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Evaluation of Oncoplastic Techniques for Conservative Breast Surgery

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Abstract

Background: Conservative breast surgery is crucial for breast cancer. Technique choice, like MRM and Reduction Mammoplasty, impacts cosmetic outcomes and patient quality of life. This aimed to compare outcomes of MRM and Reduction Mammoplasty respect to cosmetic results, postoperative complications, and overall patient satisfaction in breast cancer not responding to neoadjuvant chemotherapy. Methods: This comparative prospective conducted on 30 breast cancer who met inclusion criteria. Fifteen were assigned to each group, one undergoing MRM axillary clearance and other undergoing Reduction Mammoplasty axillary clearance. All provided written informed consent and were thoroughly counseled regarding procedures and potential outcomes. Results: Reduction Mammoplasty asasociated a significantly longer mean operative time (2.7 ± 0.465 hours) compared to MRM (1.9 ± 0.425 hours). However, there was no statistically significant difference in intraoperative blood loss between two groups. Postoperative hospital stays were comparable, Group (1) (MRM) staying 1 to 3 days and Group (2) (Reduction Mammoplasty) staying 1 to 2.5 days. found similar rates of postoperative surgical complications, including wound infection, hematoma, and wound dehiscence, between two groups.: Both techniques, MRM and Reduction Mammoplasty, are viable for breast cancer not responding to neoadjuvant chemotherapy, comparable outcomes and complications.

Keywords: Breast surgery; Oncoplastic techniques; Modified Radical Mastectomy; Reduction Mammoplasty; Cosmetic outcome.

Introduction

Breast cancer is most prevalent cancer in women worldwide, comprising 18% of all reported cancer cases and being leading cause of women's cancer-related deaths, accounting for 23% of such fatalities [1]. In Egypt, breast cancer is most common cancer among women, representing about 38.8% of all malignancies in females and a significant cause of mortality in region [2].

diagnosis of breast cancer relies on history taking, clinical examination of primary tumor and regional lymph nodes, imaging investigations, and pathological confirmation. Staging follows TNM system, considering extent of primary tumor, regional lymph nodes, and distant metastasis [3]. After receiving diagnosis, patient experiences varying levels of stress, which differ from one individual to another. This stress is not only related to facing mortality but can also profoundly alter a patient's perception of their physical, emotional, and sexual well-being due to surgical treatment of breast cancer [4].

Halsted radical mastectomy, established in 1880s a surgical approach for breast cancer, involved removing breast en bloc, pectoralis muscles, axillary lymph nodes, and a significant amount of skin. However, due to its disfiguring nature and numerous morbidities and complications, this procedure raised concerns [5].

In 1972, Madden introduced modified radical mastectomy, which conserved both pectoral muscles along radiotherapy, achieving similar oncologic outcomes to radical mastectomy but reduced morbidities. Around same time, more widespread use of mammography allowed earlier breast cancer diagnosis, leading Verones to develop a technique focused on removing only tumor free margins, along axillary dissection and radiotherapy, to achieve comparable survival rates to more aggressive surgeries [6].

However, breast-conserving techniques were initially perceived partial mutilations, prioritizing oncological outcomes over psychological and aesthetic considerations, leading to less attention to asymmetries and deformities [7]. In recent years, field of oncoplastic surgeries emerged aim of optimizing cosmetic and oncologic outcomes in breast-conserving surgeries. Originally involving volume replacement techniques for partially or totally resected breast tissue, field now includes plastic techniques to achieve tumor resection safety margins while maintaining good cosmetic results. It also addresses symmetrizing surgeries for contralateral breast when necessary, considering factors such tumor location, size, tumor-to-breast ratio, and patient preferences [8, 9].

purpose of this was to compare outcomes of MRM and Reduction Mammoplasty respect to cosmetic results, postoperative complications, and overall patient satisfaction in breast cancer not responding to neoadjuvant chemotherapy.

and methods

This comparative prospective conducted on 30 diagnosed breast cancer. research was carried out General Surgery Department of Banha University Hospitals and El Haram specialized Hospital, commencing in December 2021. Ethical approval from appropriate Ethical Committee and written informed consent from all participants were obtained prior to commencement of study.

population consisted of 30 breast cancer who did not respond to neoadjuvant chemotherapy. were into two groups: Group (1) comprising 15 who underwent Modified Radical Mastectomy (MRM) axillary clearance, and Group (2) comprising 15 who underwent Reduction Mammoplasty axillary clearance.

Inclusion criteria were defined as follows: breast cancer T3, having a large breast size (cup D or more), fit for general anesthesia, accepting both intervention modalities (MRM or Reduction Mammoplasty), accepting radiotherapy, tumor located in lower part of breast, and eligible for research participation.

Exclusion criteria were set as: tumors staged above T3, presence of skin involvement, upper medial quadrant tumor, contraindication to radiotherapy, and refusing Modified Radical Mastectomy.

All underwent a comprehensive evaluation, including a detailed history-taking process, analysis of their disease, and a thorough clinical examination in outpatient clinic. Pre-operative investigations were carried out, which included laboratory tests (complete blood count, liver profile, kidney profile, coagulation profile, and random blood sugar), and radiological investigations (bilateral digital mammography in cranio-caudal and medio-lateral oblique views, chest X-ray, and Pelviabdomen ultrasound) part of metastatic work-up protocol. Additionally, US-guided tissue biopsy using a true-cut needle core biopsy was performed on all breast lumps.

Patient counseling was crucial part of study, where each patient received a detailed explanation of their condition, type of surgery, expected postoperative adjuvant therapy, and operative details of chosen technique. Visual aids, such pictures of similar cases, were utilized to aid patient visualization of potential outcomes. Risks, benefits, and possible complications were clearly communicated, including wound infection, necrosis, asymmetry, failure of adequate cosmetic outcome, incidence of local recurrence, change in post-operative oncological management strategy, need for post-operative radiation dose to remaining breast tissue, and its effects on skin and cosmetic outcome.

Medical photography discussed and consented to, purpose and procedure of photography clearly explained to patients. Medical photos were taken and recorded in patient's records, allowing for progress documentation during follow-up visits.

Two distinct operative techniques were employed in study: Modified Radical Mastectomy and Reduction Mammoplasty oncoplastic technique. former involved an elliptical incision encompassing nipple areolar complex, while latter used a reduction mammoplasty keyhole pattern incision based on medial areolar vascular pedicles.

Post-operative management included administration of prophylactic broad-spectrum antibiotics, routine post-operative analgesia using pethidine and NSAIDs, and removal of suction drains when drainage amount less than 40-50 ml. Dressings were used to cover wounds, including Vaseline gauze to protect areolae and nipples. viability of areolae and nipples was closely monitored. Dressing changes were performed as needed, and were advised to wear a well-fitting bra starting day after surgery and continuously for following postoperative month.

Approval code:

Statistical analysis

Statistical analysis was done by SPSS v26 (IBM Inc., Armonk, NY, USA). Quantitative data were presented mean ± standard deviation (SD), while qualitative data were expressed frequency and percentage. Various tests were employed for different comparisons: independent-samples t-for comparing two means, Mann Whitney U for non-normally distributed data, Chi-square (X^2) for proportions between qualitative parameters, and Fisher Exact for 2 by 2 tables small samples. Wilcoxon Signed-Ranks test was used for paired means of non-normally distributed continuous data, and logistic regression was used for predicting dependent variables a binary outcome. A two tailed P value < 0.05 considered statistically significant.

Results

Our included 30 breast cancer not responding to neoadjuvant chemotherapy into two groups. Group (1) includes 15 who underwent Modified radical mastectomy axillary clearance. Group (2) includes 15 who underwent Reduction Mammoplasty and axillary clearance. Their age ranged from 33-65 years (mean 45.1±9.029 years) for Group (1) and 28-60 years (mean 43.60± 7.962 years) in Group (2). Out of 30 patients, 3 were diabetics (10%), and 5 out of 30 were hypertensive. **Table 1**

operative timing in Group (1) MRM ranged from 1.2 to 2.8 hours with mean timing 1.9 ± 0.425 hours. In Group (2) (Reduction Mammoplasty) from 2-4 hours mean timing 2.7 ± 0.465 hours.

There is a significant statistical difference between both groups regards operative time, being longer in (Reduction Mammoplasty) than (MRM).

intra-operative blood loss estimated by number of blood-stained gauzes, each blood-stained gauze (30x30 cm) measured about 50 ml. In Group (1) (MRM) blood loss range from 100 to 350 ml (mean= 187.33 ± 67.55 ml). In Group (2) (Reduction Mammoplasty) blood loss ranged from 100 to 400 ml (mean = 214.67± 78.55 ml). No significantly different statistical finding between two groups was noted regards Intraoperative blood loss. **Table 2**

stay in hospital in Group (1) (MRM) patient stayed from 1 to 3 (mean 1.267± 0.59) days postoperatively

and from 1 to 2.5 (mean 1.167± 0.45) days in (Reduction Mammoplasty) Group (2). **Table 3**

Regarding postoperative surgical complications: Considering surgical site infection, one out of 15 had wound infection in Group (2), one surgical site infection in Group (1). **Figure 1 A)** One patient (1/15) developed wound hematoma (6.7%) in Group (2) Reduction Mammoplasty, two (2/15) developed wound hematoma (13.3) in Group (1). **Figure 1 B)** Two out of thirty developed wound dehiscence (6.7%), one in each group. **Figure 1 C)**

Regarding seroma Formation: Six out of thirty (6/30) developed seroma, four in Group (1) and two in Group (2). **Figure 2**

Regarding need for re-excision: One case required re-excision after frozen section examination in Group (2) Reduction Mammoplasty. **Table 4**

Regarding local Recurrence: No cases in our study had local recurrence during our period of post-operative follow up of (3 months), although this time is not long enough to judge local recurrence.

Table (1) Patient characteristics.

		MRM group No. = 15	Reduction Mammoplasty group No. = 15	value	P-value	Sig.
Age	**Mean ± SD**	45.67± 9.029	43.60± 7.962	0.665•	0.512	NS
	Range	33 – 65	28 – 60			
Co-morbidities	**No**	11 (73.3%)	12 (80%)	1.347*	1.000	NS
	HTN	2 (13.3%)	2 (13.3%)			
	DM	1 (6.7%)	1(6.7%)			
	HTN & DM	1 (6.7%)	0 (0.0%)			

P-value > 0.05: Non-significant; P-value < 0.05: Significant; P-value < 0.01: Highly significant, *: Chi-square test; •: Independent t-test

Table (2) Intraoperative time, blood loss

	MRM (Group I) No. = 15	Reduction Mammoplasty (group II) No. = 15	value	P-value	Sig.
Operation time (h)	1.800± 0.4159 1.3 – 2.9	2.743± 0.4755 2.1 – 4.1	-5.115•	0.01	HS
Blood loss (ml)	187.33± 67.556 100 – 350	214.67± 78.546 100 – 400	-1.022•	0.316	NS

P-value > 0.05: Non-significant; P-value < 0.05: Significant; P-value < 0.01: Highly significant, *: Chi-square test; •: Independent t-test.

Table (3) Comparison between MRM and Reduction Mammoplasty regarding hospital stay

		MRM (group I) No. = 15	Reduction Mammoplasty (group II) No. = 15	value	P-value
Hospital stay (days)	**Mean ± SD**	1.368± 0.5936	1.069± 0.4499	0.520•	0.607
Development of hematoma	**No**	13(86.7%)	14 (93.3%)	0.370*	1.000
	Yes	2 (13.3%)	1 (6.7%)		
Development of infection	**NO**	14 (93.3%)	14 (93.3%)	0.000 *	1.000
	Yes	1 (6.7%)	1 (6.7%)		
Wound dehiscence	**No Yes**	14 (93.3%) 1 (6.7%)	14 (93.3%) 1 (6.7%)	0.000*	1.000

Table (4) the needed re-excision of surgical margins

Intra operative findings		No= 15
need for re-excision margins	No Yes	14 (93.3%) 1 (6.7%)

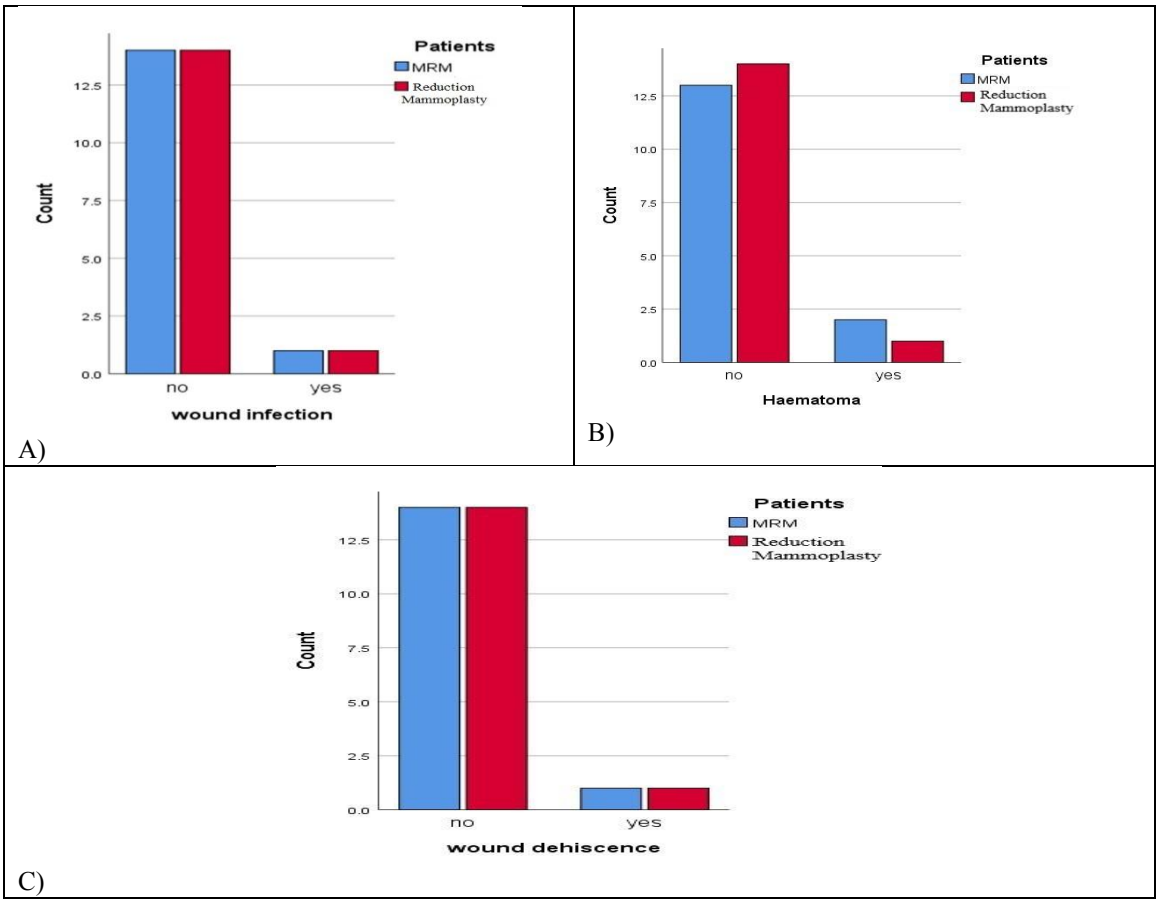

Fig. (1) A) Wound infection, *B)* wound hematoma and C) wound dehiscence

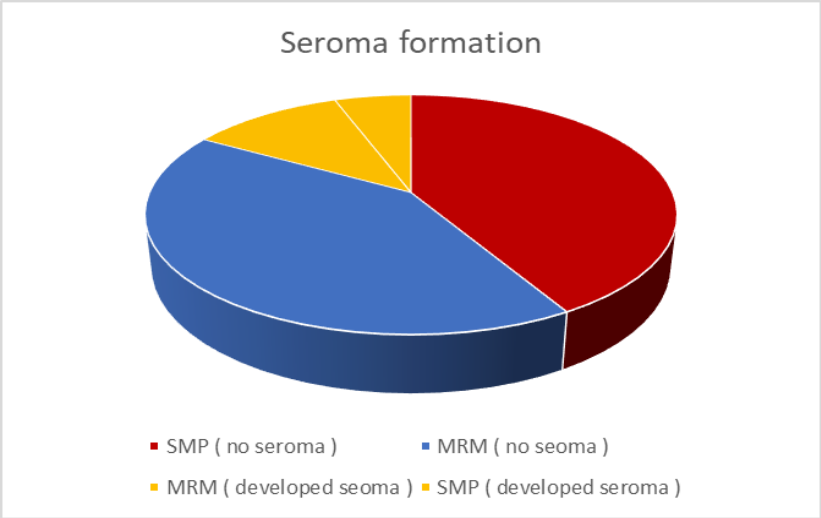

Fig. (2) Seroma Formation

Discussion

Breast conserving therapy (BCT) is widely considered a standard treatment option for specific breast cancer patients due to its acceptable oncological safety, improved aesthetic outcomes, and equivalent survival rates. Large tumors have shown a positive impact on quality of life (QoL) and self-esteem of undergoing BCT. Oncoplastic techniques, such therapeutic reduction mammoplasty (TRM), enable wide excision, reduced margin positivity, and improved aesthetic outcomes compared to conventional breast-conserving surgery (BCS). TRM is particularly suitable for large breasts where extensive resections can be performed [10, 11].

Defining appropriate indications for BCS over mastectomy in multifocal/multicentric (MF/MC) tumors is crucial due to increased risk of local recurrence. However, current indications remain ambiguous. Studies have reported comparable local recurrence rates and overall survival after BCS in unifocal or multifocal tumors [12]. Nevertheless, in selected MF/MC cases, BCS followed by adjuvant therapy has been shown to be a safe alternative to mastectomy negative surgical margins achieved during surgery [13].

Assessing response to neoadjuvant chemotherapy involves clinical examination, breast imaging studies, and pathological examination of post-treatment specimens. Magnetic resonance imaging (MRI) and positron emission tomography (PET) have emerged more effective devices in evaluating tumor response and predicting therapy outcomes. Reduction in tumor volume serves standard criterion for response evaluation, "World Health Organization" (WHO) classification defining complete response, partial response, progressive disease, or stable disease based on clinical and pathological responses [14, 15].

In this study, we report oncoplastic outcomes after surgery in 30 patients with breast cancer who did not respond to neoadjuvant chemotherapy. While no major complications were observed, a 20% rate of minor complications was noted. sample divided into two groups: Modified radical mastectomy (Group 1) and Reduction Mammoplasty (Group 2). There was no significant statistical difference in patients' ages between two groups. However, increased cosmetic and aesthetic demands in patients' age range made achieving patient satisfaction a more challenging goal.

operative time was significantly longer in Group 2 (Reduction Mammoplasty) compared to Group 1 (Modified radical mastectomy). Complications were more common in diabetic patients, similar to findings published by another (16). In Group 2, one patient experienced skin complications (6.7%), and one patient developed hematoma (6.7%). Seroma formation occurred in six cases (20%), which were managed through aspiration under aseptic precautions.

During follow-up period (3 to 12 months), no local recurrence observed in this study. local recurrence rate reported in other studies varied from 2.2% to 2.7% during median follow-up periods ranging from 30 to 75 months [17-19].

This demonstrates that Reduction Mammoplasty technique is a viable extreme oncoplastic approach for large tumors unresponsive to neoadjuvant chemotherapy, providing a suitable alternative to Modified Radical Mastectomy acceptable complication rates, minimal re-excision rates, and no early recurrence within a 3-month period. Moreover, Reduction Mammoplasty proves to be oncologically safe and offers added benefits in terms of improved quality of life and superior aesthetic outcomes compared to Modified Radical Mastectomy. Based on our findings, we recommend therapeutic reduction mammoplasty preferred choice over MRM for tumors meeting criteria for extreme oncoplasty, it yields favorable results and enhances overall quality of life for patients.

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Author contribution

Authors contributed equally in study.

Conflicts of interest

No conflicts of interest

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