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A STUDY TO ASSESS THE INTERNAL MAMMARY NODES IN RESPONSE TO VARIOUS QUADRANTS AND VARIOUS STAGES BY CT SCAN IN CARCINOMA BREAST

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ABSTRACT

BACKGROUND: The carcinoma breast is one of the most common carcinoma of the women with the other one being carcinoma cervix. The carcinoma breast usually metastasizes to axillary nodes in about 75 % of the cases followed by internal mammary nodes. The involvement of internal mammary nodes is usually overlooked and PET CT, MRI are the most common investigation done to recognize the involvement. The involvement of the internal mammary nodes usually upstages the disease shifting the treatment choice from surgery to neo adjuvant chemotherapy. In this study the incidence of internal mammary nodes in response to various stage and various quadrants of carcinoma breast were studied using contrast enhanced computed tomogram and the following results was observed, the nodes were more commonly involved in upper inner / medial quadrant and in correspondence to stage it was more common in stage III disease.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

AIM AND OBJECTIVE: The main aim of this study is to assess the incidence of internal mammary nodes in computerized tomography scan in response to various quadrants and various stages of carcinoma breast.

PATIENTS AND METHODS: This prospective clinical study of 30 cases of carcinoma breast admitted in M K C G Medical College and Hospital, Berhampur is done in the period from DECEMBER 2022 to NOVEMBER 2023.The cases were evaluated with through proper history taking, clinical examination, histology and radiological investigations and the findings are listed in a preformed proforma after taking proper consent.

RESULTS: Of all the 30 patients studied, the node positivity was observed more in the upper medial quadrant and in correspondence to the staging it is more common in stage III disease.

CONCLUSION: From our study it is concluded that the incidence of internal mammary nodal metastasis is more common in the upper inner quadrant and also was observed more commonly in stage III disease. The presence of internal mammary nodal metastasis is associated with increased chance of distant metastasis, making it as one of the predictors of prognosis. Hence in carcinoma breast the imaging of internal mammary nodes must be taken into account as it provides details about the prognosis and site of recurrence.

KEYWORDS: PET CT, MRI, internal mammary nodes, CECT.

INTRODUCTION:

Breast malignancies constitute one of the most common malignancies in women worldwide. The average global incidence of breast malignancies was 1,676,633 in the [(1)] year 2012 according to GLOBOCAN; breast malignancies constituting about 25.2% of malignancies in women all over the world. Same report stated mortality of about 14.7% in and 5-year survival rate of 36% worldwide. In India, the incidence of breast cancer is about 1, 44,937; with incidence of about 27% of all [(1)] female malignancies. The mortality of breast cancer patients is about 21.5% and their 5-year survival rate is about 35.3%, so now it has become the most common [(1)] malignancy in Indian females. The lifetime risk of developing breast cancer in Indian women is 1 in 28 women. There is a significant increased lifetime risk in urban women, i.e., 1 in 22. The increased lifetime risk in [(2)] rural women is 1 in 60. The high-risk age group of breast cancer in India is 43-46 years, which is significantly lower than that of our western [(2)] counterparts, standing at 53-57 years. CT scan has become more helpful in advanced breast cancers as a part of routine workup. It serves as a useful modality to assess the regional extent of the disease and enlarged internal mammary nodes. It is a sensitive tool to look for any distant metastases involving lung, liver, adrenals or bones. Internal mammary nodes lie along the internal mammary artery.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

Internal mammary artery arises from first part of subclavian artery. It gives rise to anterior intercostal arteries from first to sixth intercostal space, and terminates by dividing into superior epigastric and musculophrenic arteries. Internal mammary nodes get involved in the disease process, when there is an obstruction in the lymphatic's drainage by tumour cells. It is very rare to find isolated internal mammary node metastases in the absence of enlarged [3] axillary nodes. This pathway is important in cases of breast cancer and also in surgery with axillary node clearance. The surgical procedures result in blockage of axillary lymphatic drainage and therefore internal mammary nodes provide important alternative drainage pathway; hence metastasis in operated breast cancer patients in internal mammary nodes holds [4] significance.

AIM AND OBJECTIVE OF THE STUDY:

The aim of this study is to assess the incidence of internal mammary nodes in response to various quadrants and various stages of carcinoma breast in contrast enhanced computed tomography scan.

MATERIALS: It is a prospective study taking 30patients who were admitted to M K C G medical college
Berhampur, Dept of General Surgery from December 2022 to November 2023.

Inclusion criteria:

- All patients with clinical and investigatory support for the diagnosis and willingness for evaluation of carcinoma breast.
- Nodes are considered positive >5 mm.

Exclusion criteria:

- Patient not willing for participation
- Patients on neo adjuvant chemotherapy
- Recurrent disease.

METHODS: All the patient who comes under the inclusion criteria were selected and the patient were excluded according to the exclusion criteria. The patients underwent CT scan using a 6 slice multi detector CT scanner after administration of contrast medium. The parameters employed were 150kvp, 150-300 ma, 25 mm collimation and 70 cm display FOV. The patients were scanned in supine position and soft copy of the data was stored. All patients having distant metastases were excluded from the study. The following CT findings were noted: age, sex, laterality of primary tumour, tumour quadrant, histological diagnosis and grading, internal mammary nodes, number of nodes if present, size of largest node, unilateral /bilateral internal mammary nodes and specific location of the node. The patient's details such as Age, Sex, Duration of symptoms, Detailed clinical examination and Radiological investigations

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

were registered and entered in the master chart. The internal mammary nodes of size > 5 mm in size were considered positive and were taken into the study.

RESULTS AND DATA ANALYSIS:

The following observations were made and were listed.

Of the 30 patients that were observed,

Distribution of internal mammary nodes:

All identified internal mammary nodes were localized along the intercostal mammary vessels, and their location with respective intercostal spaces was described (Table 1).

Table 1: Location of IMNs with respect to the intercostals spaces

Intercostals space	Number of nodes	Percentage (n=30)
1st intercostal space	8	26 %
2nd intercostal space	12	40 %
3 rd intercostal space	6	20 %
4 th intercostal space	4	14 %

Laterality of internal mammary nodes:

Internal mammary nodes were analysed for the laterality with respect to primary tumour and also as per individual location. Incidences of ipsilateral side nodes were more common than contra lateral side, as described in (Table 2)

Table 2: Incidences of location of IMNs with respect to the tumour location

Location of nodes	Number of cases	Percentage (n=30)
IMN on ipsilateral side	25	83 %
IMN on contralateral side	1	1 %
IMN present bilaterally	4	16 %

The percentage of internal mammary node positive in response to various quadrants of carcinoma breast.

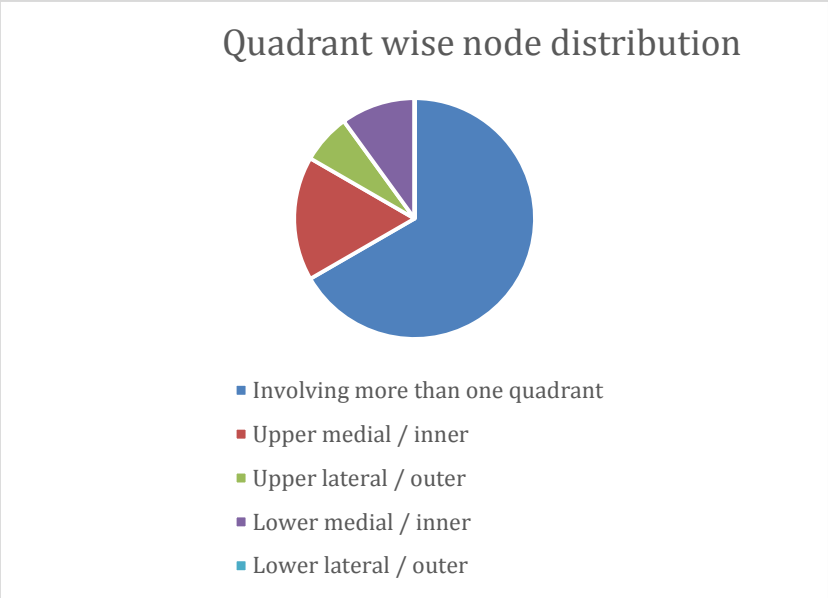
Table-3: Table showing percentage of internal mammary nodes involvement in quadrant wise

Involving more than one quadrant	66.67 %
Upper medial / inner	16.67 %

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

Upper lateral / outer	6.67 %
Lower medial / inner	10 %
Lower lateral / outer	--

Chart-1: Chart showing percentage of internal mammary nodes involvement in quadrant wise



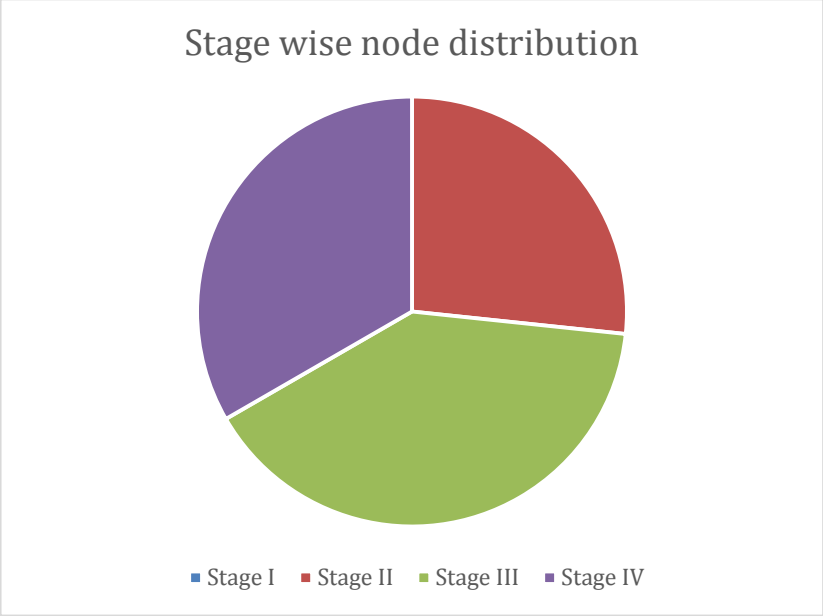
Incidence of internal mammary nodes in response to various stages:

Table-4: Table showing percentage of internal mammary nodes involvement in stage wise

Stage I	--
Stage II	26.67 %
Stage III	40 %
Stage IV	33.33 %

Chart-2: Chart showing percentage of internal mammary nodes involvement in stage wise

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023



QUADRANTS:

In comparison of the whole, the node positivity was obtained in about 70% of cases in tumour involving more than one quadrant (T3 /T4) lesions and hence cannot be categorized into any specific quadrants.

Of these isolated quadrants for which node were positive, the upper medial /inner quadrant has highest incidence of 17% in terms of percentage comparison to others.

STAGE:

In terms of stage: The incidence was high in response to stage III lesion (40%) overall followed by stage IV lesion.

DISCUSSION:

The presence of internal mammary nodes as metastatic lesion in correspondence with carcinoma breast is often overlooked due to the most common spread being the axillary nodes. But the diagnosis of internal mammary nodes positivity may directly shift the patient's stage of the disease to higher stages (stage III) and also changes the treatment protocol from the surgery to neo adjuvant chemotherapy. PET/CT and MRI is the investigation modality in the easy identification of internal mammary nodal metastasis.

The incidence of internal mammary nodes was highest in second intercostal space, followed by first intercostal space. Most of the internal mammary nodes were identified on the same side of primary. In our study, incidence of IMNs was higher in upper quadrant tumours; it may be because the incidence of upper outer quadrant tumours in general, is highest.

Internal mammary nodes are important pathway of lymphatic drainage in breast tumour. Many studies show association of metastatic internal mammary nodes with poor prognosis in breast cancer. Some other studies have validated IMNs as an independent prognostic factor [(5)] in breast cancer.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

These studies show decreased survivals and increased rates of metastases in these patients. The study published by university of Chicago demonstrating that the survivability was significantly lower in patients presenting with internal mammary nodal metastasis as compared to those presenting with axillary nodal metastasis. The gold standard for ascertaining the metastatic status of the internal mammary nodes is surgical sampling. However, majority surgeons do not practice sampling of IMNs during breast surgery. Two large studies performed by European group have reported overall improved survival in these patients – due to realization of more tailored therapy and [6,7] more accurate staging. Numerous studies were performed in later 19th century, wherein the result of Halsted mastectomies with those of extended [8] mastectomies were compared. These studies did not show any significant change in overall survival in patients undergoing IMNs sampling. It has been shown that undetected metastatic IMNs specifically in inner [9] quadrant tumour have worse prognosis. Hence, imaging has come to play an important role in detection of suspicious internal mammary nodes. In imaging, numerous studies have shown that PET CT has a higher sensitivity as compared to CECT scan in detection of internal mammary nodes.

In early 19 century, internal mammary nodes were routinely sampled along with radical breast surgeries. However, subsequently, according to randomized controlled trails, no significant difference was noted in survival rates of patients undergoing internal mammary nodes sampling versus those undergoing no sampling of these nodes. Also sampling of internal mammary nodes resulted in considerable morbidity to these patients. Hence, the sampling of internal mammary nodes fell out of favour among surgeons.

CONCLUSION:

Internal mammary nodes are significant prognostic factors for long term survival in breast cancer patients. CT scan has become more helpful in advanced breast cancers as a part of routine workup, so CT scan is a useful modality to assess the regional extent of the disease and tool to look for any distant metastases involving nodes, lung, liver, adrenals or bones. Presence of internal mammary nodes in locally advanced breast cancer cases is associated with poor prognosis.

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ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 12, 2023

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