



Evaluation of Breast Cancer Conservation Surgery Using the Round Block Mammoplasty

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Abstract

Introduction: Breast conservative surgery has become a well-established alternative to mastectomy in the treatment of breast cancer. However, in case of larger lesions or small-sized breasts, the removal of adequate volumes of breast tissue to achieve tumor-free resection margins may compromise the cosmetic outcome. Oncoplastic techniques have been introduced in recent years to optimize the efficacy of conservative surgery in terms of both local control and cosmetic results.

Patients and methods: A single arm randomized prospective study, conducted on thirty female patients presenting with operable early stage breast cancer that were managed and treated using the “round block” technique, at the surgical oncology unit at Tanta University Hospital during the period from August 2020 to September 2021.

Aim of the Work: The aim of this study was to evaluate the surgical and oncological results of donut mastopexy and to review its complications and cosmetic results.

Results: Ages of patients ranged from 29 to 65 years with a mean age 50.4 ± 9.2 . Safety margin was achieved in 26 patients (86.7%), while the deep margin was infiltrated with malignant cells in 4 (13.3%) patients. Minor complications occurred in 8 patients (28.7%); three cases (10%) had seroma. two cases suffered wound infection (6.7%). Dehiscence occurred in two cases (6.7%) and one case (3.3%) was complicated by hypo-pigmentation around the incision. Cosmetic outcome was evaluated 6 months post operatively both subjectively and objectively by the operating surgeons according to ABNSW Scale. Mean follow up period was 12.5 months ranging from 6 to 18 months. No local recurrence or distant metastasis was detected in any of the cases during the study and follow up period.

Conclusion: donut mastopexy is an easily adaptable technique and provides good exposure for a safe oncological excision. The surgical and oncological outcomes are good.

Keywords: Breast cancer, conservative surgery, oncoplastic techniques, round block technique

Introduction

Breast-conserving surgery (BCS) with radiation therapy and chemotherapy is the gold standard for early breast cancer treatment [1,2]. Many studies have demonstrated that BCS is comparable to total mastectomy in terms of the local recurrence rate and overall survival [3,4]. Furthermore, BCS is superior to total mastectomy in terms of both the efficacy of oncologic treatment and the psychological consequences of treatment [5]. However, complications such as depression, contraction deformity, seroma, hematoma, and infection are relatively common in BCS when a relatively large amount of tissue is excised [6,7]. Oncoplastic surgery (OS) combines oncological

principles with plastic surgical techniques to improve breast cancer outcomes and cosmesis [8]. In recent years, several oncoplastic approaches have been implemented to increase the maximum amount of tissue that can be resected, while still achieving favourable cosmetic results and minimizing the risk of complications. In particular, the round block technique, which is a volume displacement technique used for oncoplastic surgery, involves glandular tissue re-arrangement [9]. The round block mammoplasty (RBM) described by Benelli is a volume displacement technique commonly advocated for small to medium breast size without significant ptosis [10]. The advantages of this technique include the lack of donor site

morbidity and an inconspicuous postoperative scar, which has a periareolar location [9]. Furthermore, the round block technique is generally applicable when the tumour is located superiorly or close to the nipple [11,12]. There are only a few contraindications that depend on breast size and tumour location; very large breasts and peripheral tumour location, centrally located breast tumours, tumour size more than 70% of one quadrant or multicentric or large multifocal disease in which cases real quadrantectomy or even biquadrantectomy may be indicated [13].

This study aimed to evaluate the surgical and oncological results of the round block technique and to review its complications and cosmetic results during the study period.

Patients and methods

This study was conducted prospectively on 30 female patients presented with early-stage breast cancer that were managed and treated at the surgical oncology unit at Tanta University Hospital during the period from August 2020 to September 2021.

Inclusion criteria

All patients presented & diagnosed to have early breast cancer stage I and II, Tumors within 4 cm from nipple and areola complex that can be managed by conservative breast surgery. Exclusion Criteria; multicentric cancers, tumour invasion of chest wall and skin, metastatic breast cancer, breast lumps larger than 5 cm, and lumps far away from areola more than 4 cm, Central tumours that involve nipple and areola complex. All patients were subjected to the following: pre-operative workup including explanation and informed consent before admission including consent for medical photography. Full history and clinical examination: local and systemic that includes breast examination, mass examination (site, size, number, consistency, skin overlying and mobility), nipple and areola examination, and axillary examination. Investigations included routine laboratory workup: complete blood count, liver function tests, virology, renal function tests, fasting and postprandial blood glucose level and coagulation profile. Imaging studies included bilateral breast ultrasound, mammogram, chest x-ray and abdominal and pelvic ultrasound. tru-cut biopsy was done on all patients to confirm the diagnosis. Cardiac, chest and anaesthetic consultations were also done. The procedure was performed under general anaesthesia. The patient was positioned on the operating room table in a supine position and the arm of the operative side was abducted at the right angle on an arm board. The surgical area was disinfected by application of 10% povidone-iodine.

Operative Techniques

Informed consent was obtained for each patient and the study was undertaken as per the hospital clinical and ethical guidelines. Outer and inner circumareolar incision lines are marked, (Figure 1) area in-between to be de-epithelialized, 1-2 cm distance

between inner and outer incision line depending on tumour size, location, and nipple position, (Figure 2). Cut through the dermis at the side of the tumour location. Lift and undermine the skin to free the breast parenchyma from the skin above the tumour and at least 5 cm laterally and medially from the tumour and up to the upper end of the breast to have a good exposure. After dissecting the breast parenchyma and the lump with the tumour from the skin, the lump is lifted with the pectoralis fascia and elevated outside the skin envelope to optimize palpable control during a lumpectomy, (Figure 3). After resection of the tumour with a macroscopic margin of at least 1 cm of normal tissue, the defect was closed by approaching the lateral parenchyma with sutures (2\0 vicryl). Mobilize the lateral breast tissue by undermining above the pectoralis fascia and between the skin and breast parenchyma, (Figure 4). Close the dermis with interrupted single stitches using absorbable 2/0 and the epidermis with running absorbable 3/0, (Figure 5). Labelling of the specimen by stitching of strings of various sizes and styles was done and then the specimen was sent for a frozen section examination to determine the surgical margins of the tumour and also to confirm the diagnosis. A separate axillary incision was used to dissect lymph nodes in patients with invasive carcinoma. Two tube drains (one for the breast(in some cases) and the other for



Figure 1. Preoperative marking of skin incisions and tumor site.



Figure 2. Skin de-epithelialized between the two concentric circum-areolar incisions.



Figure 3. The tumor delivered through the wound after being completely dissected with visible macroscopic safety margins.

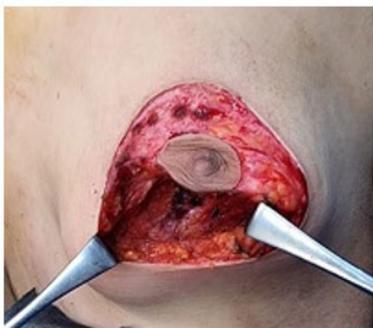


Figure 4. The resulted cavity after tumor excision with safety margin.



Figure 5. Wound being closed in layers with no drains.

the axilla(in all cases)) were inserted before the skin closure and the drains were removed when the output was equal to or less than 30 mL per day. In the case of a higher amount of drainage, the drain was removed after a period of 7 days, irrespective of its output, to prevent surgical site infection.

The excised specimen containing tumour and LNs were sent for histopathology including ER, PR, and KI 67 and Her's-

2-neu receptors.

Post-operative follow-up

Patients were all followed up at the surgical OPD for both oncologic and cosmetic grading and were referred to the medical oncology department to receive suitable adjuvant chemo and or radiotherapy according to the final pathology report. The first dressing was scheduled on the 3rd postoperative day, mainly reviewing surgical incision, local hygiene, hematomas, dehiscence, seroma, or wound infection.

The cosmetic result was objectively assessed by two of the authors after 4 months and scored using the ABNSW system (9). Five elements are included in the ABNSW: asymmetry (A), breast shape (B), deformation of the nipple (N), skin condition (S) and wound scar (W). The score is graded as follows in each category: 3-excellent: there was no obvious difference between the breasts at first sight; 2-good: there were few differences between the bilateral breasts, and these were only noticeable from close observation.; 1-fair: there were obvious marked differences between the bilateral breasts; 0 poor: there were substantial, ugly differences between the bilateral breasts. We scored all five items from 0 to 3 to produce the total score. The cosmetic outcome was regarded as excellent when the total score was 15 points, good when it was 11 to 14, fair when it was 6 to 10 and poor when it was 0 to 5.

Patients were also asked to rate their degree of satisfaction stating how they are happy with the breast shape after surgery (good, fair, or poor).

Results

(Tables 1-6).

The ages of patients ranged from 29 to 65 years with a mean age of 50.4 ± 9.2 .

Preoperatively, every patient was subjected to full history taking with special emphasis on co-morbidities and risk factors. Seven patients had different co-morbidities; diabetes, hypertension and ischemic heart disease were found in 2 (6.7%) patients for each and only one case (3.3%) suffered liver cirrhosis. Median Tumor size was 26 mm and the range was 10-47 mm.

An intraoperative frozen section was performed for all excised specimens for every patient. Safety margin was achieved in 26 patients (86.7%), while the deep margin was infiltrated

Table 1. Demographic characteristics of the studied group.

Item	Value
Age (years)	
Range	29-65
Mean \pm SD	50.4 \pm 9.2
Comorbidity	
-Diabetes mellitus	2 (6.7%)
-Hypertension	2 (6.7%)
-ischemic heart disease	2 (6.7%)
-liver cirrhosis	1 (3.3%)

Table 2. Tumour and pathological characteristics of the study population.

Item	Value
Tumour size	
Tumour size, median (range)	26 mm (10- 47 mm)
Tumour side	
-left	18 (60%)
-right	12 (40%)
Tumour Location	
Lower inner	1 (3.3%)
Lower outer	8 (26.7%)
Upper inner	6 (20%)
Upper outer	15 (50%)
Pathological type	
- Infiltrating ductal carcinoma	23 (76.7%)
- Infiltrating lobular carcinoma	2 (6.7%)
- DCIS	5 (16.6%)
Positive margins patients	4 (13.3%)
Operative time	
Minimum	45 minutes
Maximum	100 minutes
Mean \pm SD	67 \pm 12.25 minutes

Table 3. Complications among the studied cases.

Item	Value
Seroma	3 (10%)
Dehiscence	2 (6.7%)
Infection	2 (6.7%)
Nipple necrosis	0 (0%)
Hematoma	0 (0%)
hypopigmentation	1 (3.3%)

Table 4. Follow up period of the studied cases.

Item	Value
Follow up period	
Range	6-18 months
mean	12.5 months

Table 5. Cosmetic outcome according to ABNSW scale [14].

Cosmetic outcome	Value
Excellent	3 (10%)
Good	24 (80%)
Fair	3 (10%)
Poor	0 (0%)

Table 6. Patient satisfaction according to modified calabrese scale [15].

Patient satisfaction	Value
Good	24 (80%)
Fair	6 (20%)
Poor	0 (0%)

with malignant cells in 4 (13.3%) patients and free margins were achieved for these patients after re-excision of margins and none of the cases needed a mastectomy.

The final histopathological results of the resected specimens of the studied patients revealed infiltrating ductal carcinoma in 23 (76.7%) patients and infiltrating lobular carcinoma in 2 (6.7%) patients while DCIS was found in 5 (16.6%) patients.

The mean operative time was 67 \pm 12.25 minutes, with a minimum of 45 minutes and a maximum of 100 minutes.

Minor complications occurred in 8 patients (26.7%); three cases (10%) were complicated with breast seroma that was detected clinically during the follow-up visits and was spontaneously resolved over time and needed no surgical intervention. Wound infection occurred in two cases (6.7%) and was simply resolved by antibiotics and repeated dressings. Dehiscence, (Figure 9) occurred in two cases (6.7%) and was managed conservatively. One case complained of hypopigmentation around the incision, (Figure 8). No breast hematoma or nipple necrosis was encountered in any of our cases.

Cosmetic outcome was evaluated 6 months postoperatively objectively by the operating surgeons according to ABNSW Scale. The result was excellent in 3 patients (10%) of the cases; (Figure 6) the good result was noted in 24 patients (80%) of the cases, (Figure 7) while the result was fair in 3 patients (10%) of the cases.



Figure 6. Post -operative case with excellent result.

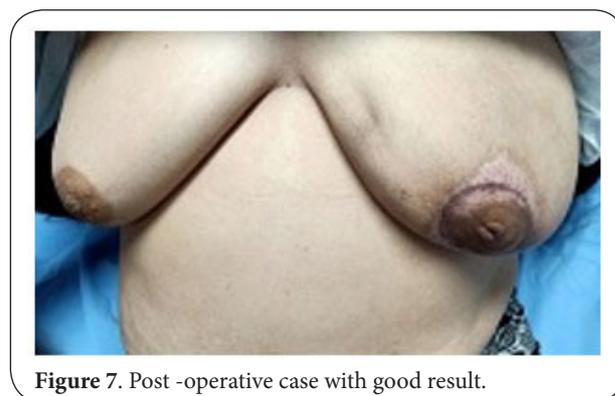


Figure 7. Post -operative case with good result.



Figure 8. Post -operative case with hypo pigmented scar.



Figure 9. Post -operative case with minor dehiscence and superficial wound infection.

All patients were asked to rate their degree of satisfaction. In 24 patients (80%) of the cases, the rate was good, and only 6 cases were rated fair (20%).

None of the patients wished to undergo contralateral breast surgery for symmetrization.

The mean follow up period was 12.5 months ranging from 6 to 18 months. No local recurrence or distant metastasis was detected in any of the cases during the study and follow up period, although this is not the main aim of the study, all patients are still and will be followed up for longer periods according to the standard guidelines for the oncologic safety.

Discussion

Breast cancer is the most common site-specific cancer in women and is the leading cause of death from cancer for women aged 20-59 years. It accounts for 26% of all newly diagnosed cancers in females and is responsible for 15% of cancer-related deaths in women [16]. Oncoplastic breast surgery is based on three basic principles: ideal breast cancer surgery with wider excisions, immediate breast reconstruction, and immediate symmetry of the other breast whenever necessary. This is achieved through several techniques based on tumour location, characteristics of the breast, volume of mammary resection, and clinical evaluation of the patient into volume displacement and volume replacement procedures. The volume displacement techniques use the remaining breast tissue, while the second, the volume replacement technique, uses other autologous tissue to supplement the insufficient breast tissue [17].

In the present study, we found that the mean age was 50.4 ± 9.2 and range 29-65 years and this is similar to the results reported by Seok [18] et al in which the mean age was 50.6 years and (range, 25-68 years), while Samy A. AbdIRhman, et al., [19] reported that the mean age was 46 with 50% cases falling between 42 and 58 years. Bhargava et al, [20] reported in their study mean age of 42.1 years (range 25-77 years) and Burrah et al [21] reported that the median age was 61 years (range 29-90 years). Mahmoud et al [22] reported that the age of the patients varied from 20 and 60 years old and the mean age was 45.7.

In the present study, seven patients had different co-morbidities; diabetes, hypertension and ischemic heart disease were found in 2 (6.7%) patients for each and only one case (3.3%) suffered liver cirrhosis. Samy A. AbdIRhman, et al., [19] reported in his work that 3 patients (15%) have hypertension, 1 patient(5%) has diabetes mellitus, and one patient(5%) has ischemic heart disease. Mahmoud et al [22] reported in his study that 1 patient (4%) had diabetes mellitus, 1 Patient (4%) had hypertension and 1 patient (4%) had ischemic heart disease.

In the present study, the median Tumor size was 26 mm and the range was 10-47 mm. This result was similar to Samy A. AbdIRhman, et al., [19] who reported in his work that the smallest tumour size was 1.4 cm, the largest one was 5cm and the mean tumour size was 3.4cms. Bhargava et al, [20] reported in their study that the mean tumour size at the time of surgery was 2.53cm (range 0.5–4.5cm) in the breast cancer group. Burrah et al [21] reported that the median tumour size was 18mm and range 1-70mm. Mahmoud et al [22] reported that the smallest tumour size was 1 cm, The largest one was 3.6cms and the mean tumour size was 1.8 cms. Akram et al [23] reported that the mean tumour size was 3.2 ± 1.1912 cm. In the present study, an intraoperative frozen section was performed for all excised specimens for every patient. Safety margin was achieved in 26 patients (86.7%), while the deep margin was infiltrated with malignant cells in 4 (13.3%) patients

and free margins were achieved for these patients after re-excision of margins and none of the cases needed a mastectomy. Samy A. AbdIRhman, et al., [19] found that all of their patients had clear margins in frozen sections taken during the operations and postoperative paraffin section results whereas, Bhargava et al, [20] reported that adequate resection with negative margins was achieved in all cancer patients and no patient needed re-excision. While Burrah et al [21] reported that forty patients (14.8%) had positive margins. Of these patients, 24 underwent re-excision of margins and 14 had completion mastectomy due to extensive disease. Two patients did not undergo any further surgery. In the 31 patients of invasive cancer with positive margins, 23 (74%) had associated DCIS. Nine out of 33 (27%) patients with DCIS had positive margins.

In the present study, the final histopathological results of the resected specimens of the studied patients revealed infiltrating ductal carcinoma in 23 (76.7%) patients and infiltrating lobular carcinoma in 2 (6.7%) patients while DCIS was found in 5 (16.6%) patients. Seok [18] et al reported that Invasive ductal carcinoma was found in 88 patients (81.5), Ductal carcinoma in situ was found in 10 patients (9.3), Invasive lobular carcinoma was found in 4 patients (3.7) Mucinous carcinoma was found in 4 patients (3.7), Tubular carcinoma was found in 1 patient (0.9) and Medullary carcinoma in 1 patient (0.9). Samy A. AbdIRhman, et al., [19] found that 14 of the patients had (IDC), 3 of them had (ILC) and 1 of them had mixed IDC and ILC carcinoma and 2 of them had mixed IDC and DCIS. Burrah et al [21] reported that out of 270 patients, Infiltrating ductal carcinoma was found in 208 patients, Infiltrating lobular carcinoma was found in 19 patients, DCIS was found in 33 patients, Mucinous in 4 patients, Tubular in 2 patients, Tubulolobular in 1 patient, Metaplastic in 1 patient, Mixed mucinous and papillary in 1 patient, Tubular cribriform in 1 patient and Solid papillary in 1 patient.

In the present study, the mean operative time was 67 ± 12.25 minutes, with a minimum of 45 minutes and a maximum of 100 minutes. Seok [18] et al reported that operation time was 50 ± 11 minutes.

Samy A. AbdIRhman, et al., [19] found that the mean operation time for the unilateral cases was 136 minutes (2 hours and 26 minutes), the fastest procedure finished in 120 minutes, longest took 195 minutes. Akram et al [23] reported that the mean operative time was 48–124 min (average: 96.5 min).

In the present study, minor complications occurred in 8 patients (26.7%); three cases (10%) were complicated with breast seroma that was detected clinically during the follow-up visits and was spontaneously resolved over time and needed no surgical intervention. Wound infection occurred in two cases (6.7%) and was simply resolved by antibiotics and repeated dressings. Dehiscence occurred in two cases (6.7%) and was managed conservatively. One case complained of hypopigmentation around the incision. No breast hematoma or nipple necrosis was encountered in any of our cases. Seok [18] et al reported that the round block technique had a total

complication rate of 11.1% (108 reconstructions), including seven seromas (6.5%), three cases of mild wound dehiscence (2.8%), and two infections (1.9%). Samy A. AbdIRhman, et al., [19] reported that complications occurred only in 3 cases, in the form of 2 cases (10%) of infection and one case (5%) of nipple necrosis. Bhargava et al, [20] reported that Post-surgery, one patient developed a postoperative hematoma and was re-explored. No active bleeding was found and the wound was reclosed as for a round block technique. No patient had NAC complex necrosis. Superficial surgical site infection was seen in 1 patient. A scar-related complication in the form of partial dehiscence occurred in the patient who underwent re-exploration due to bleeding. Burrah et al [21] reported that Postoperative complications were encountered in 18 patients (6.6%). Hematomas occurred in 6 patients and required evacuation (2 percutaneous, 1 surgical) in 3 patients. Surgical site infections were present in 12 patients. Mahmoud et al [22] reported that during the follow-up period complications occurred only in 3 cases (16%), in the form of 2 cases of infection 1 case of hematoma formation.

In the present study, the cosmetic outcome was evaluated 6 months postoperatively objectively by the operating surgeons according to ABNSW Scale. The result was excellent in 3 (10%) of the cases, a good result was noted in 24 (80%) of the cases while the result was fair in 3 (10%) of the cases.

All patients were asked to rate their degree of satisfaction. The results were graded into good, fair and poor. In 24 (80%) of the cases, the rate was good, and only 6 cases were rated fair (20%). None of the patients wished to undergo contralateral breast surgery for symmetrization. Seok [18] et al found two major depression deformities (1.9%), six minor depression deformities (5.5%), three cases of areolar widening (2.8%), one immediate bulging deformity (0.9%), three hypopigmented scars (2.8%), and two areola irregularities (1.9%), Whereas, Samy A. AbdIRhman, et al., [19] reported that the overall mean score of their study was 4.35 which falls between very good and excellent also they reported that the number of cases given an excellent score (Score 5) was 11, the number of cases given a very good score (Score 4) was 6, the number of cases given a good score (Score 3) was 2, the number of cases given a fair score (Score 2) was 1, the number of cases given a poor score (Score 1) was 0 and the number of cases given an ugly score (Score 0) was 0. Contralateral breast mammoplasty and symmetrization were done in the same setting. Bhargava et al, [20] reported that for all patients, the post-operative cosmetic assessment as done by the patients was as follows: excellent 4 patients, good 15 patients, fair none, poor 1 patient. The postoperative cosmetic outcome assessment as done by the doctor was as follows: excellent 4 patients, good 14 patients, fair 1 patient, and poor 1 patient. None of the patients underwent a contralateral symmetrization procedure. Mahmoud et al [22] reported that the cosmetic Score was 5 (excellent) in 13 patients (52%), Score 4 (very good) in 8 patients (32%), Score 3 (good) in 3 patients (12%) and Score 2 (fair) in 1 patient (4%).

Akram et al [23] reported that the cosmetic results were excellent in three (15%) cases, good in 10 (50%) cases, fair in four (20%) cases, and poor in three (15%) cases. Unacceptable outcomes (either fair or poor) were observed in seven (35%) cases. Also none of their cases wished to undergo contralateral symmetrization procedures.

In the present study, the mean follow up period was 12.5 months, ranging from 6 to 18 months. No local recurrence or distant metastasis was detected in any of the cases during the study and follow up period, although this is not the main aim of the study, all patients are still and will be followed up for longer periods according to the standard guidelines for the oncologic safety. Similarly, Samy A. AbdIRhman, et al., [19] reported that none of their cases had recurrence during the postoperative follow up period of six months duration or needed further surgery. Also, Mahmoud et al [22] reported that none of the patients had any malignant recurrence during the follow up for the first 6 months. On the other hand, Burrah et al [21] reported that the median follow-up period was 39 months (18-90 months) and there were 4 local recurrences, 1 axillary recurrence and 8 distant metastases. Symmetrization surgery was required in 13 patients (4.8%).

Conclusion

Round block technique is a safe, convenient-to-learn and versatile option for patients eligible for breast-conserving surgery. It allows achieving a favorable breast shape, particularly in women with small and medium-sized breasts with satisfactory resection margins. This technique is particularly beneficial in patients not desiring contralateral symmetrizing procedure and has an advantage of having a concealed scar.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Authors' contributions	WYE	HBB	AFA	HRM
Research concept and design	√	--	--	√
Collection and/or assembly of data	√	√	√	√
Data analysis and interpretation	√	√	√	√
Writing the article	√	--	--	--
Critical revision of the article	√	--	--	√
Final approval of article	√	--	--	√
Statistical analysis	√	√	√	√

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