



Article

CLASSIC VERSUS MODIFIED ROUND BLOCK MASTOPEXY IN BREAST CANCER PATIENTS

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Abstract: Objective: The objective of the current study is to compare between round block technique (RBT); also known as doughnut mastopexy or peri-areolar mastopexy and modified round block technique (MRBT) regarding operative time, oncological safety margin, cosmetic outcome and complications.

Methods: This prospective randomized controlled trial (RCT) study comprised 20 female patients with early stage breast cancer that were treated at KASR ALAINY teaching hospital - Faculty of Medicine, Cairo University, between October 2018 and February 2019. Patients were randomly divided into two groups (A&B) to compare the RBT with the MRBT. Operative time was calculated, oncological safety margin was determined by histopathological examination of the specimen, cosmetic outcome was assessed by two methods BCCT. core (breast cancer conservation treatment. cosmetic results) and BRA (breast retraction assessment). Moreover, post-operative complications were evaluated in the breast outpatient clinic during the follow-up period.

Results: MRBT showed better cosmetic outcome through assessment by BCCT. core (p-value 0.367) and BRA (p value= 0.03). Also, it showed shorter operative time than the RBT. The mean operative time was 89.75, 69.88 minutes in group A and B respectively. Regarding complications there was 1 reported case with post-operative seroma formation (8.4%) in group A (RBT), while there were 2 cases (25%) that developed seroma in group B (MRBT).

Conclusion: MRBT gives a better cosmetic results and shorter operative time than the RBT especially in peripherally located tumors and in small sized areolas.

Keywords: Round block technique (RBT), modified round block technique (MRBT), oncoplasty, breast cancer)

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1 INTRODUCTION

Breast-conserving surgery (BCS) is now considered the standard procedure used to treat breast cancer. That is because of the fact that BCS has equal survival rate as mastectomy, with the benefit of achieving acceptable cosmetic results. (1)

Sometimes it is not feasible to achieve good cosmetic results and that depends on tumor size, breast density and site of the tumor. That's why the idea of onco-plastic surgery (OPS) has been raised to the surface of BCS in order to achieve good results even after excision of large breast volume. (2)

Oncoplastic surgery (OPS) has emerged as a new approach to allow wide excision for BCS without compromising the natural shape of the breast. The choice of the oncoplastic technique depends on tumor size, NAC involvement, the breast volume and the degree of ptosis. (3)

Many oncoplastic techniques have been practiced in the past decade. The objective of the current study is to compare between round block technique (RBT); also known as doughnut mastopexy or peri-areolar mastopexy (4) and modified round block technique (MRBT) (5) regarding operative time, oncological safety margin, cosmetic outcome and complications.

2 PATIENTS AND METHODS

Participants:

This prospective randomized controlled trial (RCT) study comprised 20 female patients with early stage breast cancer that were treated at KASR ALAINY teaching hospital - Faculty of Medicine, Cairo University, between October 2018 and February 2019. Patients were randomly divided into two groups to compare the RBT with the MRBT. The study was approved by the hospital ethics committee.

All patients diagnosed as operable breast cancer (T1-2 N0-1 M0) were included in our study. Exclusion criteria encompassed locally advanced tumors, retro-areolar tumors and patients who have any contraindications for adjuvant radiotherapy.

Study interventions:

Preoperatively complete history, physical examination of both breasts and axillae was done including assessment of the size of the breast (cup size), the shape of the breast, previous operations (biopsies, previous surgery), systemic additional morbidity risks (diabetes mellitus, obesity, smoking habits, etc.).

Investigations including routine laboratory investigations, bilateral sono-mammography, MRI (when indicated) and metastatic work up were done. Histo-pathological diagnosis of cancer was made prior to surgery using core

needle biopsy followed by immunohistochemistry analysis. All cases were discussed in the weekly MDT meeting (multidisciplinary team) in KASR ALAINY.

In this study we used the simple randomization method to distribute cases (computer generated) into two groups: Group (A) included 12 patients who underwent round block technique (RBT) and Group (B) included 8 patients who underwent modified round block technique (MRBT).

Surgical procedure:



Fig. 1:Preoperative drawings in a patient who underwent RBT, the patient in supine position. The lines mark the partial resection area and the outer and inner incision lines.



Fig. 2:Preoperative drawings in a patient who underwent MRBT, the patient in supine position. The lines mark the partial resection area and circum-areolar incision line

The operation was done under general anesthesia with the patient in supine position with both arms abducted. In RBT, inner and outer incisions were made followed by de-epithelialization of the skin island between both incisions and the dermis is incised at the side of tumor location. Then the quadrant of breast tissue containing the target lesion was fully exposed utilizing the same plane for mastectomy (fig. 3). While in MRBT, a single peri-areolar incision is done. Dissection of the subcutaneous tissue all around separating the NAC from the surrounding skin flap (the blood supply still obtained from the underlying glandular base) (fig. 4). Excision of the mass in a wedge-shaped fashion directed radially towards the NAC, and then mobilization from the pectoralis fascia was done if needed. This was followed by closure of the defect using vicryl 2/0 or 3/0 sutures after adequate hemostasis (fig. 5).

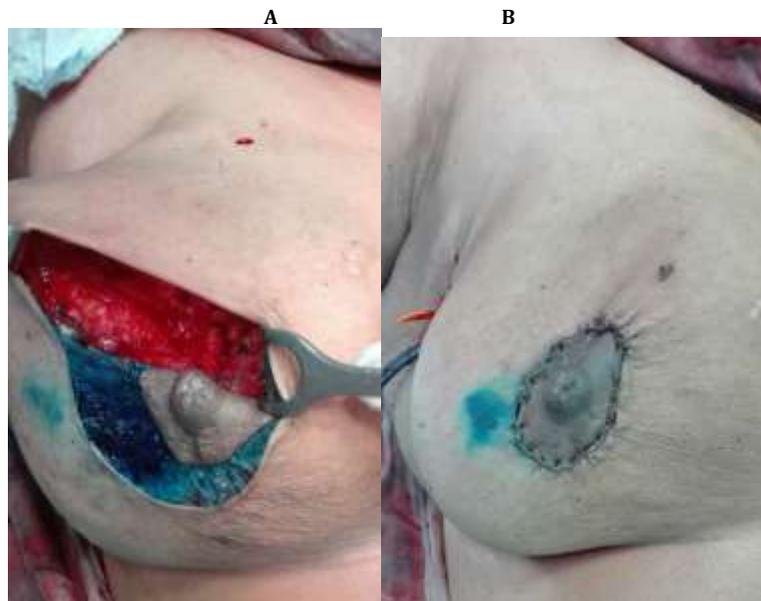


Fig. 3: A: De-epithelization of the peri-areolar skin with incision of the dermis towards the tumor site giving adequate exposure. **B:** immediate post-operative image after skin closure.



Fig. 4: The NAC is completely detached from the surrounding skin with subcutaneous dissection of the whole breast giving adequate exposure to the resection area.



Fig. 5: Immediate post-operative image showing the final appearance (the lateral incision was for the SLNB)

Assessment of cosmetic outcome: In the present study we have used objective evaluation of the cosmetic results using two methods.

A. Breast Cancer Conservation Treatment. cosmetic results (BCCT.core)

The BCCT.core (6) is an easy and accurate tool. Photographs are taken postoperatively (average one month). Then, the software takes the measurements and gives out the cosmetic score ranging from poor to excellent.

B. Breast Retraction Assessment (BRA)

Breast Retraction Assessment (BRA) is an objective evaluation of the amount of cosmetic retraction of the treated breast in comparison to the untreated breast in patients who receive conservative treatment for breast cancer. A clear acrylic sheet supported vertically and marked as a grid at 1 cm intervals is employed to perform the measurements (fig. 6). (7)

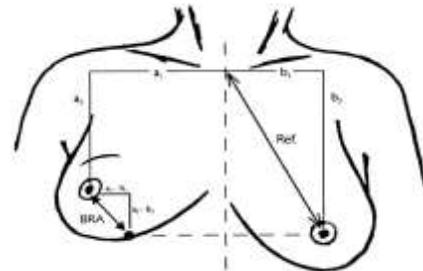


Fig. 6: Measurements taken to calculate the BRA (BRA = $\sqrt{(A_1 - B_1)^2 + (A_2 - B_2)^2}$)

Statistical methods:

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 25. Data was summarized using mean, standard deviation, median, minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons between quantitative variables were done using the non-parametric Mann-Whitney test. (8)

For comparing categorical data, Chi square (χ^2) test was performed. Exact test was used instead when the expected frequency is less than 5. (9) P-values less than 0.05 were considered as statistically significant.

3 RESULTS:

The characteristics of the 20 patients are shown in table 1. The median age was 50 years old. The breast size was small to medium sized in 14 patients (70%), while 6 cases had a large sized breast (30%). The tumor was located in the upper outer quadrant in 9 cases (45%), upper central quadrant in 9 cases (45%) and lower outer quadrant in 2 cases (10%). Recorded complications included 3 cases with seroma formation (15%) that were treated conservatively. No recorded cases with necrosis of the NAC. There is one case with positive surgical margin (group A, RBT) (5%) and needed re-excision. The postoperative cosmetic result as evaluated by BCCT was excellent in 2/20 patients (10%), good in 10/20 patients

(50%), fair in 7/20 patients (35%) and poor in 1/20 (5%). The median breast retraction was 3.5 cm.

Table 1: Patient characteristics and operative data.

Number of patients	20
Age	50 (35-61) ^x
Areolar diameter (cm)	5 (3-10) ^x
Tumor size (cm)	2.3 (1.4-3.5) ^x
Nipple-tumor distance (cm)	3 (2-7) ^x
Operative time (min.)	79 (55-120) ^x
Co-morbidities	
Hypertension	2
D.M	2
Both	1
Breast size	
Small	2
Medium	12
Large	6
Tumor location	
Lower outer	2
Upper central	9
Upper outer	9
TNM staging	
T1N0M0	5
T1N1M0	2
T2N0M0	5
T2N1M0	8
Breast density	
ACR A	4
ACR B	10
ACR C	4
ACR D	2
Complications	3 (15%)
Positive margin	1 (5%)

^x Values are median (range).

Cosmetic results evaluated by BCCT.core in both groups showed better results with group B (MRBT), however the result was statistically insignificant (p-value 0.367) (fig. 7). Cosmetic results evaluated by BRA in both groups showed significantly better results with group B (MRBT) (P value = 0.012) (fig. 8). The mean postoperative change in areolar diameter was significantly less in group B relative to group A (0.25, 1.17 cm) respectively (p value= 0.03) (fig. 9). Regarding complications there was 1 reported case with post-operative seroma formation (8.4%) in group A (RBT), while there were 2 cases (25%) that developed seroma in group B (MRBT). Moreover, Comparison between both groups regarding operative time showed significantly less operative time in group B (p value = 0.016). The mean operative time was 89.75, 69.88 minutes in group A and B respectively.

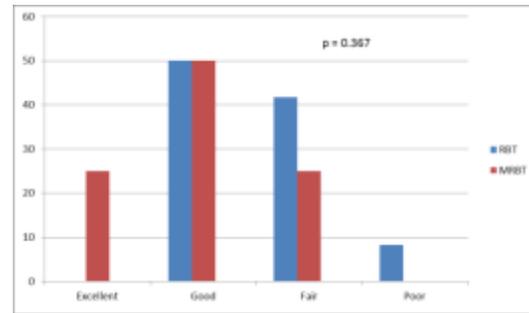


Fig. 7: Comparison between both groups regarding cosmetic outcome evaluated by BCCT.core.

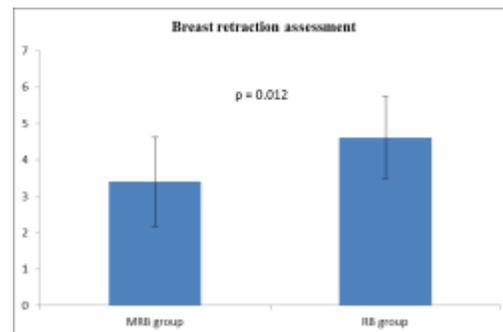


Fig. 8: Group B (MRBT) showed significantly less breast retraction (p-value 0.012).

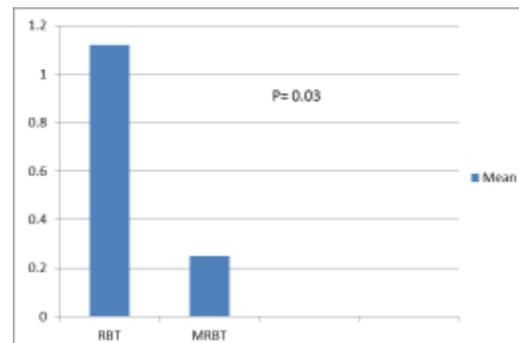


Fig. 9: Mean difference in areolar diameter after surgery in both groups.

Post-operative photographs



Fig. 10: Photographs taken 4 months after surgery for a case underwent RBT (Group A). Excision volume was 10%. (BCCT.core. gave good results and BRA was 4.3 cm).



Fig. 11: Photographs taken 2 weeks after surgery for a case underwent RBT (Group A). Excision volume was 20%. (BCCT.core. gave good results and BRA was 2.5 cm).



Fig. 12: Photographs taken 3 months after surgery for a case underwent MRBT (Group B). Excision volume was 20%. (BCCT.core. gave excellent results and BRA was 1.5 cm).



Fig. 13: Photographs taken 3 weeks after surgery for a case underwent MRBT (Group B). Excision volume was 20%. (BCCT.core. gave good results and BRA was 2.7 cm).



Fig. 14: Photographs taken before surgery (A) and 2 months after surgery (B) for a case underwent MRBT (Group B). Excision volume was 10%. (BCCT.core. gave excellent results and BRA was 2.0 cm).

4 DISCUSSION

In BCS, there are many factors that have a negative impact on the cosmetic outcome like the large tumor size, tumors located in the inner quadrant (bird's beak deformity in tumors located in the LIQ), small breast size and large incisions. In RBT and MRBT, we use the peri-areolar incision (PAI) which is an optimal incision that gives good aesthetic results. However, PAI becomes challenging in peripherally located tumors and in patients with small areolar diameter. MRBT has the advantage of giving a proper exposure through subcutaneous dissection of the whole breast hence tumors located far from the NAC can be easily excised. Late onset widening of the scar along with change of the shape and position of the areola are disadvantages of the RBT. Excision of the peri-areolar skin can cause such problems. In MRBT, the peri-areolar skin is preserved that's why scar widening doesn't usually occur. The objective of the current study was to compare between RBT and MRBT regarding operative time, cosmetic outcome and complications.

In this study, the mean age was 48.05 years which is similar to Kim et al. (49.6 years) (10). But it was less than the mean age in the study of Zaha et al. as the mean age was 54 years (5), while in Ogawa et al. the mean age was 57.2 years (11). The breast size in this study was small to medium sized in 70% of cases which is comparable with Ogawa et al. as 80% of the cases had small to medium sized breast (11). The mean tumor diameter in this study was 2.31 ± 0.56 cm, which is more or less similar to what has been reported by Zaha et al. being 2.2 cm (5). In Kim et al., the mean size of tumors was 1.7 cm (10). The mean operative time in our study was 81.8 ± 18.41 minutes which is similar to Ogawa et al. (96.5 minutes) (11). But in Zaha et al. the mean operative time was 130 minutes (5). Regarding complications in our presented study, there were 3 cases (15%) that developed seroma formation and managed conservatively while in Zaha et al., 3 cases (7.5%) developed hematoma and were also managed conservatively (5). While in Ogawa et al., there were 5 reported cases with complications (27%) (11). Positive post-operative margin was found in 1 case (5%) while in Zaha et al. the positive margin was found in 5 cases (12.5%). (5)

Regarding cosmetic outcome; the results in our study were excellent & good in 10% & 50% of the patients respectively which are more or less similar to Ogawa et al. who achieved excellent & good in 16.7% & 44.4% of patients respectively (11). On the other hand, fair & poor results were observed in 35% & 5% of patients respectively which are close to the results of Ogawa et al. (27.8% & 11.1%) respectively (11). In cases with poor cosmetic outcome, the excision volume was 40%. Therefore, those cases would benefit more from other volume displacement techniques. The similarities of results between different studies might be explained by the fact that the technique was unified among different surgeons.

In the current study, no episodes of local recurrence or systemic metastasis were reported which agreed with both Zaha et al. and Kim et al. (5) (10). A limitation to this result is the relatively small number of patients in addition to the short follow up period (3 months).

Cosmetic outcome assessment by BRA showed significantly better results with MRBT (mean BRA=3.4 cm) than with RBT (mean BRA=4.6 cm) (p -value=0.012). The MRBT also showed minimal change of areolar diameter postoperatively (average 0.25 cm). While in RBT, the average difference in areolar diameter was 1.17 cm and this result was statistically significant (p -value 0.03). The advantage of MRBT over the RBT regarding BRA and change of areolar diameter is because the peri-areolar skin is not excised and that prevents late onset scar widening and change of areolar diameter and position.

Regarding the operative time, it was significantly less in MRBT than RBT (69.88 & 89.75 minutes) respectively (P -value 0.01). This is explained by the better exposure and the easy accessibility to the mass in MRBT due to extensive mobilization which makes it easy to excise the mass with safety margin.

Moreover, comparison between both techniques regarding complications showed that 8.4% of the cases in group A (RBT) developed seroma while in group B (MRBT), 25% of the cases developed seroma. This was referred to the extensive subcutaneous dissection that was done in the MRBT.

There were no reported cases of NAC necrosis in either group. This result is better than Ogawa et al. (22% of



cases developed partial NAC necrosis) (11) and similar to Zaha et al. (0% cases with NAC necrosis). (5)

5 Conclusion:

BCS is affected negatively by many factors like large tumors, small breast, medially located tumors and large incisions. PAI is an optimal incision with good cosmetic results. However, it is difficult to excise peripherally located tumors through PAI. Scar widening and change of areolar diameter and position are common problems that happen after RBT. MRBT is a new technique that gives a better cosmetic results and shorter operative time than the RBT especially in peripheral tumors and small sized areola. When the excision volume is more than 30%, other volume displacement techniques would be useful. Both RBT and MRBT are useful procedures in performing BCS in cases whose excision volume is up to 20% with small to medium sized dense glandular breasts that can be mobilized easily.

6 ABBREVIATIONS:

- RBT (round block technique)
- MRBT (modified round block technique)
- BCS (breast-conserving surgery)
- RCT (randomized controlled trial)
- BCCT.core(breast cancer conservation treatment cosmetic results)
- BRA (breast retraction assessment)
- OPS (onco-plastic surgery)
- SPSS (Statistical Package for the Social Sciences)
- PAI (peri-areolar incision)

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Conflict of interest:

Authors declare that they have no conflict of interest.

Ethical approval:

Approval was given by the Ethical Committee for Researches of General Surgery Department, Cairo University Hospital and the Research committee of Faculty of medicine, Cairo University.

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