OPEN AIMJ ORIGINAL ARTICLE

Evaluation of Conservative Breast Surgery after Neoadjuvant Chemotherapy in Breast Cancer

General Surgery

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Received *for publication January 02, 2022;* ***Accepted*** *June 24, 2022;* ***Published online*** *June 24, 2022.*

doi: *10.21608/aimj.2022.114164.1773*

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ABSTRACT

Background: Breast cancer is the most frequent type of cancer in women, and it is also the main cause of cancer mortality in women. Through the usage of neoadjuvant chemotherapy, surgical therapy for breast tumor has progressed from highly radical, debilitating operations to less invasive techniques.

Aim of the work: To find out if conservative breast surgery is feasible and has a good oncologic result in females who had breast cancer who were downstaged via neoadjuvant chemotherapy.

Patients and methods: This non-randomized prospective study will include twenty (20) women suffering from cancer who will undergo neoadjuvant chemotherapy in order to reduce the cancer's stage and render it suitable for preservation, management, and treatment at Al-Hussein and Bab-elshaaria Hospitals.

Results: Women having breast cancer have a significant difference in tumor size before and after chemotherapy. All of them had free margins after conservative breast surgery with an intraoperative frozen portion, and the aesthetic result was satisfactory. Following six months of follow-up, there was no local recurrence.

Conclusion: It was discovered in this research that neoadjuvant chemotherapy is efficient and useful in downstaging the tumor size as well as axillary lymph nodes in breast cancer women. Also, good results were obtained regarding the local recurrence throughout the short time of this research.

Keywords: *Breast cancer; Neoadjuvant chemotherapy; Conservative breast surgery.*

Disclosure: *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.*

Authorship: *All authors have a substantial contribution to the article.*

INTRODUCTION

Breast cancer is the most frequent disease in women, and it is the main cause of cancer-related mortality in females between 20 and 59. Breast cancer is responsible for 33% of all cancers in women and 20% of cancer-related fatalities.[1]

Breast cancer is predicted to be the most frequent cancer among Egyptian women, responsible for 37.7% of all cancer cases in 2008, with 12,621 new cases. With 6546 deaths, it is also the biggest cause of cancer-related deaths, accounting for 29.1% of the total.[2]

Breast cancer surgery has progressed from highly radical, debilitating operations to less invasive techniques and from disfiguring procedures to reconstructive excellence.[3]

One of the objectives of neo-adjuvant chemotherapy (NACT) in breast tumor is to make an inoperable tumor operable. In such patients, NACT can enable appropriate disease control that would otherwise be unachievable with surgery alone. Furthermore, patients can be managed with breast-conserving surgery following NACT.[4]

BCS coupled with postsurgical radiation therapy has established the gold standard of locoregional therapy for the vast majority of women with early-stage breast cancer, providing comparable survival to mastectomy while also improving body image and lifestyle ratings. While BCS aimed to eliminate the tumor completely with sufficient surgical margins, it kept the breast's natural form and appearance. In some instances, accomplishing both objectives might be difficult, and the necessity to achieve an oncologically safe excision can lead to unsatisfactory aesthetic outcomes.[5]

PATIENTS AND METHODS

Women suffering from breast cancer underwent neoadjuvant chemotherapy to reduce the cancer's stage, rendering it qualified for conservation, management, and treatment at Al-Hussein and Bab-elshaaria Hospitals. This prospective study was conducted from July 2021 to November 2021 and included twenty (20) patients.

Inclusion criteria have been all patients with complete skin edema resolution, a remaining tumor size of less than 5 cm, no signs of multicentric malignancy, no prior radiation to the chest or breast wall, normal heart, liver, and kidney function (chemo), no substantial lymph node involvement or widespread microcalcification, and intraoperatively attained negative operative margins.

Exclusion criteria included women having T4 tumors that had part or no responsiveness to neoadjuvant chemo, individuals having multicentric illness, individuals having widespread malignant mammographic microcalcification, individuals having inflammatory cancer, prior breast radiotherapy, scleroderma, women who are pregnant, and a huge tumor in the tiny breast where clean margins could not be evaluated without a mastectomy, and central lesions.

Preoperatively, all participants in the research received a thorough history, a full examination (names, ages, family history, domicile, prior exposure to radiation, local and general examinations), imaging (mammography plus supplementary ultrasonography to quantify tumor size, computed tomography of the chest, computed tomography of the abdomen and pelvis, as well as bone scanning), and a true-cut biopsy from a breast mass.

The procedure was a conservative breast surgery involving a frozen portion performed intraoperatively.

Following surgery, the patients have been exposed to early follow-up each week for the first month (with the goal of confirming the operative incision, local cleanliness, the existence of hematomas, dehiscence of wound, seroma, and infections) and late follow-up following 3 and 6 months, as the patients have been checked using breast mammography plus supplemental ultrasound for assessment of local repetition.

All patients received postsurgical radiotherapy to lower the risk of local recurrence following conservative surgery.

Statistical methods

The IBM SPSS software package version 20.0 has been employed to analyze the data that was supplied to the computer. Numbers and percentages have been employed to describe qualitative data. The Kolmogorov-Smirnov test has been employed to confirm the distribution's normality. Range (min and max), mean, standard deviation, and median have been employed to describe quantitative data. The significance of the acquired data has been determined at the 5% level. A statistically significant p-value of <0.05 has been used.

RESULTS

Parameters	No.	%
Total patients	20	**100.0**
Age		
≤45	13	**65.0**
45 – 50	5	**25.0**
>50	2	**10.0**
Min. – Max.	**35.0 – 60.0**	
Mean ± SD.	**47.78 ±6.85**	
Median	**46.50**	
Co-morbidity		
Negative	11	**55.0**
DM	3	**15.0**
HTN	4	**20.0**
IHD	2	**10.0**
Family history		
Positive	4	**20.0**
Negative	16	**80.0**
Oral Contraceptive pills (OCP)		
No	10	**50.0**
Yes	10	**50.0**
Nulliparous		
No	17	**85.0**
Yes	**3**	**15.0**

Table 1: Patients' demographic characteristics

Parameters	No.	%
Side		
Right	11	**55.0**
Left	9	**45.0**
Site of tumor		
UOQ	7	**35.0**
LOQ	5	**25.0**
UIO	5	**25.0**
LIQ	3	**15.0**

Pathological type		
IDC	17	**85.0**
ILC	1	**5.0**
Mixed ductal & lobular ca.	2	**10.0**
Nuclear Grading		
II	16	**80.0**
III	4	**20.0**
Stage of the clinical tumor (before chemo)		
T1	3	**5.0**
T2	2	**10.0**
T3	13	**65.0**
T4	2	**10.0**
Stage of the clinical lymph node (before chemo)		
N0	2	**10.0**
N1	14	**70.0**
N2	4	**20.0**
Stage of tumor (before chemo)		
2B	10	**50.0**
3A	4	**20.0**
3B	6	**30.0**
Pathological tumor size		
Min. – Max.	**1.0 – 3.80**	
Mean ± SD.	**2.29 ± 0.72**	
Median	**2.30**	
Pathological N staging		
-ve	2	**28.0**
+ve	18	**72.0**
Hormone receptor		
Luminal A (ER + PR + HER-)	17	**85.0**
Luminal B (ER + PR + HER+)	1	**5.0**
Triple negative (ER - PR – HER-)	1	**5.0**
HER2 positive (ER - PR - HER+)	1	**5.0**
Safety margin		
-ve	20	**100.0**
+ve	**0**	**0.0**

Table 2: Distribution of the examined based on tumour features

Chemo radiologicaltumor size	**Pre - chemo tumor size(n = 20)**		**Post-chemo tumor size (n = 20)**		**Pathological tumor size (n= 20)**		**p**
	No.	**%**	**No.**	**%**	**No.**	**%**	
<2	1	5	5	25	6	30	
2 – 5 cm	5	25	15	75	14	70	
>5	14	70	0	0	0	0	**<0.001***
Sig.bet.Grps	$p_1<0.001^*, p_2<0.001^*, p_3=0.746$						
Min. – Max.	1.50 – 7.0		1.0 – 4.0		1.0 – 3.80		
Mean ± SD.	4.65 ± 1.65		2.32 ± 0.80		2.29 ± 0.72		**<0.001***
Median	5.30		2.10		2.30		
Sig.bet.Grps	**$p_1<0.001^*, p_2<0.001^*, p_3=0.332$**						

Table 3: A comparison of pre-chemo, post-chemo, and pathological tumor sizes
p1: p value for comparing pre- and post-chemo tumor sizes
p2: p value for pre-chemo and pathological tumor sizes
p3: p value for post-chemo and pathological tumor sizes
*: Statistically significant at $P \leq 0.05$

	N	**Min. – Max.**	**Mean ± SD.**
Operative time (min)	**20**	90 – 130	**105 ± 14.14**
Incision length (cm)	**20**	7.0 – 11.0	**8.71 ± 1.01**
Distance to the nearest surgical margin	**20**	**1.80 – 2.50**	**2.21 ± 0.27**

Table 4: Descriptive analysis of the examined patients as per operative time (hr) and incision length (cm)

Complications	No.	%
Post-surgical wound Infection	2	10.0
Seroma	5	25.0
Hematoma	1	5.0

Table 5: Distribution of the studied patients as per complications

Chemotherapy response	No.	%
PR	17	85.0
CR	2	10.0
SD	1	5.0

Table 6: Distribution of the studied patients in terms of chemotherapy response

Cosmetic results	No.	%
Poor	0	0.0
Fair	2	10.0
Good	2	10.0
Excellent	16	80.0

Table 7: Distribution of the studied patients in terms of cosmetic results

Patient satisfaction	No.	%
Poor	2	10.0
Fair	3	15.0
Good	5	25.0
Excellent	10	50.0

Table 8: Distribution of the examined patients based on patient satisfaction

DISCUSSION

In patients experiencing early breast cancer, breast conserving is a prudent and appealing choice. Thanks to the development of active chemotherapeutic regimens, BCT can now be extended to some patients having LABC.[6]

Multimodal treatment, which includes neoadjuvant chemotherapy, surgery, as well as locoregional radiation, has significantly boosted ultimate results and local control rates.[7]

Our goal is to evaluate the feasibility, surgical, and aesthetic results of BCS in women with breast cancer who have been downstaged to the point where they are eligible for it by neoadjuvant chemotherapy.

Twenty females who had breast cancer and had undergone neo-adjuvant chemotherapy were involved in the study.

In this research, 46% of women have been < 45 years old, 20% have been 45–50 years old, and 34% have been > 50 years old, for an average age of 47.78 years. This was similar to the findings of Barranger et al. [8], who studied 119 female patients and found that the average age was 49.6 years old, and Mashoori et al. [9], who discovered that the average age was 43.52 years old.

In the current research, T1 lesions were found in 5% of patients, 10% of cases exhibited T2 lesions, 65% of cases exhibited T3 lesions, and 10% of patients had T4 lesions. This contradicts the findings of Parmar et al. [10], which indicated that 30.9% of cases exhibited T1-T3 lesions and 69.1% exhibited T4 lesions, indicating a substantial discrepancy due to the greater levels of lymph node participation in the current research. This research's findings are similar to those of Sweeting et al. [11] who found that 6% of participants experienced T1 lesions, 24% experienced T2 lesions, 63% experienced T3 lesions, and 7% experienced T4 lesions. The tumor size of the 20 participants who underwent neo-adjuvant chemotherapy was assessed before and after chemotherapy. Before chemotherapy, the average tumor size was 4.65 cm. On the other hand, the average tumor size following neoadjuvant treatment was 2.32 cm. This does not match the findings of Parmar et al. [10], who reported an average tumor size of 6 cm before chemotherapy and 1.5 cm following neo-adjuvant chemotherapy.

The current investigation found that 10% of patients exhibited N0, 70% exhibited N1, and 20% had N2. This came to the same conclusion as El-Sayed et al. [12], who found that 20% of cases exhibited N0, 55% exhibited N1, and 25% exhibited N2.

In this research, 20% of women had stage IIB breast cancer, 50% exhibited stage IIIA breast cancer, and 30% exhibited stage IIIB breast cancer. This is close to Shin et al.'s [13] research, which found that 63.5% of participants had stage IIIA and 36.5% had stage IIIB, despite the fact that the Stage IIB group was excluded from their research, and similar to Salem et al.'s [14] research, which found that 18% of participants had stage IIB, 57% had stage IIIA, 16% had stage IIIB, and 9% had stage IIIC.

In this research, IDC was detected in 85% of the patients, ILC in 5%, and mixed ductal and lobular carcinoma in 10%. This is congruent with the findings of Mashoori et al. [9] which discovered that 91.2 % of participants exhibited IDC and 8.8 % exhibited ILC, as well as Rahman et al. [15] who discovered that 80.45 % of participants had IDC, 13.64 % had ILC, and 5.91 % had a mixed invasive pattern.

In this study, 80% of patients had G2 tumors that were moderately differentiated, while 20% of patients had G3 tumors that were badly differentiated. This is different from the findings of Iqbal et al. [16] that found that (55.6%) patients had grade II tumors while the remaining (44.4%) were grade III and the findings of Ustaalioglu et al. [17] who indicated that G II became 66% and G III was 34%, but this does not agree with Barranger et al. [8] who stated that G1 3.5%, G2 41.7%, and G3 54.8%.

Intraoperative frozen section is a technique for assessing margins that allows us to resect suspected or positive margins at the lumpectomy time, resulting in free margins in all 20 patients and a low incidence of local repetition and re-excision. This matched the findings of the Costa et al. [18] investigation. Positive margins were seen in 2.4% of women with BCS, according to Mittra et al. [19]. These differences might be explained by the fact that their research included a larger number of participants (726 participants) than this research (20 participants).

This study found that 85 % of sufferers have been ER/PR-positive and 5% have been Her2-positive, which differs from the findings of Vieira et al. [20], who discovered that 61.5 % have been ER+, 52.6 % have been PR+, and 23.1 % have been Her2-positive, and is similar to the findings of El-Sayed et al. [12] who discovered that 21% of sufferers have been Her2-positive, and is close to the findings of Rahman et al. [15] who indicated that 69.09% of the tumors have been confirmed to be oestrogen receptor positive.

As per chemotherapeutic response, partial response has been seen in 85% of cases, complete response has been seen in 10% of cases, and stationary disease has been seen in 5% of patients, which agrees with Rahman et al. [(15)] research that found 18% of patients used to have CR, 75% used to have PR, and 7% used to have SD, and Salem et al. [14] research that found 9% of patients used to have a complete response, 79% used to have a partial response, 10% used to have stationary disease, and 2% used to have progressive disease.

In this study, 25% of the patients had seroma, which has been discovered clinically and verified via ultrasound, and 10% of the patients had wound infection. In comparison to the Milan et al. [21] research, seroma has been found in 10% of patients and wound infections in 6%. In our research, as in the (Milan) research, seroma has been the most common complication. Obesity, advanced age, and diabetes mellitus have all been identified as risk factors for postsurgical problems, and presurgical antibiotic coverage has been shown to reduce rates of infection. The disparity in seroma occurrences could be explained by careful manipulation of breast tissue, rigorous adherence to CBS standards, the length of operation, suture filling of dead space, and electrocautery usage.

In this research, all patients received postsurgical radiation to decrease the risk of local recurrence following a conservative operation.

In the 20 cases that were followed up on, no local recurrence was seen following 1 month and up to 6 months. Local recurrence has been noted in one patient, in contrast to Mashoori et al. [9], who had a 1.5-year follow-up period. When contrasted to the outcomes of Levy et al. [22], who noted local repetition in 9% of patients, there were significant differences due to the longer follow-up duration of 5 years and the larger number of patients. When loco-regional therapy is ideal, the probability of local recurrence appears to be more linked to histological characteristics, so breast preservation ought to be an effective loco-regional therapeutic choice (radiotherapy after surgery, negative margins).

The aesthetic results of the following instances were assessed using the Harvard scale, and 80% of them had excellent results. In comparison to Tewari et al. [7], who discovered a good to excellent aesthetic outcome in 73% of cases and a fair outcome in 27% of cases, a great result was found in 10% of cases, and a fair result was found in 10% of patients.

When the patients in the follow-up instances had been asked to score their level of satisfaction, 55% rated excellent satisfaction, 25% rated good satisfaction, merely 15% rated fair satisfaction, and 10% rated poor satisfaction. These variations were related to the extent of breast asymmetry that can occur after BCS and were highly dependent on the extent to which postoperative outcomes matched preoperative expectations.

CONCLUSION

Women who had breast cancer who took part in our research and received neoadjuvant chemotherapy showed excellent response in terms of tumor size reduction, axillary lymph node reduction, as well as pathological response. As a result, we can infer that traditional neoadjuvant chemotherapy is successful in our research, and breast conservation following neoadjuvant chemotherapy is safe based on surgical and aesthetic outcomes in women having breast cancer throughout the study's brief follow-up period.

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