

# Evaluation of The Effect of Mastectomy Flap Fixation and Axillary Space Obliteration with Separation of Both Spaces in Reduction of Seroma Formation in Modified Radical Mastectomy Cases. Ismailia Teaching Oncology Hospital Experience

Adel Mohamed Ismail

Department of Surgical Oncology, Ismailia Teaching Oncology Hospital, Egypt

Corresponding author: Adel Mohamed Ismail, Mobile: (+20) 01065006524, E-Mail: yassinadel2014@gmail.com

## ABSTRACT

**Background:** The most prevalent complication following a modified radical mastectomy (MRM) is seroma located under mastectomy flap and/or axilla, with excessive drainage of serous fluid in the drain, long period of the drain inside the wound with risk of infection. Formation of seroma was diagnosed clinically as collection of fluid under the mastectomy flaps and axilla seen as fluctuant, non-tender swelling.

**Objective:** To study the effect of mastectomy flap fixation and axillary space obliteration with separation of both spaces in comparison with classic modified radical mastectomy in diminishing of seroma formation.

**Patients and methods:** This study included 60 female patients over the age of 20 who were undergoing modified radical mastectomy and were randomly divided into two groups of 30 each, Group A (flap fixation, axillary space obliteration, and two space separation) and Group B (non-flap fixation). Mastectomy flaps were sutured to the underlying pectoralis fascia to obliterate the dead space, with axillary space obliteration by suturing flap into serratus anterior muscle and separation of both spaces along the lateral border of the pectoralis major muscle.

**Results:** There was a statistical significant decrease in day of removing the drain, total seroma volume and frequency of postoperative seroma among Group A (with Flap fixation) compared to Group B (without Flap fixation). There was high statistically significant changes in mean total seroma volume between two group, which ranged (250-1100 cc) in group (A) compared with (1500-3500 cc) in group (B).

**Conclusion:** Dead space obliteration following MRM is a simple technique that lowers the incidence of seroma formation, total seroma volume and days of drain removal.

**Keywords:** Breast Cancer, Modified Radical Mastectomy, Seroma.

## INTRODUCTION

Breast cancer is the most frequent cancer among women globally, including Egypt. Because of late detection and a lack of screening programs, modified radical mastectomy (MRM) is the most prevalent surgical method for treating breast cancer in developing nations <sup>(1)</sup>.

The most prevalent early consequence in MRM patients is seroma formation <sup>(2)</sup>. Seroma is a sterile clear fluid collection, which developed in the space between the chest wall and skin flaps following MRM <sup>(3)</sup>.

Management of seroma is usually done by frequent aspirations which may continue for months after surgery, or it may be self-limited if it is mild. Sometimes seroma may be organized, encysted or infected which need surgical intervention <sup>(4)</sup>.

Complications involve delayed wound healing, a greater infection incidence because of frequent seroma aspirations, a longer hospital stay, patient discomfort, several outpatient clinic visits, skin flap necrosis, a delay in initiating adjuvant medications, and a higher hospital cost <sup>(5)</sup>.

Aim of the work was to study the effect of mastectomy flap fixation and axillary space obliteration with separation of both spaces in comparison with classic modified radical mastectomy in diminishing of seroma formation.

## PATIENTS AND METHODS

This study included sixty female patients who were hospitalized in the Surgical Cancer Unit at

Ismailia Teaching Oncology Hospital and were referred to MRM between September 2020 and February 2022. All subjects were divided into two equal groups randomly: Group (A) included 30 patients with MRM who underwent suturing of skin and subcutaneous flaps to underlying muscles with Vicryl size 3/0 (the pectoral skin flaps to pectoralis major and axillary skin flaps to serratus anterior muscle). The sutures were placed from medial to lateral with seven to eight stitches in two rows with 3 cm between them (Figures 1, 2).

Group (B) included 30 patients having MRM with the conventional method for closure of skin and subcutaneous (Control group). The data of the patients were collected on the basis of retrospective data collection.

**Inclusion criteria:** (1) Female older than 20 years. (2) Adult females with proven breast cancer planned for MRM. (3) No prior history of axillary surgery.

**Exclusion criteria:** (1) Simultaneous reconstruction surgery. (2) Breast cancer patients not suitable for MRM. (3) Previous axillary surgery.

## Preoperative Evaluation:

Full history taking, complete physical examination including breast examination, full routine preoperative laboratory tests, preoperative bilateral sonomammography, metastatic workup {abdominal (u/s and/or CT), chest (X-ray and/or CT)}, pathological diagnosis was obtained by core needle U/S guided biopsy.

### **Surgical technique:**

All patients in both groups underwent modified radical mastectomy under general anesthesia; all the same classical technique except in closure of the wound. Group A after finishing the modified radical mastectomy operation with fine absorbable sutures (Vicryl 3/0), the pectoral skin flaps was fixed to pectoralis major (Figure 2) and axillary skin flaps was fixed to serratus anterior muscle (Figure 3) with separation between both (Figure 1). The sutures were placed from medial to lateral with seven to eight stitches in two rows with 3 cm between them in upper and lower flaps. The axillary space was fixed to serratus anterior muscle. While in Group B skin flaps were closed in classic way. Both groups had closed suction drains. Operative time and any intraoperative complications were recorded.

### **Flap fixation technique:**

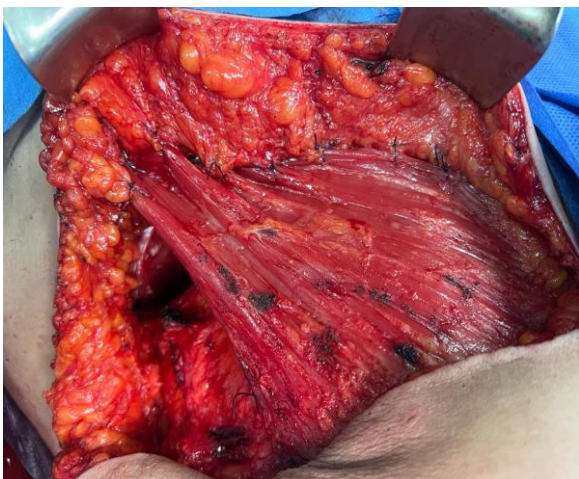
Step 1 separation of mastectomy flap from axillary space by sutures along lateral border of pectoralis major from above downward.



**Figure (1): Two dead spaces separation**

### **Step 2 mastectomy flap fixation:**

The sutures were placed in rows from above downward in two rows 3 cm between them, the upper flap starting from above downward and the lower flap from downward upward.



**Figure (2): Mastectomy flap fixation**

### **Step 3: Axillary space obliteration**

This was done by interrupted sutures between axillary skin flap and serratus anterior muscle till obliteration of the space completely.

### **Preoperative evaluation:**



**Figure (3): Axillary space obliteration**

### **Postoperative evaluation:**

Following surgery, two closed suction drains were inserted, one under the mastectomy flap and another in the axilla.

All patients were kept in the surgical ward for one or two days for follow up then discharged home with drain and a paper sheet for daily record of seroma volume in the suction drain. At each OPD visit patients were asked about drain recoded volumes and examined for any wound complication. The documented preoperative, operative and postoperative follow up data for all patients were collected and reviewed for evaluation of the outcome of both groups.

### **Ethical consent:**

An approval of the study was obtained from Ismailia Teaching Oncology Hospital Academic and Ethical Committee. Every patient signed an informed written consent for acceptance of participation in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

### **Statistical analysis**

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for the Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Data were tested for normal distribution using the Shapiro Wilk test.

Qualitative data were represented as frequencies and relative percentages. Chi square test ( $\chi^2$ ) was used to calculate difference between two or more groups of qualitative variables. Quantitative data were expressed as mean  $\pm$  SD (Standard deviation) and range.

Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value < 0.05 was considered significant.

**RESULTS**

There were no statistical significance differences between the included groups in demographic and clinical data (Table 1).

**Table (1):** Demographic and clinical details of the included groups

Variable		Group A (with Flap Fixation) (n=30)		Group B (without Flap Fixation) (n=30)		t	P
<b>Age: (years)</b>	Mean $\pm$ SD	46.53 $\pm$ 11.77		51.6 $\pm$ 12.38		1.63	0.11
	Range	29-70		33-81			
		No	%	No	%	$\chi^2$	p
<b>Comorbidity:</b>	No	13	43.3	8	26.7	2.38	0.50
	HPT	10	33.3	14	46.7		
	DM	10	33.3	13	43.3		
	Cardiac	4	13.3	3	10		
<b>Laterality:</b>	Right	14	46.7	15	50	0.07	0.80
	Left	16	53.3	15	50		
<b>Stage:</b> <b>T</b>  <b>N</b>	T1N0	5	16.7	0	0	12.25	0.06
	T1N1	2	6.7	6	20		
	T1N2	0	0	1	3.3		
	T2N0	5	16.7	2	6.7		
	T2N1	5	16.7	12	40		
	T2N2	1	3.3	0	0		
	T2N3	2	6.7	0	0		
	T3N1	3	10	3	10		
	T3N2	7	23.3	6	20		
<b>Pathology:</b>	IDC	20	66.7	22	73.3	2.9	0.41
	ILC	4	13.3	1	3.3		
	LDC	0	0	1	3.3		
	IDC+DCIS	6	20	6	20		

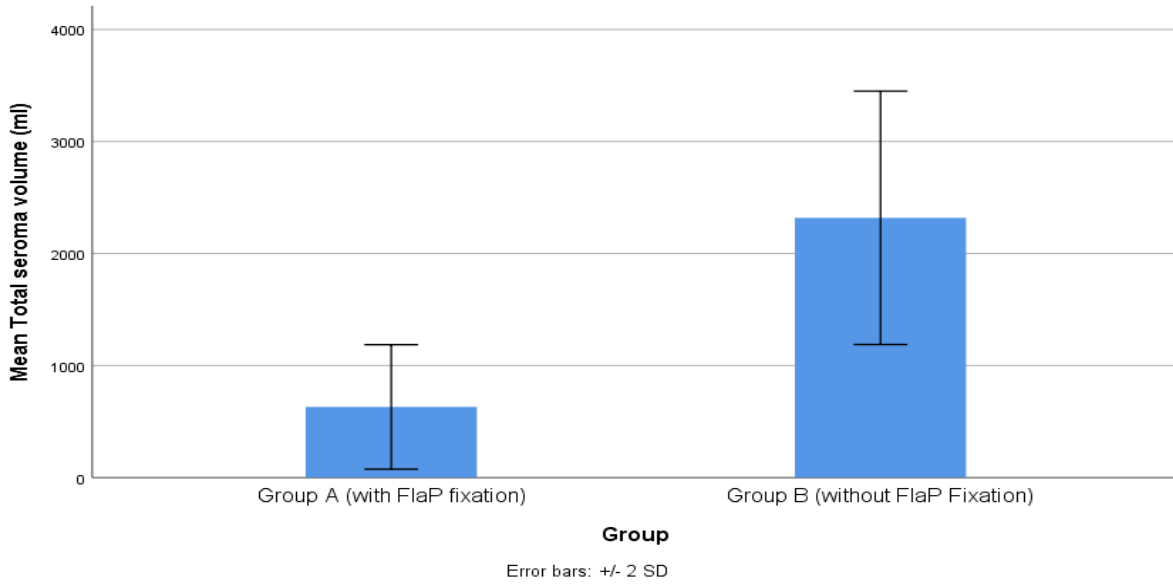
SD: Standard deviation, t: Independent t test  $\chi^2$ : Chi square test.

This table demonstrates that there was a statistical significant decrease in day of removing the drain, total seroma volume and frequency of postoperative seroma among Group A (with Flap fixation) compared to Group B (without Flap fixation) (Table 2 and figures 4-6).

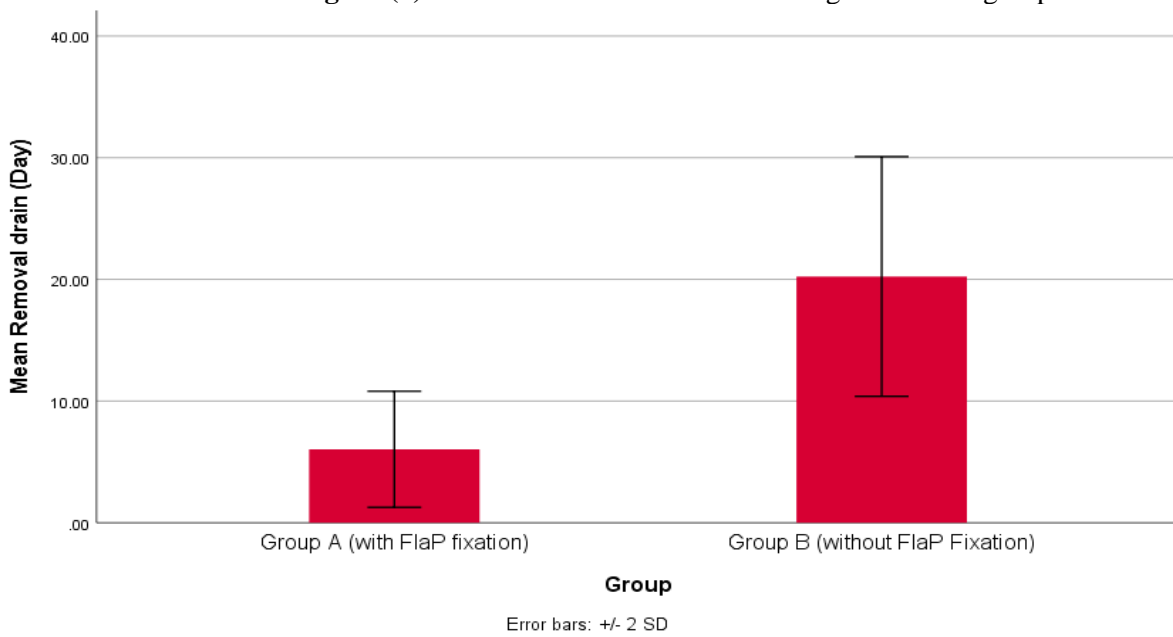
**Table (2):** Operative and postoperative data among the studied groups

Variable		Group A (with Flap Fixation) (n=30)		Group B (without Flap Fixation) (n=30)		t	P
<b>Total seroma volume: (ml)</b>	Mean $\pm$ SD	630.67 $\pm$ 149.52		2318.67 $\pm$ 565.57		<b>14.67</b>	<b>&lt;0.001</b> <b>**</b>
	Range	250-1100		1500-3500			
<b>Drain removal: (Day)</b>	Mean $\pm$ SD	6.03 $\pm$ 2.39		20.23 $\pm$ 4.92		<b>14.21</b>	<b>&lt;0.001</b> <b>**</b>
	Range	2-10		13-32			
		No	%	No	%	$\chi^2$	P
<b>Postoperative seroma:</b>	No	29	96.7	23	76.7	<b>5.19</b>	<b>0.02*</b>
	Yes	1	3.3	7	23.3		

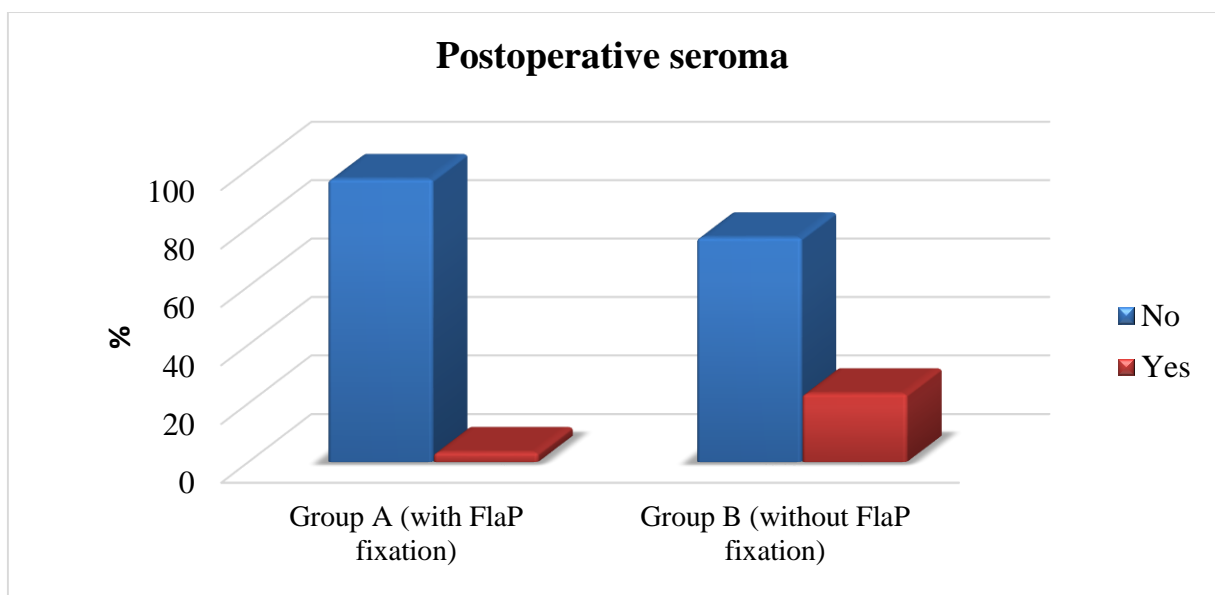
SD: Standard deviation, t: Independent t test  $\chi^2$ : Chi square test. \*: Significant, \*\*: Highly significant



**Figure (4):** Mean total seroma volume among the studied groups



**Figure (5):** Mean days of drain removing among the studied groups



**Figure (6):** Percent of postoperative seroma among the studied groups

## DISCUSSION

Seroma is a collection of serous fluid that occurs after skin flap dissection during MRM and/or in the axillary dead space in the postoperative time<sup>(6)</sup>. Seroma is the most prevalent postoperative complication following mastectomy surgery. It causes patient suffering and increases the expense of the hospital stay<sup>(7)</sup>.

In our study, 60 females with breast cancer who needed a modified radical mastectomy were divided into two groups: group A flap fixing group and group B non-flap fixing group.

In our study, there was high statistically significant decrease in the days of removing the drain, which ranged from (2-10) in group (A) compared to group (B), which ranged from (13-23). This matches with **Haroun et al.**<sup>(8)</sup>, who observed that removing the drain requires five to thirteen days whenever the daily drainage amount is low.

They also accord with the findings of **Raghavendra and Sushanto Neogi**<sup>(9)</sup> who stated that flap fixing was successful in removing dead space following MRM by lowering total drain flow and increasing hemostasis by approximating flaps, as seen by a significant lowering in seroma size after two days.

In our study, incidence of postoperative seroma formation in group (A) was 1 out of 30 as (3.3%) compared to control group (B), which was 7 out of 30 as (23.3%), which mean that closure of the dead space technique after mastectomy is associated with lower incidence of clinically significant seroma. This is consistent with the findings of **Anjani et al.**<sup>(10)</sup>, who discovered that suture fixation of skin flaps to underneath pectoral muscles considerably improved seroma prevention by eliminating dead space under the flaps. This also agrees with **Kontos et al.**<sup>(11)</sup> and **Schuijtvlot et al.**<sup>(12)</sup>. However, this disagrees with **Najeed et al.**<sup>(3)</sup> who found that after modified radical mastectomy, there is no substantial reduction in the frequency of seroma development due to flap fixation.

In our study, there was high statistically significant changes in mean total seroma volume between two group, which ranged (250-1100 cc) in group (A) compared with (1500-3500 cc) in group (B). This matches with **van Bommel et al.**<sup>(13)</sup> and **Faisal et al.**<sup>(14)</sup> who suggested that flap fixation and axillary exclusion reduce the total volume of seroma formation.

## CONCLUSION

Mastectomy flap fixation and axillary dead space obliteration with separation of two spaces are found to be a good technique in decreasing seroma formation, total amount of seroma volume and decreasing in days of drain removal in modified radical mastectomy cases. These all have significant role in decreasing patient morbidity with good advantage to start adjuvant therapy early.

**Conflict of interest:** The author declares no conflict of interest.

**Sources of funding:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## REFERENCE

1. **Siegel R, Miller K, Jemal A (2015):** Cancer statistics. *CA Cancer J Clin.*, 65:5-29.
2. **Sakkary M (2012):** The value of mastectomy flap fixation in reducing fluid drainage and seroma formation in breast cancer patients. *World Journal of Surgical Oncology*, 10:8-13.
3. **Najeed E, Rashid R, Zaffar S (2019):** Effect of flap fixation technique in modified radical mastectomy on incidence of postoperative seroma formation. *Journal of the College of Physicians and Surgeons Pakistan*, 29(5): 410-413.
4. **Agrawal A, Ayantunde A, Cheung K (2006):** Concepts of seroma formation and prevention in breast cancer surgery. *Aust NZ J Surg.*, 76: 1088-95.
5. **Van Bastelaar J, Granzier R, van Roozendaal L et al. (2018):** A multi-center, double blind randomized controlled trial evaluating flap fixation after mastectomy using sutures or tissue glue versus conventional closure: protocol for the seroma reduction after mastectomy (SAM) trial. *BMC Cancer*, 18:830. doi: 10.1186/s12885-018-4740-8.
6. **Pogson C, Adwani A, Ebbs S (2003):** Seroma following breast cancer surgery. *European Journal of Surgical Oncology (EJSO)*, 29(9): 711-717.
7. **Hashemi E, Kaviani A, Najafi M et al. (2004):** Seroma formation after surgery for breast cancer. *World Journal of Surgical Oncology*, 2(1): 44-49.
8. **Haroun A, Mohamed M, Gamal A (2017):** Effect of mechanical closure of dead space in reducing seroma formation after modified radical mastectomy. *Nat Sci.*, 15: 1-6.
9. **Raghavendra R, Sushanto Neogi R (2019):** Role of flap fixation during modified radical mastectomy in locally advanced breast carcinoma patients. *International Surgery Journal*, 6(12): 4465-70.
10. **Anjani J, Amit O, Kuber S et al. (2016):** Factors affecting seroma formation after modified radical mastectomy in patients of carcinoma breast: A prospective study. *IJSS Journal of Surgery*, 2: 21-25.
11. **Kontos M, Kothari A, Hamed H (2008):** Effect of harmonic scalpel on seroma formation following surgery for breast cancer: a prospective randomized study. *J BUON.*, 13: 223-230.
12. **Schuijtvlot M, Sahu A, Cawthorn S (2002):** A prospective audit of the use of a buttress suture to reduce seroma formation following axillary node dissection without drains. *Breast*, 11: 94-96.
13. **van Bommel A, van de Velde C, Schmitz R et al. (2011):** Prevention of seroma formation after axillary dissection in breast cancer: a systematic review. *Eur J Surg Oncol.*, 37: 829-835.
14. **Faisal M, Abu-Elela S, Mostafa W et al. (2016):** Efficacy of axillary exclusion on seroma formation after modified radical mastectomy. *World J Surg Oncol.*, 14: 39-44.