



## ORIGINAL ARTICLE

# ONCOPLASTIC RESECTION OF UPPER OUTER QUADRANT BREAST CANCER

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### Abstract

**Aim:** We report the results of four different oncoplastic procedures performed for upper outer quadrant breast cancer.

**Methods:** A total of 56 patients of early stage breast cancer were included in the current study. They were divided into 4 groups according to the surgical technique; Group I, round block technique, Group II, lateral breast mammoplasty, Group III: batwing and hemi batwing techniques, and Group IV: vertical mammoplasty technique. Each technique was evaluated regarding the procedure related complications, aesthetic result, and oncologic outcome.

**Results:** Thirteen patients underwent round block technique. Cosmetic outcome was excellent in 45% of patients and good in 55 %. One patient developed local recurrence and mastectomy was performed. Fifteen patients underwent lateral mammoplasty. Four patients showed excellent result (29%) while 7 patients showed good results (50%) and 3 (21%) patients showed satisfactory result. Two patients developed local recurrence and mastectomy was performed. In batwing and hemi batwing group (n=18), the cosmetic outcome was good in 68.7 % of patients. Vertical mammoplasty was performed to 10 patients; two patients showed wound dehiscence treated by secondary sutures the cosmetic results were excellent in 60% of patients

**Conclusion:** The use of oncoplastic techniques achieved negative margins with better cosmetic results and acceptable associated morbidities in the majority of patients.

**Keywords:** Mammary cancer, Conservative surgery, cosmetic outcome.

### INTRODUCTION

Breast conservation is chosen over mastectomy in approximately 70% of patients with early stage (I-II) breast cancer when provided with informed choice.<sup>(1)</sup> The first randomized trials, with 2 cm<sup>(2)</sup> and 4 cm<sup>(3)</sup> tumors, contributed solid scientific evidence and continued surveillance over 20 years has confirmed overall and disease-free survivals equivalent to

mastectomy,<sup>(4,5)</sup> although, the rate of local recurrence may be slightly higher.<sup>(5)</sup>

After breast conservation therapy, 20-30% of patients are reported to have poor cosmetic results with deformities of the treated breast.<sup>(6)</sup> Up to 60% of breast cancers are located laterally.<sup>(7)</sup> The importance of this location is that it allows 15% breast volume excision whereas medial location allows only up to 5 % volume excision.<sup>(8)</sup>

Oncoplastic surgery is defined as the combination of reconstructive techniques with oncologic surgery.<sup>(9)</sup> These techniques permit excision of large volume of surrounding normal breast tissues which increase the chance of microscopic clearance with tumor free margins and improved local control rates. Furthermore, such techniques lead to sustained optimum cosmetic results in the longer term and better quality of life.<sup>(10)</sup>

The goal of this article is to compare various oncoplastic techniques used in upper outer quadrant breast cancer.

## PATIENTS AND METHODS

A total of 56 female patients with histologically verified early stage (I & II) breast cancer were included in this study. These cases were presented to Surgical Oncology Unit, Oncology Center and in the authors' hospitals in the period between November 2005 to June 2009. All tumors were located at the upper outer quadrant and proved single by pre-operative mammography. Thorough history and clinical examination were done and all patients underwent metastatic work up preoperatively. Oncologic exclusion criteria for these oncoplastic techniques were the same as for all breast conserving surgery (BCT): inability to obtain resection free margin (R0 resection) after reasonable attempts, multicentric carcinoma, inflammatory breast cancer, contraindication for radiotherapy and the patient's choice. A Non-oncologic exclusion criterion was small breast size.

We informed the patients the steps of the procedures. Then we let the patients know that the oncoplastic techniques would be about 30-60 minutes more time consuming, but it will be more aesthetic and it would not affect the oncologic safety without increasing the rate of other complications. Written informed consent was obtained from all patients.

Immediate or late contra-lateral breast symmetrization was done according to the patient's own preference.

### **Surgical Techniques**

A standard oncologic role of excision of the primary tumor in any oncoplastic procedure entails wide local excision of the tumor with a negative safety margin verified by intraoperative frozen section examination as applied in breast conserving surgery. The choice of one oncoplastic technique over another depends upon the patient preference. Each technique was illustrated to the patients and the choice of the procedure was tailored according to the location of the tumor in relation to the areolar edge, age of the patients, size of the breast, body mass index (BMI) and medical co morbidities (diabetes mellitus).

#### **Group I Round block technique.<sup>(11)</sup> (n= 13 patients)**

The round block technique can be employed to remove most tumors as near as 4 cm to the areolar margin. The technique was chosen in younger age patients with

average body mass index (20-25%). After preoperative marking, de-epithelialization of the peri areolar region was done by scalpel. The dermis was incised in the half portion of the de-epithelialized area corresponding to the segmental portion of the breast involved by the tumour. The remaining half portion was considered to be the vascular pedicle involved in the glandular and NAC blood supply.<sup>(11)</sup> The surrounding skin and subcutaneous tissues was undermined in order to facilitate greater resection of glandular tissue.

A segmentally-oriented excision was then performed with the aim of incorporating the tumour with at least a 1-cm macroscopic margin of normal tissue. The margins of the resection were cleanly incised. The resulting defect was closed with approximation of the glandular tissue following mobilization of the breast from the pectoralis fascia. The axilla was cleared through separate transverse incision along the axillary hair line and level I and II axillary LNs were dissected.

#### **Group II: Lateral breast mammoplasty technique<sup>(7)</sup> (n=15 patients)**

In case of more laterally situated tumors more than 4 cm from the areolar margin as measured by tap. The technique combines wide tumor excision with superomedial NAC repositioning, on a dermo-glandular pedicle, to both counteract the lateral axial scar contraction and breast ptosis.<sup>(7)</sup> The new NAC position is marked according to standard aesthetic principles its position about 19-21 cm from the suprasternal notch and 9-11 cm from the midline.<sup>(12)</sup>

Following peri-areolar de-epithelialisation using scalpel (Fig. 1a), the tumorectomy was performed as enblock of skin and parenchyma down to the pectoral fascia. It takes the form of a pyramid (Fig. 1b) with the base abutting the areolar margin and the apex at the lateral extremity of the breast. After parenchymal dissection from the pectoral fascia using diathermy, the glandular tissues were approximated by sutures and closure was performed without separating the skin from underneath glandular tissue so there is no danger of irradiating thin skin flaps. Infero-medial undermining allows gland reconstitution and tension-free closure through parenchyma rotation.<sup>(7)</sup> We extended the incision for axillary surgery and level I and II axillary LNs were dissected.

#### **Group III: Batwing Technique.<sup>(13)</sup> (n=18 patients)**

After informing our patients about the details of every oncoplastic procedure, we noticed that older ladies in our cohort chose the batwing technique. Two closely similar half-circle incisions are made with angled wings to each side of the areola (one side only in hemi batwing) (Fig. 4a). The skin between the half circle and the wings (triangle) is then excised using scalpel. The upper side of the triangle is to be incised; the tumor is undermined from above and then excised with macroscopically clear margins. The fibro glandular tissue is advanced to close the subsequent defect; the

resulting triangle was put underneath the skin laterally from the defect. The defect was closed with subcutaneous and subsequently with intracutaneous sutures. This procedure caused lifting of the nipple, which leads to asymmetry.<sup>(13)</sup> However, in patients with pendulous breasts, this effect was desirable by the patient. A contra lateral breast symmatrization was undertaken by the same technique in only two patients. The axilla was cleared through a separate transverse incision along the hair line and level I and II LNs were removed.

**Group IV: Vertical mammoplasty (no= 10 patients)<sup>(14,15)</sup>**

Younger patients with huge pendulous breasts and average BMI (20-25) choosed this technique. Informed consent was taken for vertical therapeutic mammoplasty to the diseased breast and reduction mammoplasty to the other breast for symmatrization to all patients .After preoperative drawing (Fig. 2a), we applied the principles of reduction mammoplasty.<sup>(14)</sup> Tissue was removed as a vertical wedge in the breast meridian inferiorly and the resection was continued out laterally by beveling out as needed under a lateral flap.<sup>(14)</sup> All tissues in the lateral quadrants were removed. There was a vertical scar below the areola .There was also a complete circumareolar scar that resulted from transposing the nipple-areolar complex. The advantage of this technique is that it is based on a superoemial or medial pedicle that has excellent blood supply.

The axilla was cleared through a separate transverse incision in the axillary hair line removing level I and II.

For all patients in the 4 groups, the skin was closed by subcuticular sutures by non-absorbable monofilament suture. 2 separate suction drains were inserted, one in the breast and the second in the axilla. Drains are left till the out coming fluid was less than 20 cc/ day. Patients received perioperative antibiotics (1 hour before the surgery) and continued 2 days postoperatively.

Patients were kept in the recovery room for 6 hours then transferred to the surgical ward. The hospital stay ranged 2-5 days (median 2.6 days).

**Assessment**

**- Procedures related Complications:**

Early postoperative complications: During the hospital stay (maximum of 5 days), patients were assessed for the onset of wound infection, dehiscence, nipple and areola necrosis and haematoma formation.

Delayed postoperative complications:

In the outpatient visits (for one month postoperatively), assessment was made for wound infection, persistent seroma formation in the breast or axilla.

**- Aesthetic outcome:**

The cosmetic evaluation was performed separately by a surgeon and the patients and the mean was recorded. Cosmetic assessment was performed 6 months after the operation using a grading system. A score of 5 to 1 (5 =excellent; 4 =good; 3= satisfactory;2= poor and 1=very poor) was given after evaluation of the following parameters: symmetry of breasts, shape of breast , symmetry of NAC placement, ipsilateral and contralateral scars.<sup>(16)</sup>

**- Oncologic outcome:**

All patients were evaluated in the outpatient clinics for local recurrence. Thorough clinical examination was done every 3 month alternatively with the medical oncology team. Bilateral breast US was performed every 3-6 months. Mammograms were done for all the patients annually. MRI was done when mammography revealed suspicious data.

**RESULTS**

The tumor size ranged from 1.5- 3.5 cm, lymph nodes were N0 or N1 Table 1. The number of lymph nodes dissected ranged from 10 to 21 lymph nodes (average 15 LNs). The mean age of the patients was 47.5 years for Group I, 49 years for group II, 51.5 years for group III and 45 years for group IV. Patients who underwent batwing and hemi batwing were older (mean 51.5 years) and patients of vertical mammoplasty technique were younger (45 years). Five patients showed persistent positive margins on frozen section examination after reexcision 2 in group I, one in group II and 2 in group III and they were converted to mastectomy.

**Table 1. Tumour size and Lymph node involvement.**

	Round Block (Group I)	Lateral mammoplasty (Group II)	Batwing and hemi batwing (Group III)	Vertical mammoplasty (Group IV)	P
Mean tumour size (cm)	2.6	2.3	2.5	2.9	
Lymph node status					
N0	9/13	10/15	14/18	8/10	0.835
N1	4/13	5/15	4/18	2/10	

**Table 2. Post-operative complications.**

Complications	Round block (Group I)	Lateral mammoplasty (Group II)	Batwing and hemi batwing (Group III)	Vertical mammoplasty (Group IV)	P
1-Wound dehiscence	1/11	1/14	1/16	2/10	0.677
2- Wound infection	1/11	0	2/16	1/10	0.624
3-Nipple and areola necrosis	0	0	0	0	
4-Haematoma	1/11	0	0	0	0.295
5- Seroma formation	1/11	1/14	2/16	2/10	0.795

**Table 3. Cosmetic outcome to each group.**

COSMOTIC OUTCOME	Round block (Group I)	Lateral mammoplasty (Group II)	Batwing and hemi batwing (Group III)	Vertical mammoplasty (Group IV)	P value
Excellent	5/11	4/14	0	6/10	0.006
Good	6/11	7/14	11/16	4/10	0.518
Satisfactory	0	3/14	4/16	0	0.124
Poor	0	0	1/16	0	0.526

Regarding post-operative complications Table 2, seroma developed in 6 patients and was treated by frequent aspiration while wound infection developed in 4 patients and they were all treated by antibiotic after culture and sensitivity test. Five patients complained wound dehiscence. It was minor (less than 1/4th of the wound) in 3 cases in the round block group and major (more than 1/4th of the wound) in 2 cases in the vertical mammoplasty group. Among those 5 cases, infection caused dehiscence in 4 cases, and ischemia caused dehiscence in the 5th case. All patients were treated by secondary sutures after infection control. Only one patient developed hamatoma after round block technique and was managed by evacuation and prophylactic antibiotic.

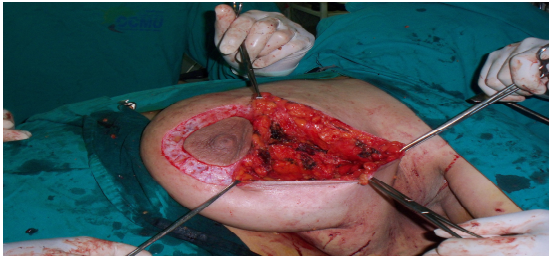
As regard the cosmetic outcome the best outcome Table 3 was with the vertical mammoplasty technique showed

excellent result in 6 patients (60%) (Fig. 2b), followed by the round block technique (Fig. 3) which showed excellent result in 5 patients (45.5%). Lateral mammoplasty technique showed excellent results in 28.5% of patients (Fig. 1c). The least cosmetic result occurred with the batwing and hemi batwing techniques .There were no excellent results and most of the patients showed good results (68.7%) (Fig. 4b) and only one patient (6%) rated here result as bad. There was no very bad result in all groups.

The follow up time of the patients ranged from 18- 60 months with a mean follow up time of 43 months. Local recurrence developed in three patients after 21, 28 and 34 months respectively. These patients were among Group I (one patient), and Group II (2 patients). Those patients were proven non metastatic and modified radical mastectomy was performed to them.



A

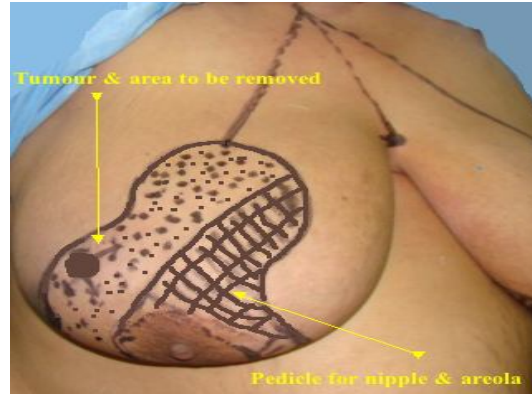


B



C

**Fig 1.**  
**(a) periareolar de-epithelization in lateral mammoplasty.**  
**(b) The defect after removal of the tumour.**  
**(c) Lateral mammoplasty 18 month after the operation.**



A

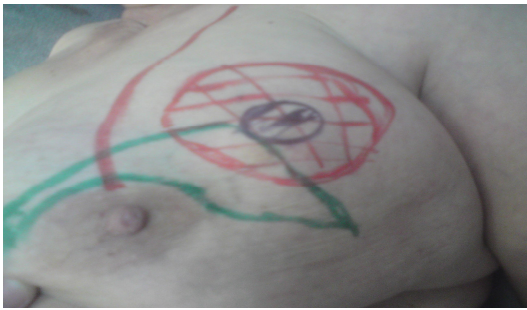


B

**Fig 2.**  
**(a) Preoperative marking before vertical mammoplasty technique.**  
**(b) Vertical therapeutic mammoplasty 2 years after the operation.**



**Fig 3. Final result after round block technique.**



A



B

**Fig 4. (a) preoperative marking for batwing technique  
(b) Final result after batwing technique.**

## DISCUSSION

The demand for breast conserving surgery became the standard care for early stage invasive breast cancer.<sup>(17,18)</sup> Breast conservation surgery provides treatment as effective as mastectomy, with the added merit of preserving the breast.<sup>(19)</sup>

The potential advantages of conservative breast surgery include lower incidence of postoperative pain and complications, preservation of the breast and nipple areolar complex, and shorter delay to adjuvant therapy.<sup>(20)</sup> Unfortunately many women who undergo BCT will have a deformity that may require surgical correction.<sup>(21)</sup> Oncoplastic breast surgery offers tools for breast conservation in patients otherwise destined for mastectomy or poor esthetic outcome.<sup>(22)</sup> Most of our patients have large mean breast volume (cup sizes C&D) permitting an expanded role of oncoplastic techniques.

Whilst technically more challenging, there are numerous benefits to be gained from oncoplastic breast surgery, which satisfies the primary oncological goal of tumor excision, often with increased margins, and yields good aesthetic outcomes.<sup>(23,24)</sup>

In our study, breast morphologies did not differ between groups. The average radiological and histological tumor sizes, the distribution of pathological TNM staging and the histological patterns of the tumors were comparable between groups.

The cosmetic demand varies among patients according to age, social status, and associated co morbidities. As most of breast cancer occurs at the upper outer quadrant, we tried to evaluate various oncoplastic techniques feasible for this quadrant.

In our study, the overall cosmetic outcome was acceptable. Statistically significant better aesthetic results we reached ( $p$  value=0.006) in the vertical mamoplasty technique followed by round block technique. Munhoz found that the best cosmetic

outcome was achieved with reduction mamoplasty in patients with macromastia with satisfactory results of all techniques<sup>(25)</sup> although there has been no consensus regarding the best mamoplasty technique.<sup>(26)</sup> In our series vertical mamoplasty was associated with reduction of breast sizes and round block technique was associated with the least scar among all other procedures. This could explain why they were rated excellent by the patients.

Skin necrosis and wound dehiscence are the most often reported complications after oncoplastic surgery.<sup>(27)</sup> Obese patients, smokers and patients with diabetes carry an increased risk of developing local complications.<sup>(28)</sup> The complication rates in our series were slightly higher in vertical mamoplasty group but without statistical significance. Five cases complained of wound dehiscence. They were all diabetic and 3 of them were obese (BMI 27-30) and they were all managed with secondary sutures.

The inability to obtain clear margins is a contraindication to breast conservation therapy.<sup>(29)</sup> The conversion rate to mastectomy in the current study was 7% (4/56) and conversion was decided after 2 times of involved margin at frozen section. McCulley and Macmillan reported a series of 50 breast cancer patients treated with therapeutic mamoplasty in which 4 patients (8%) required re operation due to surgical margin involvement.<sup>(30)</sup> Giacalone et al report that the advantage of oncoplastic technique is to obtain a large resection margin which may have impact of the oncological outcome.<sup>(31)</sup>

Rietjens et al. in a series of 148 cases of oncoplastic surgery with a median follow-up of 74 months reported a 3% rate of local recurrences after 5 years.<sup>(32)</sup> while Milan 1 study did not show any local recurrence after breast conservation therapy in tumors less than 2 cm in a follow up period of 20 years.<sup>(5)</sup> In the current series, the local recurrence was 6% (3/51). Two cases in the lateral mamoplasty group and one at the round block group. Recurrence was diagnosed after 21, 28, and 34 months. The follow up period is between 18 and 60

months, but longer follow up is needed for more evaluation.

In conclusion the use of oncoplastic techniques for upper outer quadrant breast tumors is associated with better local control and cosmetic outcome with acceptable associated morbidities; Vertical mammoplasty technique was associated with the best cosmetic outcome.

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