



Oncoplastic Surgery for Laterally Located Breast Cancer: A New Approach

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Abstract

Background and Objectives: The aesthetic results of BCS were not satisfying in some challenging scenarios. Breast cancer in the Upper Outer Quadrant (UOQ) of the breast can be excised safely without causing deformity except when more than 20% of breast tissue is removed. In such case, the skin is retracted and the Nipple- Areola Complex (NAC) is pulled towards the incision site. Planning the incision location is an essential step in oncoplastic breast surgery. Visible scarring can be minimized by locating the incision in natural anatomical boundaries like nipple areolar border, the inframammary fold or axilla fossa.

Methods: This study had been conducted on 122 female patients with breast cancer who were suitable for BCS and having tumors laterally located. A skin incision was placed in the lateral mammary sulcus; the mass is removed with dissection of two planes to facilitate closure of the defect by either adipofascial or glandular flap.

RESULTS: The aesthetic results were excellent and satisfactory for all patients. The most frequently encountered complication was surgical site infection followed by seroma formation and fat necrosis.

Conclusion: Lateral sulcus oncoplastic approach is an oncologically and aesthetically accepted option for managing patients presented by later located early breast cancer.

Keywords: BCS; UOQ; Oncoplastic surgery; Breast cancer

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Introduction

Breast cancer is the second most common cancer among women following skin cancer, with an estimated 3.5 million survivors as of 2015. There is continuous annual improvement of the overall survival of breast cancer patients, with 5-year overall survival estimates increasing from 84.6% to 90.9% over the previous two decades [1].

Surgical treatment of breast cancer has undergone marvelous changes over the past three decades. The results of large randomized clinical trials held in Europe and North America documented that the oncologic safety of breast conserving therapy is equal to modified radical mastectomy [2].

For most patients presented by early breast cancer, Breast Conserving Surgery (BCS) followed by radiotherapy has become the preferred treatment. BCS, in addition to oncologic safety, improves the body image and lifestyle. However, the aesthetic results of BCS were not satisfying in some challenging scenarios [3].

The integration of plastic and reconstructive surgery in breast cancer surgery to achieve the best aesthetic outcome with compromising the oncologic safety is termed Oncoplastic Breast Surgery (OPBS). OPBS is not a new term and it is comparable to the ordinary BCS as regarding the margin status and the recurrence rates [4-7].

Oncoplastic procedures applied to facilitate removal of larger volume of breast tissue with less deformity which is much easier than postoperative correction [8-13].

OPBS is classified into volume displacement, by closing the lumpectomy defect using local breast tissue to redistribute the respected volume over the remaining breast tissue, and volume replacement by using tissues other than the breast to fill the lumpectomy defect [14].

Breast cancer in the Upper Outer Quadrant (UOQ) of the breast can be excised safely without causing deformity except when more than 20% of breast tissue is removed. In such case, the skin is



Figure 1: Patient's position on the operating table.

retracted and the Nipple- Areola Complex (NAC) is pulled towards the incision site [3].

Planning the incision location is an essential step in oncoplastic breast surgery. Visible scarring can be minimized by locating the incision in natural anatomical boundaries like nipple areolar border, the inframammary fold or axilla fossa [14].

The aim of this study was to assess the lateral mammary sulcus incision as an oncoplastic approach for laterally located breast cancer.

Materials and Methods

This study had been conducted on 122 female patients with breast cancer who were suitable for BCS and having tumors laterally located. Study had been conducted at Surgical Oncology Unit, Alexandria Main University Hospital during the period from January 2018 to June 2019. Informed written consent was obtained from all patients, and all of them underwent the required preoperative examination, investigations, and preparation.

Exclusion criteria: Presence of any absolute or relative contraindications to BCS or any skin infiltration.

After institutional ethical committee approval, a prospective study of patients who have breast cancer in the outer quadrants of the breast. After a written consent of all patients, they were treated surgically by lateral mammary sulcus approach for tumor excision.

Table 1: Clinicopathological data of patients in the study (n = 122).

	No. (%)
Age (years)	46.3 ± 7.1 (28-62)
<40	22 (18%)
40-50	66 (54.1%)
>50	34 (27.9%)
Site	
UOQ	102 (83.6%)
LOQ	20 (16.4%)
Tumor size (cm)	2.4 ± 0.6 (1-3.7)
<2 (T1)	22 (18.04%)
≥ 2 (T2)	100 (81.96%)
Body mass index	28.6 ± 3.5 (21-37)
Normal (<25)	15 (12.3%)
Overweight (25- <30)	54 (44.3%)
Obese (≥ 30)	53 (43.4%)
Complications	
Seroma	11 (9%)
Fat necrosis	6 (4.9%)
Surgical site infection	12 (9.8%)
Neoadjuvant therapy	12 (9.8%)

Qualitative data were described using number and percentage. Quantitative data was expressed using Mean ± SD. and (Min. to Max.)

Surgical technique

The tumor outline and the incision are marked with permanent ink while the patient is sitting with her arm abducted overhead. The incision length and extension depend on the location and size of the tumor. The incision is located just behind the anterior axillary fold, curves around the breast mound. The entire procedure is carried out with the patient in the supine position with the arm abducted 90 degrees (Figure 1). The operating table is tilted slightly with head-up position and to the contralateral side. After incision, a plane is created between the breast tissue and the skin. Dissection continues till the mass is identified and a medial adequate gross safety margin is reached. The mass is excised with at least 1 cm of normal breast



Figure 2: a. Skin incision in the lateral breast sulcus. b. Elevation of the skin till passing the mass in all directions. c. Identifying the mass in the dissected breast tissue. d. Dissecting the mass from the underlying muscles. e. Margins are marked before excising the mass. f. Cavity after removing the mass with safety margin. g. The defect is closed with rotational flap of breast tissue.



tissue all around. Orientation of the specimen is made before its delivery outside the breast using sutures: Single short superior, long lateral and 2 short threads in the superficial (subcutaneous) surface. Intraoperative frozen section is done to ensure that adequate microscopic safety margin is achieved. Axillary lymph node surgery, either axillary clearance or sentinel lymph node biopsy, is done through the same incision. The defect is closed by adipofascial flap, created from the posterior part of the incision and rotated anteriorly, or rotational flap of breast tissue (Figure 2). Closed suction drain is inserted, and the wound is closed in layers.

All patients were followed up for the possible early complications and for the cosmetic outcome. The cosmetic outcome of the treated breast was evaluated by breast surgeons in comparison with the untreated breast. This evaluation included 7 items described by Aaronson et al. [15]: (a) breast volume; (b) breast shape; (c) breast deformity; (d) NAC position; (e) appearance of the breast scar; (f) skin changes; and (g) overall aesthetic result. Also, Patient satisfaction was assessed regarding aesthetic outcome according to: Size, shape, appearance of scar, symmetry, cleavage, appearance of nipple/areola complex, body wholeness/harmony, proportionate, and feel to touch.

Table 2: Complications.

	Complications					
	Seroma		Fat necrosis		Surgical site infection	
	Absent	Present	Absent	Present	Absent	Present
	(n=111)	(n=11)	(n=116)	(n=6)	(n=110)	(n=12)
Age (years)						
<40	21 (18.9%)	1 (9.1%)	20 (17.2%)	2 (33.3%)	21 (19.1%)	1 (8.3%)
40 - 50	61 (55%)	5 (45.5%)	65 (56%)	1 (16.7%)	62 (56.4%)	4 (33.3%)
>50	29 (26.1%)	5 (45.5%)	31 (26.7%)	3 (50%)	27 (24.5%)	7 (58.3%)
c²(p)	1.812 (0.461)		4.029 (0.116)		5.217 (0.057)	
Mean ± SD.	46 ± 7.1	50.2 ± 5.8	46.4 ± 7	45 ± 10	46 ± 6.9	49.5 ± 8.1
Min. - Max.	28 - 62	39 - 57	28 - 62	30 - 56	29 - 62	28 - 61
t(p)	1.904 (0.059)		0.471 (0.638)		1.637 (0.104)	
Site						
UOQ	94 (84.7%)	8 (72.7%)	98 (84.5%)	4 (66.7%)	91 (82.7%)	11 (91.7%)
LOQ	17 (15.3%)	3 (27.3%)	18 (15.5%)	2 (33.3%)	19 (17.3%)	1 (8.3%)
c²(p)	1.044 (0.386)		1.321 (0.255)		0.631 (0.688)	
Body mass index						
Normal (<25)	14 (12.6%)	1 (9.1%)	15 (12.9%)	0 (0%)	15 (13.6%)	0 (0%)
Overweight (25- <30)	53 (47.7%)	1 (9.1%)	53 (45.7%)	1 (16.7%)	52 (47.3%)	2 (16.7%)
Obese (≥ 30)	44 (39.6%)	9 (81.8%)	48 (41.4%)	5 (83.3%)	43 (39.1%)	10 (83.3%)
c²(p)	7.399(0.012')		3.109 (0.176)		8.801(0.012')	
Mean ± SD.	28.3 ± 3.3	31.7 ± 3.8	28.5 ± 3.5	31.3 ± 2.4	28.4 ± 3.5	31.1 ± 2.2
Min. - Max.	21-37	24-37	21-37	28-35	21-37	27-35
t(p)	3.249' (0.002')		1.997' (0.048')		2.666' (0.009')	
Neoadjuvant therapy	8 (7.2%)	0 (0%)	8 (6.9%)	0 (0%)	7 (6.4%)	1 (8.3%)
c²(p)	0.848 (1.000)		0.443 (1.000)		0.069 (0.575)	

χ²: Chi square test; t: Student t-test

p: p value for association between different categories

*: Statistically significant at p ≤ 0.05

Qualitative data were described using number and percentage. Quantitative data was expressed using Mean ± SD. and Min. to Max.

They were classified as satisfied or not satisfied.

Results

In the period from January 2018 to June 2019, 122 female patients diagnosed with breast cancer in the lateral quadrants of the breast and eligible for BCS were operated through lateral mammary sulcus incision. Twelve of them (9.8%) of cases received neoadjuvant chemotherapy made them eligible for BCS. Table 1 shows the clinical and pathological data of patients in the study. 83.6% of cases had their tumors located in the upper outer quadrant. Surgical site infection was the most frequently encountered complication (12 cases) and treated medically without the need for surgical intervention. Fat necrosis occurred in 6 cases, diagnosed by radiological study (either ultrasonography or mammography) and confirmed by core needle biopsy. Seroma encountered in 11 cases and treated by frequent aspiration. Complications were statistically significant with increased body mass index as shown in Table 2. Follow up period ranged from 3 to 18 months with no signs of recurrent disease. 112 patients (91.8%) were satisfied with the aesthetic results of the procedure (Figure 3 and 4) (Table 3).

Discussion

The lateral mammary sulcus approach for laterally located early breast cancer is a level 1 OPBS in which 2 planes are created to remove the mass followed by creation of adipofascial flap or glandular rotational flap to adequately close the defect. The lateral approach facilitated excision of the mass with adequate safety margin and axillary surgery through a single incision which is placed in a hidden area that is not visible in the sitting position. Rainsbury RM et al. [16] first described lateral incision for latissimus dorsi miniflap for breast reconstruction after partial mastectomy but he placed his patients in lateral position with the arm abducted to dissect the latissimus dorsi muscle. Surgical Site Infection (SSI) was the most commonly encountered complication following our procedure. SSI was more correlated with obesity which is considered by the American Society of Breast Surgeons to be one of the risk factors for SSI following breast surgery [17]. Blood supply to the rotational glandular flap and the adipofascial flap is of important concern as we encountered fat necrosis in 6 of our cases, also related to increased body mass index. The follow up of our patients is not sufficient to assess the oncologic safety of the procedure, but there was no local recurrence along this period in addition to the aesthetic satisfaction of our patients.

Table 3: Distribution of the studied cases according to patient satisfaction (n=122).

Patient satisfaction	No.	%
Satisfied	112	91.8
Not satisfied	10	8.2
Item		
Size	120	98.3
Shape	118	96.7
Appearance of a scar	115	94.2
Symmetry	110	90.1
Cleavage	122	100
Appearance of nipple- areola complex	122	100
Proportionate	116	95
Feel to touch	105	86

Conclusion

Lateral mammary sulcus approach is feasible for laterally located breast cancer with good aesthetic results. Patients should be followed for a longer duration to assess the oncologic safety. Lateral sulcus approach enables the surgeon to perform surgery for the tumor and the axilla through a single incision.

Compliance and Ethical Standards

All procedures performed in the study were in accordance with the ethical standards of the ethical committee of the surgery department, Alexandria University Faculty of Medicine.

An informed consent was taken from all patients included in the study.

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