Assessment of Modified Round Block Technique in

Management of Early Breast Cancer

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ABSTRACT

Background: The modified round block technique (MRBT) is a surgical approach used in the breast-conserving management of early breast cancer, for achievement of optimal oncological safety while preserving breast aesthetics. It involves a periareolar incision with minimal scarring, that allow for adequate tumor excision and reshaping of the breast tissue. **Aim:** To improve the oncological safety and cosmetic outcome in the surgical management of breast cancer **Patients and Methods:** This study was conducted on 72 female patients admitted to the Surgical Oncology Unit, Zagazig University Hospital, who were eligible for breast conserving therapy (BCT). A circumferential incision was made with preservation of the periareolar skin, followed by subcutaneous dissection through the entire breast. Postoperative patient satisfaction was evaluated using the Harvard scale. **Results:** the operative time ranged from 90 to 260 minutes, with a mean \pm SD of 138.1 \pm 52.7. About 58.3% of the patients showed no complications, while (27.8%) of the patients showed seroma and (13.9%) of the patients showed wound infection. Also 55.6% of the patients showed excellent results, (27.8%) showed good results, and (16.7%) showed fair results, while none of the patients showed poor results. About 83.3% of the patients were satisfied, while (16.7%) of the patients were not satisfied.

Conclusion: The MRBT is an oncoplastic technique suitable for the excision of breast tumors in different breast quadrants especially peripherally located tumors in patients with small to medium-sized breasts. It is oncologically safe and has fewer complications.

Keywords: Modified Round Block Technique, Management, Early Breast Cancer.

INTRODUCTION

Breast cancer management has progressed significantly from the traditional Halstead radical mastectomy to more conservative surgical approaches that offer equivalent oncological outcomes. Current strategies encompass modified radical surgical mastectomy with or without reconstructive procedures, breast-conserving surgery (BCS), and oncoplastic breast surgery. The contemporary approach prioritizes oncologic safety while reducing surgical morbidity and optimizing aesthetic outcomes⁽¹⁾. Breast-conserving therapy (BCT), supplemented by adjuvant radiotherapy, is now the gold standard for patients presenting with early-stage breast cancer⁽²⁾. This paradigm shift is attributed to advancements in primarily the understanding of tumor biology and breast cancer pathology. The combination of multimodal therapeutic approaches including loco-regional interventions like breast-conserving surgery and radiotherapy combined systemic with other therapies including endocrine chemotherapy aims therapy and to minimize postoperative morbidity with no compromise on the safety⁽³⁾. oncology Furthermore, neoadjuvant chemotherapy plays a pivotal role in the management of locally advanced or large tumors, enabling significant tumor downstaging. This approach increases the feasibility of breast conservation and enhances the likelihood of achieving negative surgical margins while maintaining acceptable local recurrence rates. In selected cases, it can render initially inoperable tumors amenable to surgical resection⁽⁴⁾.

The advent of oncoplastic techniques aims to restore the natural contour of the breast while concealing surgical scars, thus improving cosmetic outcomes⁽⁵⁾. Indeed, among such techniques, the round block technique (RBT) seems to have been introduced most persuasively by Louis Benelli in 1990, gaining fully embedding itself in the philosophy of oncoplastic breast surgery. This technique is highly beneficial to patients with moderate breast ptosis or hypertrophy. The modified round block technique (MRBT) adds further refinements, allowing the excision of breast tumors located more peripherally while providing a lesser degree of postoperative scarring⁽²⁾.

This study aimed to improve the oncological safety and cosmetic outcome in the surgical management of breast cancer by assessment of the feasibility of MRBT in management of breast cancer patients.

PATIENTS AND METHODS

This study was conducted on 72 female patients admitted to the Surgical Oncology Unit, Zagazig University Hospital, who were indicated for breast conservative surgery (BCS) and suitable for MRBT.

Inclusion criteria: Patient should be more than 18 years old and up to 60 years old with early stages of breast cancer (stages T1-2, N0-1, M0) and has no contraindication for breast conserving surgery.

Exclusion criteria: Patient with central retro-areolar breast mass or tumor located at or near the axilla or whom with contraindication for breast conserving surgery like Paget disease and mastitis carcinomatosis and late stages of the disease.

Preoperative Preparation

A comprehensive preoperative evaluation was conducted, beginning with a detailed history, which placed special emphasis on family history, existing medical comorbidities, and smoking habits. This was followed by a thorough clinical examination that included a general assessment to rule out metastatic disease, dermatological conditions, scars from previous surgeries, and other underlying medical issues. Additionally, a focused local examination was performed to determine the tumor's precise size and anatomical location, assess the condition of the breast skin, and evaluate the presence of any prior surgical scars. Particular attention was given to the relationship of the tumor or lumpectomy scar to the nipple-areola complex (NAC), as well as to a detailed examination of the contralateral breast, assessing its size, contour, degree of ptosis, and overall shape.

Radiological assessment of both breasts was an essential component of preoperative planning and typically included digital mammography and breast ultrasound. Breast MRI was performed selectively when further characterization was required. Laboratory investigations encompassed a complete blood count (CBC), fasting blood glucose, renal function tests (urea, creatinine), liver enzymes (serum glutamic oxaloacetic transaminase (SGOT), Serum glutamate pyruvate (SGPT), alkaline phosphatase), transaminase coagulation profile (prothrombin time and concentration), and protein levels (albumin, globulin, and A/G ratio). Additionally, an electrocardiogram (ECG) was obtained in patients younger than 40 years who had a history of cardiac conditions.

A definitive histopathological diagnosis was established through tissue sampling, either via fineneedle aspiration cytology (FNAC) or a core needle (trucut) biopsy. To rule out metastatic disease, appropriate imaging studies such as abdominal ultrasonography and/or computed tomography (CT) scans were performed. A chest radiograph was obtained, and when clinically indicated, advanced imaging such as a bone scan or positron emission tomography-computed tomography (PET-CT) was considered.

Patient Counseling and Decision-Making

Multidisciplinary team (MDT) discussions were held following the patient's admission, ensuring that all relevant clinical findings and diagnostic results were thoroughly reviewed. Patients were provided with a comprehensive explanation of the surgical procedure, alternative treatment options, and the overall therapeutic strategy. The patient's preferences played a crucial role in determining the most suitable surgical approach.

Surgical Technique (Figure 1)

The operation was performed with the patient supine and under general anesthesia. Circumferentially, a peri-areolar incision was made in the outer boundary of the areola, followed by broad subcutaneous dissection in all directions. In contrast to the classic round block method, this altered design sought to cover the entire breast and not just the tumor-bearing quadrant. Thus, distant tumors were more accessible while allowing the preservation of the peri-areolar skin, which lessens the likelihood of delayed scar widening or alterations in the shape and pigmentation of the areola.

Complete separation was performed for the nippleareola complex (NAC) from the surrounding skin while also ensuring that blood supply was maintained only via the underlying breast glandular tissue. Once the accurate localization of the tumor was established, a wide local excision was performed along with an adequate macroscopic safety margin. Attention was given to closing the wound meticulously and restoring the original areolar size by using nonabsorbable sutures, while in turn the skin and NAC were approximated utilizing continuous subcuticular absorbable sutures.

The axillary management was determined clinically for sentinel lymph node biopsy (SLNB) or axillary lymph node clearance (ALNC). Where ALNC was mandated, a skin crease incision was made just below the axillary hairline, beginning from the posterior margin of the pectoral fold and extending to the posterior axillary line. Systematic dissection was undertaken after the elevation of the skin flaps such that the pectoralis major muscle was exposed. Medial retraction of the muscle allowed for visualization of the pectoralis minor and clavipectoral fascia, while caution was taken to preserve the lateral pectoral nerve bundle; an incision was made through the clavipectoral fascia to gain access to axillary fat and nodal compartments. Surgical dissection progressed superiorly along the inferior border of the axillary vein toward the apex of the axilla, ensuring preservation of critical structures such as the long thoracic nerve, which innervates the serratus anterior muscle. Damage to this nerve could result in scapular winging. The intercostobrachial nerves were identified and preserved whenever possible, while minor tributaries of the axillary vein were ligated to facilitate visualization of the subscapular vessels and thoracodorsal nerve. The nodal and fatty tissues between the long thoracic nerve and subscapular vascular bundle were carefully dissected en bloc or separately if extensive nodal involvement was present.

The dissection extended toward the axillary apex to include level III nodes, facilitated by positioning the arm in a flexed posture at the shoulder. The axillary contents were then separated from the breast tail, allowing en bloc specimen excision. Surgical specimens were marked with orienting sutures to aid histopathological analysis, and axillary dissection typically yielded over 20 lymph nodes. The surgical field was irrigated with warm saline, hemostasis was ensured, and a suction drain was placed in both the axilla and breast surgical sites. Wound closure was achieved using interrupted subcutaneous sutures and either simple or subcuticular skin sutures, followed by wound dressing with Elastoplast.

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Fig. (1): (A): Upper outer quadrant breast mass. Fig. (B): Total circumferential periareolar incision. Fig. (C): Dissection via the incision in all directions and wide local excision of the tumor. Fig. (D): Wound is closed in the former areolar size with nonabsorbable sutures.

Postoperative Management

Close postoperative monitoring was focused on assessing the viability of the breast skin flap and ensuring adequate perfusion, with skin color and warmth evaluated at six-hour intervals for the initial 48 hours, then daily thereafter. Prophylactic antibiotic therapy with third-generation cephalosporins was initiated at the time of anesthesia induction and continued postoperatively based on patient status and procedural complexity, with courses ranging from 1 to 5 days or extended to 10 to 14 days if warranted.

Intravenous fluid therapy was administered to maintain hemodynamic stability until the patient resumed adequate oral intake. Surgical drains were closely monitored for signs of bleeding or fluid accumulation. Early ambulation was encouraged to promote recovery. The breast drain was typically removed within one to three weeks, but if premature removal resulted in seroma formation, weekly aspiration was performed until resolution, usually within two to three weeks.

Follow-Up and Outcome Assessment

All patients underwent structured follow-up for a mean duration of 10 months (ranging from 2 to 16 months) to monitor for complications and assess

cosmetic outcomes. Postoperative evaluations were scheduled biweekly following hospital discharge, with aesthetic outcomes systematically assessed at two, six, and twelve months postoperatively.

Assessment of the Outcome

The cosmetic outcome of the treated breast was retrospectively assessed by breast surgeons using the Harvard Scale, enabling direct comparison with the untreated contralateral breast. Additionally, patient satisfaction with the aesthetic outcome was evaluated based on multiple factors, including breast size, shape, scar appearance, symmetry, cleavage, nipple-areola complex aesthetics, overall body proportion and harmony, and tactile sensation. Based on these parameters, patients were classified as either satisfied or not satisfied with their cosmetic results.

All patients included in the study were followed up for a period ranging from one to two years postoperatively to monitor for any evidence of locoregional recurrence or distant failure. Surveillance imaging included annual mammography and sonography of the contralateral healthy breast, as well as sonography and MRI of the reconstructed breast.

Patients who underwent modified round block

technique (MRBT) were systematically evaluated based on various clinical and surgical parameters. These included demographic data, medical history, clinical presentation, and tumor characteristics. The specific distance of the tumor from the nipple-areola complex was documented, along with details of the operative time and any postoperative complications. Histopathological and hormonal profiles were analyzed postoperatively to guide further treatment planning.

Both the cosmetic and oncologic outcomes were comprehensively assessed. Cosmetic evaluation was performed jointly by the surgical team and the patients, ensuring a multidimensional perspective on aesthetic results. Oncologic outcomes were determined based on the incidence of local recurrence or distant metastasis during the follow-up period, providing an objective measure of surgical and oncologic success.

Ethical approval:

The Ethics Committee of the Zagazig Faculty of Medicine has given its approval to this investigation. Prior to proceeding, informed written consent was obtained to confirm the patient's understanding and agreement. Throughout its implementation, the study complied with the Helsinki Declaration.

Statistical analysis

The researcher coded, validated, and analyzed the data using IBM-SPSS Statistics for Windows, version 20.0. Quantitative data were shown as mean \pm SD, while qualitative data were given as frequencies and percentages.

RESULTS

Table (1) presents the distribution of the studied cases (n = 72) according to their preoperative evaluation. Regarding laterality, 55.6% (40 patients) were affected on the left. In terms of tumor location, the majority (72.2%) were found in the upper outer quadrant (UOQ).

Table (1) Data of the studied cases according to the preoperative evaluation. (n = 72)

Side	Right	32 (44.4%)
	Left	40 (55.6%)
Location	UOQ	52 (72.2%)
	LOQ	10 (13.9%)
	UIQ	10 (13.9%)
	LIQ	0 (0%)

Table (2) summarizes the distribution of cases according to their distance from the nipple-areola complex (NAC). The mean distance was 5.06 ± 1.5 cm. When categorized, most cases (58.3%, 42 patients) were within 3–5 cm from the NAC.

TABLE	(2)	Distance	from	NAC	(cm)	among	the
studied c	ases	(n = 72)					
TH							

Distance from	$Mean \pm SD$	5.06 ± 1.5
NAC	Range	(3 – 8)
	3 - 5 cm	42 (58.3%)
	5-8 cm	30 (41.7%)
	> 8 cm	0 (0%)

Table (3) outlines the operative time and specimen weight among the studied patients (n = 72). The mean operative time was 138.1 ± 52.7 minutes. Regarding the weight of the excised specimen, the mean value was 62.8 ± 16.8 grams.

Table (3): Operative time and weight of the specimen among the studied patients

Variables		All patients	
		(n=72)	
Operative	$Mean \pm SD$	138.1 ± 52.7	
time (minute)	Range	(90 – 260)	
Weight of	$Mean \pm SD$	62.8 ± 16.8	
specimen (gm)	Range	(40 – 100)	

Table (4) details the postoperative complications encountered among the studied patients. The majority of cases (58.3%, 42 patients) had no complications. However, 27.8% (20 patients) developed seroma.

Table (4): Con	plications among	the studied	patients
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Variables (n. %)		All patients (n=72)
Complications	None	42 (58.3%)
	Seroma	20 (27.8%)
	Wound infection	10 (13.9%)

Table (5) presents the **surgeon's aesthetic assessment** of the surgical outcomes among the studied patients (n = 72). The majority of cases, **55.6%** (40 patients), received an **excellent** rating.

Table (5): \$	Surgeon	aesthetic	assessment	among	the
studied pat	ients				

Variables (n. %)		All patients
		(n=72)
Aesthetic	Poor	0 (0%)
assessment	Fair	12 (16.7%)
	Good	20 (27.8%)
	Excellent	40 (55.6%)

Table (6) evaluates **patient satisfaction**, which is a critical component in assessing surgical success. Among the studied patients, **83.3%** (60 patients) reported being **satisfied** with their outcomes.

 Table 6: Patient satisfaction among the studied patients

Variables (n. %)		All patients (n=72)	
Patient	Not satisfied	12 (16.7%)	
Satisfaction	Satisfied	60 (83.3%)	



Fig. (2): Result after one year.

DISCUSSION

The surgical management of breast cancer has undergone significant advancements, transitioning from radical procedures toward approaches that achieve complete tumor excision while preserving normal parenchymal tissue. This evolution has led to reduced patient morbidity while ensuring equivalent oncologic safety. Consequently, aesthetic outcomes and overall quality of life for patients have substantially improved. A notable innovation aimed at further enhancing aesthetic outcomes is the development of oncoplastic surgery, which encompasses various reconstructive techniques to address partial mastectomy defects. These techniques include local tissue rearrangement, reconstruction via reduction mammoplasty or mastopexy, and the use of local-regional flaps ⁽⁶⁾.

The expanding body of literature on oncoplastic surgery outcomes has demonstrated multiple advantages, including superior aesthetic results, improved tumor margin control, high patient satisfaction, and an expanded candidacy for breastconserving surgery. This approach represents a paradigm shift in breast cancer surgery, integrating oncologic safety with enhanced cosmetic outcomes⁽⁶⁾.

The periareolar incision (PAI) is considered one of the most favorable surgical approaches in terms of minimizing scar formation. However, its application becomes challenging when accessing tumors located at a significant distance from the nipple-areola complex (NAC) or in cases where the areola is small in size. The round block technique (RBT) serves as an effective alternative, addressing the limitations of PAI by facilitating access to distant tumors while allowing for optimal breast contour restoration following tumor excision. This technique results in minimal scarring and enhances overall aesthetic outcomes, making it a valuable approach in oncoplastic breast surgery⁽⁷⁾.

In the round block technique (RBT), the dermis is incised only on the tumor-bearing side to preserve the vascular supply of the nipple-areola complex (NAC), which is maintained by dermal vessels from all directions. However, this technique presents challenges when addressing tumors located in the peripheral regions of the breast. Furthermore, excessive periareolar skin excision or de-epithelialization increases the risk of late-onset complications, including scar widening, areolar shape distortion, and breast asymmetry. To overcome these limitations, the modified round block technique (MRBT) was introduced as an advanced oncoplastic breastconserving surgery. This modification aims to enhance tumor accessibility while optimizing aesthetic outcomes. ensuring improved contour breast preservation and minimizing postoperative complications⁽⁸⁾.

In our study, 44.4% of tumors were located in the right breast and 55.6% in the left, with a predominant 72.2% situated in the upper outer quadrant (UOQ). This distribution is consistent with **Refaat** *et al.* ⁽⁹⁾, who also observed a majority of tumors in the UOQ, underscoring the commonality of this tumor location in breast cancer cases.

Our reported mean tumor distance from the NAC was 5.06 ± 1.5 cm, with 58.3% of cases within 3–5 cm and 41.7% within 5–8 cm. **Zaha** *et al.* ⁽¹⁰⁾ reported a median distance of 5.2 cm, closely aligning with your findings. **Refaat** *et al.* ⁽⁹⁾ noted a slightly greater median distance of 7 cm, indicating that MRBT can be effectively applied across a range of tumor proximities to the NAC.

The consistency in tumor location and NAC distance across these studies supports the adaptability of MRBT for tumors in various quadrants and at varying distances from the NAC. Both **Refaat** *et al.* ⁽⁹⁾ and **Zaha** *et al.* ⁽¹⁰⁾ demonstrated that MRBT facilitates effective tumor excision without compromising cosmetic outcomes, even for peripherally located tumors. our study's alignment with these findings reinforces

MRBT's utility in achieving favorable aesthetic and oncologic results in diverse patient populations

Our study corroborates the findings of **Refaat** *et al.* ⁽⁹⁾ and **Zaha** *et al.* ⁽¹⁰⁾ affirming the efficacy of MRBT in managing early-stage breast cancer with excellent cosmetic and oncologic outcomes.

We reported mean operative time of 138.1 ± 52.7 minutes, which is slightly longer than that reported by **Refaat** *et al.*⁽⁹⁾, who observed a mean operative time of 128.89 ± 42.07 minutes. This variation may be attributed to differences in surgical team experience, patient anatomy, or case complexity, In **Ogawa**⁽¹¹⁾ study the median operative time was 189.5 minutes

The mean excised specimen weight in our study was 62.8 ± 16.8 grams. **Zaha** *et al.* ⁽¹⁰⁾ reported a mean resected tumor volume of 30.2 ± 15.0 mL, which is somewhat lower than our findings. This discrepancy could result from variations in tumor size, breast size, or surgical technique.

In our study, 58.3% of patients experienced no complications, 27.8% developed seroma, and 13.9% had wound infections. **Refaat** *et al.* ⁽⁹⁾ reported a total complication rate of 11.1%, including seroma, wound dehiscence, and infection. The higher complication rates in our study may be due to factors such as patient comorbidities, surgical technique variations, or differences in postoperative care protocols.

In our study, 55.6% of cases were rated as excellent, 27.8% as good, and 16.7% as fair, with no poor ratings. This indicates a high level of surgical success in achieving desirable cosmetic results. Similarly, **Zaha** *et al.*⁽¹⁰⁾ reported satisfactory cosmetic outcomes with minimal scar formation and no subsequent changes in the shape or position of the areola following MRBT. Additionally, a retrospective review of 108 breast reconstructions using the round block technique found that the cosmetic score was 4.5 out of 5, indicating favorable aesthetic results. These findings collectively suggest that MRBT is effective in optimizing postoperative breast aesthetics⁽¹²⁾.

Our study reported an 83.3% patient satisfaction rate, with 16.7% expressing dissatisfaction. This high satisfaction rate aligns with findings from other studies. For instance, a single-center experience with the modified round block technique reported that 87% of patients rated their cosmetic outcomes as good, 6.1% as excellent, and 6.1% as fair. These consistent satisfaction rates across studies underscore the effectiveness of the modified round block technique in meeting patient expectations regarding cosmetic outcomes⁽¹³⁾.

Our study reported an 83.3% patient satisfaction rate, with 16.7% expressing dissatisfaction. **Refaat** *et al.* ⁽⁹⁾ similarly found high levels of patient satisfaction, with good to excellent outcomes reported in 88.8% of cases. These high satisfaction rates underscore the effectiveness of MRBT in meeting patient expectations regarding cosmetic outcomes.

The favorable aesthetic assessments and high patient satisfaction rates observed in our study, as well

as in those by **Refaat** *et al.* ⁽⁹⁾ and **Zaha** *et al.* ⁽¹⁰⁾, highlight the efficacy of MRBT in achieving desirable cosmetic outcomes. However, the presence of some patient dissatisfaction emphasizes the subjective nature of aesthetic perception and underscores the importance of thorough preoperative counseling. Aligning patient expectations with realistic outcomes is crucial for enhancing overall satisfaction.

Abdelwahab *et al.* ⁽¹⁴⁾ concluded that the modified round block technique (MRBT) yielded satisfactory cosmetic outcomes, high surgeon and patient satisfaction, and a low incidence of postoperative complications. Specifically, 90% of patients had excellent surgical outcomes, 85% reported excellent satisfaction, and complications such as skin retraction and breast fibrosis.

CONCLUSION

The MRBT is an oncoplastic technique suitable for the excision of breast tumors in different breast quadrants especially peripherally located tumors in patients with small to medium-sized breasts. It is oncologically safe and has fewer complications. When compared with RBT it has a shorter operative time and superior cosmetic outcomes and avoids the later onset widening of the NAC and change in the NAC position.

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