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ORIGINAL ARTICLE

Short term outcomes of breast conserving surgery in breast cancer after neoadjuvant therapy.

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ABSTRACT… Objective: To determine the short term outcomes of BCS after neo-adjuvant therapy in patients with carcinoma of breast. **Study Design:** Descriptive Case Series. **Setting:** Surgical Wards, Mayo Hospital, Lahore. **Period:** February 2020 to August 2020. **Methods:** This study was performed in 41 patients having breast lump, fulfilling inclusion criteria presented in outdoor of surgical department of Mayo Hospital Lahore with ethical approval on 10-01-2020. Before neo-adjuvant chemotherapy, clips were positioned in the breast at the site of lump. Immediate mammogram was obtained after that, to confirm clips position. Patients underwent pre planned cycles of chemotherapy and then was restaged after chemotherapy. Response to chemotherapy evaluated clinically, radiologically and on resected specimen all the information was noted on predesigned proforma. Data Analyzed through SPSS version 26. **Results:** Mean age of the patients diagnosed with carcinoma of breast fall in the age group 31-35 (Mean age 35 ± SD 1.456). More than 80% of the tumors came out to be invasive ductal carcinomas of breast with majority (about 65%) in the upper outer quadrant of breast. About 42% and 44% of the patients showed complete and partial clinical response respectively. In this study 17% of the patients showed no pathological response after chemotherapy. About 54% and 29% of the patients showed partial pathological response and complete pathological response respectively. About 100% of the tumors excised were having margins free of tumor. **Conclusion:** Based on the results of our study it can be concluded that breast conserving surgery after neo-adjuvant chemotherapy is choice of treatment with good short term outcomes, eradicating the need for mastectomy depending on response to chemotherapy.

Key words: Breast Conserving Surgery, Breast Cancer, Neoadjuvant Therapy, Short Term Outcomes.

INTRODUCTION

In the whole world, breast carcinoma is the commonest carcinoma among females and the incidence of this cancer is increasing day by day.[1] The ratio is one in eight women during her lifetime. In the past few decades many methods have evolved to treat breast cancer. The treatment options are according to tumor staging, grading and depends upon many other factors as well like receptor status. These surgical interventions include breast conserving surgery (BCS), modified radical mastectomy (MRM) and radical mastectomy. These procedures can be followed after neo-adjuvant therapy and/or followed by adjuvant chemo or radiotherapy depending upon the requirement.[2] Breast conserving surgery is defined as the removal of breast carcinoma with clear surgical margins of about 1cm of normal tissue all around the specimen while preserving normal breast tissue. Neo-adjuvant chemotherapy (NACT) is the standard option in the treatment of primary breast carcinoma that is operable and is locally advanced. The sole purpose of neo-adjuvant chemotherapy in breast carcinoma is to give excellent systemic type of treatment while clinically lowering the stage of the cancer.[3] It aims to treat hidden metastases and decrease tumor mass. NACT use in patients in which surgery can be performed and where there is no contraindication to surgery, as it changes the surgical treatment option from mastectomy to breast conserving surgery, which improves cosmetic outcome.[4] Neo-adjuvant treatment designs demand a close cooperation

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between oncology specialists, including surgical-oncologists,medical-oncologists, oncoradiologists and oncopathologists.[5]

With improvement in treatment strategies, neo-adjuvant systemic therapy provides a powerful unconventional tool in local regional management especially of breast cancer and gives increased attention to individualized breast oncologic care.[6] Benefits of neo-adjuvant chemotherapy include tumor response to treatment which will result into improved survival. Various trials showed that neoadjuvant chemotherapy shrinks the tumor size, eradicating the need for mastectomy thus making breast conserving surgery possible. Other benefits about prognosis depending upon the degree of pathologic response. Getting a complete pathological complete (pCR) in the breast after neo-adjuvant chemotherapy has been observed to be strongly related with a better outcome in comparison with those patients who are unable to achieve a complete response. And another important use of neo-adjuvant chemotherapy is that it converts node-positive disease to pathologically node-negative disease at operation with rates reaching up to 70%.[7-12]

Some previous studies showed unfortunate results as well regarding the outcomes on margin status in a large number of population. For example, a Dutch histopathology study showed tumor positive margins in 16 females after undergoing BCS. Similarly in the US one out of every four patients would have to undergo an additional operation after BCS which is also quite unfortunate.[13-16] In the present study we evaluated the success rate of BCS after NACT in comparison with the previous studies available.

METHODS

After approval from the ethical review board on 10-01-2020 and approval of grant of research project, we included 4[16] patients fulfilling inclusion criteria from the outdoor department of MHL after complete workup. Written consent was taken before including the patients in study. Complete history and clinical examination were performed. All patients discussed in Multidisceplinary team meeting for final plan. Before neo-adjuvant chemotherapy, clips were positioned in the breast at the site of lump. Immediate mammogram was obtained after that to confirm clips position. Then patients underwent pre planned cycles of chemotherapy and then was restaged after chemotherapy. Our regimen included 4 cycles of adriamycin plus cyclophosphamide followed by 4 cycles of taxanes each after three weeks interval. Patients then underwent BCS and specimen sent for histopathology. The lumpectomy involves different types of incisions based on various factors. These include incision within Langer lines over the mass, whenever technically and cosmetically feasible, or a radial incision, particularly in the case of a large tumor. Patient was given general anesthesia and then the most suitable incision was given. Following the incision, subcutaneous flaps were formed surrounding the tumor. The specimen/lump was then removed. 1cm clinically normal tissue margins with also included in the specimen removed. Axillary fate was different in different patients as described above. Patients were evaluated for clinical response by consultant surgeon. Pathological response plus margin status was documented on histopathology report. All the information's noted on specially designed proforma.

RESULTS

In this study the mean age of patient lies in the range of age 31 to 35 (Mean age 35 ± SD 1.456). Following is the bar chart (Figure-1) showing age distribution at the time of diagnosis.

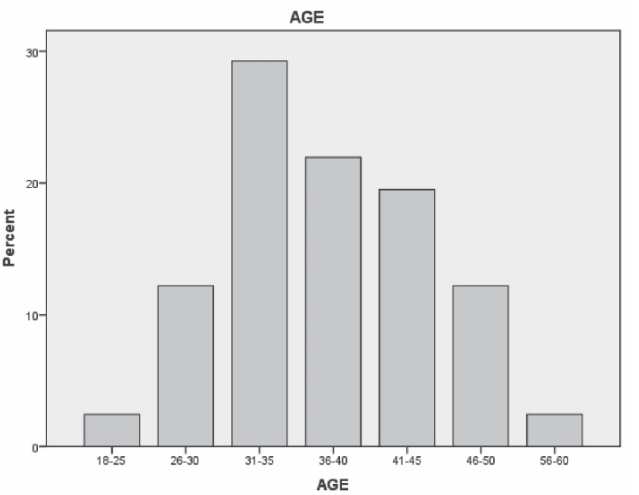

Figure-1. Bar chart showing age distribution

About 65% of the tumors lie in the upper outer quadrant of breast, 19.5% of the tumors lie in the upper inner quadrant of breast. Only 12.2% and 7.3% of the tumors lie in the lower outer and lower inner quadrant respectively (Figure-2).

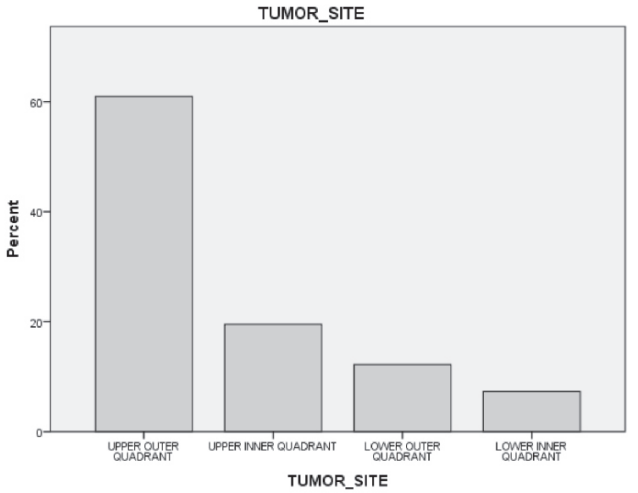

Figure-2. Bar chart showing the quadrant involvement

More than 80% of the tumors are invasive ductal carcinomas of breast followed by lobular invasive carcinomas and other types (Figure-3).

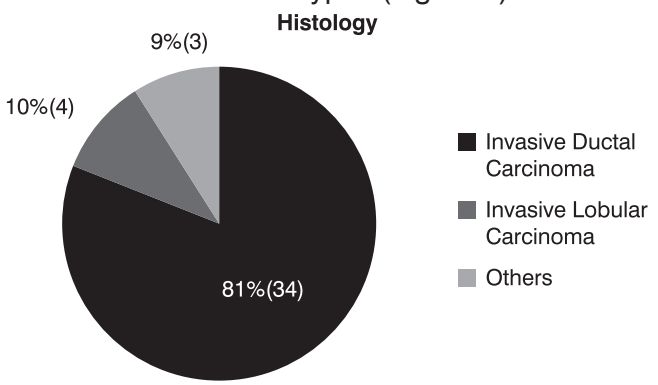

Figure-3. Pie chart showing histopathological distribution of breast cancer

About 56% of the tumors were less than or equal to 2cm, 44% of the tumors were greater than 2cm but not greater than 5cm in post neoadjuvant setting (FIGURE 4).

About 43.9% of the patients showed partial clinical response, followed by 41.5% as complete clinical response and 14.6% as stable disease as shown in the following figure (FIGURE 5) showing bar chart.

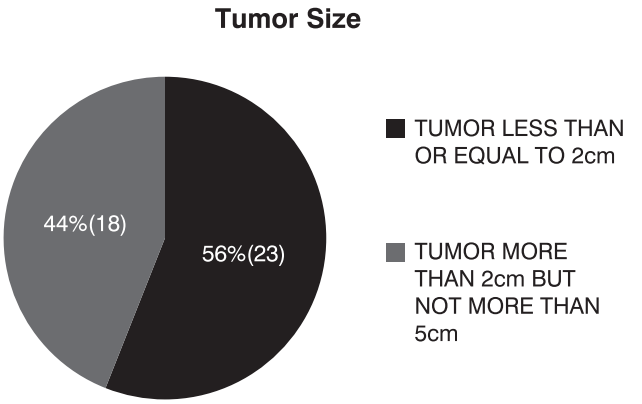

Figure-4. Pie chart showing distribution of breast cancer according to the size of lump

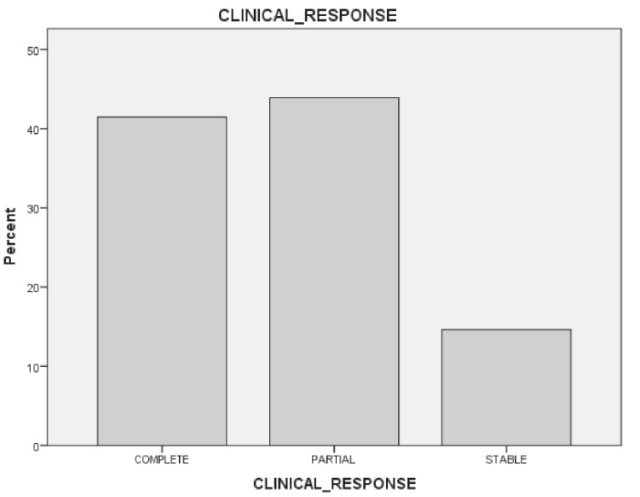

Figure-5. Bar chart showing clinical response after NAC

All the tumors removed were having margins free of tumor as shown in Table-I.

Margin_Status		
Margins	**Frequency**	**Percent**
Clear	41	100.0

Table-I. Percentage of positive margins involved after lumpectomy

In this study 17% of the patients showed no pathological response after chemotherapy. 54% and 29% of the patients showed partial and complete pathological response respectively. Below is the pie chart showing frequencies of pathological response observed after chemotherapy (Figure-6).

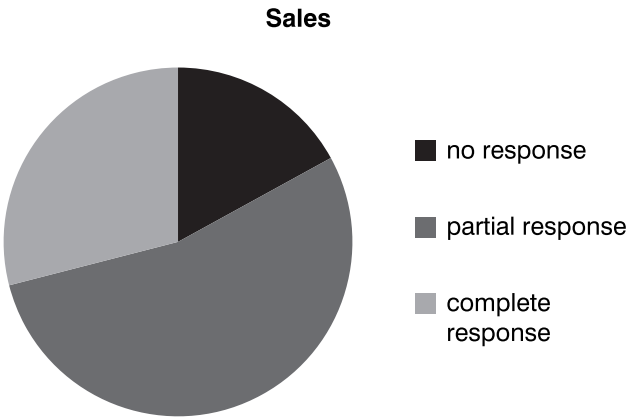

Figure-6. Pie chart showing pathological response after NAC

The correlation between clinical and pathological response is as follows (Table-II).

Clinical_Response * Pathological_Response Cross-tabulation				
		Pathological_Response		
		No Response	Partial Response	Complete Response
Clinical_Response	Complete	2(5%)	8(20%)	7(17%)
	Partial	4(10%)	10(24%)	4(10%)
	Stable	1(2%)	4(10%)	1(2%)

Table-II. Correlation between clinical and pathological response after NAC

The p-value of above cross-tabulation came out to be 0.671.

DISCUSSION

Early breast cancer patients are often offered chemotherapy before surgery as neo-adjuvant chemotherapy can decrease that breast lump size changing surgery decision from mastectomy to breast conserving surgery. If there will be complete removal of tumor/lump in surgery or if there is pathological complete response (pCR) after chemotherapy, this will result in improved survival.[17] Thus we can say that neo-adjuvant chemotherapy for carcinoma of breast is considered as the gold standard treatment for locally advanced tumors breast cancers having an aim to achieve complete pathological response (pCR). Various studies have been done to check the conformity between biological, radiological and histopathological variables of carcinoma of breast and response to neo-adjuvant chemotherapy by histological examination of the removed tissue.[18] Size of tumor is easy to be compared before and after neo-adjuvant chemotherapy if there is no response or minimal response to neo-adjuvant chemotherapy. Overall, tumors that are smaller in size have good prognosis.[19,20] Our study showed that only 7% of our patients showed both complete clinical response and complete pathological response after neo-adjuvant therapy. Only 1% of the patients showed no clinical and pathological response to therapy. More than 80% of the tumors were invasive ductal carcinomas of breast followed by lobular invasive carcinomas and other types. Faneyte et al. showed histological classification. 64.5% were invasive ductal carcinoma and 14.5% were invasive lobular carcinoma (ILC).[21] These results were comparable with our results. In our study 42% and 44% of the patients showed complete clinical and partial clinical response respectively. Only 15% cases showed stable disease. Ogston et al. analyzed that 19% patients had a complete clinical response, 58% had a partial response and 21% had static disease.[22] Rouzier et al. elaborated that in their study that post neo-adjuvant complete clinical response was observed in 9% of patients and partial clinical response occurred in 47% patients. 44% of the patients showed stable or progressive disease.[23] Kim et al. showed that 10% of his patients had complete clinical response and 52% of patients had partial clinical response.[24] Cindy et al. said that in their study population consisted of 214 patients who had NAC, 61 (28.5 %) of whom had NAC+BCS. The median age of the patients was 53.5 years. A pCR was achieved for 19 of the patients (31.1 %). Of the remaining 42 patients, 9 (21 %) had close or positive margins.[25] In this study 17% of the patients showed no pathological response after chemotherapy. 54% and 29%of the patients showed partial and complete pathological response respectively. Schott et al. showed that 9.8% of his patients had a pathological complete response to chemotherapy (9.8%).[26] Gajdos et al. showed the complete clinical response in 8% of his patients and a complete pathologic response in 13% of his patients. He showed that 16% of his patients had partial clinical response.[27] In another study, by Clouth et al. 19.8% of the cases

showed pathological complete response.[22] In this study, 100% of the tumors removed in BCS were having margins free of tumor after neo-adjuvant chemotherapy. Volders et al. observed that 24.3% of patients had positive margins after NACT.[28] Sushil et al. analyzed that 16% of patients had positive margins on wide local excision after neo-adjuvant therapy.[29] These results were contradictory to the results of this study in which 100% tumor free margins were obtained. Woeste et al. included total 162 patients in his study. After NACT, the breast tumor excised had margins free of tumors. 100% of his margins were tumor free.[30] These results obviously are comparable with the results of this study.

CONCLUSION

Based on the results of our study it can be concluded that breast conserving surgery after neo-adjuvant chemotherapy is choice of treatment with good short term outcomes, eradicating the need for mastectomy as 100% margin free tumors were removed showing excellent clinical and pathological responses.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Hamna Khan:** Main investigator, data collection.
2	**Ali Akbar:** Operational supervision.
3	**Sana Afroze:** Analysis.
4	**Ahmad Afnan Ali:** Data collection.
5	**Ghazanfar Ali:** Data collection.
6	**Jamal Anwar:** Discussion writing.
7	**Shabeeh Ahmed:** Discussion writing.