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Cosmetic and Oncological Outcome of Different Oncoplastic Techniques in Female Patients with Early Central Breast Cancer

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Abstract

Background: Surgical management of breast cancer has evolved significantly over the years, trending away from radical procedures, and moving toward those with complete resection of tumor while preserving the normal parenchyma tissue thereby decreasing patient morbidity. This shift has allowed for improved aesthetic outcomes and quality of life for patients, while maintaining equivalent oncologic safety. The aim of this study was to assess the cosmetic and oncological outcome of different oncoplastic techniques in female patients with early centrally located breast cancer. Methods: This study included ٤٠ female patients with CLBC that were treated at the General Surgery department Benha university hospital using four oncoplastic techniques, from August ٢٠٢٠ to November ٢٠٢١. Patients were divided into ٤ groups according to operation type: Group I : Grisotti technique (n=١٠) Group II : Melon slice technique (n=١٠) Group III : Donut technique (n=١٠) Group IV : Batwing mastopexy technique (n=١٠). Results: Cosmetic results are assessed by dividing techniques to NAC involvement operations and NAC preserved operations. Group I and II (NAC removal operations) showed a statistically significant difference in patient satisfaction between Grisotti technique which shows better results (٧ excellent cases, ٢ good and ١ fair) and Melon slice technique which shows (only one excellent cases , ٥ good and ٤ fair) (p=٠.٠٢٢٥). Group III and IV (NAC preserved operations) showed no statistically significant difference as Donut technique shows (٨ excellent, one good and one fair cases) while Batwing mastopexy technique shows (٧ excellent, ٢ good and one fair cases). Conclusion: Oncoplastic breast surgery techniques are safe and effective and can be used to reconstruct the central quadrant after resection of CLBC with reasonable cosmetic outcomes which improvs patient satisfaction.

Key words: Cosmetic and Oncological Outcome - Oncoplastic Techniques - Female Patients - Early Central Breast Cancer

١.Introduction:

Breast cancer represent ٣٢٪ of cancers diagnosed in female population in Egypt with about ١٨٠٠٠ new cases diagnosed among female in ٢٠١٤ in Egypt **(١).**

Breast-conserving surgery (BCS) followed by adjuvant radiotherapy, was documented to be equal to mastectomy with regard to oncological outcomes (٢) and had, to a large extent, replaced total mastectomy in the last few decades. Oncoplastic breast surgery (OBS) was developed with the aim of further improving the esthetic and functional outcomes of BCS **(٣).**

The central quadrantectomy was the usual conservative treatment for CLBC. In the majority of cases, this procedure involves the excision of the NAC as well as the corresponding part of the underlying breast parenchyma down to the pectoralis fascia, which can result in local glandular defects and poor cosmetic results like distortion of the breast contour and scar contracture. The central glandular defect can be corrected with great cosmetic results thanks to the development of OPS procedures, which involve volume displacement or replacement approaches. **(٤)**

Oncoplastic breast surgery (OBS) was developed as an extension of breast-conserving surgery (BCS) in an effort to improve aesthetic and oncological outcome following surgery for breast cancer **(٥).**

The aim of this work was to assess the cosmetic and oncological outcome of different oncoplastic techniques in female patients with early central breast cancer.

٢.Patients and Methods

Type of the study:

This prospective study was carried out at the Department of General Surgery, Faculty of Medicine, Benha University. A total of ٤٠ female patients with centrally located breast cancer (CLBC) and indicated to oncoplastic breast surgery (OBS) were enrolled into the study.

Target population:

All female patients with centrally located breast cancer who sought treatment at the Department of General Surgery, Faculty of Medicine, Benha University during the study period from August ٢٠٢٠ to November ٢٠٢١.

Study population:

All female patients who presented to the outpatient clinic with centrally located breast cancer.

Inclusion criteria:

All patients with early central breast cancer were included in the study. The definition of CLBC is cancer located within ٢ cm of the areola **(٦)**.

Exclusion criteria:

- Patients with peripheral or eccentric cancer breast (extends more than ٢ cm beyond the areolar margin).
- Multicentric breast cancer.
- History of breast radiotherapy.
- Inflammatory breast cancer (IBC).
- Systemic metastasis.
- Patient refusal of BCS.
- Pregnancy.
- Unfit patients.
- Ethical consideration**:**

All official permission letters taken from director of the General Surgery Department before start in the data collection. The study purpose and treatment were carefully explained to the patients individually. Then, they were consented to participate in the study. They were allowed to ask questions freely to ensure that they had understood.

Methods:

Every patient was subjected to:

A. Clinical assessment:

Complete history: Personal history [including age and parity status, menstrual history, special habits (as smoking), family history (if one member of family of the patient was diagnosed with breast cancer as mother, sister or daughter) and history of drug intake as contraceptive pills or previous radiation exposure

Complete clinical examination of both breasts and axilla including assessment of the breast size (cup size), shape, ptosis (by LaTrenta and Hoffman classification) **(٧),** previous operations (biopsies, previous surgery) in addition to co-morbidities such as diabetes mellitus and obesity.

B. Imaging assessment:

- Ultrasound and mammogram and/ or MRI of breast.
- Metastasis was excluded by metastatic work up in the form of US abdomen, CT chest, and bone scan if needed.

C. Biopsy:

Tru-cut biopsy and immunohistochemistry to determine the biological type of the tumor. Patients with suspected Paget's breast (PDB) disease underwent wedge biopsy.

D. Laboratory investigations:

- Routine laboratory investigations including:
- Complete blood picture.
- Bleeding and coagulation profile.
- Fasting blood sugar.
- Renal function tests (blood urea nitrogen and creatinine)
- Liver function tests (ALT, AST, serum albumin, serum bilirubin).

E. Assessment of the NAC:

Evaluation of NAC is an essential part of the preoperative assessment to detect if NAC is involved or not. NAC complex was excised if any of the following features present: Clinical signs of NAC involvement (retraction of nipple, nipple discharge, ulceration, Paget disease) or radiological findings suggestingmalignant involvement of the NAC (distance from the lesion to nipple less than ٢ cm, done by MRI).

F. Surgical procedure:

- Grisotti mastopexy.
- Melon slice technique.
- Quadrantectomy with donut technique.
- Quadrantectomy with batwing mastopexy.

Surgical technique:

According to NAC's involvement, size of the breast, and degree of ptosis, we classified the patients into ٤ groups (figure ١). Patients who required contralateral breast surgery to achieve bilateral symmetry refused to do any contralateral surgery. Also, patients who underwent NAC resection refused to undergo NAC reconstruction.

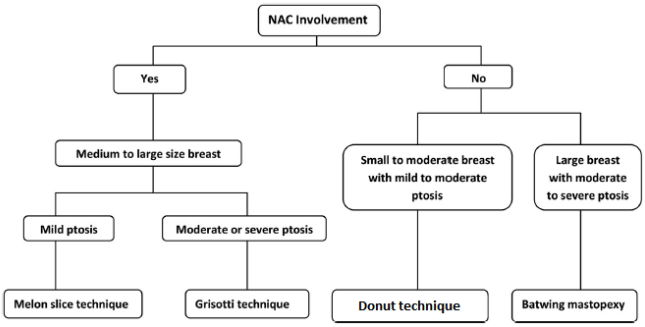


Fig (١): Outlines of OPS techniques

Preoperative assessment:

A multidisciplinary team that included one or more specialised members from general surgery, pathology, radiology, radiation, and medical oncology reviewed the patients, and if they met our inclusion criteria, patients were recruited in our study.

Preoperative thorough medical history, physical examination of both breasts and axilla, evaluation of breast size (cup size),

shape, ptosis, prior operations (biopsies, previous surgery), as well as co-morbidities such diabetes mellitus and obesity, were all performed on all patients.

LaTrenta and Hoffman Classification was used to evaluate the degree of breast ptosis. Investigations were conducted, including standard laboratory tests, bilateral mammography and ultrasonography, an MRI, and a metastatic workup. Patients with suspected Paget's breast (PDB) disease underwent wedge biopsy; core needle biopsy was used for diagnosis.

Surgical techniques

Tumors present at the retro-areolar region, or encroaching on it, underwent central quadrantectomy including excision of the nipple/areola complex (NAC) down to the pectoralis fascia . Following surgical excision, the breast specimen was marked with sutures by the surgeon to retain orientation. Surgical margins were determined by macroscopic and histologic examination of frozen sections of the breast specimens in the operating room by a pathologist. An adequate safety margin of ١ cm was always insured.

Patients presenting with radiologically confirmed clinical axilla, had sentinel lymph node biopsy (SLNB), using patent blue and/or radiolabelled colloid. Combined intradermal peri-areolar and peri-tumoral injection techniques was used. Patients with positive SLNB or radiologically detected lymph nodes in the axillae received level I and II dissection. Axillary lymph node dissection (ALND) was completed in whenever positive one or both axillary lymph nodes levels were accoutered.

١. Grisotti mastopexy:

It consists of excision of the central quadrant inferior based comma-shaped flap mobilization, with rounded skin island to fill the defect (figures٢ and ٣).

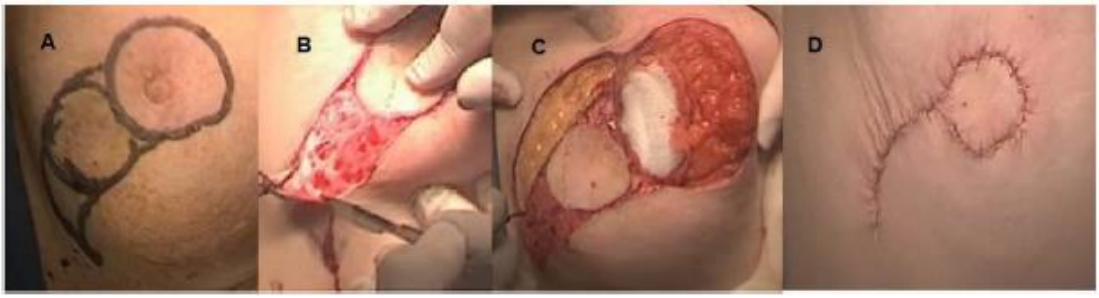


Fig (٢): Grissoti technique

(A) Preoperative mapping.
(B) Flapde-epithelialization without new areola.
(C) Central quadrant defect.
(D) Postoperative view.

Mobilization of the flap will be done using one of the following techniques:

- The medial margin of the flap was incised down to the pectoral fascia with wide mobilization of the flap from the pectoral fascia; then, the flap was advanced and rotated to fill the defect.
- The dermis of the medial and lateral margins of the flap was released to the required extent but keeping its base on the pectoral fascia intact to preserve blood supply.

Fig (٣): Another patient with Grisotti technique

٢. Melon slice technique:

It consists of horizontal elliptical excision, including NAC, with excision of the tumor with safety margin down to pectoral fascia followed direct closure (figure ٤).

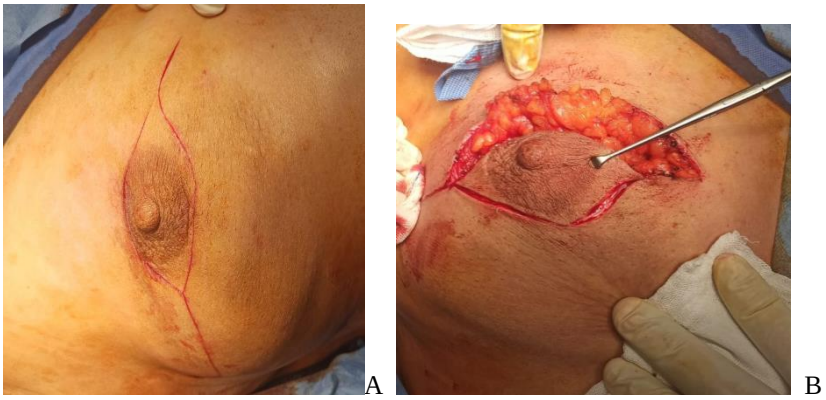


Fig (٤): Melon slice technique

(A) Preoperative mapping.
(B) Elliptical incision.
(C) Tumor bed.

٣. Donut technique:

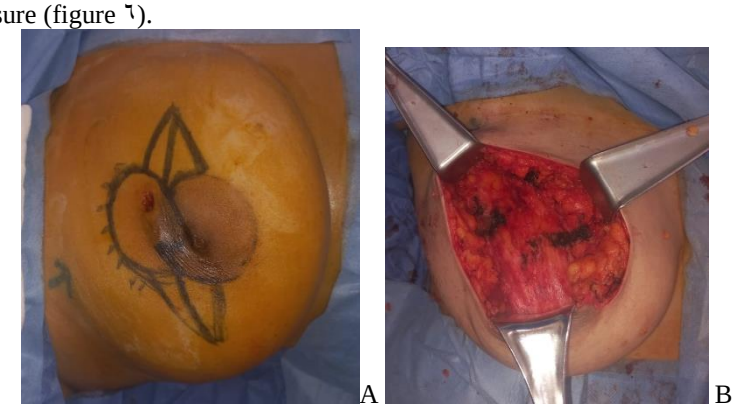
It consists of ٢ circular skin marking, the inner circle is made on the border of the areola, and the outer circle depends on the size and location of the tumor, breast ptosis, and the position of the nipple. De-epithelialization of the tissue between ٢ incisions, then excision of the tumor with safety margins down to the pectoral fascia. Skin incisions are closed using a running technique (figure ٥).

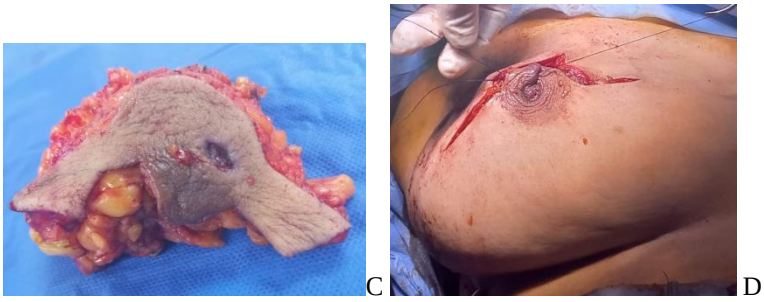
Figure (٥): Donut technique

(A) Preoperative mapping.
(B) De-epithelialization between ٢ circles.
(C) Central quadrantectomy defect.
(D) Postoperative view.

٤. Batwing mastopexy technique:

Two semicircular incisions are performed with angled “wings” on each side of the NAC. The ٢ half-circles are positioned to allow them to be re-approximated to each other at wound closure. Removal of these skin wings enables the semicircles to be shifted together without creating redundant skin folds at closure (figure ٦).





C D

Figure (٦): Batwing mastopexy technique

(A) Preoperative mapping.
(B) Glandular defect.
(C) Specimen.
(D) closure of the wound.

٣.Results:

As Grisotti technique and Melon slice technique are indicated in patients' tumors with NAC extent, hence, all patients in Group I and II was with NAC involvement before surgery.

After surgery, NAC was involved in ٨(٨٠٪) of patients in Group I (Grisotti technique) and ٦(٦٠٪) in group II (Melon slice technique) while NAC completely free in Group III (donut technique) and group IV (Batwing mastopexy technique) **Table (١)**

Table (١) Distribution of NAC involvement after surgery in all studied groups

NAC involvement after surgery	Yes	No	X^2 test	P value
Group I Grisotti technique (n=١٠)	٨ (٨٠٪)	٢ (٢٠٪)		
Group II Melon slice technique (n=١٠)	٦ (٦٠٪)	٤ (٤٠٪)		
Group III Donut technique (n=١٠)	٠ (٠٪)	١٠ (١٠٠٪)	٢٢.٤١٨	<٠.٠٠٠١
Group IV Batwing mastopexy technique (n=١٠)	٠ (٠٪)	١٠ (١٠٠٪)		

There were ١٤ patients (٣٥٪) who developed postoperative complications. ٦ patients (١٥٪) developed superficial wound infection and were managed conservatively with antibiotics. ٤ patients (١٠٪) developed hematoma, all were treated conservatively. ٤ patients (١٠٪) developed seroma all were treated with needle aspiration. There was no statistically significant difference between groups according to postoperative complications. Postoperative complications are illustrated in **Table (٢)**

Table (٢) Complications distribution in all studied groups

Complications, n (%)	Seroma	Hematoma	Wound infection	Total	Fisher	P value
Group I Grisotti technique (n=١٠)	٠ (٠٪)	٢ (٢٠٪)	٢ (٢٠٪)	٤ (٤٠٪)		
Group II Melon slice technique (n=١٠)	١ (١٠٪)	١ (١٠٪)	١ (١٠٪)	٣ (٣٠٪)		
Donut technique (n=١٠)	١ (١٠٪)	١ (١٠٪)	٢ (٢٠٪)	٤ (٤٠٪)	٠.٤٣٩	٠.٩٣١
Batwing mastopexy technique (n=١٠)	٢ (٢٠٪)	٠ (٠٪)	١ (١٠٪)	٣ (٣٠٪)		
Total	٤ (١٠٪)	٤ (١٠٪)	٦ (١٥٪)	**١٤ (٣٥٪)**		

Mean tumor size was ٢.٤٨ ± ٠.٩٠ cm. Surgical safety margins were negative in all patients with a mean distance from tumor margin ١.٠٨ ±٠.٥٧cm. There was no statistically significant difference between groups according to Tumor size and Safety margins

TNM status of the tumors were pT١ in ١١ patients (٢٧.٥٪) and pT٢ in ٢٩ patients (٧٢.٥٪) while axillary lymph nodes were positive in ٢٦(٦٥٪) patients. There was no statistically significant difference between groups according to TNM status. All Pathological properties are illustrated in **Table (٣)**

Table (٣) Pathological properties distribution in all studied groups

Pathological properties		Group I Grisotti technique	Group II Melon slice technique	Group III Round block technique	Group IV Batwing mastopexy technique	Total	ANOVA / x٢	P value
Tumor size,cm		٢.٦±٠.٨٧	٢.٢±١.٠٣	٢.٤±٠.٧٩	٢.٧±٠.٩٢	٢.٤٨ ±٠.٩٠	٠.٥٢٧١	٠.٦٦٧
Safety margins		١.١±٠.٦٣	٠.٩±٠.٧١	١±٠.٤٨	١.٣±٠.٤٧	١.٠٨ ±٠.٥٧	٠.٨٦٢٧	٠.٤٧٠
TNM stage	pT١	٣ (٣٠٪)	٤ (٤٠٪)	٢ (٢٠٪)	٢ (٢٠٪)	١١ (٢٧.٥٪)		
	pT٢	٧ (٧٠٪)	٦ (٦٠٪)	٨ (٨٠٪)	٨ (٨٠٪)	٢٩ (٧٢.٥٪)	١.٣٧٩	٠.٧١٠
+ve LN involvement		٦ (٦٠٪)	٧ (٧٠٪)	٥ (٥٠٪٠	٨ (٨٠٪)	٢٦ (٦٥٪)	٢.١٩٧	٠.٥٣٢

Cosmetic results are assessed by dividing techniques to NAC involvement operations and NAC preserved operations. Group I and II (NAC removal operations) showed a statistically significant difference in patient satisfaction between Grisotti technique, which shows better results (٧ excellent cases, ٢ good and ١ fair), and Melon slice technique which shows (only one excellent cases , ٥ good and ٤ fair) (p=٠.٠٢٢٥).

Group III and IV (NAC preserved operations) showed no statistically significant difference as Donut technique shows (٨ excellent, one good and one fair cases) while Batwing mastopexy technique shows (٧ excellent, ٢ good and one fair cases) (p value=٠.٨١٨٧) **Table (٤)**

Table (٤) cosmetic result **distribution in all studied groups**

cosmetic result, **n (%)**		Excellent	Good	Fair	X^2 test	P value
NAC involvement operations	Group I Grisotti technique (n=١٠)	٧ (٧٠٪)	٢ (٢٠٪)	١ (١٠٪)		
	Group II Melon slice technique (n=١٠)	١ (١٠٪)	٥ (٥٠٪)	٤ (٤٠٪)	٧.٥٨٥	.٠٢٢٥
NAC preserved operations	Group III Donut technique (n=١٠)	٨ (٨٠٪)	١ (١٠٪)	١ (١٠٪)		
	Group IV Batwing mastopexy technique (n=١٠)	٧ (٧٠٪)	٢ (٢٠٪)	١ (١٠٪)	٠.٤٠	٠.٨١٨٧
Total		٢٥ (٦٢.٥٪)	٩ (٢٢.٥٪)	٦ (١٥٪)	١٢.٨٠٥	٠.٠٤٦٢٤

٤.Discussion

Breast cancer represent ٣٢٪ of cancers diagnosed in female population in Egypt with about ١٨٠٠٠ new cases diagnosed among female in ٢٠١٤ in Egypt **(١) .**

Breast-conserving surgery (BCS) followed by adjuvant radiotherapy, was documented to be equal to mastectomy with regard to oncological outcomes **(٢),** and had to a large extent replaced total mastectomy in the last few decades. Oncoplastic breast surgery (OBS) was developed with the aim of further improving the esthetic and functional outcomes of BCS **(١٠) .**

The central quadrantectomy was the usual conservative treatment for CLBC. In the majority of cases, this procedure involves the excision of the NAC as well as the corresponding part of the underlying breast parenchyma down to the pectoralis fascia, which can result in local glandular defects and poor cosmetic results like distortion of the breast contour and scar contracture. The central glandular defect can be corrected with great cosmetic results thanks to the development of OPS procedures, which

involve volume displacement or replacement approaches. **(٤)**

Oncoplastic breast surgery (OBS) was developed as an extension of breast conserving surgery (BCS) in an effort to improve esthetic and functional outcome following surgery for breast cancer **(٥).**

The aim of this study was to assess the cosmetic and oncological outcome of different oncoplastic techniques in female patients with early centrally located breast cancer

This study included ٤٠ female patients with CLBC that were treated at the General Surgery department by four oncoplastic techniques, Benha university hospital from August ٢٠٢٠ to November ٢٠٢١. Patients were divided into ٤ groups according to operation type :

- Group I : Grisotti technique (n=١٠)
- Group II : Melon slice technique (n=١٠)
- Group III : Round block technique (n=١٠)
- Group IV : Batwing mastopexy technique (n=١٠)

The mean age of the patients was ٥٣.٤٦ ± ٨.٦٥ years (range; ٣٧ - ٧٢). There was no statistically significant difference between groups according to age.

In the same line with Essa et al., ٢٠٢١ study, the mean age was ٥٣ years. The patients' average age, according to Park et al., ٢٠١٤ is ٤٩ years. Naguib ٢٠٠٦ found a mean age of ٤٨ years in another study. The age of the patients in this study is similar to that of the previous three investigations.

Regarding Menopausal status, ١٨ (٤٥٪) of patients was postmenopausal state .There was no statistically significant difference between groups according to Menopausal status.

٧ (١٧.٥٪) patients was with positive Family history of cancer breast. There was no statistically significant difference between groups according to Family history of cancer breast.

As Grisotti technique and Melon slice technique are indicated in patients' tumors with NAC extent, all patients in Group I and II was with NAC involvement before surgery. In contast, patients in group III and IV was with no NAC involvement before surgery. (p<٠.٠٠٠١).

After surgery, NAC was involved in ٨(٨٠٪) of patients in Group I (Grisotti technique) and ٦(٦٠٪) in group II (Melon slice technique) while NAC completely removed in Group III (Round block technique) and group IV (Batwing mastopexy technique) There was a statistically significant difference between groups according to Menopausal status. (P<٠.٠٠٠١).

There were ١٤ patients (٣٥٪) who developed postoperative complications. ٦ patients (١٥٪) developed superficial wound infection and were managed conservatively with antibiotics. ٤ patients (١٠٪) developed hematoma, all were treated conservatively. ٤ patients (١٠٪) developed seroma all were treated with needle aspiration. There was no statistically significant difference between groups according to postoperative complications.

The tumor size (mean, ٢.٤٨ ± ٠.٩٠ cm). Surgical safety margins were negative in all patients with a mean ١.٠٨ ±٠.٥٧cm. There was no statistically significant difference between groups according to Tumor size and Safety margins

Tumors were staged as pT١ in ١١ patients (٢٧.٥٪) and pT٢ in ٢٩ patients (٧٢.٥٪). ٢٦(٦٥٪) patients presenting with positive axillary lymph nodes. There was no statistically significant difference between groups according to TNM stage and +ve LN involvement

cosmetic result are assessed by dividing techniques to NAC involvement operations and NAC preserved operations. Group I and II (NAC removal operations) showed a statistically significant difference between Grisotti technique which shows better results (٧ excellent cases, ٢ good and ١ fair) and Melon slice technique which shows (only one excellent cases , ٥ good and ٤ fair) (p=٠.٠٢٢٥)

Group III and IV (NAC preserved operations) showed no statistically significant difference as Round block technique shows (٨ excellent, one good and one fair cases) while Batwing mastopexy technique shows (٧ excellent, ٢ good and one fair cases)

Excellent patient satisfaction with oncoplastic breast surgery was also obtained in some **studies (٨).**

Also, in agreement with our results, **(١١)** determined that ٩٤٪ of patients were very satisfied or moderately satisfied with the cosmetic outcome; ٨٥٪ of patients felt that the treated breast was nearly identical or only slightly different from the untreated breast.

(١٢) observed good cosmetic outcome in ٨٤٪ to ٨٩٪ of patients. In the work of **(١٣),** the use of oncoplastic techniques achieved negative margins with acceptable cosmetic results in the majority (٨٤٪) of patients. In that of **(١٤),** ٩٦٪ of patients were moderately to extremely satisfy with the surgery.

In contrast to the present study, **(١٥)** recorded postoperative asymmetry of the breasts in a high proportion of the patients, with the control breast being more ptotic and larger in size than the treated breast. ٩٦.٧٪ of

patients were satisfied with the performed type of breast surgery, while (٣.٣٪) preferred subcutaneous mastectomy with implant. (٨٣.٣٪) of patients did not suggest reshaping of treated breast; (٦.٧٪) chose nipple reconstruction

٥.Conclusion

Oncoplastic breast surgery techniques are safe and effective and can be used to reconstruct the central quadrant after resection of CLBC with reasonable cosmetic outcomes which improvs patient satisfaction.

From our results and previous literature, Oncoplastic breast surgery procedures are safe and successful, and they can be utilized to reconstruct the center quadrant following CLBC excision with acceptable cosmetic results, resulting in increased patient satisfaction.

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