

ORIGINAL RESEARCH

To evaluate relation between breast lump size and axillary lymph node positivity in carcinoma of breast

Dr. Ashwani Kumar¹, Dr. Raj Kamal², Dr. Amrit Pal Singh³, Dr. Amrit Suman⁴

¹Professor, ²Assistant Professor, ³Senior Resident, ⁴Junior resident,
Department of General Surgery, Government Medical College, Amritsar, Punjab, India

Corresponding author

Dr. Amrit Suman

Department of General Surgery, Government Medical College, Amritsar, Punjab, India

Received: 12 April, 2023

Accepted: 18 June, 2023

ABSTRACT:

Background: Breast cancer is most frequently diagnosed cancer among women and leading cause of cancer death in females worldwide. The present study was conducted to analyze axillary lymph node positivity after radiological and histopathological investigations also to evaluate statistical relationship between breast lump size and axillary lymph node positivity.

Material and methods: The study was conducted at Guru Nanak Dev Hospital, attached to Govt. Medical College, Amritsar, who presented with malignant breast lumps in either breast were assessed for enlarged axillary lymph nodes after approval from Institutional Ethics Committee, Government Medical College, Amritsar and informed consent from patients to be enrolled in study. This was a study of 50 cases that meet the inclusion and exclusion criteria. Patients were evaluated at base line for breast lump which include lump size, fixity, tenderness, nipple discharge, thickening or puckering of the skin and axillary lymph node status.

Results and observation: On radiological metastatic workup it was found that out of 50 cases, mets were present in 8 (16%) cases on X-ray chest, 13 (26%) cases on X-ray LS spine and USG whole abdomen was found to be normal in all 50 cases. Correlation between breast lump size and axillary lymph node positivity showed that lymph node positivity in lump sizes <2cm is 16.66% and lump size >2cm is 93.75 proving that lymph node metastasis is more common in larger tumor size.

Conclusion: We found that tumour size is a significant predictor of axillary nodal status, which can be used to separate some patients from an unnecessary full axillary dissection.

Keywords: Breast cancer, lymph node, tumor size and site.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION:

Breast cancer is the leading cancer in women, accounting for 25% of all cancer cases worldwide.¹ It is more common in developed countries.² Outcomes for breast cancer vary greatly depending on the cancer sub-type, stage of disease, and person's age. The most common histologic type of breast cancer is infiltrating ductal carcinoma.³ The mainstay of breast cancer treatment is surgery when the tumor is localized, followed by chemotherapy as well as radiotherapy (when indicated) and for estrogen receptor (ER) and progesterone receptor (PR)-positive tumors, adjuvant hormonal therapy.^{3,4}

More than two-thirds of breast cancer cases are diagnosed in women aged 50 years and older; the majority of these cases are in developed countries. For women aged 15–49 years, twice as many breast cancer cases are diagnosed in developing countries

than in developed countries. In countries where mammography is available and affordable, adherence to recommendations for routine screening is associated with reduced mortality from breast cancer.⁵

Traditionally, breast cancer is thought to progress in a stepwise manner through several stages: hyperplasia—intraductal carcinoma—invasion and growth within the breast, followed (in some cases) by metastasis to the lymph nodes and/or distant sites.^{6,7}

There is a clear and consistent linear relationship between size and metastases in the size range between 1.0 and 5.0 cm, and it is assumed this curve can be extrapolated in both directions to predict the proportions of patients with nodal or distant metastases for very small and for very large tumours.^{8,9}

AIMS AND OBJECTIVES

1. To analyze axillary lymphnode positivity after radiological and histopathological investigations.
2. To evaluate statistical relationship between breast lump size and axillary lymphnode positivity.

MATERIAL AND METHODS:

All patients admitted to the surgery wards at Guru Nanak Dev Hospital, attached to Govt. Medical College, Amritsar, who were presenting with malignant breast lumps in either breast were assessed for enlarged axillary lymph nodes

The study was conducted after approval from Institutional Ethics Committee, Government Medical College, Amritsar and informed consent from patients to be enrolled in study.

This is a study of 50 cases that meet the inclusion and exclusion criteria.

Patients were evaluated at base line for breast lump which include lump size it fixity, tenderness, nipple discharge, thickening or puckering of the skin and axillary lymph node status.

INCLUSION CRITERIA:

1. All females of age between 18 and 70 years.
2. Palpable breast lump of variable duration.
3. Patients with palpable or non palpable axillary lymph node.

EXCLUSION CRITERIA:

1. Patients below 18 years of age.
2. Patients with acute and tender breast lumps like breast abscess.
3. Lump in both the breasts
4. Lump proved to be benign

Ethical Clearance:

The study was conducted after approval from Institutional Ethics Committee, Government Medical College, Amritsar and informed consent from patients to be enrolled in study.

METHOD:

A patient presenting to the outpatient department with palpable breast lump was subjected to a detailed clinical history with physical examination and the information was entered in the proforma. After obtaining an informed and valid consent from the patient, physical examination for the breast lump was performed. The examination was performed on the standard lines of examination of breast lump and ca breast. For measuring the size of breast lump clinical parameters were applied. Axilla was particularly thoroughly examined for any swelling due to enlarge lymph nodes. Axillary involvement was assessed by clinical examination and USG. After physical examination patient was subjected to special investigations– like mammography, ultrasound, FNAC and metastatic work up : X-Ray chest, USG abdomen, X-Ray LS spine.

STATISTICAL ANALYSIS:

At the end of study, the data was collected and analyzed using appropriate statistical methods.

RESULTS:

Out of the 50 women studied, the prevalence of malignant diseases is the most in the 51-60yrs group followed by 41-50 years of age group. The prevalence of malignant diseases is least common in age group 21-30 years and extreme of ages i.e. more than 60. The mean age for malignant breast diseases 49.42 ± 11.19 years.

Figure 1: Distribution of the side of the lump

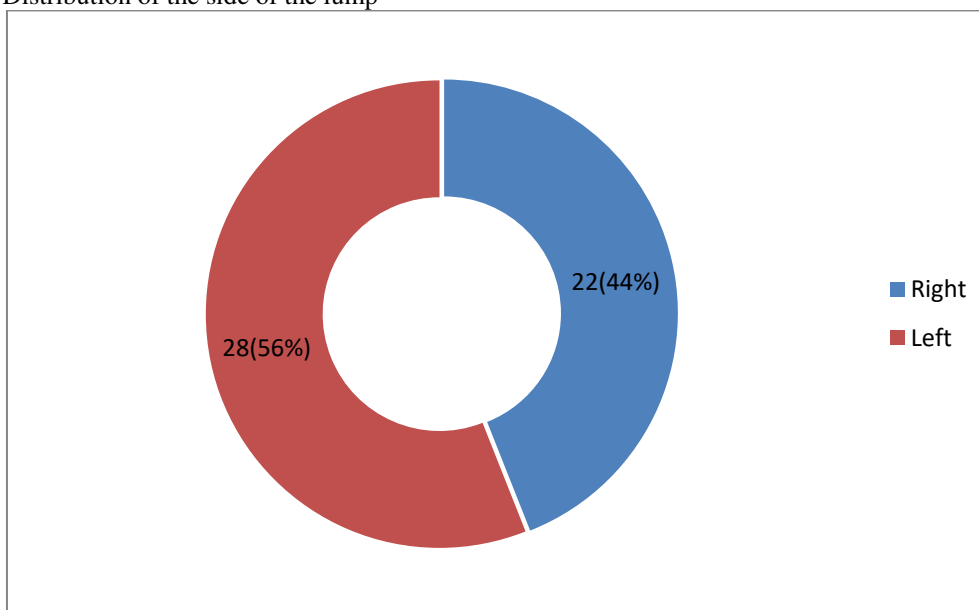


Table 1: Clinical examination of breast lump

Clinical Examination of breast lump		No. of cases (n=50)	Percentage	
Margins	Regular	8	16.00	
	Irregular	42	84.00	
Skin Over Lump	Normal	32	64.00	
	Non Pinchable	18	36.00	
Nipple Retraction	Normal	40	80.00	
	Retracted	10	20.00	
Fixity	Pectoralis major	Mobile	22	44.00
		Adherent	28	56.00
	Chest Wall	Mobile	41	82.00
		Adherent	9	18.00

Table 2: Clinical examination of axillary lymph nodes

Clinical Examination		No. of cases (n=50)	Percentage
Consistency	Soft	6	12.0
	Firm	17	34.0
Mobility	Mobile	22	44.0
	Fixed	28	56.0
Matted	Matted	7	14.0
	Discrete	43	86.0

Table 3: Radiomamography evaluation of involved breast

Radiomamographic Findings		No. of cases	Percentage
Micro Calcification	Negative	35	70.0
	Positive	15	30.0
Obliteration of Retromemory Space	Non Oblitrative	22	44.0
	Oblitrative	28	56.0

Table 4: Evaluation for metastatic workup

Metastatic Workup		No. of cases	Percentage
X-ray Chest	Normal	42	84.0
	Mets Positive	8	16.0
X-ray LS Spine	Normal	37	74.0
	Mets Positive	13	26.0
USG Whole Abdomen	Grossly Normal	50	100.0

Table 5: Correlation between breast lump size and lymph node positivity

Breast lump size	Histopathology Examination of Axillary Lymph Nodes				Total	
	Negative		Positive		No. of cases	%age
	No. of cases	%age	No. of cases	%age		
≤2cm	15	83.33%	3	16.66%	18	100%
>2cm	2	6.25%	30	93.75%	32	100%

'p'=0.000; d.f. 1

DISCUSSION:

Breast cancer is the most common cancer in females. Considering the breast cancer as major cause of morbidity and mortality, early detection of primary tumour is of great importance. Increase in the number of involved axillary lymph node is associated with an increased probability of recurrence and mortality.¹⁰

Axillary node involvement is the most significant prognostic factor for women with breast cancer.¹¹ A common route of spreading breast carcinoma is first through the axillary lymph nodes,

and the incidence of ALNI increases with larger tumors.^{11,12} Since past few decades ALND had been a part of standard method for determining axillary nodal status.¹³⁻¹⁵ To identify patients at high risk of axillary metastases, we studied characteristics of primary tumors and their relationship with involvement of surrounding tissues. To investigate any relationship between tumor size and its invasive manner, we divided all patients into 2 groups according to the primary tumor size. Our results demonstrate the strong relationship between the primary tumor size and ALNI. As the tumor size

increases, the number of positive axillary nodes also increase.

We examined the relationship between primary tumour size and metastasis in axillary lymph nodes in women with infiltrating ductal cancer. For lump sizes between approximately 2 and 7 cm in size, there was an increasing trend of probability of metastasis to lymph node. For lump sizes under 2 cm, rates of lymph node positivity were relatively constant. Most previous studies report similar relationship between tumour size and lymph node positivity.

In this study, lump sizes under 2 cm are treated as single category. All tumors larger than 2cm are treated as different categories. By expanding the spectrum of possible tumor sizes, we are able to better characterize the relationship between tumor size and axillary lymph node metastasis. This analysis is cross sectional in nature as it is not possible to observe dynamically the transition of tumor from non-metastatic state to a metastatic state in an individual.

The age of 50 patients in our study ranged from 21-76 years. While the incidence of females with carcinoma breast was high in age groups 51-60 years (38%) and least in age group 21-30 years. The mean age for malignant breast disease in our study is 49.42 ± 11.19 . It is single most common cause of death among women aged in 5th and 6th decade. In a study by Orang E et al¹⁶ mean age for carcinoma breast was found out to be 48.93 ± 12.60 . Although there was fluctuation in mean age of patients over years women 21-30 years of age had lowest frequency and those with 51-60 had highest incidence of breast cancer. In another study by Nouh MA et al¹⁷, maximum no. Of patients with Carcinoma breast and associated lymph nodes positivity were found to fall in 40-60 years of age which is consistent with our study.

Out of the 50 cases studied, most of the malignant lumps were found in the left side breast of the patients. In this same study by Nouh MA et al¹⁷, it was also found that laterality of breast with carcinomas lump was found to be maximum in left side.

Most of the patients in our study belong to rural area due to lack of self-awareness in females in contrast to urban residing females in whom incidence of carcinoma breast with metastasis has been declined over years.

Study shows that 42 (84%) cases examined for lump breast had irregular margins, skin over lump was non pinchable for 18 (36%) cases, retraction of nipple was present in 10 (20%) cases and fixity of lump to pectoralis major was present in 28 (56%) cases and chest wall in 9 (18%) cases.

Out of 50 cases studied, most of the lumps i.e. in 31 (62%) cases lump was found to be present in upper outer quadrant. Followed by lower outer

quadrant in which lump was found to be present in 11 (22%) cases.

Most of the breast lump with lymph node metastasis was found to be present in cases with lump in upper outer quadrant (62%). Similar study by Orang E et al¹⁶, tumor site was found most common in upper outer quadrant 53.9% of cases which is consistent with our study.

In our study we evaluated the patients for metastatic workup for sites other than axilla, like chest, lumbosacral spine and abdomen. It was found that chest metastasis were found to be positive in 16% cases and lumbosacral metastasis were positive in 26% cases on radiological examination. This information is important regarding the course of treatment in a particular patient. Female with no distant metastasis and resectable lump underwent MRM whereas, female with non resectable (metastasis positive) lump underwent neo adjuvant chemotherapy/radiotherapy. Most of the lymph node metastasis was found to be present in cases with lump present in upper outer quadrant. Out of 50 cases lump showing fixity to the underlying structures (chest wall and pectoralis major muscle), which were 28 in number, 17 (60.71%) cases were found to be lymph node positive. On contrary lump freely mobile which were 22 in number, 11 (50.0%) cases were found to be lymph node positive. This leads to conclusion that, however, fixity is not a criteria for lymph node positivity but most of the cases with lump fixity to underlying structure are lymph node positive.

In our study, all the cases with matted lymph nodes 8 in number are lymph node positive for metastasis, whereas, cases with non-matted lymph nodes which are 42 in number, 20 (47.61%) cases shows positivity. This shows that non matted lymph nodes doesn't exclude lymph nodes for being positive for metastasis ($p=0.006$). Whereas, all the lymph nodes which were firm in consistency and matted showed positivity for mets.

Correlation between breast lump size and axillary lymph node positivity showed that lymph node positivity in lump sizes $<2\text{cm}$ is 36% and lump size $>2\text{cm}$ is 64% proving that lymph node metastasis is more common in larger tumor size ($p=0.000$).

Out of 50 cases clinical examination of palpable axillary lymph node showed that 16 (32.0%) were firm in consistency, 28 (56%) cases were fixed and 7 (14%) cases were matted.

In this study we emphasize on lymph node positivity with regards to size of breast lump. We considered lumps between 0.8cm to 7.5cm which were further classified into two groups under $\leq 2\text{cm}$ and $>2\text{cm}$. It was found that lymph node positivity for sizes larger than 2cm is significant i.e. 93.75%.

In similar study by Yoshihara E et al¹⁸ the risk for ALNM steadily increase from smallest to largest tumor size. The larger the tumor higher the probability of positive lymph nodes. Although, no

evidence was found for a non-linear relationship of tumor size. A study by Colleoni M et al¹⁹ it was notes that size of nodal involvement was significantly correlated with other prognostic features such as presence of vascular invasion, high grade and large tumor size. In another study by Barth A et al²⁰ study of mammographically detected tumor that measured <1cm in size, the incidence of axillary lymph node positivity was 3% while in our study no female with lump <1cm is node positive.

CONCLUSION:

In conclusion we found that tumour size is a significant predictor of axillary nodal status, which can be used to separate some patients from an unnecessary full axillary dissection. Larger diameter of tumour can predict the more probability of involving the surrounding tissue. So , an exact estimation of the size of primary tumour is necessary prior to surgery to make the best decision for management of patients with intraductal breast carcinoma.

REFERENCES:

1. Stewart WB, Wild CP. World Cancer Report 2014. Lyon France: World Health Organization; 2014. p. 16.
2. Stewart WB, Wild CP. World Cancer Report 2014. Vol. 5.2. Lyon France: World Health Organization; 2014. Breast cancer; p. 362.
3. Paymaster JC, Gangadharan JC. Epidemiology of breast cancer in India. *J Natl Cancer Inst.* 1972;48:1021–24.
4. World Health Organization. Cancer Control: Knowledge Into Action: WHO Guide for Effective Programmes: Module 4: Diagnosis and Treatment. Geneva: World Health Organization; 2008. [Last accessed on 2019 Jul 28]. Available from: <https://www.ncbin.nlm.nih.gov/books/NBK179050/> [Google Scholar]
5. Forouzanfar MH, Foreman KJ, Delossantos AM, Lozano R, Lopez AD, Murray CJ, et al. Breast and cervical cancer in 187 countries between 1980 and 2010: A systematic analysis. *Lancet.* 2011;378:1461–84.
6. Weigelt B, Peterse JL, van't Veer LJ. Breast cancer metastasis: markers and models. *Nat Rev Cancer.* 2005;5:591–602. doi: 10.1038/nrc1670.
7. Fidler IJ. The pathogenesis of cancer metastasis: the 'seed and soil' hypothesis revisited. *Nat Rev Cancer.* 2003;3:453–458.
8. Sivaramakrishna R, Gordon R. Detection of breast cancer at a smaller size can reduce the likelihood of metastatic spread: a quantitative analysis. *Acad Radiol.* 1997;4:8–12.
9. Laura S, Coombs N, Ung O, Boyages J. Tumour size as a predictor of axillary node metastases in patients with breast cancer. *ANZ J Surg.* 2006;76:1002–1006.
10. Łukasiewicz S, Czezelewski M, Forma A, Baj J, Sitarz R, Stanisławek A. Breast Cancer-Epidemiology, Risk Factors, Classification, Prognostic Markers, and Current Treatment Strategies-An Updated Review. *Cancers (Basel).* 2021 Aug 25;13(17):4287.
11. Gajdos C, Tartter PI, Bleiweiss IJ. Lymphatic invasion, tumor size, and age are independent predictors of axillary lymph node metastases in women with T1 breast cancers. *Annals of surgery.* 1999;230(5):692-6.
12. Silverstein MJ, Skinner KA, Lomis TJ. Predicting axillary nodal positivity in 2282 patients with breast carcinoma. *World journal of surgery.* 2001 Jun;25(6):767-72.
13. Lee JH, Kim SH, Suh YJ, Shim BY, Kim HK (2010). Predictors of axillary lymph node metastases (ALNM) in a Korean population with T1-2 breast carcinoma: triple negative breast cancer has a high incidence of ALNM irrespective of the tumor size. *Cancer Res Treat.* 2010;42, 30-6.
14. Giuliano AE, Kirgan DM, Guenther JM, Morton DL (1994). Lymphatic mapping and sentinel lymphadenectomy for breast cancer. *Ann Surg,* 220, 391-401.
15. Wasserberg N, Morgenstern S, Schachter J, et al (2002). Risk factors for lymph node metastases in breast ductal carcinoma in situ with minimal invasive component. *Arch Surg,* 2002;137:1249-52
16. Orang E, Marzony ET, Afsharfard A. Predictive role of tumor size in breast cancer with axillary lymph node involvement-can size of primary tumor be used to omit an unnecessary axillary lymph node dissection?. *Asian Pacific Journal of Cancer Prevention.* 2013;14(2):717-22.
17. Nouh MA, Ismail H, El-Din NH, El-Bolkainy MN. Lymph node metastasis in breast carcinoma: clinicopathological correlations in 3747 patients. *J Egypt Natl Canc Inst.* 2004 Mar 1;16(1):50-6.
18. Yoshihara E, Smeets A, Laenen A, Reynders A, Soens J, Van Ongeval C, Moerman P, Paridaens R, Wildiers H, Neven P, Christiaens MR. Predictors of axillary lymph node metastases in early breast cancer and their applicability in clinical practice. *The Breast.* 2013 Jun 1;22(3):357-61.
19. Colleoni M, Rotmensz N, Peruzzotti G, Maisonneuve P, Mazzarol G, Pruneri G, et al. Size of breast cancer metastases in axillary lymph nodes: clinical relevance of minimal lymph node involvement. *Journal of clinical oncology.* 2005 Mar 1;23(7):1379-89.
20. Barth A, Silverstein MJ, Craig PH, Waisman JR, Colburn WJ. Predicting axillary lymph node metastases: 918 patients with T1 breast cancer. *Proc Annu Meet Am Soc Clin Oncol* 1996: 15:A48.