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Central Partial Mastectomy in Patients with Centrally Located Breast Tumors

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ABSTRACT

Background: Oncoplastic surgery (OPS) is crucial for centrally located breast cancers (CLBCs) to enable safe tumor resection, while maintaining good cosmetic outcomes. This study illustrated the results of women with CLBC having various surgical methods for partial breast reconstruction after central quadrantectomy.

Methods: This prospective cohort study involved 30 patients with CLBC scheduled for OPS. The surgical techniques were decided by a multi-disciplinary team considering tumor size and location, breast size, degree of ptosis, ratio of breast to tumor size, nodal status, and nipple involvement. The postoperative cosmetic appearance was assessed after four weeks as a patient-reported outcomes (PROs) using a five-point scale.

Results: The average age of the cohort was 46.8±9.1 years. The tumor was retroareloar in 11 patients and periareolar in 19. Nodal involvement was identified in 12 cases (40%). Nipple-areola complex was involved in 9 patients (30%). Techniques performed were crescentic excision (n=9), round block (n=8), and reduction mammoplasty (n=2) in the periareolar group. In the retroareolar group, Grisotti flap (n=4), reduction mammoplasty (n=2), crescentic excision (n=2), central quadrantectomy followed by 1ry (n=2) or purse string closure (n=1) were performed. Excellent and good cosmetic outcomes were reported by 83.3% of the patients. Operative complications were trivial and observed in a few patients including seroma, wound infection, and loss of nipple sensitivity.

Conclusion: Oncoplastic surgery in patients with CLBC depending on the tumor location, breast size and degree of ptosis achieved excellent and good results with the application of different surgical techniques.

1. NTRODUCTION

Worldwide, breast cancer (BC) has emerged as the leading malignant tumor [1]. Breast cancer survivorship has increased due to advancements in treatments, screening methods, and longer life expectancy, with surgical treatment prioritizing reducing complications and improving quality of life [2]. These paradigm shifts have evolved, starting with Halsted's radical mastectomy and culminating in the current focus on breast-conserving therapy (BCT). BCT entails partial mastectomy with axillary staging, together with adjuvant radiation therapy and suitable systemic therapy [3].

However, women with centrally located breast cancers (CLBCs) have historically been excluded from BCT due to concerns about unsatisfactory cosmetic outcomes following the resection of the nipple-areola complex (NAC) [4,5]. These tumors account for 5-20% of breast cancer cases [6]. The NAC takes on a distinctive role as many women perceive their breast reconstruction as incomplete until the nipple is reconstructed [7]. With the growing emphasis on breast conservation, there has been a surge in interest in oncoplastic surgery (OPS) in which the integration of oncological principles with plastic surgical procedures aims to enhance the surgical results and cosmetic appearance of BC [8].

This technical advancement has led to the development of several breast reduction methods using local flaps to rebuild the areola following the oncologic removal of the NAC. Nevertheless, choosing the most suitable approach for every patient is challenging [9]. Oncoplastic methods encompass level I and level II [10]. Numerous variables influence the ultimate cosmetic outcome, including the dimensions and position of the tumor, the size and form of the breast, any additional therapy before or after surgery, the presence of other medical conditions, smoking habits, age, and the preference of the patient [11].

The current study demonstrates the outcomes of a group of females with CLBC undergoing different surgical techniques for partial breast reconstruction following central quadrantectomy. The ultimate goal of such a study is to set up an oncoplastic algoristhm for the surgical management of periareolar breast tumors.

2. PATIENTS AND METHODS

This prospective cohort study involved all female patients (n=30) with CLBC who presented to the breast unit of the National Cancer Institute (NCI), Cairo University, from July 2020 to July 2021. The study was approved by the research ethical committee. Informed consent was obtained from study participants after they were informed of the risks and benefits associated with treatment alternatives.

Inclusion criteria were females 20-65 years old with centrally located breast tumors scheduled for different surgical techniques of breast reconstruction following central quadrantectomy, and good response to neoadjuvant therapy (NAT). Centrally located breast tumors were defined as tumors located underneath the NAC (including Paget's disease) or within a 2 cm radius. The minimum postoperative follow-up time was 2 years. Exclusion criteria were recurrent or metastatic disease, patients with medical co-morbidities that preclude surgical management or contraindications for BCT, e.g., multicentric disease, radiotherapy contraindications, patients refusing surgery, and patients needing or requiring mastectomy.

3. METHODS

All the patients were reviewed by a multi-disciplinary team (MDT), and a management plan was designed. Patients who were subjected to NAT had pre-treatment clips for later localization of the tumor according to response. All patients were submitted to full history taking and clinical examination. The breast and tumor were assessed for tumor size and location, breast size and degree of ptosis, the ratio of breast size to tumor size, nodal status, and nipple changes. The degree of ptosis was classified according to Regnault's classification [12]. Routine laboratory investigations and breast imaging were conducted followed by ultrasound-guided tru-cut core biopsy.

Surgical techniques

Round Block (Figure 1):

Preoperative drawings were conducted with the patient in an upright position. An outline of the de-epithelialization zone was delineated between the outer and inner incision lines; the intervening area designated for de-epithelialization varied from 1 to 4 cm, contingent upon tumor size, location, and nipple position. As the volume of breast tissue to be excised and the degree of ptosis to be treated increase, the distance between the inner and outer incision lines also enlarges. In tiny tumors and breasts with analogous nipple placements, the distance between the inner and outside incision lines was minimized. The diameter of the new nipple-areola complex may range from 38 to 42 mm, contingent upon the dimensions of the existing nipple-areola.

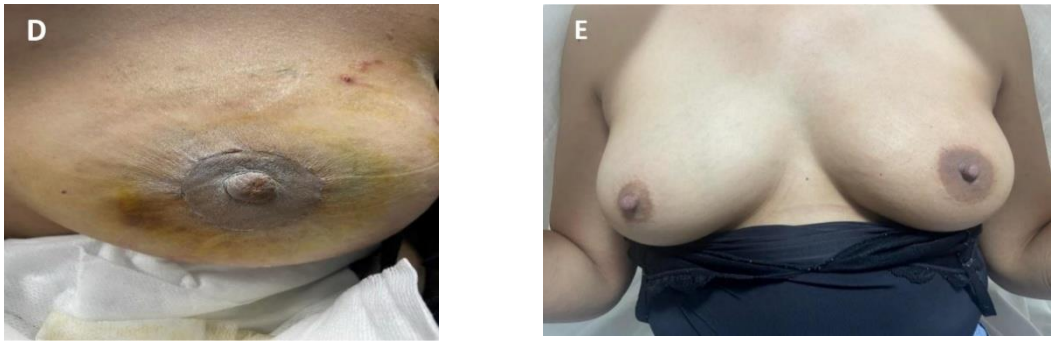

Figure 1: Round block technique: a) Preoperative marking b) Resection of the tumor c) Closure of the wound d) After 2 weeks e) After one year following radiotherapy

Crescent mastopexy

The incision was marked when the patient was in an upright or seated posture. The first inferior C-shaped incision traversed the cranial areolar margin from 9 to 3 o'clock, whereas the next parallel C-shaped incision was positioned more cranially. An en-bloc resection involving the chest wall was performed. The tumor-bearing segment was resected without the surrounding skin. The tissue beneath the skin crescent was elevated from the chest wall and moved upward to fill the resection gap, with the underlying tissue promptly transferred into the cavity. Absorbable 2-0 sutures were utilized to close the defect and avert seroma formation. The incision was closed employing a two-layer suture technique that approximates the superior and inferior margins. An interrupted suture in the dermal layer was executed to precisely line the corresponding skin margins, subsequently followed by the insertion of a 4–0 or 5–0 absorbable monofilament running suture to ensure skin closure.

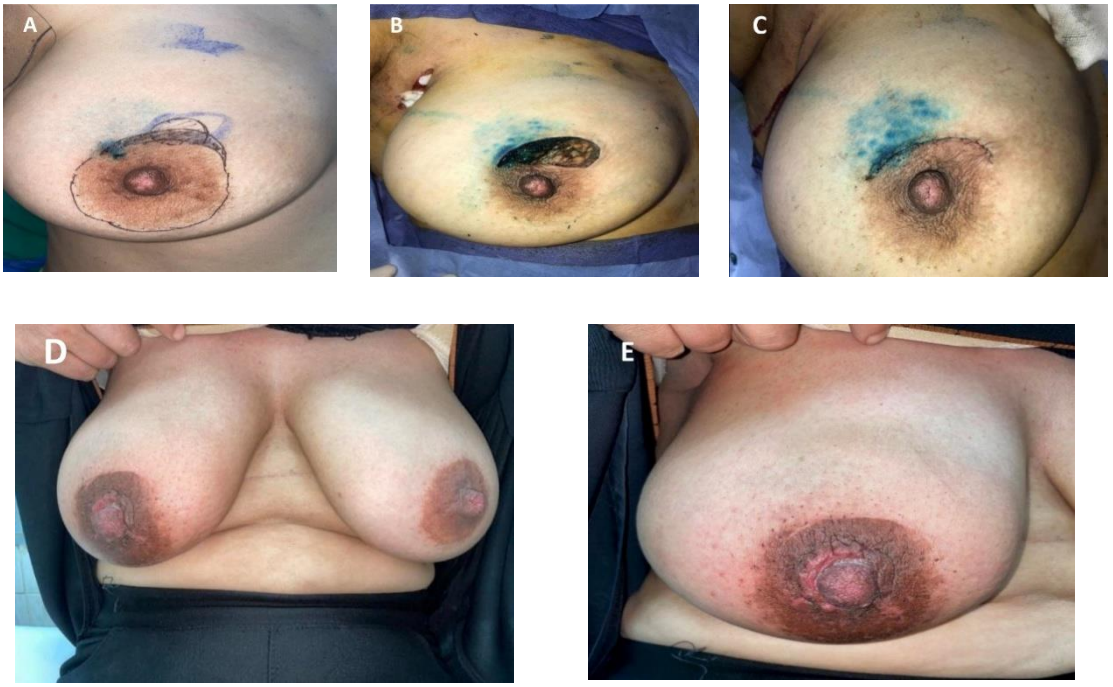

Figure 2: Crescent mastopexy: a) Preoperative marking b) Resection of the tumor c) Closure of the wound d,e) After 1 year following radiotherapy

Grisotti Flap Mammoplasty

A circle with a diameter identical to that of the NAC was inscribed inferior to the NAC, positioned between two "J" shapes extending infero-laterally to the external inframammary fold line, creating a "comma shape." The area between the two "J" shapes was de-epithelialized, preserving the disc that will function as a new areola. Then, central lumpectomy was done

removing the NAC. The flap, containing the future areolar skin disc, was mobilized and fixed in the resected central lumpectomy site. Deep glandular sutures were placed at the level of the "J" to reshape the breast configuration.

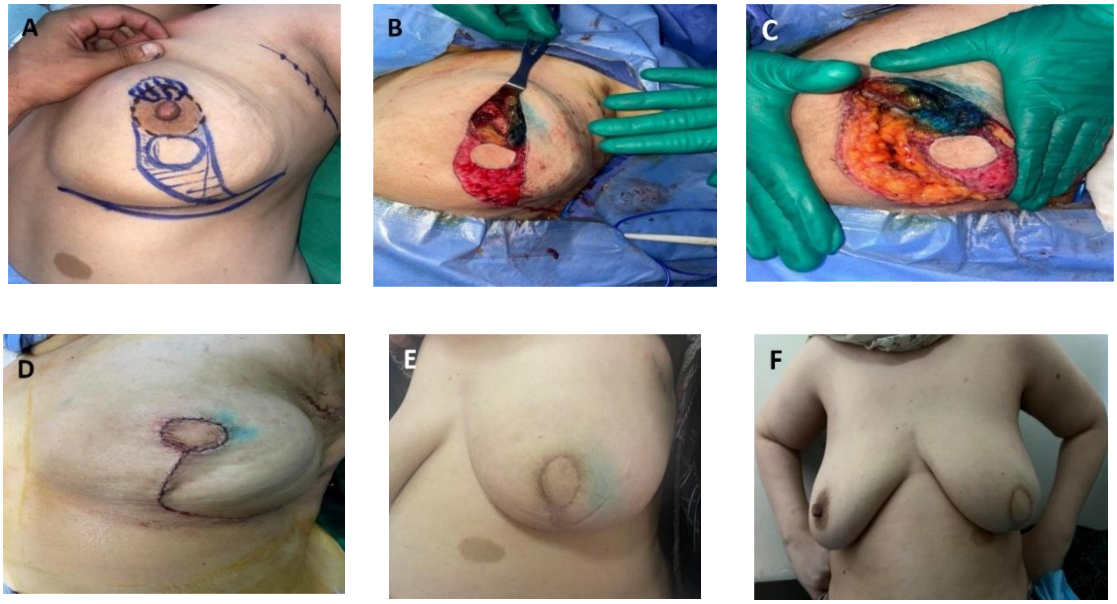

Figure 3: Central quadrantectomy with Grisotti flap: A) Preoperative marking, B) Resection of the tumor + De-epithelialization, C) Mobilization of the flap, D) Closure of the wound, E) After 1 month, F) After one year following radiotherapy

All patients received their adjuvant treatment according to the NCI protocol. All patients received adjuvant radiotherapy in the form of whole breast irradiation (WBI) 40-42.5 Gy/15-16 fractions and boost doses 15 Gy/5 fractions to the operative bed.

Parameters of evaluation:

A preoperative photograph of the patient in three different views (anterior and both sides) was taken for assessment of cosmetic outcomes. The oncologic outcome was judged by the final pathological examination. The first postoperative follow-up visit was within 30 days of the surgery date. The postoperative cosmetic appearance was assessed four weeks after surgery and a photograph of patients in three different views (anterior and both sides) was taken. The patients were asked to rate the postoperative cosmetic result and their degree of satisfaction compared with the preoperative breast using a five-point scale (excellent, 5; good, 4; fair, 3; poor, 2; and bad, 1).

Photographic assessment of adverse effects of radiotherapy (RT) was done 6 months and one year after the end of RT. Early complications were recorded including infection, skin necrosis, wound dehiscence, and loss of dermo-glandular flaps. Late complications in terms of the failure of cosmetic outcomes, poor esthetic outcomes, and patient dissatisfaction were recorded. Numerical data were described as median and range or mean and standard deviation as appropriate, while qualitative data were described as number and percentage.

4. RESULTS

The mean age of the studied group was 46.8±9.1 years. Table 1 shows the demographic and baseline clinical characteristics of the studied group.

Table 1: Baseline characteristics of the studied group

		Value
Age (years)		46.8±9.1
Marital Status	Married	26 (86.7%)
	Single/Widow	4 (13.3%)
Menopausal Status	Pre-menopausal	12 (40.0%)

	Post-menopausal	18 (60.0%)
Medical Diseases		8 (26.7%)
Family History		7 (23.3%)

Data are presentred as mean±SD, or number (%)

Table 2: Tumor characteristics in the studied group

		Value
Tumor Site		
Retroareolar		11 (36.7%)
Periareolar		19 (63.3%)
Tumor size (mm)		28.5 (14-55)
Side	Left	18 (60.0%)
	Right	12 (40.0%)
Distance from nipple-areola complex (cm)		1.5 (0.5-2.0)
Ptosis		18 (60.0%)
Pathological Type	IDC	24 (80.0%)
	Others	6 (20.0%)
Grade	I	5 (16.7%)
	II	21 (70.0%)
	III	4 (13.3%)
Biology	HER-2 Enriched	2 (6.7%)
	Luminal	19 (63.3%)
	Triple -ve	5 (16.7%)
	Triple +ve	4 (13.3%)
Clinical T-stage	T1	6 (20.0%)
	T2	21 (70.0%)
	T3	3 (10.0%)
Clinical N-stage	N0	18 (60.0%)
	N1	12 (40.0%)
American Joint Committee on Cancer Stage	IA	5 (16.7%)
	IIA	12 (40.0%)
	IIB	12 (40.0%)
	IIIA	1 (5.3%)
Neoadjuvant Treatment		9 (47.4%)
Neoadjuvant Target therapy		5 (26.3%)
T-stage after Neoadjuvant treatment	T1	1 (5.3%)

	T2	4 (21.1%)
	Tx	4 (21.1%)

Data are presentred as number (%) or median (range)

The tumor was retroareloar in 11 patients and periareolar in 19. The median distance from the NAC to the tumor was 1.5 cm (range: 0.5-2.0 cm). The median tumor size was 28.5 mm (range: 14-55 mm). IDC was the most frequent pathological type. Most cases had grade II disease. Tumors were bi-focal in 3 patients. Four patients with periareolar tumors had intraductal extension towards the nipple and 4 of those with retroareolar tumors had nipple retraction or ulceration. Nodal involvement was found in 12 patients (40%). The most common ACCJ stage was IIA or IIB. Triple-negative disease was detected in 5 patients (26.3%). Nine patients (47.4%) received neoadjuvant treatment (Table 2).

The median operative time in all cases was 85 minutes, however, the Wise pattern reduction mammoplasty required 180 minutes. Three main types of surgical techniques were performed. Crescentic excision (n=11) and round block (n=8) techniques were the most commonly performed surgical procedures, followed by reduction mammoplasty (n=4) in patients with large breast sizes (Table 3). Two patients had Wise pattern mammoplasty, and two had batwing procedures. Central quadrantectomy followed by 1ry or purse string closure was done in 3 patients and Grizotti flap in four. In two patients out of 11 with retroareolar tumors, cresentic excision with preservation of NAC was achieved. The types of surgery in patients with retroareolar tumors (n=11), and in the periareolar tumors (n=19) are shown in Table 4.

Axillary clearance was done for 15 patients, while sentinel LN biopsy (SLNB) was done for 15. Axillary surgery had been performed through a separate incision in 27 patients, while the mammoplasty incisions were used for the axillary procedure in the remaining three.

Table 3: Operative characteristics of the studied group

		Value
Type	Crescentic Excision	11 (36.6%)
	Round block	8 (26.7%)
	Reduction Mammoplasty	4 (13.3%)
	CQ + 1ry closure	2 (6.7%)
	CQ + Grizotti Flap	4 (13.3%)
	CQ + purse string closure	1 (3.3%)
Operative time (minutes)		85 (50-180)
Least margin (cm)		0.5 (0.2-2.0)
Axillary Surgery	Clearance	15 (50.0%)
	Sentinel	15 (50.0%)
Axilla Status	Positive	10 (33.3%)
	Negative	20 (66.7%)
Adjuvant Chemotherapy		17 (56.7%)
Adjuvant Hormonal Therapy	Tamoxifen	9 (30.0%)
	Tamoxifen + Zoladex	6 (20.0%)
	Aromatase Inhibitors	8 (26.7%)
Adjuvant Target Therapy		4 (13.3%)
Time from Surgery to Radiotherapy (month)		4 (1-9)
Complications of Radiotherapy	Grade 1 erythema	7 (23.3%)

	Grade 2 erythema	6 (20.0%)
Pathological Stage	IA	4 (13.3%)
	IIA	17 (56.7%)
	IIB	4 (13.3%)
	IIIA	5 (16.7%)
Radiotherapy Sessions	15	20 (66.7%)
	20	7 (23.3%)
	25	2 (6.6%)
	5	1 (3.3%)

Data are presentred as number (%) or median (range)

CQ: Central quadrantectomy

Table 4: Operative types in retroareolar and periareolar cases

	Retroareolar (n=11)	**Periareolar (n=19)**
Crescentic Excision	2 (6.7%)	9 (47.4%)
Round block		8 (42.1%)
Reduction Mammoplasty		
Batwing		1 (3.3%)
Modified batwing	1 (3.3%)	
Wise pattern	1 (3.3%)	1 (3.3%)
CQ + 1ry closure	2 (6.7%)	
CQ + Grisotti Flap	4 (6.7%)	
CQ + purse string closure	1 (3.3%)	

Data are presentred as number (%)

Adjuvant Therapy

None of the patients had delayed adjuvant treatment. The number of sessions of radiotherapy and the types of adjuvant treatments are shown in Table 3. The median time between surgery and adjuvant radiotherapy was four months. All patients received whole breast irradiation and 4-5 boost doses to the operative bed. Thirteen patients developed grade 1 to 2 erythema after radiation therapy.

Outcome of Surgery

All of the excised tumors had negative margins with a mean of 7 mm ranging from 2 to 20 mm. In the 9 patients who had central quadrantectomy for retroareolar tumors, NAC was removed as a safety margin after a frozen section in five and involved in four. These patients had satisfactory -ve margins. Patients who had crescentic excision for retroareolar tumors with preservation of NAC (after coring of the nipple) had close but -ve margins (2-3 mm). In patients with periareolar tumors especially those with tumors close to the areola (< 5 mm) or with a narrow areola, the margin of resection was narrow to preserve nipple vascularity (2-3 mm).

Patient-reported outcomes:

As reported by patient satisfaction, the cosmetic outcome was excellent in 18 patients (60%). All patients who had the round

block technique and 8 patients who were subjected to crescent mastopexy reported excellent satisfaction, in addition to two patients who had central quadrantectomy and Grisotti flap. Good satisfaction was reported by 7 patients (23.3%); 3 were subjected to crescentic excision, 2 had central quadrantectomy and Grisotti flap, one had bilateral Wise pattern mammoplasty for periareolar tumor (NAC preserved), and one had central quadrantectomy and 1ry closure. The outcome was designated as fair in 4 patients; one was subjected to central quadrantectomy and 1ry closure, one had bilateral wise pattern for retroareolar tumor (NAC removed), one had bilateral modified batwing for retroareolar tumor (NAC removed), and one had unilateral batwing mammoplasty for periareolar tumor (NAC preserved). One patient who was subjected to central quadrantectomy and purse-string closure felt bad about the cosmetic outcome. Therefore, excellent and good cosmetic outcomes were reported by 83.3% of the patients.

Operative Complications:

Two patients had seroma and one had a wound infection. Loss of nipple sensation occurred in two patients with the round block technique, in two who had crescentic excision for retroareolar tumor with preservation of the NAC, and in one who had the batwing technique. Three out of eight patients who had the round block technique complained of widening of the areola compared to the opposite side. No cases of wound gaping or postoperative severe pain were detected.

5. DISCUSSION

Breast-conserving therapy (BCT) is ultimately recognized as the standard treatment for early-stage breast cancer. BCT will always be a great choice, especially from an aesthetic point of view. Nevertheless, certain patients are not typically seen as suitable candidates for breast conservation, such as those with centrally located breast tumors affecting the NAC [13].

This prospective cohort study demonstrates the results of partial breast reconstruction following central quadrantectomy for 30 patients with CLBC. We aimed to compare different techniques regarding patient-reported outcomes (PROs) and set up an oncoplastic guideline for various surgical procedures for CLBCs. The tumor was retroareloar in 11 patients and periareolar in 19, with a median distance from the NAC of 1.5 cm (range: 0.5-2.0 cm). The median tumor size was 28.5 mm. Ptosis was severe in two patients, and minor to moderate in 16. The selected surgical approach was based on these characteristics. The techniques used for retroareloar tumors were Grisotti flap (n=4), crescent mastopexy (n=2), central quadrantectomy and primary closure (n=2), modified batwing (n=1), purse string closure (n=1), and Wise pattern technique (n=1). In those with periareolar tumors round block (n=8), crescent mastopexy (n=9), batwing mastopexy (n=1) for a large breast of moderate ptosis, and Wise pattern technique (n=1) for a large severely ptosed breast were performed.

The choice of the optimal technique in the current series was judged after a multidisciplinary team discussion, considering various factors. These include careful preoperative staging of the tumor in addition to a frozen section of the tumor specimen intraoperatively for better definition of the mass and resection margins, and consequently safer oncological outcomes [14].

We have carefully tested the patients in the current series to identify patients with a high likelihood of NAC involvement, hence aiding the decision of NAC preservation or resection. All patients had preoperative assessment through clinical examination to identify those with clinically questionable NAC, potentially exhibiting nipple retraction, ulceration, and/or erosion. Wide variation in the incidence of NAC involvement was reported in different studies. For example, Piato et al. found a 17% rate of NAC involvement without any clinical evidence [15]. Other studies reported rates as low as 6.3% [16]and 8.7% [17]. In the current series, NAC was removed because of involvement in 9 patients (30%). The elevated prevalence of NAC involvement linked to retroareolar tumors typically requires NAC removal along with a sufficient safety margin around the tumor, resulting in unsatisfactory cosmetic outcomes [18].

From the oncological perspective, we did not detect any case of local recurrences or distant metastasis during the follow-up period with a minimum of two years. The median follow-up period was 26 months (range: 24-39 months).

As reported by the patients, the cosmetic outcome of surgical procedures in this study was excellent or good in 83.3% of the patients. All patients who had the round block technique reported excellent outcomes in addition to 72.7% of those who had crescent mastopexy. Despite the removal of the NAC, patients who had Grisotti flap reported excellent outcomes in 50% and good in 50%. The remaining 3 patients of crescent mastopexy showed good outcomes. The outcome was designated good in a patient who underwent bilateral Wise pattern mammoplasty for periareolar tumor NAC preservation. NAC removal was associated with fair outcomes in three patients. The outcome was better in periareolar cases (excellent, good, and fair in 16, 2, and 1 patients, respectively). In retroareolar cases, the outcome was excellent in 2 patients, good in 5, fair in 3, and bad in one.

In our study, 9 patients with retroareolar tumors were highly suspicious of NAC involvement. In patients with large and/or ptotic breasts, central quadrantectomy was followed by Grisotti technique (n=4), modified batwing mastopexy (n=1), and Wise pattern (n=1). In those with small and/or non-ptotic breasts, primary closure (n=2) or purse string closure (n=1) was done. The remaining two patients with retroareolar tumors underwent crescentic excision with NAC preservation after coring the nipple with negative margins. NAC preservation was feasible due to the wide areola permitting resection without necessitating nipple removal.

In the current study, the Grisotti technique was associated with excellent/good cosmetic outcomes and a high patient satisfaction level. In agreement with these findings, other studies reported excellent cosmetic results with these techniques [18–22]. The typical Grisotti flap offers a unique oncoplastic solution for individuals with retroareolar malignancies and moderately sized breasts. It facilitates the preservation of the breast while attaining a suitable aesthetic outcome regarding contour and projection [23]. It facilitates the restoration of the defect post-quadrantectomy through the advancement and rotation of a random pattern dermoglandular pedicle [24]. Increasing data indicates that executing a Grisotti flap for retroareolar malignancies is oncologically safe in appropriately selected patients [25,26].

Modified Batwing and Wise pattern procedures were employed in two patients with large breasts in the present study. A batwing mastopexy is an optimal technique for tumors situated deep or near NAC [27]. The procedure entails the excision of two crescent-shaped regions of skin and parenchyma above the NAC, together with two contiguous triangular sections of skin and parenchymal tissue flanking both sides of the NAC [28]. A prospective study assessed the results of batwing mastopexy in 35 women. Breast shape and NAC position were evaluated as good in 86% and 91% of the patients, respectively. No adverse ratings of cosmetic outcomes were reported [29].

We observed that all patients who underwent NAC excision refused NAC reconstruction. This result was documented in other studies denoting the importance of breast shape and contour rather than the issue of nipple and areola preservation. Furthermore, all patients except two refused contralateral breast surgery for symmetry due to fear of bilateral disfigurement, or exhaustion of treatment procedures. Previous studies reported similar findings [18,30].

However, patients with the preserved NAC group reported significantly better cosmetic. The absence of a NAC is viewed as a shortfall in achieving a complete aesthetic outcome, regardless of the decision to forego NAC reconstruction.

The patients with periareolar tumors in this series were managed mainly by the round block technique or crescent mastopexy. The Round block mammoplasty (RBM) is a viable choice for periareolar malignancies that facilitates safe oncological excision [31]. It exhibits similar operating characteristics to traditional wide local excision (WLE). It demonstrated a reduced re-excision rate and improved cosmetic outcomes in patients, indicating that it is not only similar to standard WLE but may also offer advantages in some circumstances [32]. RBM maintains the vitality of NAC by safeguarding the subdermal plexus through the de-epithelization of the skin. The scar from this surgery is exclusively periareolar, resulting in enhanced patient satisfaction [33].

A minor series from Japan comprising 18 patients showed excellent cosmetic results in three cases, good in eight cases, fair in five cases, and poor in two cases after RBM [34]. Bramhall et al. demonstrated a cohort of 57 patients, with a median follow-up of five years. The tumor size was 25 millimeters. The margin positive rate was 21.05%, accompanied by two local recurrences [35]. A matched case-control research conducted by Lim et al. revealed that the aesthetic outcome was superior, and the rates of re-excision were reduced in the RBM group compared to WLE [32].

A retrospective analysis of 270 patients who received RBM documented the surgical and oncological outcomes. The median age of the patients was 61 years, and the median follow-up duration was 39 months. The carcinoma was situated in the two superior quadrants. In fifty percent of the patients, the mean tumor size was 18 mm. Postoperative complications occurred in 6.6% of patients [31]. A study comparing reduction mammoplasty and RBM indicated that the latter operation exhibited less morbidity, a lower complication rate, no delays in radiotherapy, and superior cosmetic outcomes [36].

The crescent excision is performed to access the tumor situated between the 9 and 3 o'clock positions in the upper quadrants. The crescent approach is straightforward to execute unilaterally, adheres to oncological principles of breast cancer management, and eliminates the need for additional contralateral breast symmetrization [37]. In a previous study, the crescent technique was used in two cases for resection of tumors located in the upper central quadrant between 10 and 2 o'clock positions in patients with small-size to moderate-size breasts. Cosmetic results were excellent [38].

So far, there is no definitive consensus or guidelines for managing CLBCs. We could not find a specific section concerning this tumor location in the atlas and guidelines for OPS [39]. An atlas and guidelines for OPS was created to assist in patient selection and determining the most suitable surgical procedure for breast cancer patients undergoing BCS. This classification and quadrant per quadrant atlas did not specifically refer to periareolar tumors. Likewise, the American Society of Breast Surgeons classified OPS based on volume displacement and replacement concepts, but it did not specifically reference CLBCs [40].

The findings of the current study can suggest an approach for managing CLBC cases (Figure 4). The algorithm categorizes individuals based on tumor location, as peri- or retroareolar positioning served as the primary rationale for the differing surgical procedures in this study. The second determinant for distinction is the extent of breast ptosis. This method may serve as a primary directive for definitive oncoplastic surgical care of this rather overlooked area in the existing guidelines.

A comprehensive multicenter investigation is essential to establish a genuine consensus regarding the validity of this proposed algorithm.

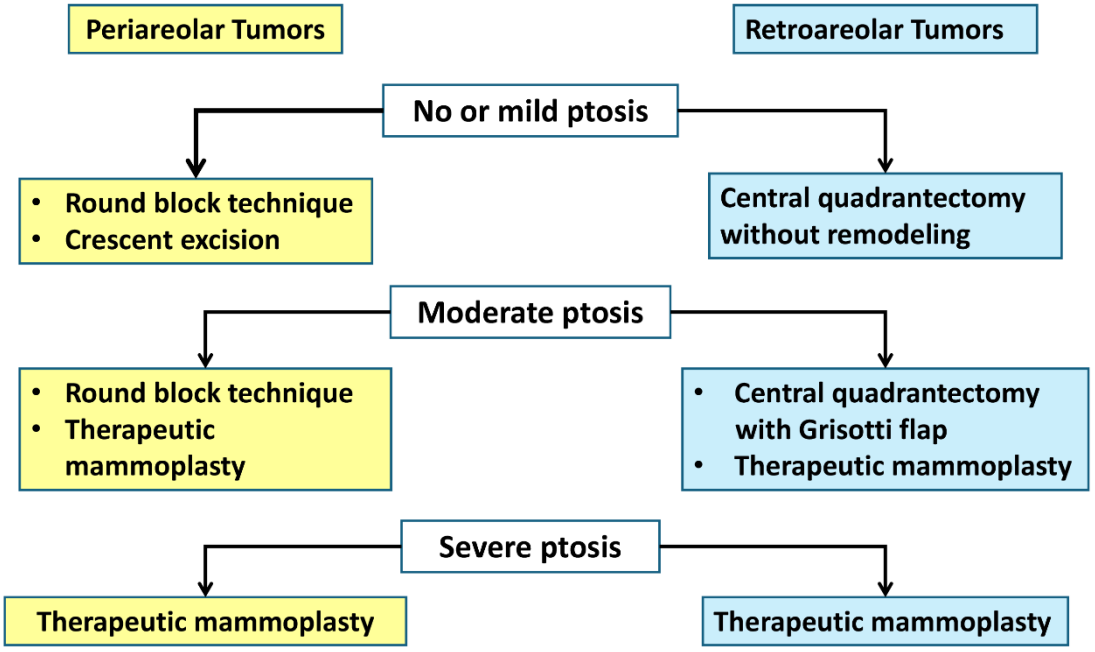

Figure 4: A suggested algorithm for oncoplastic surgical management of centrally located breast tumors

The most prominent limitation of this study is the small sample size. However, this problem is enforced by the relative rarity of CLBCs. Besides, we did not report the frequency of local recurrences or distant metastases in the study group beyond the relatively short follow-up of two years.

6. CONCLUSION AND RECOMMENDATION

Oncoplastic surgery in patients with CLBC depending on the tumor location, breast size and degree of ptosis achieved excellent and good results with the application of different surgical techniques. The selection of the most suitable surgical approach for each patient must include extent of ptosis and involvement of the NAC. Patients presenting with CLBC must undergo a thorough evaluation to detect signs of involvement of NAC, such as non-enhancing lesions and/or nipple retraction, alongside an intraoperative frozen section of the excised lesion and nipple coring biopsy, to determine whether there is a necessity for NAC removal, especially in retroarelar lesions.

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