



**ORIGINAL RESEARCH PAPER**

**General Surgery**

**A STUDY ON CORRELATION BETWEEN ESTROGEN RECEPTOR, PROGESTERONE RECEPTOR, HUMAN EPIDERMAL GROWTH FACTOR RECEPTOR-2 STATUS AND OTHER PROGNOSTIC FACTORS IN CARCINOMA BREAST**

**KEY WORDS:** Carcinoma Of Breast, Prognostic Factor, Hormonal Receptors Status, Prognostic Factors With Lymphovascular Invasion In Carcinoma Breast.

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**ABSTRACT**

The study aimed to evaluate the correlation of prognostic factors such as age, BMI, ER, PR, HER2 receptor status in patients with carcinoma of breast to study the correlation between hormonal receptors status and other prognostic factors with lymphovascular invasion in carcinoma breast. A total of 160 patients with carcinoma breast presented to Madras Medical College, Rajiv Gandhi Government General Hospital from February 2019 to November 2019 were chosen & recorded along with Data were processed using SPSS software. It was found that an increase in the incidence of breast carcinoma is high in the peri-menopausal age group (40–50) years of age. From this study, we conclude that Positive receptor status (ER, PR and, HER2NEU) is found in the majority of the women with normal BMI and negative receptor status is associated with obese patients. Positive receptor status (ER, PR) is associated with decreased lymphovascular invasion and negative receptor status is associated with increased lymphovascular invasion. Normal BMI is associated with decreased lymphovascular invasion in both pre and post-menopausal women in contrast to obese patients. It can also be concluded that lymph node with lymphovascular invasion HER 2 NEU with lymphovascular invasion is Statistically insignificant.

**INTRODUCTION:**

Carcinoma breast is one of the most common carcinomas occurring in Females. It's a major illness that affects the female physically and mentally. In India, it is leading cancer among women in cities and the second most common cancer in rural women. Chennai ranks third (32.6) among Indian states. India has the highest number of breast cancer deaths in the world (70218) followed by China (47984) and the USA (43909). The outcome in breast cancer management depends upon various prognostic factors Age, Tumour size, Lymph nodes, Receptor status, Lymphovascular invasion, Body mass index. Early diagnosis and treatment will decrease the morbidity and mortality of the disease significantly. The treatment depends upon the patient at which stage they are presenting to the health services. Breast cancer management requires a multi-modality approach, which includes surgery, radiotherapy, chemotherapy, hormonal therapy. In this study, we planned to study the correlation of the various prognostic factors such as age, BMI, Receptor status, node and lymphovascular invasion in patients with Carcinoma of the breast.

**METHODS:**

The present study was done in Madras medical college, Rajiv Gandhi Government General Hospital between February 2019 to November 2019. A total of 160 patients with carcinoma breast presented consecutively to this college were chosen.

**INCLUSION CRITERIA:**

- All the carcinoma breast patients diagnosed clinically and confirmed by trucut biopsy undergoing MRM
- BODYMASSINDEX–16to40(Normal to severely obese)
- BMI:16–25Normal
- BMI:25–40Overweightandobese

**EXCLUSION CRITERIA:**

- Advanced carcinoma of the breast
- Carcinoma breast with metastasis
- Undergoing neoadjuvant chemotherapy
- Very severely obese patients (BMI>.40)
- Severely under-weight (BMI<16)

All patients who fulfill the inclusion criteria will be enrolled- USG breast (agelessthan40years)/mammogram of another breast (agemorethan40years), Trucut biopsy, CT Chest, Skel

etal survey/ Bone scan, USG abdomen will stage the carcinoma breast based on TNM classification. Based on staging will proceed with modified radical mastectomy followed by adjuvant therapy, the resected segment will be sent for histopathology to study the Lymphovascular involvement Biopsy proven patients only will be included in the study. Trucut biopsy will be taken and samples were submitted for histopathology, Determination of estrogen, progesterone receptor expression, and HER-2 neu status. Associations with other characteristics like age, menopausal status, body mass index, tumor size, and the node will also be studied.

**STATISTICAL ANALYSIS:**

Data were processed using SPSS software. All values were expressed as mean ± Standard deviation/median. A comparison of absolute eosinophil count between the two groups was done using the student 't' test.

**RESULTS:**

About 160 women who were affected with carcinoma breast were included in this study based on my inclusion and exclusion criteria. All women are biopsy-proven carcinoma breast and underwent surgery as primary treatment.

**AGE DISTRIBUTION:**

Among the 160 women, 40(25%) were under 40 years, 56(35%) were between 41 to 50 years, 41(25.6%) were between 51 to 60 years, about 20(12.5%) were between 61 to70 years and only 3(1.9) were above 70years. Thus, most of the patients in my study were between 41 to 50 years.

**BMI:**

In my study, I took the women having a BMI between 16 to 25 as normal and BMI between 26 to 40 as obese. Among 160 women, 89(55.6%) were normal BMI whereas 71(44.4%) were obese. In my study, the mean BMI value of woman getting carcinoma breast was 25.019

**MENOPAUSAL STATUS:**

In my study, 86(54%) women had breast cancer after attaining menopause whereas 74(46%) of women had breast cancer before attaining menopause.

**LYMPHOVASCULAR INVASION:**

Among the 160 carcinoma patients 74(46%) patients have

lymphovascular invasion where the remaining 86(54%) has no lymphovascular invasion.

**ER, PR AND HER2NEU RECEPTOR STATUS:**

In this study of 160 carcinoma breast women, 54% has ER receptor-positive status, 60% has PR receptor-positive status and 49.4% has HER2NEU receptor-positive status. Among them, 36.3% have both ER, PR receptor-positive status.

**CORRELATION DATA:**

In this study on carcinoma breast the following prognostic factors were correlated and their relationship was studied.

**1.ER RECEPTOR STATUS WITH LYMPHOVASCULAR INV ASION:**

In this study among the patient with lymphovascular invasion, a majority (77%) has negative ER receptor status whereas those without lymphovascular invasion majority shows positive ER receptor (65.1%) status.

**PR RECEPTOR STATUS WITH LYMPHOVASCULAR INV ASION:**

In this study among the patient with lymphovascular invasion, a majority (86.5%) has negative PR receptor status whereas those without lymphovascular invasion majority show positive PR receptor (62.8%) status.

**HER2NEU RECEPTOR STATUS WITH LYMPH OV ASC U LAR INV ASION:**

In this study among the patients having lymphovascular invasion, 44.60% has positive HER2NEU status whereas 55.4% has HER2NEU negative status.

**BOTH ER, PR RECEPTOR STATUS WITH LYMPHO VASC ULAR INV ASION:**

Among the patients affected with lymphovascular invasion only 13.5% shows positive ER, PR receptor status whereas 55.8% of positive ER, PR receptor status has no lymphovascular invasion.

**2.RECEPTOR STATUS WITH BMI: ER RECEPTOR STATUS VS BMI:**

In this study, 75.3% (majority) of carcinoma breast patients with ER-positive status have normal BMI whereas only 24.7% are obese whereas among negative ER receptor status majority (60.9%) were obese.

**PR RECEPTOR STATUS VS BMI:**

In this study, 79.63%(majority) of carcinoma breast patients with PR positive status have normal BMI whereas 23.4% are obese whereas among negative PR receptor status 58.3% were obese.

**HER 2NEU RECEPTOR STATUS VS BMI:**

In this study among the patients having POSITIVE HER2NEU, 61.7%(majority) has normal BMI whereas 38.3% are obese.

**BMIVS LVI:**

Among the patients who have a lymphovascular invasion in this study, 71.6% (majority) are obese with BMI more than 25 whereas in those without lymphovascular invasion majority (79.1) are normal with BMI less than 25.

**BMIVS LVI VS MENOPAUSE:**

Among the post-menopausal woman, the positive lymphovascular invasion is noted mainly (61.4%) in women with a BMI of more than 25 (obese). Negative lymphovascular invasion is noted mainly in normal women (83.3) with a BMI of less than 25. Among the premenopausal women, positive lymphovascular invasive is noted mainly in obese women (86.5%) whereas negative lymphatic invasion is noted mainly (76.5) in normal women.

**BMIVS NODE:**

Among the node positivity tumor patients, 52% have normal BMI whereas 47.3% have high BMI. (Obese). Among the node negativity, 62% are normal and 38% are obese.

**NODE VS LVI:**

Node positivity is noted in 75.7% of patients with lympho vascular invasion and 62.8% noted in patients without lymphovascular invasion.

**ODDS RATIO AND P VALUES FOR VARIOUS PROGNO STIC FACTORS**

		ODDS RATIO	PVALUE
ER STATUS	BMI	0.210	0.0005
PR STATUS	BMI	0.219	0.0005
HER 2 NEU STATUS	BMI	-	0.116
ER STATUS	LVI	0.160	0.0005
PR STATUS	LVI	0.093	0.0005
HER2 NEU STATUS	LVI	-	0.157
BMI, PREMENOPAUSAL	LVI	21.5	0.0005
BMI, POSTMENOPAUSE	LVI	9.53	0.0005
NODE	LVI	1.844	0.08
NODE	BMI	1.463	0.274

**DISCUSSION:**

In this observational study, we studied the association between various prognostic factors of carcinoma breast like receptor status, BMI, lymphovascular invasion in both pre and post-menopausal women. In this study, the mean age of women with carcinoma breasts was 48.57 years of age which is almost closure to Mehdi tashibi et al study.

In this study, most of the patients were between 40 to 50 years which is similar to Chopra et al study from Punjab. Thus most of the women with carcinoma breasts are in their perimenopausal age. In this study patients having BMI less than 25 were taken as normal and BMI more than 25 were taken as obese. We found that BMI is a statistically significant independent risk factor of carcinoma breast. In our study majority of carcinoma breast patients with ER +ve, PR+VE, BOTH ER&PR +VE have normal BMI, whereas the majority of carcinoma breast patients with ER-VE, PR-VE, ERPR-VE status has BMI in the obese range.

This implies that patients with normal BMI have more chances for positive receptor status which has a better prognostic value whereas obese patients were associated with more negative hormonal receptor status tumors which has a comparatively poor response to treatment. This observation is comparable to the previous study from America, which analyzed breast cancer mortality in the obese group relative to the normal weight.

In a study including African patients, overweight was significantly related to breast cancer mortality by multivariable analysis. However, this study is controversial to Kawai et al reported that obesity was an independent risk factor for breast cancer death but had no association with breast cancer prognosis. We also correlate BMI with clinically palpable node. But there is no statistically significant association between node positivity and BMI.

In this study, the lymphovascular invasion is more with obese (71.6%), which is an independent poor prognosis for carcinoma breast. In our study, the lymphovascular invasion is more in both pre and postmenopausal women and it is statistically significant (p<0.01) which implies increased BMI as a significant risk factor in both premenopausal and postmenopausal women. This observation is similar to kanglu et al study in post-menopausal status but controversial to premenopausal status, which showed the following inference that

for premenopausal women, higher BMI could decrease breast cancer risk but higher BMI is associated with increased breast cancer risk in postmenopausal women. In Jain et al study 37.4% patients had ER-positive status and 62.6% patients had ER-negative status while 34% patients had PR positive status and 66% patients had PR negative, whereas in our study we have the following observation 54% has ER receptor-positive status, 60% has PR receptor-positive status. Among them, 36.3% have both ER, PR receptor-positive status.

In our study, we compared the Receptor status with BMI and lymphovascular invasion. Our study concluded that in patients having positive receptor status like ER+VE/ PR+VE/ ER&PR+VE, the majority are in the range of normal BMI and have significantly lower lymphovascular invasion whereas in patients having negative receptor status majority has lymphovascular invasion and has BMI in the obese range. This implies that positive receptor status is a good prognostic factor and chemotherapy can be effectively used as adjuvant therapy. This is comparable to the Dunnwald et al study, Vinita et al study which also concluded that ER/PR negative status has been associated with increased mortality.

Our study has 49.4% HER2NEU receptor-positive status which is comparable to Jain et al study which has a 35% positive status. There is no statistically significant association between HER2NEU receptor status and lymphovascular relationship which is in contrast to Jain et al study. Lymphovascular invasion is an important and independent prognostic factor of carcinoma breast. In our study, 46% has lymphovascular invasion which was comparatively lower than the young Ju et al study.

This may be due to the larger sample study of that study. The lymphovascular invasion has a statistically significant positive correlation with negative receptor (ER, PR, and ER&PR) status and BMI. But the lymphovascular invasion was not statistically significant with HER2NEU and nodal status. This nodal status association is in contrast to the young Ju et al study.

**CONCLUSION:**

- The incidence of breast carcinoma is high in the perimenopausal age group (40–50 years of age).
- In my study the following statistically significant results were obtained:
- receptor status (ER, PR, AND HER2NEU) is found in the majority of women with normal BMI and negative receptor status is associated with obese patients.
- status (ER, PR) is associated with decreased lymphovascular invasion and negative receptor status is associated with increased lymphovascular invasion.
- BMI is associated with decreased lymphovascular invasion in both pre and postmenopausal women in contrast to obese patients.
- of the lymph node with lymphovascular invasion is found to be statistically insignificant
- vascular invasion is statistically insignificant.

**LIMITATIONS:**

- Our study involved only those women with carcinoma breast admitted in our surgical department; hence it does not reflect the data of the community.
- Our study doesn't include the patients with advanced carcinoma breast who were on neoadjuvant therapy.

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**CONFLICT OF INTEREST:** None declared

**ETHICAL APPROVAL:**

The study was approved by the Institutional Ethics Committee

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