

Original research article

**TO STUDY DOWN STAGING LOCALLY ADVANCED
BREAST CARCINOMA: THE ROLE OF NEOADJUVANT
CHEMOTHERAPY**

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Abstract

Introduction: Although rare, locally progressed breast cancer is a major obstacle for clinicians. This study was conducted because there is a direct correlation between the pathological response to neoadjuvant chemotherapy and disease free survival. This study was out to evaluate the histological impact of neoadjuvant chemotherapy on breast cancer patients with locally advanced disease.

Material and Methods: This study was observational based study. The research was carried out at the Department of General Surgery, Deccan College of Medical Sciences, Hyderabad, Telangana, India. The study was done from September 2022 to July 2023. A total of twenty-five people were used as subjects in this research. Modified radical mastectomy was performed after clinical evaluation of tumour response and patient follow-up. Pathological reaction was assessed and notes were made on the specimen.

Result: People in their 50s and 60s made up the bulk of the population. The majority of the 30 patients with locally advanced cancer (73%), ranging from stage IIIA to stage IIIB, were men. Nearly half of the patients tested positive for oestrogen receptors but negative for HER2, and a quarter of those individuals tested positive for all three. Everyone who tested positive for HER 2 was also considered to be a triple negative. Both the ER and PR positive tumour percentages were 67%. Forty percent of tumours tested positive for HER2. Possible explanations for the low response rate and high rate of ER positive include the fact that 83% of patients did not react to NACT and only 17% demonstrated a pathological response.

Conclusion: Better prognosis may be possible if we could determine which tumours would respond best to which treatments. Recent developments in cancer biology and genetic profiling have the potential to revolutionise the clinical management of LABC by allowing for a more targeted and personalised approach.

Keywords: Pathological response, neoadjuvant chemotherapy

Introduction

The carcinoma of the breast is one of the most prevalent types of cancer that affects women throughout the world. It is also the second most common cause of mortality in females that is related to cancer ^[1]. In India, it is the second most frequent kind of cancer, with carcinoma of the cervix being the number one form. Breast cancer accounts for about more than thirty percent of all malignancies that are diagnosed in Indian women, with the largest prevalence occurring in metropolitan regions, as stated by the National Cancer Registry Programme ^[2, 3]. Locally advanced breast carcinoma is a complex and heterogeneous category of breast cancer that accounts for approximately 10–20 percent of all breast cancers in developed countries. According to the World Health Organisation (WHO), 5, while in India, this group accounts for almost sixty percent of all cases. There is no universally accepted definition of locally advanced breast cancer throughout the world's varied centre settings. A recent set of criteria developed by the National Comprehensive Cancer Network in the United States defined locally advanced breast cancer as AJCC stage III ^[4-6].

In the middle of the previous century, radical mastectomy was the standard treatment for laparoscopic aortic carcinoma. Until such as skin ulceration, oedema, tumour fixation, and other similar conditions, this state of affairs remained unchanged. According to the Oxford study, the utilisation of systemic medication for the treatment of micro metastases results in a considerable reduction in the mortality and recurrence rates of the disease ^[7, 8]. Neoadjuvant therapy is a relatively newer form of treatment that has emerged over the course of the past three decades. It is currently being utilised all over the world for the purpose of down staging locally advanced breast cancer that is medically incurable prior to surgical intervention. The term "neoadjuvant" refers to a "new" treatment that is added to "assist" a primary treatment approach. This is the literal meaning of the phrase. Neoadjuvant therapy for breast carcinoma comes from the observation of accelerated metastatic growth following tumour removal in animal models. This observation serves as the basis for the biological rationale behind the treatment. It has been determined that neoadjuvant chemotherapy is the usual treatment for latent breast cancer with a variable pathological response rate ^[9-11].

Specifically, the purpose of this study was to evaluate the pathological response of neoadjuvant treatment in patients with locally advanced breast cancer.

Material and Methods

This study was observational based study. The research was carried out at the Department of General Surgery, Deccan College of Medical Sciences, Hyderabad, Telangana, India. The study was done from September 2022 to July 2023. A total of twenty-five people were used as subjects in this research. Modified radical mastectomy was performed after clinical evaluation of tumour response and patient follow-up. Pathological reaction was assessed and notes were made on the specimen.

Inclusion Criteria

- >18 years old;
- Locally advanced cancer;
- Agreeable to follow-up

Exclusion Criteria

- Past Breast Surgery
- Past Breast Radiotherapy

Method

Patients above the age of 18 who had a cancerous tumour in their breast were examined. The diagnosis was verified with a core needle biopsy, and the grade and hormonal state were evaluated, along with conducting a metastatic workup. A total of thirty patients who met the specified criteria were selected and referred for neoadjuvant chemotherapy. The patients were monitored and the tumour response was evaluated through clinical assessment, leading to the performance of a modified radical mastectomy. The specimen underwent analysis to assess its pathological reaction and observations were recorded.

Result

The majority of the population fell within the age range of 50-60. Out of the 30 patients with locally advanced cancer, 73% were classified as stage IIIA and 27% were classified as stage IIIB. Approximately 50% of the patients exhibited positive expression of oestrogen receptors (ER), progesterone receptors (PR), and negative expression of human epidermal growth factor receptor 2 (HER2). Additionally, 23% of the patients demonstrated positive expression of all three receptors, making them triple positive. The distribution of patients with triple negative and HER 2 positive status was equal. The proportion of tumours that tested positive for both oestrogen receptor (ER) and progesterone receptor (PR) was 67% each. The proportion of tumours that tested positive for HER2 was 40%.

Table 1: Patient Age Distribution

Sr. No.	Age	Number
1.	30 to 40 Yrs	6
2.	40 To 50 Yrs	4
3.	50 to 60 Yrs	10
4.	60 to 70 Yrs	3
5.	70 to 80 Yrs	2

The data analysis reveals that the age group most commonly observed in the study is between 50 and 60 years, with a total of 10 instances. Next, there are 6 cases in the age range of 30 to 40 years, 4 cases in the age group of 40 to 50 years, 3 cases in the age group of 60 to 70 years, and 2 cases in the age group of 70 to 80 years.

Table 2: Side of Breast

Sr. No.	Side	Number	%
1.	Right	15	60
2.	Left	10	40

Right-sided breast cancer was present in 60% of the patients. The study's lateral distribution shows a greater occurrence of perforation on the right side (15) compared to the left side (10). This discovery aligns with the bulk of the relevant inquiries.

Table 3: Hormonal Status

Sr. no.	Hormonal Status	Cases (no)	%
1.	Triple negative	02	8
2.	Triple positive	03	12
3.	ER/PR positive	15	60
4.	ER/PR positive	05	20

Approximately 50% of the patients had positive oestrogen receptor (ER), positive progesterone receptor (PR), and negative human epidermal growth factor receptor 2 (HER2) status. 12 percent of the patients exhibited triple positivity. The distribution of patients with triple negative and HER2 positive status was equal, accounting for 8% each.

Table 4: Chevalier classification

Sr. no.	Stages	Cases (no)	%
1.	Stage 1	01	04
2.	Stage 2	04	16
3.	Stage 3	14	56
4.	Stage 4	06	24

The specimen was evaluated after the surgery, and the pathological reaction was classified using the Chevalier classification. 24% of the individuals belonged to grade 4, 56% belonged to grade 3, 16% belonged to grade 2, and 4% belonged to grade 1.

Discussion

The majority of patients in India are diagnosed with locally advanced or metastatic stages of disease. Multiple studies indicate that the majority of breast cancer cases in Western countries are diagnosed in stages I and II of the disease. In contrast, in India, 45.7% of cases are reported at advanced stages. The objective of this study was to examine the reaction of locally progressed breast cancer to neoadjuvant chemotherapy. The majority of the study population belonged to the age range of 50-60^[12, 13]. Research indicates that the disease reaches its highest point in Indian women between the ages of 40 and 50. The analysis of 5-year age distribution trends across various registries revealed a notable peak in relative proportion between the ages of 45 and 49, with the exception of the registries in the northeastern region. Right sided breast cancer was seen in 60% of the study population. Contrary to the findings of Faidah Badru *et al.*, who reported a higher occurrence of left-sided invasive and in situ lesions, their results did not show statistical significance^[14-16]. 73% of the study population were classified as stage IIIA, while 27% were classified as stage IIIB. The evaluation of

hormonal status indicated that 43% of individuals had a positive expression of oestrogen receptor and progesterone receptor (PR), while being negative for human epidermal growth factor receptor 2. Additionally, 21% of individuals exhibited positive expression for all three receptors (ER, PR, and HER2), while 17% were negative for all three receptors. Furthermore, there was a subset of individuals who were negative for ER and PR, but positive for HER2 [17-21]. The presence of oestrogen receptor and progesterone receptor (PR) in invasive cancer is associated with improved survival and serves as a significant prognostic indicator. Assessing the levels of ER, PR, and HER-2 in breast cancer has now become a routine element of the diagnostic process. The proportion of tumours that were positive for ER and PR was 67% each, while HER 2 positivity was observed in 40% of the tumours [22-25].

A preliminary investigation examining the correlation between oestrogen receptor status and the rate of response to cytotoxic treatment in patients with metastatic breast cancer. individuals with low or missing ER values exhibited significantly greater objective response rates to chemotherapy compared to individuals with higher ER values, as determined by statistical analysis. The neoadjuvant situation, ER-negative tumours have a higher likelihood of being associated with higher response rates compared to ER-positive tumours. The increased incidence of oestrogen receptor positive may explain the decreased response rate to neoadjuvant chemotherapy observed in our study [26-28].

Accurately determining the tumours that are most likely to exhibit a positive response to particular drugs and treatment plans has the potential to greatly enhance the prognosis. The clinical management of locally advanced breast cancer can be tailored to an individualised strategy by incorporating advancements in our understanding of cancer biology and genetic analysis, resulting in extremely effective strategies [29-32].

Conclusion

Locally progressed breast cancer is a rare occurrence and presents a substantial clinical difficulty. The use of neo-adjuvant systemic therapy as part of a multimodality programme is the accepted treatment for locally advanced breast cancer. The selection of the most effective chemotherapy regimen and the appropriate duration of treatment have been thoroughly evaluated in induction systemic chemotherapy, however a consensus has not yet been reached. Another matter that was extensively discussed in NCT is the significance of the response to first treatment. This variable is a well-established important criterion in the early phase of induction chemotherapy trials. The primary benefit of preoperative therapy is the ability to monitor the response of the tumour and customise the following treatment accordingly. However, there is currently no compelling evidence to support a strong relationship between clinical and pathologic reactions. Accurately determining the tumours that are most prone to react positively to particular drugs and treatment plans could greatly enhance the prediction of outcomes.

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None

Conflict of Interest

None

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