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Clinicopathological Response And Toxicity Of Neoadjuvant Chemotherapy In Locally Advanced Breast Cancer

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Abstract
Background: *Locally advanced breast cancer (LABC) remains a significant clinical burden, especially in low- and middle-income countries where late presentation is common. Neoadjuvant chemotherapy (NACT) is a key component of treatment, aimed at tumor downstaging and improving surgical outcomes. This study evaluates the clinical and pathological response to NACT in LABC, along with associated toxicities.*
Materials and Methods: *This prospective observational study was conducted at Assam Medical College and Hospital over a one-year period, including 40 female patients with histologically confirmed LABC. Patients received either the ACT (Doxorubicin, Cyclophosphamide, followed by Paclitaxel) or CAF (Cyclophosphamide, Adriamycin, and 5-Fluorouracil) regimen of NACT. Patient age, tumor size, nodal status, histopathology and receptor profile were documented. Clinical response was assessed using the Response Evaluation Criteria in Solid Tumours (RECIST 1.16) criteria after three chemotherapy cycles, and pathological response was evaluated post-treatment. Chemotherapy-related toxicities were recorded and analyzed. Statistical comparisons were made using Chi-square or Fisher's exact test, t-test or Mann–Whitney U test, with $p < 0.05$ considered statistically significant.*
Results: *The mean age of patients was 48.6 ± 10.1 years. All patients presented with a palpable breast lump, and axillary lymphadenopathy. At presentation, the mean tumor size was 5.4 cm, 22 (55%) patients having tumors >5 cm, and 19 (47.5%) patients with axillary matted nodes (N2). Invasive ductal carcinoma accounted for 95% of tumors, with ER/PR-positive, HER2-negative subtype being the most common (55%) type. Following three cycles of NACT, out of the 40 patients, a complete clinical response was observed in four (10%) patients and partial clinical response in 32 (80%) patients with comparable response rates between ACT and CAF regimen (P= 0.42). The mean tumor size reduction was 64% post NACT (P<0.00001). Pathological complete response was achieved in two (5%) cases. Although younger age and smaller tumor size showed trends toward higher complete remission rates, these differences were not statistically significant. Common adverse effects included alopecia (77.5%), nausea and vomiting (25.0%), anorexia and weight loss (17.5%), anemia (10.0%), and neuropathy (7.5%).*
Conclusion: *This study highlights the efficacy of NACT in achieving tumor downstaging of LABC, with response rates being comparable between ACT and CAF regimens. NACT was effective in patients with LABC and was generally well tolerated. Further studies with larger cohorts and longer follow-up are recommended.*
Key Words: *Locally advanced breast cancer, Neoadjuvant chemotherapy, Clinical response, Pathological response, Chemotherapy toxicity*

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I. Introduction

Breast cancer is a major health concern in women around the world, causing widespread morbidity and mortality. Across the world breast cancer is projected to surpass 2 million cases by 2030 (1). Locally Advanced Breast Cancer (LABC) presents a significant clinical challenge worldwide, particularly in low- and middle-income countries like India, where delayed diagnosis is common. According to data from India's National Cancer Registry Program, the incidence of breast cancer in urban areas has gradually increased from 1990 to 2013 (2), with LABC accounting for 60% of cases—compared to barely 10-20% in high-resource settings (3). LABC typically refers to tumors greater than 5 cm, often with regional lymph node involvement or invasion of

adjacent tissues(4). While early stage breast cancers have improved prognosis with timely interventions, LABC continues to exhibit high morbidity and mortality due to its advanced presentation (4).

Historically managed through radical mastectomy, LABC treatment has evolved towards a multidisciplinary approach, with neoadjuvant chemotherapy (NACT) playing a vital role. NACT not only facilitates tumor downstaging to enable breast-conserving surgery but also helps in evaluating tumor responsiveness to systemic therapy (5). Studies have consistently shown that early administration of chemotherapy can target micrometastatic disease, potentially improving both surgical outcomes and overall survival (3, 5). For example, several studies have reported that a pathological complete response (pCR) following NACT was strongly associated with improved overall survival (OS) and disease-free survival (DFS), especially in patients with triple-negative and HER2-positive breast cancer(6, 7).

Despite these advances, not all patients respond uniformly to NACT, with complete clinical response observed in < 30% of patients only (8-10). As such, clinical and pathological assessment of tumor dynamics pre- and post-NACT is fundamental for optimizing therapeutic approaches. Modern imaging techniques, such as ultrasonography, mammography, and MRI—combined with histopathological analysis, help in accurately assessing response to NACT (11, 12). While NACT offers potential benefits in tumor control and surgical outcomes, its associated toxicities ranging from cytopenia to neuropathy—pose challenges to treatment adherence and patient quality of life (13). Hence, a balanced assessment of both response and toxicity is crucial to developing individualized treatment plans.

This study aims to evaluate the clinical, and pathological responses to NACT in patients with LABC, with an additional focus on chemotherapy-related toxicities. By identifying response patterns and tolerability profiles, this study seeks to contribute to optimized and patient-centered breast cancer management.

II. Materials And Methods

This was a prospective observational study conducted in the Department of General Surgery, Assam Medical College and Hospital, Dibrugarh, Assam, over a period of one year, from October 2023 to September 2024. Ethical approval was obtained from the Institutional Ethics Committee (Human), Assam Medical College and Hospital. Informed written consent was taken from all participants after a detailed explanation of the study's purpose, procedures, and voluntary nature.

Study Design: Prospective open label observational study

Study Location: This was a tertiary care teaching hospital based study conducted in the Department of General Surgery, Assam Medical College and Hospital, Dibrugarh, Assam

Study Duration: October 2023 to September 2024.

Sample size: 40 patients.

Sample size calculation: A total of 40 patients diagnosed with locally advanced breast carcinoma (LABC) and scheduled to receive neoadjuvant chemotherapy (NACT) were included. The sample size was calculated based on an anticipated response rate of 76.6%, with 95% confidence, 20% relative precision, and 10% margin for non-response or loss to follow-up.

Subjects & selection method: The study population was drawn from patients being admitted in department of Surgery, Assam Medical College and hospital between October 2023 to September 2024.

Inclusion Criteria

1. Female patients aged >18 years
2. Diagnosed with LABC (as per AJCC staging)
3. Willing to undergo regular follow-up

Exclusion Criteria

1. History of prior breast surgery or radiotherapy
2. Presence of metastatic disease at presentation

Data Collection and Baseline Assessment

Baseline clinical and demographic details were recorded, including age, tumor size, nodal status, AJCC stage, and receptor profile (ER, PR, HER2). Tumor evaluation was done via clinical breast examination, ultrasonography (USG), and mammography. Standard craniocaudal and mediolateral oblique views were

obtained on mammography, and findings were corroborated by USG. All patients underwent core needle biopsy using a 14G needle under image guidance. Tissue samples were subjected to histopathological evaluation and immunohistochemistry (IHC) to determine hormone receptor and HER2-neu status. HER2-positive tumors were defined as having an IHC score of 3+ (14).

Neoadjuvant Chemotherapy Regimens

Patients were administered either the AC-T regimen (doxorubicin and cyclophosphamide followed by paclitaxel) or the CAF regimen (cyclophosphamide, doxorubicin, and 5-fluorouracil), selected based on individual risk profiles, including disease stage, receptor status, and cardiac considerations. The AC-T regimen was preferred for high-risk cases, such as node-positive or triple-negative/HER2-positive tumors, due to its superior efficacy, while CAF was reserved for patients with anthracycline-sensitive tumors or those at risk of cardiac complications as follows.

AC-T regimen:
- Doxorubicin 60 mg/m² IV, Day 1
- Cyclophosphamide 600 mg/m² IV, Day 1
- Followed by Paclitaxel 80 mg/m² IV weekly
- Cycles repeated every 21 days

CAF regimen:
- Cyclophosphamide 600 mg/m² IV, Day 1
- Doxorubicin 60 mg/m² IV, Day 1
- 5-Fluorouracil 600 mg/m² IV, Day 1
- Cycles repeated every 21 days (three cycles)

Clinicopathological Response Evaluation

After three NACT cycles, clinical response was assessed using Response Evaluation Criteria in Solid Tumors (RECIST 1.16)(15) as follows: clinical complete response (cCR) was defined as the disappearance of all target lesions; clinical partial response (cPR) as greater than or equal to 30% decrease in lesion diameter. Stable disease (SD) was defined as no sufficient shrinkage or increase and pogressive disease (PD) was ≥20% increase in lesion diameter post NACT.

Pathological response was evaluated on post-NACT core needle biopsy or surgical specimens using criteria described by Pinder et al.(16) Pathological Complete Response (pCR) was defined as absence of residual invasive tumor in the breast and axillary lymph nodes. However, this category also included patients with residual ductal carcinoma in-situ (DCIS). Pathological partial response (pPR) was categorized as those with ≥50% tumor regression and pathological no response (pNR) as <50% tumor regression or no response.

Toxicity Evaluation:

Side effects related to chemotherapy were closely monitored during the course of treatment. At each visit, patients were asked about any new symptoms, and clinical examinations were performed to assess for common toxicities. Routine blood tests, including complete blood counts and biochemical profiles, were conducted prior to each chemotherapy cycle to detect any treatment-related changes. Toxicities were categorized as hematologic (e.g., anemia, thrombocytopenia) or non-hematologic (e.g., alopecia, nausea, vomiting, diarrhea, neuropathy). Differences in toxicity profiles between the ACT and CAF regimens were also analyzed to assess tolerability and inform supportive care strategies.

Statistical Analysis

Categorical variables were summarized as frequencies and percentages, while continuous variables were reported as mean ± standard deviation. Groupwise comparisons were made using Chi-square/Fisher's exact test for categorical variables and t-test or Mann–Whitney U test for continuous variables, as appropriate. All tests were two-tailed, with $p < 0.05$ considered significant. Data analysis was conducted using R software (version 4.2.0).

III. Results

Baseline Patient Characteristics

Table no. 1 shows the clinical characteristics of the patients at presentation. A total of 40 female patients with histologically confirmed LABC were included in the study. The mean age at presentation was 48.6 ± 10.1 years, with most patients aged between 51-60 years (37.5%), followed by 41-50 years (35.0%). Only 2 (5%) of patients were younger than 30 years. All patients presented with a palpable breast lump (100%), and

axillary swelling (100%) which was indicative of nodal involvement. Additional symptoms included breast pain (35.0%), breast oedema (32.5%), nipple retraction (25.0%), skin ulceration (25.0%), and nipple discharge (5.0%). The mean tumour size at presentation was 5.4 cm, with 22/40 (55.0%) cases having tumors >5 cm in diameter. Axillary node status showed 52.5% had mobile nodes (N1), while 47.5% had matted nodes (N2); no patients were classified as node-negative, aligning with the inclusion criteria for LABC. A total of 23/40 cases were staged at IIIB and 17/40 cases at IIIA using AJCC staging system. Histopathological evaluation confirmed 38/40 (95.0%) of the patients as having invasive ductal carcinoma (IDC) and only 2/40 (5.0%) as having lobular carcinoma. Hormonal profiling showed that the ER/PR-positive, HER2-negative subtype was most common (55.0%), followed by triple-negative breast cancer (TNBC) at 15.0%. Additionally, HER2-positive, ER/PR-negative tumors accounted for 10.0% of cases, while dual positivity for ER/PR and HER2 was noted in 5.0%.

Table no. 1: Baseline clinical characteristics of the 40 patients included in the study

Patient Characteristics	Number of cases (N=40)	Percentage (%)
Age (in years)		
18-20	0	0.0
21-30	2	5.0
31-40	5	12.5
41-50	14	35.0
51-60	15	37.5
>60	4	10.0
Symptom		
Nipple discharge	2	5.0
Retraction of nipple	10	25.0
Skin ulceration	10	25.0
Oedema over breast	13	32.5
Pain	14	35.0
Breast Lump	40	100.0
Swelling in axilla	40	100.0
Tumour Size (in cm)		
>5	22	55.0
≤5	18	45.0
Axillary Lymph Nodes		
No lymph nodes (N0)	0	0
Mobile axillary nodes (N1)	21	52.5
Matted axillary nodes (N2)	19	47.5
Histopathology		
AJCC Stage		
3A	17	42.5
3B	23	57.5
Histopathology		
Invasive Ductal Carcinoma	38	95.0
Lobular Carcinoma	2	5.0
Hormone Status		
ER/PR+ve,HER2-ve	22	55.0
Triple -ve	6	15.0
ER/PR-ve,HER2+ve	4	10.0
ER/PR+ve,HER2+ve	2	5.0
Not available	6	15.0

Clinicopathological Response to Neoadjuvant Chemotherapy

Among the patients receiving NACT, the ACT regimen was administered to 29/40 (72.5%) of patients, while the CAF regimen was given to the remaining 11 (27.5%) patients. Among the 40 patients, four (10.0%) achieved a complete clinical response (cCR), 32 (80.0%) patients had a partial response (cPR) and two (5%) patients each had a stable disease and a progressive disease as described in table no 2.

Table no. 2: Clinical response to NACT in LABC cases

Clinical Response	Number of cases (N=40)	Percentage (%)
Partial Response (cPR)	32	80.0
Complete Response (cCR)	4	10.0
Stable Disease	2	5.0
Progressive Disease	2	5.0

Pathological examination after NACT revealed stromal changes, areas of fibrosis, and necrosis consistent with therapeutic effect. Table no. 3 shows that a pathological complete response (pCR**)** was observed in two (5.0%) of the cases, partial pathological response (pPR), was observed in 29 (72.5%) cases, while 9

patients showed no significant pathological response (pNR). The difference between clinical and pathological complete response was not statistically significant (p = 0.25).

Table no. 3: Pathological Response to NACT in LABC cases

Pathological Response	Number of cases (N=40)	Percentage (%)
Partial Response (pPR)	29	72.5
Complete Response (pCR)	2	5.0
No Response (pNR)	9	22.5

Table no. 4 summerises the response by NACT regimen used. Response rates did not vary significantly between ACT and CAF regimen (P=0.423). Among patients receiving ACT, 22/29 (75.9%) achieved partial response, while three patients (10.3%) attained complete remission. In contrast, 10/11 (90.9%) of patients in the CAF group exhibited a partial response, with only one (9.1%) achieving complete remission. No patients in the CAF group were classified as stable disease or progressive disease, whereas two (6.9%) of ACT-treated patients showed disease stabilization or progression. Moreover, the mean baseline tumour size was also significantly reduced by 64% from 5.36 ± 1.49 cm to 1.93 ± 1.69 cm after NACT (P<0.00001).

Table no. 4: Response to NACT by regimen used (ACT vs. CAF)

Clinical response to NACT	ACT N (%)	CAF N (%)	P-value
Complete responder	3 (10.3)	1 (9.1)	0.423
Partial Responder	22 (75.9)	10 (90.9)	
Stable Disease	2 (6.90)	0 (0)	
Progressive Disease	2 (6.90)	0 (0)	

Among the 21 younger patients aged ≤50 years (likely premenopausal), partial remission was the most common response to neoadjuvant chemotherapy, observed in 18 (85.7%) cases. One (4.8%) patient experienced complete remission, one had stable disease, and one had progressive disease. Similarly, in 19 patients over 50 years of age (presumed postmenopausal), partial remission remained the predominant outcome, occurring in 14 (73.7%) of cases, followed by complete remission in three (15.8%) patients, stable disease in one, and progressive disease in one patient. While the older age group demonstrated a higher rate of complete remission compared to the younger cohort (15.8% vs. 4.8%), this difference did not reach statistical significance (P=0.70).

Tumour size is widely considered a key factor in predicting response to neoadjuvant chemotherapy (NACT). Patients with tumours larger than 5 cm showed a complete remission rate of 9.1%, while, patients with tumours measuring 5 cm or less achieved complete remission in 11.1% cases. Although smaller tumours appeared to be associated with slightly better outcomes, these differences were not statistically significant (p = 0.63).

Table no. 5: Response to NACT in LABC by age and tumor size

	Complete Remission N (%)	Partial Remission N (%)	Stable Disease N (%)	Progressive Disease N (%)	P-Value
Age group					0.70
<= 50 years (Premenopausal)	1 (4.76)	18 (85.71)	1 (4.76)	1 (4.76)	
> 50 years (Post menopausal)	3 (15.79)	14 (73.68)	1 (5.26)	1 (5.26)	
Tumour size					0.63
>5 cm	2 (9.1)	17 (77.3)	1 (4.5)	2 (9.1)	
≤5 cm	2 (11.1)	15 (83.3)	1 (5.6)	0 (0.0)	

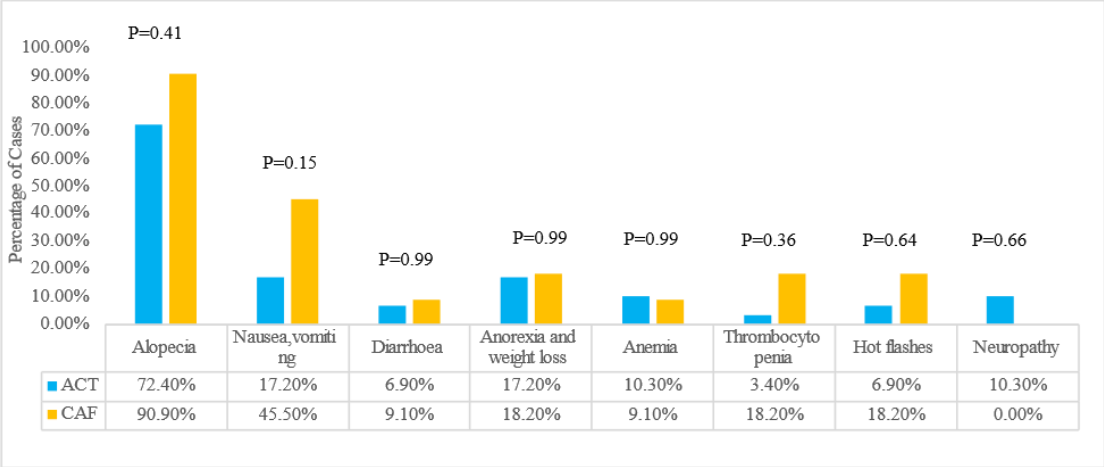
Chemotherapy-Related Toxicities

Table no. 6 lists the toxicities related to NACT that were systematically recorded throughout the chemotherapy cycles based on patient-reported symptoms and clinical observation. The most frequently observed side effect was alopecia, reported in 31/40 (77.5%) of patients. Gastrointestinal symptoms were among the most common non-hematological toxicities. Nausea and vomiting occurred in 10/40 (25.0%) of patients, with a notably higher frequency in those receiving the CAF regimen (45.5%), compared to ACT (17.2%). This difference, though not statistically significant (P=0.15), suggests a trend consistent with the emetogenic potential of 5-Fluorouracil-based regimens (Figure no. 1). Anorexia and weight loss were observed in 7/40 (17.5%) of patients, and diarrhea, though less common, was reported in 3/40 (7.5%) of patients. Among the hematologic toxicities, anemia was present in 3/40 (10.0%) of patients, thrombocytopenia occurred in 3/40 patients (7.5%), and peripheral neuropathy, a known complication of taxane therapy, was identified in 3/40 (7.5%) of patients, primarily in the ACT group.

Table no. 6: Distribution of toxicities in 40 patients receiving NACT regimen

Side Effects	Number of cases (N=40)	Percentage (%)
Alopecia		
Absent	9	22.5
Present	31	77.5
Nausea,vomiting		
Absent	30	75.0
Present	10	25.0
Diarrhoea		
Absent	37	92.5
Present	3	7.5
Anorexia and weight loss		
Absent	33	82.5
Present	7	17.5
Anemia		
Absent	36	90.0
Present	4	10.0
Thrombocytopenia		
Absent	37	92.5
Present	3	7.5
Hot flashes		
Absent	36	90.0
Present	4	10.0
Neuropathy		
Absent	37	92.5
Present	3	7.5

Figure no. 1: Comparison of toxicities and side-effects between ACT and CAF regimen of NACT in LABC



IV. Discussion

This study provides a comprehensive overview of the clinical presentation, toxicity profiles, and therapeutic responses to NACT in patients with LABC. The results not only add to the existing literature on NACT response, but also contribute to the broader understanding of LABC management in resource-limited settings.

The mean age of the study cohort was 48.6 years, with the majority of patients between 41–60 years, reflecting the trend of earlier breast cancer presentation in low- and middle-income countries (LMICs) (9). In contrast, data from high-income countries such as the USA and Europe report a higher mean age at presentation (61–63 years) for LABC (17, 18). This age disparity has been consistently reported and may reflect differences in awareness, screening availability, and healthcare access.

All patients in this study presented with a palpable breast lump, and many also experienced pain, oedema, nipple retraction, and skin ulceration—hallmark symptoms of advanced disease. Axillary

lymphadenopathy was present in all cases, emphasizing the regional spread typical of LABC. These findings align with earlier reports, including a study by Gedam et al., where breast lump was universally observed, followed by nipple distortion and other skin changes(9).

Tumor size remains a key challenge in LABC. In this study, the mean tumor size at presentation was 5.4 cm, with over half the patients presenting with tumors larger than 5 cm. This finding is consistent with previous studies reporting that the majority of LABC patients present with tumors larger than 5 cm (19, 20). Axillary nodal involvement was also prominent, with 52.5% exhibiting mobile nodes (N1) and 47.5% presenting with matted nodes (N2). Most patients (57.5%) were staged at Stage IIIB under the AJCC classification, consistent with the typical clinical stage seen in delayed presentations. Histologically, invasive ductal carcinoma (IDC) was the predominant subtype, accounting for 95.0% of cases, which is consistent with previous studies(9, 20). Hormone receptor testing showed the most common subtype to be ER/PR-positive, HER2-negative (55.0%), followed by triple-negative breast cancer (15.0%) and HER2-positive tumors. These results are similar to previous studies from India, eg., Dhanushkodi et al (2021), reported expression of estrogen receptor, progesterone receptor, in 55%, 45% tumors, respectively, while 12% of tumours did not express any of the above receptors (triple-negative). Another study by Kunnuru et al (2020) found estrogen receptors positive results in 60%, progesterone receptors 51.6% patients and HER-2-neu receptor status in 46.6% of the cases (8, 20).

The majority of patients (72.5%) received the ACT regimen, while 27.5% were treated with CAF. Both are established protocols in the neoadjuvant setting. Clinical complete response (cCR) was noted in 10.0% of the patients while clinical partial response (cPR) was observed in 80.0% of the patients, These rates are broadly in line with other published studies where a cCR following NACT was observed in 12% to 25 % of the LABC patients (8-10, 21). The observed 64% reduction in mean tumor size post-NACT in our study underscores the clinical effectiveness of chemotherapy in tumor downstaging, a trend also reported in previous studies with similar tumor reduction rates of around 74% (22). Despite encouraging clinical responses, pathological complete response (pCR) was achieved in only 5.0% of cases. This discrepancy between clinical and pathological response highlights the limitations of physical and radiological assessments in predicting true tumor eradication. Nonetheless, the ability of NACT to significantly reduce tumor burden supports its role in enabling surgical resectability and potentially improving long-term outcomes.

When analyzed by regimen, there was no statistically significant difference in clinical response between ACT and CAF ($p = 0.423$). However, the CAF group had a slightly higher partial response rate (90.9%) compared to ACT (75.9%), while complete response rates were similar. Interestingly, no cases of stable or progressive disease were observed in the CAF group, suggesting a trend toward better tumor control, though this finding should be interpreted cautiously due to the small sample size.

Age-wise, patients ≤50 years (had higher partial response rates (85.7%) but lower complete remission (4.8%), compared to patients >50 years (postmenopausal), where partial response was slightly lower (73.7%) but complete response was higher (15.8%). While this trend is consistent with Kunnuru et al., who found better NACT response in postmenopausal women ($p < 0.05$) (8), our study, however, did not find the difference to be statistically significant. Similarly, when evaluating tumor size, patients with tumors ≤5 cm had a slightly higher complete remission rate (11.1%) compared to those with tumors >5 cm (9.1%), and showed no evidence of progressive disease. However, this difference was also not statistically significant ($p = 0.63$), though larger tumors often correlate with more aggressive disease and higher residual burden, necessitating tailored therapeutic strategies.

Side effects were generally consistent with known toxicity profiles of anthracycline and taxane-based therapies. Alopecia was the most common adverse effect (77.5%), followed by nausea and vomiting (25.0%), and anorexia with weight loss (17.5%). Gedam et al. similarly reported high rates of alopecia and hematologic toxicity (9). Notably, the CAF regimen was associated with more frequent nausea and vomiting (45.5%) than ACT (17.2%), consistent with literature indicating greater gastrointestinal side effects with fluorouracil-based therapies(23).

Overall, the study highlights the effectiveness of NACT in tumor downstaging, with partial remission as the most common response. However, the low complete remission rate suggests that chemotherapy alone may not be sufficient for achieving total tumor eradication, necessitating alternative or additional therapies for better outcomes. Further, the relatively small sample size might have limited the statistical power and lack generalizability of the findings. Additionally, the short duration of follow-up did not allow for the evaluation of long-term outcomes such as disease-free survival and overall survival. Future studies with larger cohorts and extended follow-up periods are needed to validate these findings and assess their prognostic implications.

V. Conclusion

NACT, primarily using ACT and CAF regimens, was effective in tumour downstaging, with complete clinical remission observed in 10% of the patients and partial clinical response in 80% of patients. A mean

tumour size reduction of 64% was recorded post-treatment, though pathological complete response was achieved in only 5% of cases. No significant difference in response was noted between regimens, although CAF showed a slightly higher partial response rate. Trends in response variability based on age and tumour size were noted but lacked statistical significance. Treatment-related toxicities were common but manageable, with alopecia being the most frequent adverse event and gastrointestinal side effects more prominent in the CAF group. Despite these encouraging outcomes, the study is limited by its small sample size and short duration of follow-up, which may affect the generalizability of results and preclude conclusions about long-term survival. Nevertheless, the findings support the continued role of NACT in the management of LABC, while underscoring the need for future larger studies to confirm the results and explore the role of NACT in effecting long-term outcomes of LABC.

References

[1] Zhang S, Jin Z, Bao L, Shu P. The Global Burden Of Breast Cancer In Women From 1990 To 2030: Assessment And Projection Based On The Global Burden Of Disease Study 2019. Front Oncol. 2024;14:1364397.

[2] Mehrotra R, Yadav K. Breast Cancer In India: Present Scenario And The Challenges Ahead. World J Clin Oncol. 2022;13(3):209-18.

[3] Tartar M, Comstock CE, Kipper MS. Locally Advanced Breast Cancer (LABC) And Neoadjuvant Chemotherapy. Breast Cancer Imaging. Philadelphia: Mosby; 2008. P. 224-301.

[4] Garg PK, Prakash G. Current Definition Of Locally Advanced Breast Cancer. Curr Oncol. 2015;22(5):E409-10.

[5] Moneer M, El-Didi M, Khaled H. Breast Conservative Surgery: Is It Appropriate For Locally Advanced Breast Cancer Following Downstaging By Neoadjuvant Chemotherapy? A Pathological Assessment. Breast. 1999;8(6):315-9.

[6] Spring LM, Fell G, Arfe A, Sharma C, Greenup R, Reynolds KL, Et Al. Pathologic Complete Response After Neoadjuvant Chemotherapy And Impact On Breast Cancer Recurrence And Survival: A Comprehensive Meta-Analysis. Clin Cancer Res. 2020;26(12):2838-48.

[7] Luangdilok S, Samarnthai N, Korphaisarn K. Association Between Pathological Complete Response And Outcome Following Neoadjuvant Chemotherapy In Locally Advanced Breast Cancer Patients. J Breast Cancer. 2014;17(4):376-85.

[8] Kunnuru SKR, Thiyagarajan M, Martin Daniel J, Singh KB. A Study On Clinical And Pathological Responses To Neoadjuvant Chemotherapy In Breast Carcinoma. Breast Cancer (Dove Med Press). 2020;12:259-66.

[9] Gedam MC, Shukla, K., & Ingale, L. Y. . Clinical Presentation And Management Of Locally Advanced Breast Carcinoma. International Surgery Journal. 2018;5(18).

[10] Alvarado-Miranda A, Arrieta O, Gamboa-Vignolle C, Saavedra-Perez D, Morales-Barrera R, Bargallo-Rocha E, Et Al. Concurrent Chemo-Radiotherapy Following Neoadjuvant Chemotherapy In Locally Advanced Breast Cancer. Radiat Oncol. 2009;4:24.

[11] Jochelson MS, Lobbes MBI. Contrast-Enhanced Mammography: State Of The Art. Radiology. 2021;299(1):36-48.

[12] Menezes GL, Knuttel FM, Stehouwer BL, Pijnappel RM, Van Den Bosch MA. Magnetic Resonance Imaging In Breast Cancer: A Literature Review And Future Perspectives. World J Clin Oncol. 2014;5(2):61-70.

[13] Nyrop KA, Deal AM, Shachar SS, Basch E, Reeve BB, Choi SK, Et Al. Patient-Reported Toxicities During Chemotherapy Regimens In Current Clinical Practice For Early Breast Cancer. Oncologist. 2019;24(6):762-71.

[14] Gown AM. Current Issues In ER And HER2 Testing By IHC In Breast Cancer. Modern Pathology. 2008;21:S8-S15.

[15] Schwartz LH, Litière S, De Vries E, Ford R, Gwyther S, Mandrekar S, Et Al. RECIST 1.1—Update And Clarification: From The RECIST Committee. European Journal Of Cancer. 2016;62:132-7.

[16] Pinder SE, Provenzano E, Earl H, Ellis IO. Laboratory Handling And Histology Reporting Of Breast Specimens From Patients Who Have Received Neoadjuvant Chemotherapy. Histopathology. 2007;50(4):409-17.

[17] Hendrick RE, Monticciolo DL, Biggs KW, Malak SF. Age Distributions Of Breast Cancer Diagnosis And Mortality By Race And Ethnicity In US Women. Cancer. 2021;127(23):4384-92.

[18] Sousa C, Cruz M, Neto A, Pereira K, Peixoto M, Bastos J, Et Al. Neoadjuvant Radiotherapy In The Approach Of Locally Advanced Breast Cancer. ESMO Open. 2020;4(Suppl 2).

[19] Mishra M, Singh, P., & Tripathi, A. Clinical, Radiological And Pathological Evaluation Of Residual Disease In Women Receiving Neoadjuvant Chemotherapy For Locally Advance Carcinoma Breast. International Surgery Journal. 2018;5.

[20] Dhanushkodi M, Sridevi V, Shanta V, Rama R, Swaminathan R, Selvaluxmy G, Et Al. Locally Advanced Breast Cancer (LABC): Real-World Outcome Of Patients From Cancer Institute, Chennai. JCO Glob Oncol. 2021;7:767-81.

[21] Olfa G, Amel T, Rim C, Aymen Z, Faten E, Makrem H, Et Al. Clinical And Pathological Response To Neoadjuvant Anthracycline Based Chemotherapy In Women With Breast Cancer. World Journal Of Oncology. 2010;1(4):167.

[22] Pandurangappa V, Paruthy SB, Jamwal R, Singh A, Tanwar S, Kumar D, Et Al. Assessment Of Response To Neoadjuvant Chemotherapy In Locally Advanced Breast Carcinoma Using Image-Guided Clip Placement. Cureus. 2023;15(10):E47763.

[23] Vogel CL, Smalley RV, Raney M, Krauss S, Carpenter J, Velez-Garcia E, Et Al. Randomized Trial Of Cyclophosphamide, Doxorubicin, And 5-Fluorouracil Alone Or Alternating With A "Cycle Active" Non-Cross-Resistant Combination In Women With Visceral Metastatic Breast Cancer: A Southeastern Cancer Study Group Project. Journal Of Clinical Oncology. 1984;2(6):643-51.