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Single Center Experience of Round Block Technique for Breast Surgery; Oncologic Safety and Patient Satisfaction

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ABSTRACT

Background: Round block technique (RBT) is a versatile technique for the excision of benign and malignant breast lesions with oncologic safety. Although a technically challenging procedure, it has the benefit of an inconspicuous scar and desirable aesthetic outcomes and wider exposure for tissue resection and remodelling. This study discusses the utility of RBT for the excision of different pathologies, complications, and cosmetic outcomes, as it is underutilized in developing countries.

Methods: The study was conducted at the breast surgery clinic at Liaquat National Hospital. All patients with benign (fibroadenomas, benign phyllodes) or malignant (carcinoma, malignant phyllodes) lesions undergoing the round block technique were included. The clinical size, site, distance from the nipple, pathology, pathological size, and margin status were recorded. Early and late complications were documented during the follow-up. At the time of the final study analysis, patients were interviewed for cosmetic outcome satisfaction using the Harvard scale (4-point Likert score)

Results: Overall, 49 patients were included in the study over 2.5 years. The mean clinical tumor size was 4.72cm, of which 63% were in the upper quadrant, and the average distance from the areolar margin was 1.71cm. The pathology included 21 fibroadenomas and 18 carcinomas, with a mean size of 4.14cm. Early complications were seen in 12 cases, and late complications were observed in 2 cases, which were all managed conservatively. The cosmetic outcome was found to be fair by 6.1% of the patients, good by 87%, and excellent by 6.1% of them.

Conclusion: RBT is a technically challenging procedure but is easily adaptable. It provides good exposure for excision of both benign and malignant tumors of the breast while maintaining the oncologic safety margin and good cosmesis, especially for young patients with large lesion in the upper inner quadrant.

INTRODUCTION

The round block technique (RBT), doughnut mastopexy, or peri-areolar mastopexy as first described by Louis Benelli is a versatile technique for good surgical exposure and aesthetic results for excision of breast lesions.[1] In mammoplasty, the main goal of achieving an aesthetically pleasing scar is possible as the scar is concealed at the areolar border. Due to easy access, exposure and larger incision length, malignant tumor and large benign lesions like giant fibroadenoma, phyllodes tumor, or multicentric fibroadenomas can be excised with a hidden scar. It allows for better dissection while raising dermal flaps and closure of the defect, achieving a regular breast contour and avoiding any depressions.[2] Contralateral symmetrisation is rarely required. RBT is also used for centralization of nipple-areolar complex while performing oncoplastic mammoplasty e.g., lateral mammoplasty.[3]

Many studies have reported good cosmetic results and complete preservation of nipple sensation.

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However, suture failure and protrusion, scar hypertrophy and hypopigmentation, or widening of the nipple areola complex are also among the known complications especially in large-sized breasts.[4] Therefore, this technique should be reserved for moderate-sized breasts and minimal ptosis and the areola should be made smaller for better cosmetic results.[5]

RBT is also technically a more challenging and time-consuming approach than the radial, periareolar incision techniques; for this reason, few surgeons prefer this technique. It is a complex procedure that involves raising a wide dermal flap and should be undertaken after fully acquiring and mastering basic oncoplastic principles.[3] Exclusions for the round block technique include patients with severe ptosis or a central malignant tumors involving the nipple areolar complex and heavy smoker.[6]

The literature on RBT is limited for Asian countries and constitutes small series from single institutes. Although commonly used in the developed countries, this technique is not used in Asian countries. Even in the age of oncoplastic surgery, disfiguring scars and asymmetrical breast contours even in young patients are commonly seen. A case report from Pakistan reported the first successful subareolar excision of a giant fibroadenoma (13cm) via a round block technique with good cosmetic results.[7] A case report from India used the round block technique in a breast cancer patient with oncologic safety margins and good cosmetic outcome.[8] A case series of four cases from Nepal also commented on the underutilization of the round block technique although it is being safely utilized for carcinoma and multicentric fibroadenomas with good aesthetic results.[9] The present study discusses the application of RBT for the excision of different pathologies, complications, and cosmetic outcomes.

METHODS

The study was conducted at the Breast surgery unit of Liaquat National Hospital and Medical College for 2.5 years from January 2020 to June 2022. The approval was taken from the hospital Research and ethics committee and patients' consent was obtained while patient confidentiality was maintained. All patients who underwent the round block technique for benign (fibroadenomas, benign phyllodes) or malignant (carcinomas, ductal carcinoma in situ, malignant phyllodes) lesions as per clinical indications were included in this cross-sectional study. The indications were lesions close to the areolar margin mainly in the upper half, peripheral in the upper inner quadrant, and small areolar diameter that could not provide exposure for a large tumor i.e., large tumor-to-areolar diameter ratio. The standard procedure was performed whereby 2 parallel circumferential peri-areolar incisions through the epidermis were given first at the margin of the areola and 2cm apart from each other (Figure 1).

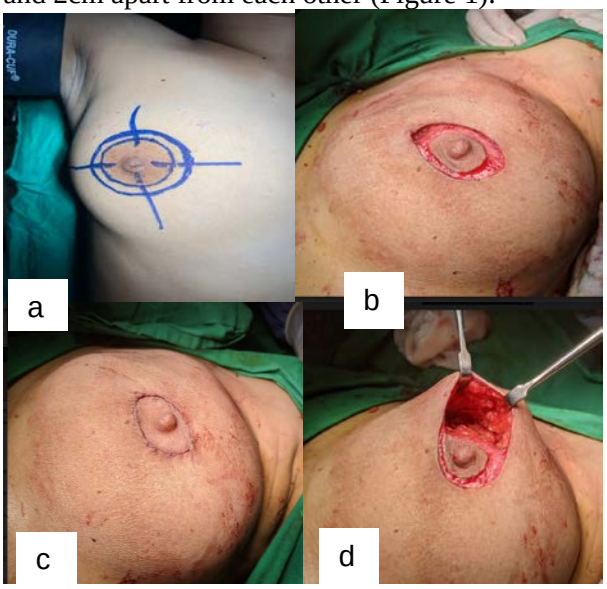

Figure 1. a. Skin marking for round block technique for fibroadenoma, b. Skin de-epithelialization between the 2 incisions, c. Skin flaps raised for tumor excision, d. After the subcuticular skin closure

Then, de-epithelization was done between the two incisions, removing a doughnut of the epidermis (Figure 2).

Figure 2. Intraoperative results of breast conserving surgery

Incision was deepened through dermis at the site of the lesion giving adequate exposure and then the planned procedure was performed via this incision, which is simple, wide lumpectomy or breast-conserving surgery for cancer. In case of a non-palpable lesion after preoperative chemotherapy, wire-guided localization was performed on the day of surgery. Flaps were raised and the lesion was excised with 1cm margins; cavity margin shaving was taken as per unit protocol. The nipple-areolar complex was also raised if the tumor extended to the retro-areolar region. The defects were approximated by mobilizing

the surrounding breast parenchyma and closing it radially with an absorbable suture followed by the closure of subcutaneous tissue. The skin closure was done with proline 5/0 initially and was removed after 2 weeks and later switched to absorbable monocryl. The patients were called into the clinic after 2 weeks and the dressing was left intact after surgery until the first follow-up.

Patients with benign tumors were discharged in case of no surgical complications while malignant and phyllodes tumors were followed according to the protocols for adjuvant treatments (Figure 3, 4). Early complications like seroma, surgical site infections, wound dehiscence, skin or nipple areola complex necrosis and late complications like scar widening, hypopigmentation, and distortion were recorded. Patients were interviewed at the time of final data analysis, with an average follow-up time varying from 1 year to 3.5 years for the cosmetic result using the Harvard\RTOG breast cosmesis grading scale and graded as poor, fair, good, and excellent (Table 1).

Figure 3. Follow-up after breast conserving surgery at 2 weeks

Figure 4. Follow-up at 2 years

Table 1

Harvard scale (4-point Likert scale)	
Excellent	Treated breast nearly identical to the untreated breast
Good	Treated breast slightly different from untreated breast
Fair	Treated breast is clearly different from the untreated breast but not seriously distorted
Poor	Treated breast seriously distorted

RESULTS

The total number of patients who underwent the round block technique were 49 for 2.5 years from January 2019 to June 2022. The mean age of the patient was 37.7 years (15-67 years). The technique was used for 19 simple lumpectomies, 12 wide lumpectomies, and 18 breast conservation surgeries. The average clinical tumor size was 4.72cm, (largest benign tumor 12cm). The average distance of the lesion from the nipple-areola complex was 1.71cm (max. 4cm). The lesion location was as follows: 10 in the upper outer quadrant, 9 in the central, 9 in the upper inner quadrant, 16 at 12 o'clock, 2 in the lower outer quadrant, and 3 lower inner quadrants.

The histopathology of the lesions included 21 fibroadenomas, 18 breast carcinomas, 8 phyllodes tumors (2 benign, 3 borderline, and 3 malignant), and 2 Ductal carcinomas in situ (DCIS). The pathologic tumor size ranged from no residual tumor to 11.8cm (mean 4.14). The cavity margin shaving was positive in 2 cases and margin re-excision was required. Early complications were seen in 11 patients (22.4%), which included seroma in 7 cases, 2 surgical site infections, 1 skin edges necrosis, and 1 partial wound dehiscence. No complications required a revisional surgery. Late complications reported in 4% of the patients including 1 hypopigmentation of edges and 1 scar widening. Patients reported cosmetic results to be fair (6.1%), good (87%), and excellent (6.1%), according to the Harvard scoring system. No patient reported poor results.

Out of the 49 patients, 5 had multicentric fibroadenomas (4 patients with 2 fibroadenomas and one with 3 fibroadenomas). One of the patients had a bilateral lumpectomy for 2 lumps each via the RBT due to small areolar to tumor diameter. One patient had skin edges necrosis and reported cosmetic satisfaction as fair and the rest of the patients reported good results. (Table 2)

Table 2. Patients' characteristics and the reported outcome

Characteristics	Mean (Range)
Age (years)	37 (15-67)
Clinical Tumor size (cm)	4.5 (0-12)
Benign	5.09
Malignant	4.68
Pathologic tumor size (cm)	4.1 (0-11.8)
Benign	4.92
Malignant	3.60
Distance from nipple (cm)	1.7 (0-4)
Pathology	
Fibroadenoma	21
Phyllodes tumor	8
DCIS	2
Carcinoma	18
Surgical procedure	
Lumpectomy	19
Wide local excision	12
Breast-conserving surgery	18
Location	
Upper outer	10
Upper inner	9
12 o clock	16
Lower outer	2
Lower inner	3
Central	9
Early complications	11
Seroma	7
Surgical site infection	2
Dehiscence	1
Skin edges necrosis	1
Late complications	2
Dehiscence	1
Widening	1
Cosmetic results	
Poor	0
Fair	3
Good	43
Excellent	3

DISCUSSION

Round block technique can be utilized when the tumor size is large, a long incision is required, and peri areolar incision cannot be utilized where more than a third of the circum-areolar incision length would compromise the blood supply.[10] In a comparative study between doughnut mastopexy lumpectomy (DML) and simple lumpectomy (SL) via peri-areolar incision, results showed the benefit of 3 folds with longer incision than SL (5.2cm versus 14.5cm) where the average volume of tissue excised was higher in DML group. This is comparable to our study as RBT provided access to tumors up to 12cm. The long-term cosmetic outcome and the time duration of RBT and SL are similar[11], and the time for de-epithelisation and longer suturing is compensated for by good glandular exposure.[6]

RBT can be used for any tumor location but is well-suited for the upper quadrant. For such tumors, it gives the opportunity to have a concealed scar avoiding the neck line area instead of a scar in UIQ especially in young patients with benign lumps who have aesthetic concerns. The CROSS technique described for tumors in UIQ is recommended by the author for breast conserving surgery for tumor farther away from nipple areola complex and the average age in this study was 51 years.[12] In our experience, tumors with a size of 6.5cm and tumor distance of 3cm from areola were excised and margins were negative for all cases.

RBT is difficult to apply in lower quadrants specifically if the tumour-breast volume is high which will compromise breast contour resulting in bird beak deformity.[13] A study with 30% lesions in the lower quadrant reported acceptable results concluding that RBT can be safely performed in all quadrants.[13] On the other hand, Ogawa *et al*. did not include the lower portion of breast cancers stating that large defects for more than 25% tissue resection give unacceptable cosmetic results.[1] In our study, 5 lesions were in the lower quadrants, but the largest diameter was 4cm and was located near the areolar margin up to 1cm. The cosmetic outcome in these patients was good and no complications were documented. RBT can be effectively used for the lower pole if the tissue volume to be excised is less than 20%.

The tissue volume that can be excised has been reported up to 8cm by Kim *et al.* which also depends on the lesion and breast volume ratio. The patient developed a seroma but it resolved gradually over 2-3 weeks and the cosmetic outcome was good. Other studies have reported that the RBT was indicated for the resection amount of less than 100 g or a tumor-breast volume ratio of less than 20%.[13] One study reported favourable results and no major complications if the maximum tumor volume resected was 79.2ml and the maximum tumor-breast volume ratio was 14.7%, regardless of the tumor location, volume, and nipple-tumor distance.[13] In our practice, encapsulated papillary carcinoma up to 12cm and fibroadenoma as small as 3cm had been excised. The limitation of our study was that the weight of the tissue removed and breast size were not documented. Clearly, the tumor to breast volume and areolar diameter are important considerations in addition to the tumor size while selecting patients for round block techniques.

The oncological safety has been studied in a retrospective analysis of 270 patients who underwent round block mammoplasty for breast-conserving surgery. The average tumor size excised was 2.35cm and the volume was up to 41.4gm. The margin was positive in 41 cases (14.8%). This study concluded

that RBT is oncologic safe for the margin of excision, has low morbidity and good cosmesis.[14] In another study, 92 patients were followed up for 3 years after oncoplastic surgery by RBT. A median follow-up of 15 months showed no local recurrence and there was a high degree of patient satisfaction.[3] Kaviani *et al*. reported the recurrence rate of 5.4% over a follow-up period of 26.4 months among nine hundred and thirty seven patients who underwent BCS via different approaches including RBT.[15] In our study, there were 18 carcinoma cases and 2 DCIS operated by RBT. Four patients had positive margins but re-excision was not required as the cavity margin shavings taken at the time of the first surgery as per institution protocol were negative given their oncological safety.

There were 5 cases of multicentric fibroadenomas and one with bilateral fibroadenomas. All patients gave good scores except one that was fair. The patient had 3 lumps (max size 6.5cm and in upper part of the breast). Excessive tissue handling by retraction can explain the skin edges necrosis and inferior cosmesis. RBT application for multicentric fibroadenomas or multiple pathologies is very useful as multiple scars can be avoided. Lai *et al*. presented a case series of 20 patients with multicentric fibroadenomas (3.3+/-1.2) operated using the RBT with 95% of patients, reporting good aesthetic outcomes similar to our results. Nipple areola complex partial necrosis was reported in one patient.[16] Therefore, one has to be careful with the tissue handling.

The average distance between the nipple and the tumour is reported up to 5.5 cm±1.7[13]but in our study the maximum distance was 4cm. However, other studies showed that the modified round block technique is more suited for peripherally located tumours (4cm). In this modification, the NAC is completely detached from the surrounding skin instead of de epithelisation, and extensive subcutaneous dissection is carried out to provide better access to the tumour. The median distance between the nipple and the tumor was 5.2 cm and the areolar size was 2.8 cm. Cosmetic outcomes were satisfactory with minimal scar formation and no subsequent changes in the shape or areola position.[17] Refaat *et al*. also used a modified round block technique and moderate size breast (cup B) tumors with a distance of 7cm from NAC were excised successfully with good to excellent patient satisfaction.[10] RBT is feasible for peripherally located tumors for less than 4cm and for longer distances, modification or other techniques should be applied.

The patients undergoing oncoplastic techniques or mammoplasty as compared to round block technique require contralateral symmetrisation procedure. None of the patients needed contralateral symmetrisation with satisfactory cosmesis. Studying the data of 57 consecutive patients, Bramhall reported contralateral symmetrisation procedure in only 2 patients.[18]

CONCLUSION

RBT allows for the excision of both benign and malignant tumors with oncologic safety. We recommend it in cases with large tumors to breast ratio, small areola size, upper quadrants of the breast and multifocal or multicentric lesions. It gives an obscure scar and reshapes the breast without compromising cosmetic outcomes as aesthetic concerns and expectations are higher on patients' agendas than before.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ETHICAL CONSIDERATIONS

The approval was taken from the hospital Research and ethics committee and patients' consent was obtained while patient confidentiality was maintained.

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None.

DATA AVAILABILITY

Not applicable.

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