

Axillary Exclusion Technique as a Method for Reducing Seroma Formation after Modified Radical Mastectomy

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ABSTRACT

Background: Seroma is one of the most common complications of conventional modified radical mastectomy (MRM) with axillary clearance in the management of breast cancer causing subsequent associated morbidities (Infection, Flap necrosis, Prolonged drainage and Delayed healing). The rate of seroma formation has been reported to be affected by the type of surgical procedure. **Objective:** To evaluate axillary exclusion technique for reducing seroma formation after modified radical mastectomy in the management of breast cancer. **Patients and Methods:** 40 female patients with breast cancer were recruited and divided randomly into 2 groups: The first group was managed by MRM and the other group was managed by MRM with axillary exclusion technique. Operative time, drainage volume and, seroma formation rate and wound infection were compared for both techniques. **Results:** Operative time was significantly longer in the group managed by MRM with axillary exclusion than in group managed by MRM only (85 ± 8 minutes versus 59.5 ± 3.5 minutes respectively). No significant difference in the amount of blood loss between the 2 groups. Drainage volume was significantly less in the group managed by axillary exclusion technique than in the group managed by MRM only (300.85 ± 29.4 ml versus 950.15 ± 45.21 ml respectively). Only one patient suffered from seroma formation in the group managed by axillary exclusion in contrast to 7 patients in the group managed by MRM only (P value= 0.048). **Conclusion:** MRM with axillary exclusion technique in the management of breast cancer resulted in significant reduction in the drainage volume post operatively and thus the rate of seroma formation.

INTRODUCTION

Breast cancer management has seen an evolution from the radical extirpation of the previous century, involving loss of the breast, skin and underlying muscle, to current practice, which aims for local excision of the tumour whilst preserving much of the breast. Advancements in the techniques of sentinel node biopsy have reduced formal extensive axillary staging surgery to a minimally invasive procedure⁽¹⁾.

Although surgical treatment for breast cancer has shifted dramatically from radical operations to breast-conserving surgical techniques, modified radical mastectomy with axillary dissection remains the most frequently performed surgical procedure for locally advanced breast cancer⁽²⁾.

The most common complications of conventional modified radical mastectomy with axillary dissection are seroma and lymphedema, with incidences of 11% to 85% and 2% to 50%, respectively. Other frequent complications are hematoma, prolonged axillary drainage, wound infection or necrosis, and intraoperative and postoperative bleeding⁽³⁾.

The rate of seroma formation has been reported to be affected by the type of surgical procedure. It occurs more often in modified radical mastectomy than in breast-conserving surgery, in axillary lymph node dissection than in sentinel lymph node dissection, and in modified radical mastectomy without immediate reconstruction than with immediate reconstruction. In addition, tumor size, age 60 years or older, total amount of drainage, neoadjuvant chemotherapy, and volume of drainage exceeding 30 ml in the 24 hours before drain removal have been associated with seroma formation⁽⁴⁾.

Theories of aetiology are important in determining the most likely surgical technique for seroma prevention. Various techniques have been studied in an attempt to minimize post-mastectomy drainage volumes and the incidence of seroma. None however, have been found to be consistently successful and consequently none are used in common practice. If it is believed that the disrupted lymphatics in the axillary fossa are central to aetiology, it follows that obliterating this space will minimise fluid collection⁽⁵⁾.

In this study, we will evaluate the use of a novel technique of wound closure after modified radical mastectomy to minimize the incidence of seroma formation.

PATIENTS AND METHODS

In this study, 40 female patients with breast cancer were recruited. The study was a prospective randomized trial from the period January 2015 to December 2016. The patients were divided into 2 groups by closed envelop method. The groups were:

- A) 20 patients with breast cancer treated with MRM
- B) 20 patients with breast cancer treated with MRM followed by axillary exclusion technique

Inclusion criteria:

- Patients with malignant breast mass by triple assessment.
- In stages I, II & IIIA.
- Able to tolerate general anaesthesia.

Exclusion criteria:

- Patients with metastatic disease.
- Patients with collagen diseases.
- Patients candidates for breast conserving surgery.
- Patients with inflammatory breast cancer.

All enrolled patients were consented to participate in the study. All the operations and follow up were performed in Ain Shams University Hospitals, follow up was done weekly in the surgical outpatient clinic in the 1st month post operatively then every two weeks for another 2 months.

Surgical Techniques:

1. Group I: MRM .

2. Group II: MRM with axillary exclusion technique.

After MRM, at the point of skin closure, patients either underwent axillary exclusion or not. The technique involved suturing the superior mastectomy skin flap down to the free edge of pectoralis major and the lateral chest wall (serratus anterior fascia) using a interrupted 2/0 vicryl stitch and then suturing the lower flap to the lateral chest wall to reliably exclude the axillary fossa from the remainder of the mastectomy cavity. Also, 3-4 sutures were placed between pectoralis major and minor. Two drains

are inserted, one under the mastectomy flaps and the other in the axilla.

Illustrated figures:

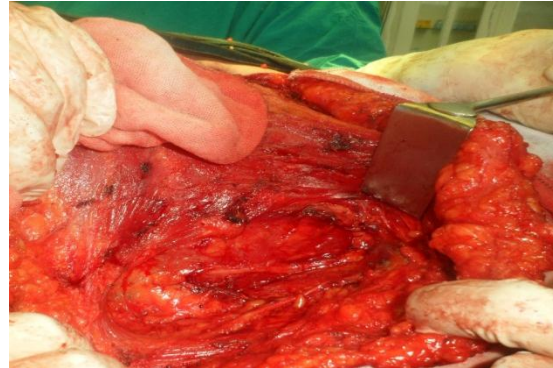


Figure 1: Axillary fossa after modified radical mastectomy.

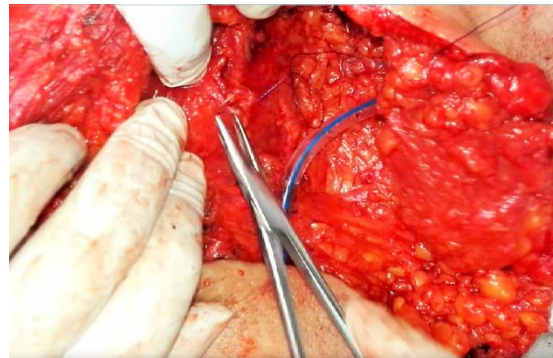


Figure 2: Suturing the upper mastectomy flap to pectoralis major and lateral chest wall.

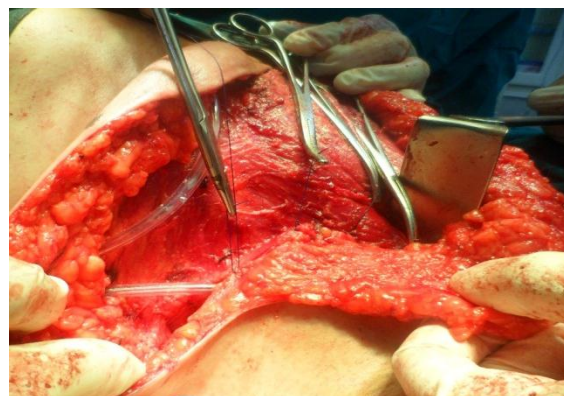


Figure 3: After suturing the upper flap to lateral chest wall with interrupted sutures.

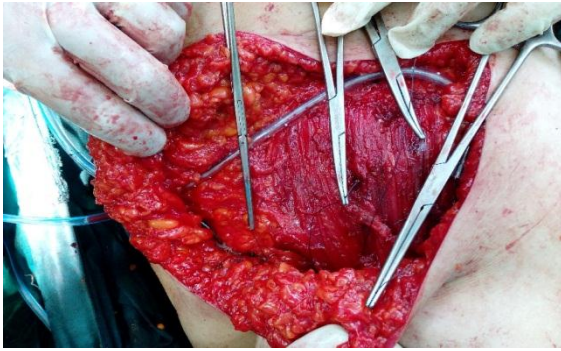


Figure 4 : After closing the axillary dead space before skin closure.

Patients were assessed Intra-operatively for :

- **Operative time.**
- **Blood loss.**

Postoperative results:

- **Histopathology for assessment of accuracy of axillary dissection (number of lymph nodes dissected) in the operation.**
- **Assessment of amount of blood and serous fluid discharge in the suction drain daily till**

Post-Operative findings:

1. Post operative lymph node evaluation

Table (1): Total numbers and numbers of positive (metastatic) lymph nodes in both groups

	Group I	Group II	P-value
Total numbers of lymph nodes dissected (Mean±SD)	17±4	18±3	0.98 NS
Numbers of positive (metastatic) lymph node (Mean±SD)	4.2±1.2	3.9±1.3	0.88 NS

No significant difference between both groups as regard total numbers and numbers of positive lymph node after axillary dissection.

2. Drainage Volume:

In group (I), the total drainage volume ranged from 600-1500 ml with the mean (950). In group

the amount of discharge becomes less than 30 CC when it becomes serous.

- **Postoperative complications (seroma, bleeding, skin burn, haematoma, lymphedema & wound infection & necrosis).**

RESULTS

Operative Time:

The operative time in group (I), ranged from 50 -80 minutes with the mean time 59.5 ± 3.54 min. In group (II), the operative time ranged from 70-100 minutes with the mean time 85 ± 8.877 min. There is significant difference between both groups.

Blood loss:

In group (I), the intra-operative blood loss ranged from 120-350 ml with the mean loss 220 ml. In group (II), blood loss ranged from 100-300 ml with the mean loss 200 ml. P-value > 0.05

There was no statistically significant difference between the two groups

(II), ranged from the total drainage volume 150-450 ml with the mean (300). There was an important difference between the two groups as the drainage volume decreased in group (II) compared to group (I). (Table 1; Fig. 5)

Table (2): Mean total drainage volume in the two groups.

Group	Range	Mean±SD	P-value
I	600 – 1500	950.15±45.21	<0.001*
II	150 – 450	300.85±29.4	

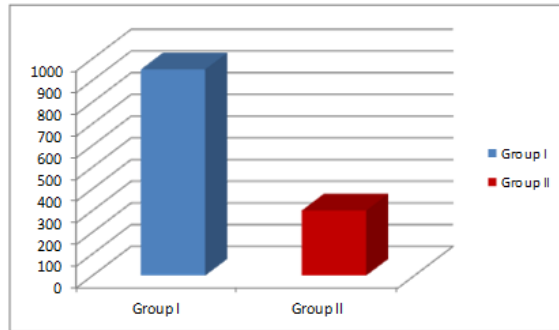


Figure (5): Mean total drainage volume in the two groups.

3. Drainage Days:

In both groups, the drains were removed usually when the discharge become less than 30 ml/day. In group (I), the range of drain removal from 6-20 days, and in group (II), the range of drain removal from 3-12 days. This difference is due to less drainage volume in group (II).

4. Seroma Formation Rate:

In group (I) seven (7) patients complicated by seroma after drain removal. In group (II) 1 patient was complicated by seroma. There was a significant difference between the two groups with p-value 0.048. All cases were improved after repeated aspirations (Table 3).

Table (3): Seroma rate in the two groups

Patients With Seroma	Group I		Group II		Total	
	N	%	N	%	N	%
Negative	13	65.00	19	95.00	32	80.00
Positive	7	35.00	1	5.00	8	20.00
Total	20	100.00	20	100.00	40	100.00
Chi-square	X ²		3.906			
	P-value		0.048*			

5. Development of Wound Hematoma and Infection:

In group (I), one patient developed wound hematoma and two patients developed wound

infection. In group (II), patients developed neither wound infection nor wound hematoma. This was not significant (Table 4).

Table (4): Postoperative wound infection.

Wound infection	Group I		Group II		Total	
	N	%	N	%	%	N
Negative	18	90.00	20	100.00	38	95.00
Positive	2	10.00	0	0.00	2	5.00
Total	20	100.00	20	100.00	40	100.00
Chi-square	X ²		0.526			
	P-value		0.468			

DISCUSSION

Breast cancer is the most common malignancy in women, and the most common cause of cancer-related death among them. Despite advances in adjuvant therapy for breast cancer, surgery is still the mainstay of treatment⁽⁶⁾.

Seroma is a frequent problem after mastectomy and axillary lymph node dissection. Seroma is associated with pain, discomfort, impaired mobilization and repeated aspirations, often resulting in a surgical site infection⁽⁷⁾.

Postmastectomy seroma can be defined as a collection of serous fluid just under the skin flaps

or in the axillary space immediately following mastectomy with axillary dissection that can be detected either clinically or sonographically⁽⁸⁾.

In our study the overall incidence of seroma was 35% which is comparable with the studies of *Stehbns*⁽⁹⁾ and *Pogson et al.*⁽¹⁰⁾ who stated that the incidence of postmastectomy seroma is around 30%. However *Kuroi et al.*⁽¹¹⁾ and *Stanczyk et al.*⁽¹²⁾ reported that the incidence of post mastectomy seroma is approximately 50%. *Woodworth et al.*⁽¹³⁾ reported that the incidence of seroma fell within the range of 15–81%, and this agrees with our result.

A recent study stated that the incidence is thought to be somewhere between 25% - 60% for mastectomy and axillary clearance and has been reported as high as 85%⁽¹⁴⁾.

Several techniques of flap fixation or wound drainage, as well as limitation of postoperative shoulder movement and the use of adhesive glue, have been investigated to improve primary healing and minimize seroma formation⁽¹⁵⁾.

Wolde et al.⁽⁷⁾ concluded that minimizing dead space through fixation of the skin flaps to the underlying muscles (quilting) lowers the incidence of seroma. In his study, two consecutive groups with a total of 176 patients following mastectomy and axillary clearance were retrospectively compared. The first group had a traditional wound closure and the second was quilted. The incidence of seroma decreased from 80.5 % to 22.5 % ($p < 0.01$).

In our study we found that, In group (I), the total drainage volume ranged from 600-1500 ml with the mean (950). In group (II), ranged from the total drainage volume 150-450 ml with the mean (300), ($p < 0.001$). Our mean number of days for drain removal was 5.8 days in the axillary exclusion group versus 12.8 days in the control group when the drainage volume is less than 30 ml/ day.

This disagrees with the results of *Kopelman et al.*⁽¹⁶⁾ who said that most surgeons remove the drain when the drainage volume is less than 50 ml in the preceding 24 h, which usually takes about 10 days if the flap-fixation technique is not used.

Using Vicryl 2/0 suture, *Khater et al.*⁽⁸⁾ started the quilting technique in the upper and lower flaps to the pectoral fascia by a continuous sutures. In our study, the technique involved suturing the superior mastectomy skin flap down to the free edge of pectoralis major and the lateral

chest wall using interrupted 2/0 vicryl stitches and then suturing the lower flap to the lateral chest wall.

The operative time was prolonged in the quilting group by around 20 minutes ($P < 0.001$)⁽⁸⁾. This is comparable with our technique as there was prolongation of the operative time around 24.5 minutes ($P < 0.001$). This was the only disadvantage of our technique.

On the other hand, *Elshakhs et al.*⁽⁶⁾ found that the length of operation in the flap-fixation group was longer than that in the no-flap-fixation group by about 5 min.

CONCLUSION

We found that, there was significant decrease in the total drainage volume by about 650 ml after application of the axillary exclusion technique. Also a significant decrease in patients complicated by seroma; around 30%.

The only disadvantage of this technique is the prolongation of the operative time around 24.5 minutes.

In the study we concluded that our technique of axillary exclusion has resulted in significantly reduced drainage volumes and fewer seromas.

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