

Effect of Local Glandular Flap on Seroma in Conesrvative Breast Surgery

BESHOY S.R. FAHIM, M.Sc.; MOHAMED A.M. KHALAFALLA, M.D.; GAMAL EL-DIN O. FARG, M.D. and MOHAMED A.M. ELTAYEB ELAZAZZY, M.D.

The Department of Breast Surgery, Faculty of Medicine, Ain Shams Univeristy

Abstract

Background: Breast cancer is a major health problem globally, and the most common female cancer worldwide. Treatment of the disease is undergoing improvements and modifications continuously, and the recent two decades have witnessed major reforms in the management options.

Aim of Study: In this study, we aimed to assess the effect of local glandular flap on seroma reduction.

Patients and Methods: This prospective comparative study was conducted at tertiary care hospital at Ain Shams University Hospitals from March 2021 till December 2021 and performed on total 30 patients with breast cancer who underwent conservative breast surgery.

Results: Our study results revealed that Seroma was less frequent among flap group than among no flap group (30.0% versus 60.0%). The differences statistically were significant, while Hematoma were less frequent among flap group than among no flap group (0.0% versus 6.7%) with no statistically significant differences. The wound infection, dehiscence, fat necrosis and scar disfigurement were less frequent among flap group than among no flap group. The differences statistically were not significant ($p=0.999$). Regarding to cosmetic outcomes, our results revealed that cosmetic results (Nipple-areola shape and symmetry) were better among flap group than among no flap group (80.0% versus 60.0% and 73.3% versus 53.3%) respectively for good response. The differences statistically were not significant ($p=0.427$ and 0.368) respectively.

Conclusion: We concluded that there was statistically significant difference between the flap group than no flap group regarding the postoperative complications of seroma while hematoma, wound infection, dehiscence and fat necrosis or regarding cosmetic disfigurement of Nipple-areola, shape and symmetry of the breast with the contralateral side showed no significant differences between the flap group than no flap group.

Key Words: *Local glandular flap – Seroma – Conesrvative breast surgery.*

Introduction

SEROMA is an abnormal collection of serous fluid in the dead space of post-mastectomy skin flap, axilla or following breast conserving surgery and is the most common early wound sequel. Seroma represent the most frequent complication of breast cancer surgery. The reported incidence of seroma ranges from 25% to 50% and the rate for axillary dissection is approximately 25%. This complication may prolong recovery, length of hospital stay and health budget. It can also delay the initiation of adjuvant therapy, predispose to wound infection, delay wound healing and has also been linked to arm lymphoedema. The main pathophysiology of seroma is still poorly understood [1].

A glandular rotation flap technique has been widely used for relatively small defects of the breast. However, this technique is hardly performed for relatively large defects because of the difficulty in obtaining a sufficient amount of tissue to fill the defect. In particular, when the tumor is located in the lower quadrant, a reduction mammoplasty can be an appropriate surgical approach. However, in this case, the resultant asymmetry in both the breasts is inevitable. Therefore, additional reduction surgery of the contralateral breast is an essential procedure to ensure bilateral symmetry of the breasts [2].

Recent innovations, to further enhance aesthetic outcomes, has been the development of “oncoplastic” surgery, which broadly refers to reconstruction of partial mastectomy defects. A variety of techniques have been described for partial mastectomy reconstruction, including local tissue rearrangement, reconstruction through reduction mammoplasty or mastopexy approaches, and transfer of local-regional flaps. The outcomes

Correspondence to: Dr. Beshoy S.R. Fahim.
E-Mail: besohysamy1991@gmail.com

following oncoplastic surgery has shown numerous benefits to this reconstructive approach, including improved aesthetic outcomes, better control of tumor margins, high patient satisfaction, and the ability to extend the option of breast conservation [3].

Aim of the study:

This study aims to assess the effect of local glandular flap on seroma reduction.

Patients and Methods

Study design: A prospective comparative study.

Study setting: Patients attending Ain Shams University Surgical Hospital.

Study population:

This is a prospective comparative study to compare between seroma formation in conservative breast surgery with and without local glandular flap for 30 cases, 15 cases for each group: Group A conservative breast surgery with local glandular flap. (15 women), Group B conservative breast surgery without local glandular flap. (15 women).

Selection method:

Simple Random Sampling.

Study setting:

This study was conducted at Ain-Shams University Hospitals, in the period from March 2021 till December 2021. Approval of the Ethical Committee and written informed consent from all participants were obtained. Techniques were proposed for patients in whom inclusion criteria was met. Diagnosis and staging examinations were carried out according to the standard protocol being conducted at Ain Shams University Hospitals and Nasr City Insurance Hospital. In-patient post-operative recovery time ranged from twenty four hours to a maximum of ten days. All patients were discharged with a set of instruction and follow-up schedule. We followed-up for both oncologic and cosmetic grading and were referred to receive suitable adjuvant chemo and or radiotherapy according to the final pathology report.

Inclusion criteria:

- Females with T1 and T2 mass.
- Females aged from 20 up to 60.

Exclusion criteria:

- Previous breast surgery.
- Patients with cancer metastasis.
- Not fit for reduction.

All patients were submitted to history taking including full personal history, complaint, analysis of their disease along with thorough medical and family history with its relevance to the condition, complete clinical examination in the outpatient clinic that included general condition assessment and local breast examination.

Pre-operative investigations were performed that included:

Laboratory tests: Including complete blood count, liver profile, kidney profile, coagulation profile, blood sugar.

Radiological examination: Including bilateral digital mammography in at least two views (Cranio-caudal and medio-lateral oblique). CT Chest, CT pelvi-abdomen with contrast as part of our metastatic work up protocol, bone scan as indicated and upon the patients complaint from bony ache. ECG and echocardiography were performed upon requested by the anaesthiologist when indicated. Tissue biopsy using ultrasound guided true cut needle biopsy in all patients was indicated \pm true cut of axillary lymph node if enlarged > 1 cm.

Multi-disciplinary team:

Multi-disciplinary team at the breast unit at General Surgery Department of Ain Shams University reviewed every single case independently. The MDT Included: Breast surgery consultant, pathology consultant, plastic surgery consultant, radiology consultant & oncology consultant. Discussion was made up for every case including her history, examination and investigations, until the decision was tailored for every case.

Medical photography:

The need for medical photography was also discussed and explained. How will the photography be taken, and whom is going to photograph her. Also the reason of the photography was discussed, explained and consented. Medical photos were taken and kept in the patient's records as agreed upon. At least two views were taken; Front and Side views. Pictures were taken to the patients along their follow-up visits to keep record and document progress.

Surgical technique:

The single-incision transaxillary BCS approach begins with the patient in a supine position, slightly rotated away from the surgeon, and the ipsilateral arm extended. A single incision is made in the breast to axilla. Then, the deltopectoral fascia is opened from the breast using sharp dissection with electrocautery. Prior to incisional

closure, the delto-clavicular-pectoral fascia is closed with a running absorbable suture. The conventional approach BCS used separate breast and axillary incisions for the tumor and lymph nodes, respectively. With Full-thickness excision of the lesion is completed, with at least a 1cm macroscopic margin of normal tissue and the skin overlying the lesion being removed. Frozen sections were obtained and intraoperative excision margins were taken to reach free margins. All patients were given the contact information of the surgeon in case of any complication arises and were asked to pass by the clinic at least once a month during the course of their adjuvant therapy. After completion of the adjuvant therapy, patients were asked to follow-up in the surgical department clinic once every three months for the six months for clinical examination, breast ultrasound and tumor markers, bilateral mammography and routine investigations as required.

Follow-up assessment of cosmetic outcome:

Cosmetic outcome was evaluated during the early post-operative period and on follow-up. Evaluation was done by means of scoring system, graded from one indicating poor results and five indicating excellent results. Pictures were taken before and after surgery for comparison in terms of breast contour, breast size and shape, degree of ptosis, NAC deviation and degree of asymmetry. Comparison of pre and post-operative breast measurements were taken in terms of NAC position to the mid humeral level, distance from the sternal border and infra mammary sulcus. Cosmetic outcome was evaluated by the the patient by immediate post-operative, 2 weeks- and 1 month-photographs. Re-evaluation was done after completion of adjuvant chemo and radiotherapy during follow-up. Documentation of breast edema and inflammation was done and managed according to its severity for the first six months after the surgery.



Fig. (1): Post-operative shape of breast after local glandular flap.



Fig. (2): Post-operative shape of breast without local glandular flap and insertion of suction drain.

Statistical analysis:

Data were collected, coded, revised and entered to the Statistical Package for Social Science (IBM SPSS) version 20. The data were presented as number and percentages for the qualitative data, mean, standard deviations and ranges for the quantitative data with parametric distribution. The *p*-value was considered significant as the following: *p*>0.05: Non significant (NS), *p*<0.05: Significant (S), *p*<0.01: Highly significant (HS).

Results

Table (1): Baseline characteristics among the studied groups.

Variables	Measure	Flap (N=15)	No flap (N=15)	<i>p</i> -value
Age (years)	Mean ± SD	36.9±8.9	39.7±8.6	^0.379
	Range	24.0-52.0	27.0-55.0	
Breast size	A	1 (6.7%)	1 (6.7%)	§0.999
	B	1 (6.7%)	2 (13.3%)	
	C	5 (33.3%)	4 (26.7%)	
	D	8 (53.3%)	8 (53.3%)	
Tumor location	UOQ	3 (20.0%)	3 (20.0%)	§0.999
	LOQ	8 (53.3%)	8 (53.3%)	
	UIQ	3 (20.0%)	2 (13.3%)	
	LIQ	1 (6.7%)	2 (13.3%)	
Tumor size	T1	8 (53.3%)	11 (73.3%)	§0.450
	T2	7 (46.7%)	4 (26.7%)	
Surgery type	Conservative-lumpectomy	15 (100.0%)	15 (100.0%)	NA #0.450
		7 (46.7%)	7 (46.7%)	
Post operative chemotherapy	One month	8 (53.3%)	8 (53.3%)	
	Two months			

UOQ: Upper outer quadrant. UIQ: Upper inner quadrant.
 LOQ: Lower outer quadrant. LIQ: Lower inner quadrant.
 - Data presentd as (n, %) unless mentioned otherwise.
 ^ Independent *t*-test. §Fisher's Exact test.
 # Chi square test. NA: Not applicable.

Table (1) shows that: No statistical significant differences between the studied groups regarding baseline baseline characteristics; age, breast size, tumor lacion, tumor size, syrgtry type and post-operative chemotherapy.

Table (2): Seroma among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Present	3 (20.0%)	9 (60.0%)	#0.025*
Absent	12 (80.0%)	7 (40.0%)	

Data presentd as (n, %). #Chi square test.

Table (2) show that: Seroma was less frequent among flap group than among no flap group (30.0% versus 60.0%). The differences statistically were significant ($p=0.025$).

Table (3): Hematoma among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Present	0 (0.0%)	1 (6.7%)	§0.999
Absent	15 (100.0%)	14 (93.3%)	

Data presentd as (n, %). §Fisher's Exact test.

Table (3) show that: Hematoma was less frequent among flap group than among no flap group (0.0% versus 6.7%). The differences statistically were not significant ($p=0.999$).

Table (4): Wound infection among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Present	0 (0.0%)	1 (6.7%)	§0.999
Absent	15 (100.0%)	14 (93.3%)	

Data presentd as (n, %). §Fisher's Exact test.

Table (4) show that: Wound infection was less frequent among flap group than among no flap group (0.0% versus 6.7%). The differences statistically were not significant ($p=0.999$).

Table (5): Wound dehiscence among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Present	1 (6.7%)	1 (6.7%)	§0.999
Absent	14 (93.3%)	14 (93.3%)	

Data presentd as (n, %). §Fisher's Exact test.

Table (5) show that: Wound dehiscence was the same among flap group as among no flap group (6.7% versus 6.7%). The differences statistically were not significant ($p=0.999$).

Table (6): Fat necrosis among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Present	0 (0.0%)	1 (6.7%)	§0.999
Absent	15 (100.0%)	14 (93.3%)	

Data presentd as (n, %). §Fisher's Exact test.

Table (6) show that: Fat necrosis was less frequent among flap group than among no flap group (0.0% versus 6.7%). The differences statistically were not significant ($p=0.999$).

Table (7): Scar disfigurement among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Present	0 (0.0%)	1 (6.7%)	§0.999
Absent	15 (100.0%)	14 (93.3%)	

Data presentd as (n, %). §Fisher's Exact test.

Table (7) show that: Scar disfigurement was less frequent among flap group than among no flap group (0.0% versus 6.7%). The differences statistically were not significant ($p=0.999$).

Table (8): Cosmotic result (Nipple-areola) among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Good	12 (80.0%)	9 (60.0%)	§0.427
Satisfactory	3 (20.0%)	5 (33.3%)	
Poor	0 (0.0%)	1 (6.7%)	

Data presentd as (n, %). §Fisher's Exact test.

Table (8) show that: Cosmotic result (Nipple-areola) was better among flap group than among no flap group (80.0% versus 60.0%) for good response. The differences statistically were not significant ($p=0.427$).

Table (9): Cosmotic result (shape) among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Good	11 (73.3%)	8 (53.3%)	§0.368
Satisfactory	4 (26.7%)	5 (33.3%)	
Poor	0 (0.0%)	2 (13.3%)	

Data presentd as (n, %). §Fisher's Exact test.

Table (9) show that: Cosmotic result (shape) was better among flap group than among no flap group (73.3% versus 53.3%) for good response. The differences statistically were not significant ($p=0.368$).

Table (10): Cosmotic result (Symmetry) among the studied groups.

Finding	Flap (N=15)	Without flap (N=15)	p-value
Good	7 (46.7%)	5 (33.3%)	§0.770
Satisfactory	7 (46.7%)	8 (53.3%)	
Poor	1 (6.7%)	2 (13.3%)	

Data presentd as (n, %). §Fisher's Exact test.

Table (10) show that: Cosmotic result (Symmetry) was better among flap group than among no flap group (46.7% versus 33.3%) for good response. The differences statistically were not significant ($p=0.770$).

Discussion

Breast cancer is a major health problem globally, and the most common female cancer worldwide. Treatment of the disease is undergoing improvements and modifications continuously, and the recent two decades have witnessed major reforms in the management options [4].

Surgery is no exception, and the standard of care for breast cancer surgery has evolved from the radical mastectomy of Halsted in the 1890s to the breast conserving surgery (BCS) of today. Moreover, excision of margins of normal breast tissue around a large breast mass may involve large volumes of resection, which cause asymmetry and unsightly cosmetic deformities [5]. The solution to this problem has been provided by in-breast tissue relocation to increase cosmetic outcomes of wide breast tissue excision, recognized as oncoplastic techniques and consisting of a combination of esthetic plastic procedures and cancer surgery [6].

Breast-conserving therapy (BCT) consisting of surgical removal of the primary tumor followed by whole breast irradiation is an alternative to mastectomy which results in equivalent long-term survival. Although rates of BCT have increased over time worldwide, there is no consensus about what amount of normal breast tissue should be removed as a margin to minimize the risk of local recurrence [7].

Since various oncoplastic surgical approaches for management of breast cancer represent major conflict and often associated with complications and cosmetic disfigurement, using local random glandular flap, which is practical for many tumor locations and sizes was highlighted as a main point of interest [4].

Consequently, this study aimed to assess the effect of local glandular flap on seroma reduction.

This prospective comparative study was conducted at tertiary care hospital at Ain Shams University Hospitals from March 2021 till December 2021 and performed on total 30 patients with breast cancer who underwent conservative breast surgery.

During this study, 40 patients were assessed for eligibility and 30 patients were included in the study (15 in each group). Of all eligible patients,

7 patients were excluded from the study based on the inclusion criteria and 3 patients refused to participate in of the study.

Ultimately, the analysis was based on the data of 30 patients diagnosed with breast cancer who underwent conservative breast surgery and divided into two groups.

The current study revealed that there were no statistically significant differences between the studied groups regarding baseline characteristics; age, breast size, tumor location, tumor size, surgery type and postoperative chemotherapy.

Our study results revealed that Seroma was less frequent among flap group than among no flap group (30.0% versus 60.0%). The differences statistically were significant ($p=0.025$), while Hematoma were less frequent among flap group than among no flap group (0.0% versus 6.7%) with no statistically significant differences ($p=0.999$).

Our study results revealed that wound infection, dehiscence, fat necrosis and scar disfigurement were less frequent among flap group than among no flap group. The differences statistically were not significant ($p=0.999$).

Different studies were done evaluating various oncoplastic surgical approaches with glandular flap, some of them agree and others differ from our results.

Alipour et al., [4] conducted a retrospective study that enrolled 25 patients to collect data of patients who had been operated using local random glandular flap and the information gathered consisted of tumor characteristics, flap characteristics, and results of surgery regarding oncologic and cosmetic outcomes.

In agreement with our results, Alipour et al., [4] revealed that the early or late complications were non-significant as Seroma developed in three patients out of 25 patients which are non-significant and managed conservatively without aspiration, and all resolved successfully indicating perfect choice of flap method, one patient developed fat necrosis and one patient developed infection and abscess in the lower pole of the breast, inferior to the operation site occurred 2 months after the surgery while she was under chemotherapy. It was treated by incision and drainage and antibiotic therapy.

Almasad et al., [8] conducted a retrospective study that enrolled twenty-five patients who had breast cancer to evaluate the results of a proposed

simple technique of volume replacement by local flaps that raised from adjacent skin and subcutaneous tissue with or without glandular breast tissue to reconstruct the breast after conserving surgery for breast cancer.

Also, in concordance with our results, Almasad et al., [8] reported non-significant complications as one patient developed wound hematoma and skin bruises which was spontaneously resolved, another patient developed fat necrosis during radiotherapy which require surgical excision of the hard tender fat under the skin flap. No flap loss or wound infections were reported.

Kijima et al., [9] conducted a retrospective study in which oncoplastic breast surgery (OBS) was performed by combining partial mastectomy with immediate breast reshaping using a keyhole-shaped skin flap in two patients diagnosed as having Paget's disease and revealed that although an ohm-shaped scar appeared on the treated breasts, the roundness, height and projection of the breasts were similar to those of the contralateral breasts. Softness reappeared, and the patients had no complications in the breast or donor site.

Regarding to cosmetic outcomes, our results revealed that cosmetic results (Nipple-areola shape and symmetry) were better among flap group than among no flap group (80.0% versus 60.0% and 73.3% versus 53.3%) respectively for good response. The differences statistically were not significant ($p=0.427$ and 0.368) respectively.

Regarding to cosmetic outcomes that rated by the surgeon and the patients, Alipour et al., [4] revealed that all operated breasts were grossly symmetric with the contralateral one with good patient satisfaction and nearly no need for contralateral symmetrization procedures.

Almasad et al., [8] reported that 84% of women were satisfied on the cosmetic outcome because their overall evaluation was good or very good. No poor aesthetic outcome was recorded in this study.

Ahmed et al., [10] conducted a study that included 60 females with centrally located breast cancer who underwent central quadrantectomy and local dermo-glandular flap to evaluate the local dermo-glandular flap as a new reconstructive oncoplastic technique after removal of central malignant tumors of the breast, in terms of patient satisfaction and local recurrence.

Ahmed et al., [10] revealed that forty-seven patients (78.33%) reported satisfaction after the

operation. Ugly scarring and the existence of tissue defects were the main factors affecting patient satisfaction. Correction of these complications increased overall satisfaction to 88.33%.

The strength points of this study are that it is prospective study design and having no patients lost to follow-up during the study. It is the first study in Ain Shams University Hospitals to the effect of local glandular flap on seroma reduction in terms of efficacy and postoperative complications.

The limitations of the study are worthy of mention including relatively smaller sample size relative to the previous studies, not being a multicentric study and this represents a significant risk of publication bias. Another limitation is the relatively short-term follow-up of patients postoperatively which may underestimate the incidence of local or distant recurrence observation. Presence of covid-19 pandemic.

Conclusion:

As evident from the current study, there was statistically significant differences between the flap group than no flap group regarding the postoperative complications of seroma while hematoma, wound infection, dehiscence and fat necrosis or regarding cosmetic disfigurement of Nipple-areola, shape and symmetry of the breast with the contralateral side showed no significant differences between the flap group than no flap group.

The present study can burden the knowledge and shed some light on future prospective studies with larger sample sizes demonstrating the long-term outcomes of local glandular flap for oncoplastic breast conserving surgery.

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تكون تجمع مصلى مع سديلة غدنية وبدونها فى جراحة الثدي

المقدمة: يعد سرطان الثدي مشكلة صحية كبرى على مستوى العالم، وهو أكثر أنواع السرطانات شيوعاً بين النساء فى جميع أنحاء العالم. يخضع علاج المرض للتحسينات والتعديلات بشكل مستمر، وقد شهد العقدين الأخيرين إصلاحات كبيرة فى خيارات الإدارة.

الهدف من الدراسة: فى هذه الدراسة، هدفنا إلى تقييم تأثير السديلة الغدنية الموضعية على تقليل السيروما.

المرضى وطرق البحث: أجريت هذه الدراسة المقارنة المرتقبة فى مستشفى الرعاية الثالثية بمستشفيات جامعة عين شمس من مارس ٢٠٢١ حتى ديسمبر ٢٠٢١ وأجريت على إجمالى ٣٠ مريضاً بسرطان الثدي خضعوا لجراحة الثدي المحافظة.

النتائج: أظهرت نتائج دراستنا أن السيروما كان أقل تواتراً بين مجموعة السديلة مقارنة بمجموعة عدم وجود سديلة (٣٠.٠٪ مقابل ٦٠.٠٪). كانت الفروق ذات دلالة إحصائية، بينما كان الكدمة الدموية أقل تواتراً بين مجموعة السديلة مقارنة بمجموعة اللاسديلة (٠.٠٪ مقابل ٦.٧٪) مع عدم وجود فروق ذات دلالة إحصائية. أظهرت نتائج دراستنا أن عدوى الجرح والتفزز والكتل الدهنية وتشوه الندبات كانت أقل تواتراً بين مجموعة السديلة مقارنة بمجموعة عدم السديلة. ولكن لم تكن الفروق ذات دلالة إحصائية.

الخلاصة: يمكن للدراسة الحالية أن تثقل كاهل المعرفة وتلقى بعض الضوء على الدراسات المستقبلية بأحجام عينات أكبر توضح النتائج طويلة المدى للسديلة الغدنية الموضعية لجراحة الحفاظ على الثدي الورمية.