nodes. This is almost comparable to the local study<sup>20</sup>. In our study, all the tumors with size >5cm and all the grade 3 tumors had positive axillary lymph nodes, whereas the corresponding values in another Egyptian study by Nouh<sup>21</sup> were 85% and 76.8% respectively; the reason for this slight difference in percentage may be greater sample size in that study as compared to ours, where the sample size was limited to 30 cases. Another study by Mincey<sup>22</sup> also proves that the

number of axillary lymph nodes positive for metastasis from breast carcinoma increases as tumor size increases. ( $p=0.002$ ).

Similarly, in our study, about 67% of T2 tumors had positive nodes and approximately 65% of grade 2 neoplasms had positive nodes, almost comparable to the Egyptian study by Nouh. The foreign study by Mincey<sup>22</sup> showed that higher grade of tumor conferred a higher risk of lymph node involvement. ( $p=0.02$ ). Our study also supported this fact by showing that most of grade 3 tumors (69%) had >9 positive nodes.

Hence, considering that most of the tumors in our study were T2 and T3, it is evident that awareness is lacking in our society, even in the comparatively modern cities like Lahore, as many cases included in our study were from Lahore, and patients presented at an advanced stage.

## CONCLUSION

1. Majority of the patients in our study were in the fourth and fifth decade of life.
2. About 54% of cases presented with large sized tumors.
3. Infiltrating ductal carcinoma was the commonest type.
4. None of the tumors belonged to grade 1 category.
5. Most of the large tumors were grade 3 carcinomas.
6. Larger the tumor size and higher the tumor grade, more were the number of lymph nodes involved by metastatic breast carcinoma.
7. Our study was compared with similar local and foreign studies, and most of the values were comparable.

## SUGGESTIONS

1. There is a great need for public education to enhance awareness.
2. In order to decrease mortality and morbidity associated with breast carcinoma, we must aim at early detection and prompt management.
3. Properly trained staff should be present in periphery as well so that cases are not missed

or misdiagnosed at an early stage of this disease.

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