

Early outcomes of modified round block technique for the early stage of upper outer quadrant breast cancer

Original
Article

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ABSTRACT

Background: The standard treatment for early breast cancer is breast-conserving surgery. The primary objective of breast-conserving surgery is controlling cancer as effectively as mastectomy and achieving cosmetic results that are acceptable to patients. We aimed to evaluate the early outcomes of the modified round block technique (MRBT) for the early stage of upper outer quadrant breast cancer.

Patients and Methods: This cross-sectional study was conducted on 20 females undergoing MRBT surgery for early-stage upper outer quadrant breast cancer at the General Surgery Department at Benha University Hospital. All patients underwent thorough general and local examination via inspection, palpation, and examination of lymph nodes, routine laboratory investigation, and sonomammographic evaluation.

Results: The surgeons' assessment showed that 18 (90%) patients had excellent outcomes, and two (10%) patients had good outcomes. Concerning the patients' satisfaction, 17 (85%) patients had brilliant outcomes, and three (15%) patients had good outcomes. Eighteen (90%) cases showed good scar, two (10%) cases presented with fair scar, two (10%) cases showed areola enlargement, six (30%) presented with good symmetry, whereas 14 (70%) cases showed excellent symmetry, 18 (90%) cases presented with a defined and symmetrical inframammary fold, while two (10%) cases presented with a defined and asymmetrical inframammary fold. One (5%) patients had skin retraction and breast fibrosis, while it did not occur in 19 (95%) patients.

Conclusion: MRBT had obtained a satisfactory outcome of cosmetic, surgeon and satisfaction of patient, and less incidence of postoperative complications.

Key Words: Cancer of breast, early stage, outcomes, technique of modified round block.

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INTRODUCTION

Breast cancer is the most frequently occurring cancer in women and the leading cause of cancer-related deaths among women aged 20–60. It accounts for 23% of all cancer deaths in women^[1]. Breast-conserving surgery (BCS) is the typical approach for treating early-stage breast cancer. Its main objective is to manage the cancer as effectively as a mastectomy while also providing cosmetic outcomes that patients find satisfactory. Key factors that affect the cosmetic results include the size of the tissue removed, the location of the tumor, and the density of the breast tissue^[2,3].

Oncoplastic techniques can achieve excellent cosmetic results even after removing a significant amount of breast tissue. Various oncoplastic volume-displacement methods for partial mastectomy have been documented to effectively maintain appearance^[4]. Recently, a number of oncoplastic techniques have been developed to allow for the removal

of more breast tissue while still ensuring good cosmetic outcomes and reducing the likelihood of complications^[5].

The round block technique (RBT) is an oncoplastic method employed to remove breast lesions located around the areola, particularly effective for small to medium-sized breasts with moderate sagging^[6]. The RBT offers benefits such as a larger skin incision that provides better access to tumors while leaving a scar similar in length to that from a periareolar incision. However, this technique can lead to issues such as scar widening over time and changes in the shape of the areola^[7,8]. Zaha *et al.*^[9] showed that the modified round block technique (MRBT) has been developed to address these issues, particularly for women with small to medium-sized breasts.

We aimed to investigate and analyze early outcomes of the technique of modified round block for the early stage of upper outer quadrant breast cancer.

PATIENTS AND METHODS:

This cross-sectional study was conducted on 20 females undergoing the technique of modified round block surgery for upper outer quadrant breast cancer early stage at the General Surgery Department at Benha University Hospital. It was authorized by Benha University Hospital ethics committee for 1 year (from October 2023 to March 2024). Written informed consent was secured from all participants. The study was conducted in accordance with the 1964 Helsinki Declaration and its subsequent amendments.

Inclusion criteria were patients with the studied patients' mean age of 41.2±9.48 years surgically fit patients, and patients in the early stage of upper outer quadrant breast cancer (stages cT1–2, N0–1, ≤M0), with no or small intraductal component (≤25%) and with breast mass located at least 1.5 cm from the complex of nipple–areola complex (NAC) and underwent technique of modified round block surgery.

Exclusion criteria were patient with surgically unfit patients, patients in the stage more than cT2 N1 M0, large or central retro areolar breast mass in small breast (no cosmetic advantage), Paget's disease of the breast or mastitis carcinomatosa, large in-situ component (>25%) or multicentric disease, previous radiotherapy, and pregnancy.

Preoperative assessment

All patients were exposed to the detailed history assessment, menstrual history, lactational history, contraception, previous breast surgery, and/or breast radiation, chronic illness, and relevant family history. Complaints in the patient own words, like pain, swelling, nipple discharge, skin changes, and other systemic complaints related to lung, liver, and bone, was evaluated.

General examination, including vital signs, general appearance, head, neck, chest, abdominal, limbs, and back, and calculation of the BMI was performed. The local examination was based on triple assessment according to recent algorithms, which included both breasts, axillae, and supraclavicular lymph nodes was additionally performed.

All patients underwent inspection, palpation of the swelling and other relations like skin, breast tissue, muscles, and bones, and examination of the draining lymph nodes.

Investigations, including routine laboratory investigation (CBC, SGOT, SGPT, urea, creatinine, INR, PT, PTT, and virology; HCV antibodies, HBs) were conducted.

Radiological assessment

Sonographic examination for both breasts and axillae was performed. Determination of preoperative

surgical fitness was also performed. Ultrasonography is particularly useful in young women whose mammography is not helpful. MRI also detected the multifocality and multicentric of cancer to focus on the sample of our participant.

Biopsy

A true cut biopsy for preoperative assessment and a frozen section biopsy for intraoperative assessment were taken.

Surgical procedure

The patient underwent surgery while lying on their back with both arms raised to a 90° angle. General anesthesia was administered, and the chest and arm on the same side as the surgery were prepared. A sterile sleeve was placed on the arm to facilitate position adjustments during the procedure. As for MRBT, after the tumor resection margin was marked, a single periareolar incision was marked, then dissection down to the tissue subcutaneous in a circumferential manner along the NAC whole circumference, separating it from the surrounding skin, allowing better exposure of the breast tissue. The flap was raised at the same plane as mastectomy, exposing the breast tissue containing the tumor. The vascularity of the NAC is maintained through the underlying glandular tissue through the fourth and fifth intercostal vessels.

The tumor was excised down to the pectoral fascia in a wedge shape facing radially the NAC. The tumor margins were marked, and the specimen was sent for histopathology and marginal assessment using an intraoperative frozen section. In case of certain margin involvement, re-excision was done till reaching free margins. The bed of tumor was marked by clips for further radiotherapy guidance. After hemostasis, the breast parenchyma was approximated using dermo-glandular flaps, and the defect was closed with sutures of 2/0 Vicryl nonabsorbable PDS.

A closed suction drain was inserted. The skin was tightened with nonabsorbable PDS sutures in a purse-string fashion, acting as a cerclage to restore the areola to its original size. The skin and areola were then closed using either continuous subcuticular absorbable sutures or interrupted nonabsorbable sutures. For the axillary surgery, a separate incision was made for a sentinel lymph node biopsy. If the sentinel lymph node biopsy was positive, levels I and II axillary dissections were performed.

Intraoperative data such as total operative time, frozen section time, the weight of the specimens, and intraoperative bleeding, were evaluated. Data on hospital stay, overall postoperative complications, including both axillary and breast wounds, and short-term complications (during a 3-week postoperative period) were recorded for each patient. These complications included postoperative

hematoma, surgical site infection, flap necrosis (partial skin necrosis, nipple necrosis), axillary or breast seromas, wound dehiscence, and delayed wound healing. All patients received radiotherapy and adjuvant chemotherapy according to the stage and type of tumor as scheduled. All patients were evaluated for fat necrosis, cosmetic outcome, and symmetry completion of the radiotherapy course.

Patients follow up

For 6 months mean postoperatively, all patients were evaluated in terms of the breast scar appearance, the breast fibrosis presence and degree, breasts' asymmetry, and major deformities, including the inframammary fold appearance, the skin retraction presence and degree, and NAC position and shape. All patients were also evaluated in terms of reports of breast pain and the presence of lymphedema.

The cosmetic outcome was assessed by asking the patient herself to rate the result of surgery as regards breast symmetry, scarring, and degree of satisfaction using the Harvard four-point scale [excellent with score (four), good with score (three), fair with score (two), or poor with score (one)].

The esthetic outcomes of breast treatment are evaluated as follows: excellent if the treated breast closely resembles the untreated breast; good if the treated breast is slightly different from the untreated breast; fair if the treated breast is noticeably different but not severely distorted; and poor if the treated breast is significantly distorted. Surgeons assess the esthetic results based on factors such as size, shape, scar appearance, symmetry, cleavage, the look of the NAC, proportions, and texture.

Sample size

To estimate the sample size, we used OpenEpi program, Version 3 to calculate sample size for frequency in a population according to Mohsen and Marzouk^[10] in their study of the technique of round block cosmetic outcomes in the management of early stages of cancer of the breast, found that 10% of the population have bad cosmetic results. The sample size formulae used are as follows: so the sample size should be at least 18 patients, setting assurance interval at 95% and effect of design at one for a random sample, and we increased the sample size to 20 patients to overcome the loss of follow up. This sample was needed to detect early outcomes of MRBT for the early stage of upper outer quadrant breast cancer.

Statistical analysis

Statistical analysis was performed using SPSS, v28 (IBM Inc., Armonk, New York, USA). Quantitative data were reported as means with SD, while qualitative data were shown as frequencies and percentages (%).

Multivariate logistic regression was employed to evaluate the relationships among multiple independent variables. A *P* value of less than 0.05 was deemed significant.

RESULTS:

We included 20 females in our study, 13 (65%) patients were married, and seven (35%) patients were single. The BMI mean was 30.7 ± 3.92 kg/m². Concerning the associated comorbidities, nine (45%) patients had hypertension (HTN), five (25%) patients had diabetes mellitus (DM), and four (20%) patients had hyperlipidemia (Table 1).

The breast size was small in five (25%) patients, medium in nine (45%) patients, and large in six (30%) patients. The mean tumor size of the studied patients was 1.8 ± 0.5 cm. The tumor side was on the right upper outer quadrant in eight (40%) patients and was on the left upper outer quadrant in 12 (60%) patients. The tumor from NAC mean distance was 8.4 ± 1.87 cm and the NAC diameter mean change was 0.42 ± 0.21 cm. The radiological evaluation (T staging) revealed that 12 (60%) patients had T1 stage, and eight (40%) patients had T2 stage. The node positivity was N0 in 14 (70%) patients and N1 in six (30%) patients (Table 2).

Table 3 shows that the mean time of operation was 116.32 ± 56.32 min, the specimen mean weight was 69.5 ± 19.14 g, and the time of mean frozen section was 44.7 ± 5.63 min.

Regarding the postoperative complications, wound dehiscence occurred in one (5%) patient, and seroma occurred in three (15%) patients. Other postoperative complications were not observed in any patient in the current study (Table 4).

Concerning the patients' assessment, 17 (85%) patients had excellent outcomes, and three (15%) patients had good outcomes. The surgeons' assessment showed that 18 (90%) patients had excellent outcomes, and two (10%) patients had good outcomes (Table 5).

Six months postoperatively and after all the patients had completed their radiotherapy, their breast scars were evaluated according to their appearance; these ranged from good to poor, with fair value in between. A total of 18 (90%) patients showed good scars, two (10%) presented with fair scars. Two (10%) cases showed areola enlargement. The breast asymmetry and major deformities were also evaluated at the same time using a scale that ranged from excellent (no asymmetry) to poor (breast asymmetry with major deformities); fair results were indicated by breast asymmetry without major deformities, and good results were indicated by asymmetry with no deformities. In this study, we noted that six (30%) presented with good symmetry, whereas 14 (70%) showed excellent symmetry. Evaluation of the inframammary fold indicated that 18 (90%) patients presented with a symmetrical and defined

fold of inflammation, whereas two (10%) patients presented with an asymmetrical and defined fold of inflammation. Skin retraction and breast fibrosis were mild in one (5%) patient and did not occur in 19 (95%) patients (Table 6).

The analysis of multivariate logistic regression exposed that age, distance of the tumor from NAC, and DM were the only significant predictors for the quality of the scar. BMI, change in NAC diameter, operative time, HTN, breast size, node positivity, tumor size, and T staging were insignificant predictors for the quality of scar (Table 7).

The analysis of multivariate logistic regression exposed that the distance of the tumor from NAC and breast size were the only significant predictors of breast symmetry. Age, BMI, change in NAC diameter, operative time, HTN, DM, node positivity, tumor side, tumor size, and T staging were insignificant predictors for breast symmetry (Table 8, Fig. 1).

Table 1: Baseline characteristics of the studied patients

	Total (N=20)
Age (years)	41.2±9.48
Weight (kg)	84.0±11.34
Height (m)	1.7±0.03
BMI (kg/m ²)	30.7±3.92
Residence	
Urban	11 (55)
Rural	9 (45)
Educational status	
Illiterate	4 (20)
Literate	16 (80)
Marital status	
Married	13 (65)
Single	7 (35)
Comorbidities	
HTN	9 (45)
DM	5 (25)
Hyperlipidemia	4 (20)

Data presented as mean±SD or frequency (%).
DM, diabetes mellitus; HTN, hypertension.

Table 2: Clinical data of the studied patients

	Total (N=20)
Breast size	
Small	5 (25)
Medium	9 (45)
Large	6 (30)
Tumor size (cm)	1.8±0.5
Tumor side	
Right upper outer quadrant	8 (40)

Left upper outer quadrant	12 (60)
Distance of the tumor from NAC (cm)	8.4±1.87
Change in NAC diameter (cm)	0.42±0.21
Radiological evaluation (T staging)	
T1	12 (60)
T2	8 (40)
Node positivity	
N0	14 (70)
N1	6 (30)

Data presented as mean±SD or frequency (%).
NAC, nipple–areolar complex.

Table 3: Intraoperative and pathological data of the studied patients

	Total (N=20)
Intraoperative data	
Operative time (min)	116.32±26.23
Weight of specimen (g)	69.5±19.14
Frozen section time (min)	44.7±5.63

Data presented as mean±SD or frequency (%).

Table 4: Postoperative complications of the studied patients

	Total (N=20)
Postoperative complications	
Wound infection	0
Hematoma	0
Wound dehiscence	1 (5)
Seroma	3 (15)
Partial NAC necrosis	0
Impairment of nipple sensation	0
Fat necrosis	0
Local recurrence	0
Distant metastasis	0

Data presented as frequency (%).
NAC, nipple–areolar complex.

Table 5: Outcome of the studied patients

	Total (N=20)
Patients' satisfaction assessment	
Excellent	17 (85)
Good	3 (15)
Fair	0
Poor	0
Surgeons' assessment	
Excellent	18 (90)
Good	2 (10)
Fair	0
Poor	0

Data presented as frequency (%).

Table 6: Outcome after completion of the radiotherapy of the studied patients

	Total (N=20)
Scar	
Good scar	18 (90)
Fair scar	2 (10)
Areola enlargement	2 (10)
Breast symmetry	
Excellent symmetry	14 (70)
Good symmetry	6 (30)
Inframammary fold	
Defined and symmetrical	18 (90)
Defined and asymmetrical	2 (10)
Mild skin retraction and breast fibrosis	1 (5)

Data presented as frequency (%).

Table 7: Multivariate logistic regression for predictors of quality of scar

Variables	Odds ratio	P
Age	0.8493	0.039*
BMI	2.7148	0.952
Distance of the tumor from NAC	0.4348	0.044*
Change in NAC diameter	51.047	0.157
Operative time	1.1608	0.788
HTN	0.446	0.473
DM	0.0385	0.016*
Breast size	2.4246	0.415
Node positivity	3.4216	0.522
Tumor size	2.3785	0.307
T staging	0.4093	0.615

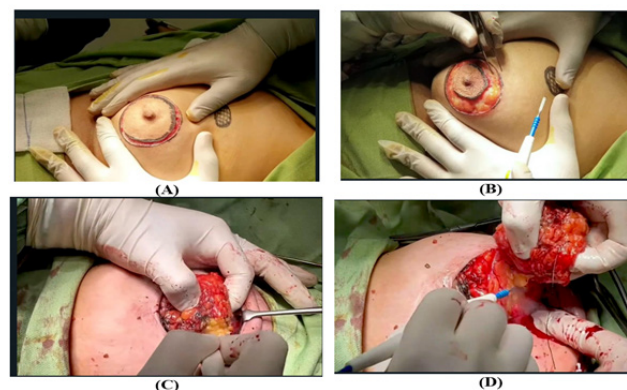
DM, diabetes mellitus; HTN, hypertension.

*Statistically significant as *P* value less than 0.05.

Table 8: Multivariate logistic regression for predictors of breast symmetry

Variables	Odds ratio	P
Age	0.0075	0.880
BMI	0.0025	0.981
Distance of the tumor from NAC	0.5408	0.038*
Change in NAC diameter	0.5637	0.756
Operative time	2.3988	0.699
Breast size	0.1695	0.035*
HTN	1.4308	0.756
DM	2.1380	0.591
Node positivity	0.2474	1.000
Tumor side	0.7565	0.186
Tumor size	0.0012	1.000
T staging	0.0003	0.780

DM, diabetes mellitus; HTN, hypertension.

**Fig. 1:** (a) Periareolar incision, (b) circumareolar periareolar dissection for better exposure of breast tissue, (c) excision of tumor tissue down to the pectoral fascia, (d) complete release of the tumor with the marking of the edges.

DISCUSSION

The technique of MRBT is an oncoplastic BCS designed to address the issues associated with the traditional RBT.

It was hypothesized that the MRBT is an oncoplastic method that allows for the removal of peripherally located breast tumors without the need to excise periareolar skin, making it suitable for tumors in all quadrants of the breast. This technique aims to minimize scarring and reduce the complications commonly associated with traditional BCSs^[11].

In the current study, we discovered that the studied patients' mean age was 41.2±9.48 years.

Mohsen and Marzouk^[10] studied 60 female patients diagnosed with cancer of breast early stages and found that the patients the mean age was 45.5±10.25 years.

In the present study, the most breast size was medium-sized breast, nine (45%) and was large-sized breast in six (30%) patients, and was small-sized breast in five (25%) patients.

Most of the patients in Mohsen *et al.*^[12] cohort had small to medium-sized breasts (80%). In the study by Zaha *et al.*^[9] included only patients with small to medium-sized breast, specifically those with an A or B cup size.

In Refaat *et al.*^[13] study, out of the patients, 12 (8.3%) had small breasts (cup A), 96 (66.7%) had moderate-sized breasts (cup B), and 36 (25%) had larger breasts (cup C). Tumors were located in all quadrants of the breasts, with a median distance of 7 cm from the nipple.

A previous study encountered early wound complications in 10 (16.66%) patients. Three (5%) of these patients developed postoperative hematoma; two were treated by aspiration, and one required reoperation. On the second day postoperatively, she also developed partial nipple necrosis and delayed wound healing later on. They found that two (3.3%) patients had other comorbidities (chronic liver disease and DM)^[10].

The duration of recorded mean operative in our study was 116.32±26.23 min, this may be in favor of the study by Ogawa *et al.*^[14] (mean operative time of 96 min) and with the study by Zaha *et al.*^[9], reporting a mean operative time of 130 min.

Regarding cosmetic outcomes, the patients' assessment revealed that 17 (85%) patients had excellent outcomes, and three (15%) patients had good outcomes. The surgeons' assessment showed that 18 (90%) patients had excellent outcomes, and two (10%) patients had good outcomes. A total of 18 (90%) patients showed good scars, and two (10%) presented with fair scars. Two (10%) cases showed areola enlargement. We noted that six (30%) presented with good symmetry, whereas 14 (70%) showed excellent symmetry, 18 (90%) patients presented with a defined and symmetrical inframammary fold, whereas two (10%) patients presented with an asymmetrical and defined fold of inflammation. Skin retraction and breast fibrosis were mild in one (5%) patients and did not occur in 19 (95%) patients. A previous study reported excellent and good results in 87.5 and 7.5% of cases, respectively^[12]. This approves with the results reported by Zaha *et al.*^[9] who stated excellent and good results in 65 and 10% of patients, respectively, but is highly comparable with the results reported by Ogawa *et al.*^[14], observing excellent and good results in 16.6 and 44.3% of patients, respectively.

Regarding the postoperative complications, wound dehiscence occurred in one (5%) patient, and seroma occurred in three (15%) patients. Other postoperative complications, including wound infection, hematoma, partial NAC necrosis, impairment of nipple sensation, fat necrosis, and distant metastasis, were not observed in any patient in the current study.

In the study by Zaha *et al.*^[9], they documented complications involving hematomas in three (7.5%) cases, all of which were treated conservatively.

In another study by Ogawa *et al.*^[14], they reported complications in five (27%) cases. A significantly higher rate of seroma was reported in the MRBT group, and this finding can be explained by the extensive subcutaneous dissection performed in the MRBT. Concerning complications, six patients in Mohsen

et al.^[12] study developed seroma formation comprising 15% of the total number of cases (two patients in the RBT group and four patients in the MRBT group).

In Mohsen *et al.*^[12] study, NAC necrosis were not reported in either group. This outcome is better and contradicts the study by Ogawa *et al.*^[14], in which 22% of cases developed partial necrosis of NAC and is in favor of the results by Zaha *et al.*^[9], reporting no cases with NAC necrosis.

Rafaat *et al.*^[13] reported a postoperative complication rate of 11.1%, which included seroma, wound dehiscence, infection, and hematoma. The increased incidence of seroma, especially in medium and large breasts, was likely due to extensive dissection. All complications were managed conservatively, with no need for additional surgery. Both this study and previous reports did not observe any cases of necrosis of the NAC.

However, Zaha *et al.*^[9] used the modified RBT to resolve the previous problems in BCS, especially for women with small-sized to medium-sized breasts, and Kim *et al.*^[15] conducted a retrospective study to introduce RBT without cerclage for patients with breast malignancy and to evaluate the results of oncological and cosmetic outcomes, their studies reported no cases of local recurrence among patients underwent MRBT. This may be attributed to the relatively long follow-up period (mean follow-up of 16 months and ranged between 12 and 23 months).

CONCLUSION

MRBT has achieved a satisfactory cosmetic outcome, patient and surgeon satisfaction, and less incidence of postoperative complications.

ABBREVIATION

BCS, breast-conserving surgery; **DM**, diabetes mellitus; **NAC**, nipple–areolar complex; **RBT**, round block technique.

CONFLICT OF INTEREST

There are no conflicts of interest.

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