

## Original Research Article

# Is flap fixation an effective technique for reduction of postmastectomy seroma?

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### ABSTRACT

**Background:** Seroma formation after breast cancer surgery cannot be avoided, but it can possibly be decreased by closing of the dead space surgically. Prospective trials have established that flap fixation after mastectomy, and consequently dead space diminution, can be very valuable.

**Methods:** A clinical trial done in Sohag University Hospital. All patients undergoing mastectomy or modified radical mastectomy for invasive breast cancer or ductal carcinoma in situ (DCIS) were eligible for inclusion and divided into two groups: The control group (C) From, patients had conventional wound closure; and flap fixation group (FF) where patients underwent wound closure using flap fixation.

**Results:** We found that the mean blood loss was significantly higher among C group compared to only 41 ml among FF group. Regarding seroma formation, the total number of patients developed seroma showed non-significant difference between the two groups; while the number of seroma requiring aspiration was significantly higher among C group (48%) compared to FF group (20%). Regarding skin dimpling, it was mild and temporary in the minority of FF group cases, persisted in only 8% of cases after 6 months postoperative. Shoulder mobility was normal in the vast majority of cases in the early postoperative period (28% among C group and 40% among FF group); and all of these cases returned to normal shoulder mobility after 6 months of physiotherapy.

**Conclusions:** This study demonstrates that reduction of the dead space after mastectomy using flap fixation reduces seroma formation and seroma aspirations without significant rise in the complications such as skin dimpling and shoulder mobility limitations.

**Keywords:** Flap fixation, Seroma and mastectomy, Seroma aspirations

### INTRODUCTION

The role of surgeon in management of operable breast cancer, have several options as breast conserving surgery and mastectomies with or without reconstruction.<sup>1</sup>

There were numerous postoperative complications reported such as skin flaps necrosis, wound dehiscence, seroma formation, hematoma, and infection.<sup>2,3</sup>

A seroma occurs in dead space as a collection of serous fluid and presents as a fluctuant swelling underneath a wound. After breast surgery, this can be under skin flaps of mastectomy, in the axilla after dissection or at the site of latissimus dorsi (LD) flap. Seromas are considered the most frequent complication after breast surgery. They cause anxiety and discomfort for the patient caused by frequent seroma aspirations and recurrent visits to the outpatient clinic to deal with seroma and its sequelae.<sup>4,5</sup>

Other associated problems of seroma as skin flap necrosis, wound disruption, affect shoulder mobility and increase the incidence of lymphedema. These complications lead to delay the onset of adjuvant chemotherapy and radiotherapy.<sup>4,5</sup>

The mechanisms of seroma formation and the etiology is multifactorial.<sup>6</sup>

Factors implicated as shearing of skin flaps and underlying muscle, dead space, diathermy and inflammatory mediators.<sup>7,8</sup>

Massive axillary dissection and lymph node involvement with malignancy are important factors.<sup>9</sup> Seroma formation after breast cancer surgery cannot be avoided, but it can be minimized by closing of the dead space surgically.<sup>10</sup>

Prospective trials have established that flap fixation after mastectomy, and consequently dead space reduction, could be very valuable.<sup>11</sup>

We hypothesize that fixation of the flaps after mastectomy with subsequent diminution of the dead space will reduce seroma formation, which will reducing the number of outpatient visits and resulting in less seroma aspirations.

## METHODS

### *Type and site of the study*

A clinical trial was conducted at Sohag University Hospital.

The aim of this prospective cohort study was to compare patients undergoing mastectomy with flap fixation in addition to low suction drainage to patients undergo mastectomy with suction drainage only as regard number of seroma aspirations.

### *Inclusion criteria*

All patients undergoing mastectomy or modified radical mastectomy for invasive breast cancer or ductal carcinoma in situ (DCIS) were included in the study.

### *Exclusion criteria*

Exclusion criteria were inoperable breast cancer; patients with difficult follow up; benign breast lesions.

Agreement of ethical committee and consent from patients was obtained.

All patients undergoing mastectomy or modified radical mastectomy for invasive breast cancer or ductal carcinoma in situ (DCIS) were eligible for inclusion.

Low vacuum drains were used in all patients. After fluid collection became less than 50 ml/24 h the drains were removed. After 10 days, all drains were extracted, irrespective of amount of fluid drained.

Patients were analyzed in two separate 1-year intervals (January 2017 to December 2017) in which the method of wound closure differed.

- The control group (C) from, patients had conventional wound closure using subcutaneous and intradermal absorbable sutures. 25 cases were included in this group.
- In flap fixation (FF) group, patients had wound closure using flap fixation. After the mastectomy, suturing of the skin flaps was done on to the pectoral muscle with (vicryl 2.0). Sutures were placed in two or three rows, according to the length of the skin flaps without causing dimpling of the skin and without closing the axillary dead space with sutures. Another 25 cases were included in this group.

Patient demographics (age, use of anticoagulant drugs, tumor stage, type of operation and blood loss) were noted. Infection was defined as the wound condition that needs antibiotic treatment or surgical evacuation of abscess. Seroma was defined as accumulation of fluid diagnosed with palpation or aspiration of clear serous fluid. Number of seroma aspirations as registered in the patients' charts.

### *Statistical analysis*

Continuous variables are presented as means with standard deviations; categorical variables are presented as numbers and percentages. Continuous variables were compared between study groups with Student t tests. Categorical variables were compared between study groups with Chi-squared tests.  $P < 0.05$  was considered evidence of statistical significance.

## RESULTS

The mean age of the study groups was around 54 years in C group, compared to 56 years in the FF group. Around 28% of cases needed anticoagulant therapy among C group compared to only 16% among FF group. Regarding the tumor characteristics, the majority of cases were in stage T1 or T2 (80% among C group; and 76% among FF group) and with no nodal involvement. All of these showed non-significant differences between the two groups (Table 1).

Regarding the operative and postoperative data comparison of the study groups; we found that the mean blood loss was significantly higher among C group (59 ml) compared to only 41 ml among FF group. Regarding seroma formation, the total number of patients developed seroma showed non-significant difference between the

two groups; while the number of seroma requiring aspiration was significantly higher among C group (48%) compared to FF group (20%). Other data including hematoma, SSI (surgical site infection) and pneumothorax showed non-significant differences between the two groups. Regarding skin dimpling, it was mild and temporary in the minority of FF group cases,

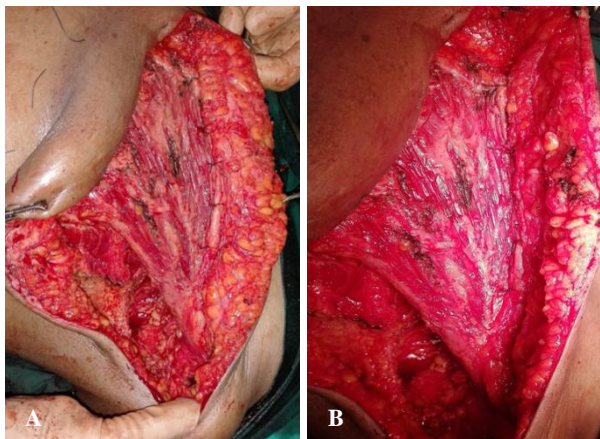
persisted in only 8% of cases after 6 months postoperative. Shoulder mobility was normal in the vast majority of cases in the early postoperative period (28% among C group and 40% among FF group); and all of these cases returned to normal shoulder mobility after 6 months of physiotherapy (Table 2).

**Table 1: Demographic and clinical data of the study groups.**

		C group	FF group	Chi square*	P value
		No (%)	No (%)	T test**	
<b>Age</b>	Mean±SD	54.04±9.72	56.20±7.79	0.867**	0.390 (NS)
<b>Anticoagulants</b>	No (%)	7 (28)	4 (16)	1.049*	0.306 (NS)
<b>Tumor stage</b>	CIS	2 (8)	2 (8)	1.591*	0.808 (NS)
	T1	10 (40)	6 (24)		
	T2	10 (40)	13 (52)		
	T3	2 (8)	3 (12)		
	T4	1 (4)	1 (4)		
<b>N stage</b>	N0	18 (72)	20 (80)	0.439*	0.508 (NS)
	N1	7 (28)	5 (20)		

**Table 2: Operative and postoperative data of the study groups.**

		C group	FF group	Chi square*	P value
		No (%)	No (%)	T test **	
<b>Blood loss (ml)</b>	Mean±SD	59±21.51	41.2±14.95	3.398**	0.001 (S)
<b>Seroma</b>	No(%)	15 (60)	11 (44)	1.282*	0.258 (NS)
<b>Seroma requiring aspiration</b>		12(48)	5 (20)	4.367*	0.037 (S)
<b>No. of aspirations</b>	1	10 (83.3)	5 (100)	0.944*	0.331 (NS)
	2	2 (16.7)	0		
<b>Hematoma</b>	No (%)	3 (12)	1 (4)	1.087*	0.297 (NS)
<b>SSI</b>	No (%)	6 (24)	3 (12)	1.220*	0.289 (NS)
<b>Pneumothorax</b>	No (%)	0	0	0	1.000 (NS)
<b>Skin dimpling</b>	Early postoperative	0	5 (20)	5.556*	0.050 (S)
	After 6 months	0	2 (8)	2.083*	0.490 (NS)
<b>Limited shoulder mobility</b>	Early postoperative	7 (28)	10 (40)	0.802*	0.370 (NS)
	After 6 months	0	0	0.000*	1.000 (NS)



**Figure 1 (A and B): Upper flap fixation.**



**Figure 2 (A and B): Lower flap fixation.**



**Figure 3: Suction drain insertion.**



**Figure 4: Wound appearance after flap fixation.**

## DISCUSSION

Seroma formation and its subsequent complications still the main postoperative problems after mastectomy or modified radical mastectomy, proving that wound drainage is inadequate in combating seroma.<sup>12,13</sup>

The most important clue aiming to decrease seroma formation seems to be the closure of the dead space. However, the techniques used to accomplish this goal are subject of much controversy and debate.<sup>14</sup>

For long time, breast surgeons have classically used suction drain to diminish the dead space.<sup>15</sup>

The extent of the dissection plane and the size of excised tissues looks to be an important factor in seroma formation, and therefore, closure of dead space in patients undergoing mastectomy or modified radical mastectomy are so important. Pressure wears or bandages are not efficient in minimizing seroma formation.<sup>15,17</sup>

Several studies have been done to evaluate the effect of sealing devices on seroma formation in axillary dissection.<sup>10</sup>

However, skin flap fixation seems to be much more effective.<sup>16,17</sup>

Flap fixation in addition to low suction drainage significantly reduces seroma formation and the need for seroma aspiration after mastectomy.<sup>18,19</sup>

This study aimed to evaluate the effect of flap fixation in reducing the risk for seroma formation and comparing the overall postoperative course of flap fixation cases to classical wound closure technique.

Our study included 25 cases underwent the flap fixation technique after breast surgery, and another 25 cases underwent classic wound closure technique. All of the demographic and preoperative clinical data of the two groups were matched, with non-significant differences.

All the demographic and clinical preoperative data were comparable with no significant differences between the two groups; findings which were consistent with previous studies.<sup>15,20,21</sup>

In this study, the flap fixation groups showed significant low percentage of seroma formation that required aspiration, and also lower blood loss. This was agreed with the results of van Bastelaar et al who showed that seroma; especially those necessitating aspiration was much lower among flap fixation cases compared to the controls.<sup>15</sup> The study done by Sakkary found that seroma detected by both clinical and/or ultrasonography was significantly lower among cases with flap fixation technique (20%) compared to controls (50%).<sup>20</sup> This study showed also that the overall drained fluid and days of drain application were significantly lower among flap fixation group compared to controls. A relatively recent study done by Jabir et al agreed with these results, with significantly lower risks for seroma formation and duration of drain application among flap fixation cases compared to their control group.<sup>21</sup> Also, this study stated that, using multivariate regression analysis, the only independent factor associated with lower risk for seroma formation was the dead space obliteration using flap fixation.

Postoperative complications in our study showed non-significant differences between the two groups, with the exception of early skin dimpling, which was significantly higher among flap fixation group, but after 6 months, this returned to be non-significant compared to the control group. Our results agreed the previously published data of Jabir et al, who stated that the overall complication rate and the duration of hospital stay were more or less similar between the two study groups, with non-significant differences.<sup>21</sup> Also, these results were similar to the results published by van Bastelaar et al, with two differences; the first one was that the overall complication rate in our study was slightly higher than that of van Bastelaar et al study; and the second difference was that they did not record the percentage of skin dimpling or shoulder limitation of mobility in their study.<sup>15</sup> According to Sakkary, the complications detected were either cellulitis (which was seen in 10% of both groups without significant difference) and flap necrosis, which was seen in only 2 of his cases.<sup>20</sup>

## CONCLUSION

This study demonstrates that diminution of the dead space after mastectomy using flap fixation reduces seroma formation and seroma aspirations without significant rise in the complications such as skin dimpling and shoulder mobility limitations.

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