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Original Research Paper

Pharma

BREAST CANCER: STRATERGIES FOR NEO-ADJUVANT AND ADJUVANT THERAPY

Dr. N. Junior Sundresh	Professor, Department Of General Surgery, Government Cuddalore Medical College & Hospital
Dr. Dhanapal C. K	Professor, Coordinator–pharm. D Program, Department Of Pharmacy, Annamalai University
S. Shilpa	Pharm D, Annmalai University
U. Janani	Pharm D, Annmalai University

ABSTRACT

Background: To maximize results, treatment for early-stage breast cancer entails a multimodal strategy that includes radiation, systemic therapy, and surgery. Adjuvant therapy, which included systemic medications including hormone therapy and chemotherapy, was traditionally used following surgery to lower the chance of recurrence. Neoadjuvant therapy has emerged as a worthwhile and almost as successful substitute, given prior to surgery. **Objective:** This study's primary goal is to assess and contrast the effectiveness, safety, and results of various adjuvant and neoadjuvant therapeutic approaches in the treatment of breast cancer. **Methods:** This was a prospective observational study conducted at the Government Cuddalore Medical College and Hospital [GCMCH], in Chidambaram, in the Department of Surgery. The study comprised all patients diagnosed with CA-Breast. **Result:** With a disease-free survival percentage of 66.67% among the 44 patients, adjuvant chemotherapy was the most often employed strategy. In our study, the death rate was quite low. Our study revealed that there is an significant correlation between Neoadjuvant chemotherapy and Tumor size reduction rate. **Conclusion:** Our research findings indicate that the administration of neoadjuvant chemotherapy resulted in a decrease in tumor size, hence enabling the performance of a straightforward surgery. Furthermore, the overall survival rate of cancer patients was enhanced by adjuvant chemotherapy and comprehensive patient care.

KEYWORDS : 1.Early-stage breast cancer 2.Surgery 3.Systemic therapy 4.Adjuvant therapy 5.Neoadjuvant therapy 6.Tumor Regression 7.Overall survival 8.Recurrence risk 9.Personalized treatment

INTRODUCTION

Breast cancer is the most prevalent cancer among women to receive a diagnosis, and its incidence rates are rising globally. The intricacy of breast cancer stems from factors other than its frequency, such as therapy obstacles, molecular subtypes, and varied presentations. The management of breast cancer has changed as a result of the advancement of treatment techniques, which include immunotherapy, targeted medicines, and chemotherapy. These changes have given patients fresh hope and better outcomes. Neoadjuvant therapy is giving systemic medication, such as hormone therapy or chemotherapy, prior to surgery. Neoadjuvant chemotherapy (NACT) is increasingly being used for all subtypes of breast cancer especially in advanced breast cancer.

Surgery is still the mainstay of treating breast cancer, but combining neoadjuvant and adjuvant chemotherapy can have additional therapeutic benefits, such as better cosmetic results and higher rates of breast conservation. The importance of NACT in the therapy of early-stage breast cancer is anticipated to grow, further improving patient outcomes and care quality, as research into neoadjuvant treatment regimens and predictive biomarkers of response continues.

MATERIALS AND METHODS

Hospital based study in clinically diagnosed Breast cancer patients attending Department of surgery, at Government Cuddalore Medical College and Hospital [GCMCH], Chidambaram.

Study Site

Department of surgery, Government Cuddalore Medical College and Hospital [GCMCH], a 1250 bedded multi-speciality tertiary care teaching hospital located in Rural South India, Chidambaram.

Study Design

A prospective observational study.

Study Period

10 months [August (2023)-May(2024)]

Study Population

Patients selected on the basis of inclusion and exclusion criteria.

Sample Size

Using Yaro Tamane formula and statistic table sample size is calculated as 44 .

$n=N/(1+N(e)2)$

$n=50/(1+50(0.05)2)$

$n=44$

Study Tools

Proforma (Data collection form)

Sources Of Data

Case sheets and personal interaction with patients.

Study Recruitment

The study method involves the enrolment of patients based on inclusion and exclusion criteria.

Inclusion Criteria

- Patients with histologically confirmed diagnosis.
- Patients with CA-Breast who are willing to give informed consent in the study.

Exclusion Criteria

- Prior history of other malignancies: Participants who have been diagnosed with any other form of cancer, except non-melanoma skin cancer, may be excluded to ensure that the study focuses solely on breast cancer.
- Patients with Concurrent serious medical conditions
- Pregnancy or breastfeeding patients.
- Male patients with breast cancer.

Study Procedure

- Study was conducted for a period of 10 months [August (2023)-May (2024)]
- Selection of subjects were based on inclusion and exclusion criteria.
- Prior to start the study, informed consent form from patient was obtained.
- Demographic details, medical history, lab investigations, therapeutic management and conditions related to disease were collected using data collection form (Study Proforma).
- The study was carried out among CA-Breast patients visiting Inpatient under the department of Surgery, Government Cuddalore Medical College and Hospital [GCMCH].
- Patient counselling was provided in terms of oral method.
- Collected data were analysed using suitable descriptive statistical tools.
- Report generation.
- Discussion and Conclusion.
- Report submission.

Data Analysis

The data collected were recorded using Microsoft excel and analysed using relevant statistical tool to provide significant result.

RESULTS

Age Wise Distribution

In our study of 44 Female patients with breast cancer, the distribution by age was as follows:

- Age 35-40: 4 patients
- Age 41-45: 6 patients
- Age 46-50: 8 patients
- Age 51-55: 9 patients
- Age 56-60: 10 patients
- Age 61-65: 4 patients
- Age 66-70: 3 patients

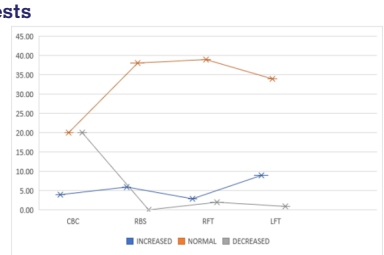
On Examinations

In this study, the examination of patients revealed the following findings:

- 36% of patients had maggots.
- 96% of patients had a breast mass that was firm to hard in consistency.
- 37% of patients had supraclavicular fullness, while 63% had no lymph node swelling or supraclavicular fullness.
- 72% of patients had a retracted nipple-areolar complex (NAC) with no discharge.
- 34% of patients had an ulcer fixed to the underlying tissue.
- 88% of patients experienced tenderness.
- 85% of patients exhibited warmth in the affected area.
- 70% of patients had indurated surrounding skin.
- 33% of patients had a retracted nipple.

Diagnosing Tools

I] Blood Tests

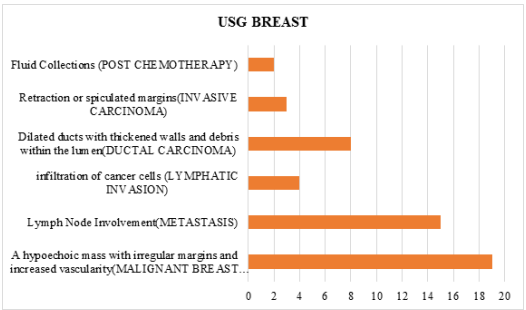


Iii] Fnac Findings

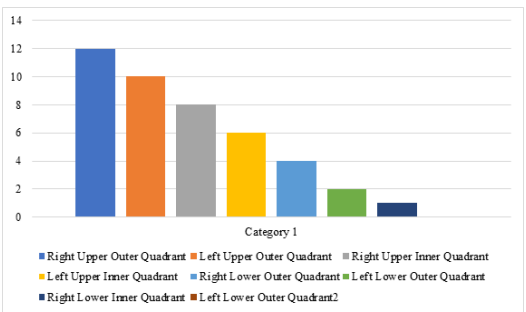
The study's histopathological findings in breast cancer patients are as follows:

- **Clusters of pleomorphic cells with hyperchromatic nuclei:** Observed in 43.18% of cases, indicating significant cellular abnormality and malignancy.
- **Infiltrating breast tissue:** Detected in 6.81% of cases, suggesting invasive cancer spreading into surrounding breast tissue.
- **Proliferation of malignant cells confined within ducts:** Found in 13.63% of cases, consistent with ductal carcinoma in situ (DCIS).
- **Abnormal cells within lobules:** Present in 22.72% of cases, indicative of lobular carcinoma.
- **Tubular carcinoma:** Identified in 4.54% of cases, representing a specific type of breast cancer with characteristic tubular structures.

Ii] Usg Findings



Spatial Distribution Patterns of Breast Cancer



The bulk of the patients in this study-12-have cancer in the upper outer quadrant, with the left upper outer quadrant-10 patients-following closely behind. Significant involvement is also seen in the upper inner quadrants; 8 individuals on the right side and 6 on the left side are impacted, respectively. The outside quadrant is more frequently impacted than the inner quadrant, with lower quadrant involvement occurring less frequently.

Treatment

A group of forty-four patients with breast cancer were observed thorough assessment at our hospital throughout a ten -month period. A sizable percentage of these individuals needed adjuvant chemotherapy after surgery. Adjuvant chemotherapy was specifically given to thirty patients as a part of their postoperative care regimen. This choice was made after giving serious thought to a number of variables, such as the patient's general health and the features and stage of the tumour. Furthermore, seven patients had radical mastectomy or modified radical mastectomy as a surgical intervention. Based on patient-specific criteria—which would have included things like tumour size, location, and disease severity. These patients got individualised treatment based on their unique requirements.

Furthermore, neo-adjuvant chemotherapy proved beneficial as a first line of treatment for a group of seven individuals. Neo-adjuvant chemotherapy was used in conjunction with surgery to decrease tumour size and enable more cautious surgical techniques. Better surgical outcomes and optimal tumour control were made possible by this method. Even with the greatest of intentions for patient care, problems could occasionally occur and post-surgery treatment was required

for complications. Due to complications like maggots or the development of bloody or foul-smelling discharge at the surgical site, two individuals needed specialised care. These problems were addressed, and prompt intervention and careful wound care were given to encourage the best possible healing and recovery.

Some of the regimens used in chemotherapy are

1. **AC-regimen:** comprising Cyclophosphamide at a dosage of 600 mg/M2 with Adriamycin at 60-75 mg/M2, 5-Fluorouracil at 500 mg/M2 and mitomycin 2mg given intravenously on days 1 and 15 of each cycle, each infusion lasting approximately 1 hour

2. **CAP regimen:** comprising Cyclophosphamide at a dosage of 600 mg/M2 with Adriamycin at 60-75 mg/M2 and Paclitaxel 175mg/m2 given intravenously with adjustments in dosage or timing made according to standardized guidelines based on chemotherapy toxicity grades

3. **PC regimen:** comprising Paclitaxel at 175mg/m2 with carboplatin at 360mg/m2 and Filgrastim 300mcg given intravenously with adjustments in dosage or timing made according to standardized guidelines based on chemotherapy toxicity grades

Before commencing chemotherapy, Patients received a mix of drugs in order to minimise potential problems. The drugs include Inj. Dexamethasone, a corticosteroid that helps to avoid allergic responses and reduce inflammation. By inhibiting serotonin receptors, injection ondansetron is used to treat nausea and vomiting as side effects of chemotherapy. A proton pump inhibitor called inj. pantoprazole is used to stop chemotherapy-induced gastrointestinal distress and ulcers. Moreover, the antihistamine injection pheniramine helps reduce allergic symptoms including swelling and itching. The purpose of this pre-treatment regimen is to improve patient comfort and reduce side effects related to chemotherapy, hence facilitating a more seamless treatment experience.

Surgery: The modified radical mastectomy, or MRM, is the typical treatment utilised in breast cancer cases. When primary closure following a mastectomy was not possible, surgical procedures such transverse abdominis myocutaneous flap repair or latissimus dorsi repair were performed. Furthermore, in our study all the seven patients underwent modified radical mastectomy as part of the surgical protocol.

Treatment Outcome

1. **Chemotherapy Response:** In our study, the results were evaluated using multiple criteria for each of the thirty patients who got adjuvant chemotherapy after surgery, including

Tumor Regression: Percentage of Tumor Regression = (Number of patients with tumor regression/Total number of patients who received adjuvant chemotherapy) × 100 Percentage of Tumor Regression = (27/30) × 100 Percentage of Tumor Regression = 90%

Disease-Free Survival (DFS): Percentage of DFS = (Number of patients with disease-free survival/Total number of patients who received adjuvant chemotherapy) × 100 Percentage of DFS = (20/30) × 100 Percentage of DFS = 66.67%

Overall Survival (OS): Percentage of OS = (Number of patients who survived/Total number of patients who received adjuvant chemotherapy) × 100 Percentage of OS = (29/30) × 100% Percentage of OS = 96.66%

Disease progression rate:
Disease Progression Rate (%) = (Number of Patients with Disease Progression/Total Number of Patients Followed Up) × 100 Disease progression rate(%) = (2/30) × 100 Disease Progression Rate (%) = 6.66%

2. **Surgical Outcome:** In our study, the outcomes of seven patients who underwent MRM surgery were evaluated based on a number of criteria, including

Complete resection rate:
Complete Resection Rate (%) = (Total Number of Patients Undergoing Surgery/ Number of Patients with Complete Tumor Removal) × 100 Complete resection rate(%) = (7/7) × 100 Complete resection rate(%) = 100%

3. **Neo-adjuvant Chemotherapy:** The success of neo-adjuvant chemotherapy in reducing tumor size and facilitating less invasive surgical procedures was 6 in out of 7 patients who received neoadjuvant chemotherapy .

Tumor size Reduction Rate:
Tumor Size Reduction Rate (%) = (Number of Patients with Significant Tumor Size Reduction /Total Number of Patients Received Neoadjuvant Chemotherapy) × 100
Tumor size Reduction Rate(%) = (6/7) × 100
Tumor size Reduction Rate(%) = 85.71%

4. **Complication Management**

(Post-Surgical Complications and Management) Two (6.66%) of the thirty patients experienced discharge & maggot infestations at the surgery site. Turpentine oil treatment and a CP regimen proved to be helpful for managing these problems.

DISCUSSION

Based on demographic data, The distribution appears to indicate a greater proportion of participants in the middle age groups (46–60), with fewer participation in the younger (35–45) and older (61–70) age groups. Warmth and tenderness were very common in our study (85% and 88%, respectively), suggesting a potential for inflammation. Furthermore, 70% of the surrounding skin had noticeable induration. Most remarkably, in 96% of cases, the tissue's firm to hard firmness was seen, suggesting a possible malignancy.

Variations in various important blood tests were found in the lab investigation reports for patients with breast cancer. Four individuals had elevated Complete Blood Count (CBC) results, twenty had normal results, and twenty had decreased blood count results. Six patients had elevated blood sugar levels, 38 had normal levels, and none had low blood sugar, according to the findings of the Random Blood Sugar (RBS) test. The findings of the Renal Function Test (RFT) showed that 2 patients had lowered levels, 39 had normal levels, and 3 patients had raised levels. Finally, the findings of the Liver Function Test (LFT) revealed that nine individuals had elevated liver enzyme levels, thirty-four had normal levels, and one had lowered levels.

We found in our study that 19 patients had hypoechoic masses with irregular borders and enhanced vascularity, which is indicative of malignant breast tumours. Fourteen patients had lymph node involvement, which suggests metastasis and highlights the spread of the disease beyond the original tumour location. Furthermore, two patients had cancer cells infiltrate lymphatic channels, which raises the possibility of lymphatic dissemination. Four patients had dilated ducts with thickened walls and debris inside the lumen, which is indicative of ductal carcinoma, a prevalent subtype of breast cancer. Three patients had retraction or spiculated margins, which are suggestive of invasive carcinoma and indicate tumour infiltration into the surrounding breast tissue. Lastly, fluid collections seen in two patients during chemotherapy

indicate possible side effects and alterations associated with the course of treatment. These findings collectively informed diagnosis, staging, and treatment strategies for breast cancer patients.

We saw that a group of 44 patients with breast cancer received thorough assessment and care at our hospital over a period of ten months. Following surgery, thirty patients got adjuvant chemotherapy that was customised for their individual tumour features and health state. Seven individuals had radical mastectomy or modified radical mastectomy depending on individual factors such as tumour location and size. Neo-adjuvant chemotherapy improved surgery results in seven patients by shrinking the size of the tumour. Problems following surgery, such as wound problems in two patients, were treated with quick expert care. AC, CAP, and PC were among the chemotherapy regimens that were modified according to toxicity grades. In order to facilitate a more seamless course of treatment, patients were prescribed drugs prior to chemotherapy, such as pantoprazole for GI protection, ondansetron for nausea, and dexamethasone for inflammation.

Two patients (4.5%) in our cohort had surgical site discharge and maggot infestation as post-operative sequelae. Turpentine oil and a CP regimen were effective in treating them. The incidence and treatment of these side effects emphasise the value of careful post-operative care as well as the possible necessity of focused interventions in the treatment of uncommon but serious post-surgical problems.

Regarding the effectiveness of neo-adjuvant chemotherapy, surgical outcomes, and chemotherapy response, the results provide promise for our study population. The effectiveness of adjuvant chemotherapy in avoiding disease recurrence was demonstrated by its favourable tumour regression rates (83.33%) and disease-free survival (66.67%). Moreover, the remarkable 96.66% overall survival rate highlights the possible advantages of adjuvant chemotherapy in enhancing long-term results. With a 100% full resection rate, the surgical results were outstanding and demonstrated the efficacy of the MRM surgical technique.

Furthermore, with an astounding tumour size reduction rate of 90%, neo-adjuvant chemotherapy demonstrated noteworthy success in shrinking tumour size and enabling less invasive surgical operations. Although a small percentage of patients (6.66%)experienced post-surgical problems, proactive measures such as the use of turpentine oil and a CP regimen were taken, highlighting the significance of timely intervention and all-encompassing care. Together, these results provide credence to the idea that adjuvant chemotherapy and surgical procedures should be integrated into the treatment of breast cancer. However, they also emphasise the importance of being vigilant about managing complications that arise after surgery.

CONCLUSION

To sum up, postoperative patient monitoring is essential for the prompt identification and treatment of problems. The 6:7 ratio indicates that neoadjuvant therapy is successful in decreasing tumour size and enabling less invasive operations, which is why it should be taken into consideration for all patients undergoing surgery. To achieve the best results, the decision between CAP,PC and AC regimens should be customised to the unique needs of each patient and involve a multidisciplinary discussion among medical practitioners.

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Disclosure

The authors report No conflicts on interest for this work.

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