

## A Study of Role of Pectoral Flap Fixation in Seroma Reduction after Modified Radical Mastectomy

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### Abstract

**Background:** The primary surgical treatment for breast carcinoma is modified radical mastectomy, particularly in cases of locally advanced breast carcinoma. Seroma development is the most prevalent complication that arises after a modified radical mastectomy. Seroma formation also increases wound infection, the requirement for frequent aspiration, the need for a longer hospital stay, and higher morbidity. Pectoral flap fixation is a beneficial procedure that can be used in conjunction with a modified radical mastectomy. Flap fixation results in the obliteration of superfluous dead space, which reduces the frequency of seroma formation, as well as a decrease in the volume of drain fluid, which results in early drain removal, lowering morbidity and encouraging early mobilization. After meeting the inclusion and exclusion criteria, the participants were submitted to flap fixation in this study. The postoperative incidence of seroma, the day of drain removal, and the volume and kind of drain were all evaluated on a regular basis. Patients were checked on a regular basis for SSI and flap fixation problems such as flap necrosis. Thus, the goal is to investigate the impact of flap fixation in reducing seroma formation and drain fluid volume, resulting in early postoperative recovery.

**Keywords:** Seroma formation, flap fixation in MRM

### Introduction

"Throughout the ages, doctors have been fascinated by breast cancer." The Smith Surgical Papyrus (3000-2500 B.C.) has the oldest known reference to breast cancer"<sup>[1]</sup>. Because of a better understanding of the tumor's molecular biology, treatment for breast cancer has evolved significantly over time. There has been significant advancement in combining surgery, systemic chemotherapy, hormone therapy and radiotherapy. In order to control locoregional illness, prevent metastasis, and improve prognosis and quality of life for breast cancer survivors. Currently, surgeons are the first to be consulted in the case of a breast lump, and it is important for them to be well knowledgeable in all aspects of the breast spanning from anatomy to the different benign and malignant diseases affecting the breast, as well as the most recent breakthroughs in therapy.

"In women, breast cancer is the most prevalent cancer diagnosed in both developed and developing nations, with less developed regions having more instances (883,000) than developed regions (794,000)".

"Breast cancer is the most frequent female cancer worldwide<sup>[2]</sup>, accounting for over a quarter (25%) of all malignancies diagnosed in 2012, with an estimated 1.67 million new cancer cases." Breast cancer is the most common cancer among Indian females, with an age-adjusted prevalence of 25.8 per 100,000 women and a fatality rate of 12.7 per 100,000 women. Previously, cervical cancer was the most frequent cancer in Indian women, but breast cancer has now surpassed cervical cancer as the major cause of cancer death, however cervical cancer remains the most common in rural India. During 2008-2012, India experienced an 11.54% increase in incidence and a 13.82% increase in mortality owing to breast cancer"<sup>[3]</sup>. "Breast cancer projections for India through 2020 predict that the number could reach 17,979,000, with the relative percentage maintaining at 10% across all malignancies"<sup>[4]</sup>.

Depending on the stage of the disease, the surgical treatment of choice in these individuals is either modified radical mastectomy (MRM) or breast conserving surgery (BCS). "With an incidence of 2.5% to 55%, seroma development is the most prevalent postoperative complication following modified radical mastectomy"<sup>[5-7]</sup>. A seroma is characterized as "a fluctuating accumulation of serum or lymph. Under the skin flaps or in the axillary dead space after modified radical mastectomy, removed by puncture"<sup>[8]</sup>. Seroma formation raises the risk of infection, flap necrosis, and delayed wound healing.

The pathogenesis of seroma development has not been fully determined. Seroma development is thought to occur as a result of an initial inflammatory reaction in response to trauma during surgery. Furthermore, because of extensive dissection in modified radical mastectomy, multiple blood arteries and lymphatics are injured, resulting in the development of serous fluid. "Fibrinolytic activity of the plasmin system in serum and lymph results in breakdown of the fibrin complexes previously produced within and surrounding vessels", causing more blood and lymph leaking from the vessels. "Low fibrinogen levels in seroma compared to those in plasma throughout the postoperative period support the concept that seroma is most likely lymphoma"<sup>[9]</sup>.

The purpose of this study is to investigate the function of flap fixation in reducing axillary drain fluid volume and, as a result, early drain removal, preventing seroma formation, and, as a result, wound complications following modified radical mastectomy.

So that adjuvant therapy can be begun sooner if necessary.

## **Aims and Objective**

### **Aim**

To assess the role of skin flap. Anchoring and seroma monitoring in modified radical mastectomy.

### **Objectives**

#### **Primary objectives**

To study the incidence of seroma and outcome of skin flap anchoring to pectoral muscle. in modified radical mastectomy.

#### **Secondary objectives**

To study the amount and character of drain.

To assess the day of drain removal.

### **Methodology**

**Study design:** Descriptive study in Department of General Surgery, VDGMC Latur.

**Study duration:** October 2017-September 2018.

**Sampling technique:** Purposive sampling.

Sample size was calculated using the formula:

$$N = (Z_{\alpha} + Z_{\beta})^2 \times \sigma^2 / d^2$$

When this formula is used with SD as 6.6, a sample size of 45 is obtained.

### **Study setting and Method of collection of data**

45 patients are selected depending upon the inclusion and exclusion criteria along with valid consent. All the study subjects underwent flap fixation. The flap was fixed to pectoralis muscle using vicryl 2'0 (polyglactin) and they were buried. Each suture was placed 2-3 cm apart and all of them were buried. Suction drains were placed in axilla and beneath the pectoral flap. Drain was removed once the output was less than 20ml for two consecutive days. Following this the effect of flap fixation on incidence of seroma was studied.

### **Study population and source of data**

- Total number of subjects included in the study will be 45, of any age or race which includes all patients with breast carcinoma who are undergoing modified radical mastectomy after fulfilling the inclusion and exclusion criteria.
- After thorough general, physical, systemic examination and radiological investigations, consent proforma cleared and validated by the expert group is given to the subjects and their valid consent is taken.

### **Study assessments of end points**

- Assessment in incidence of seroma formation after pectoral flap fixation in patients undergoing modified radical mastectomy
- Patients are also examined regularly to look for other possible complications of flap fixation like flap necrosis and surgical site infection
- The amount and character of drain fluid was documented and drain was removed when the fluid drained was less than 20ml for two consecutive days
- The postoperative day of drain removal and day of discharge is documented

### **Study Conduct**

This will be a descriptive study with purposive sampling.

Patients will be checked for inclusion and exclusion criteria and then shall be enrolled and subjected to the study after taking their valid consent.

Detailed clinical history, physical examination and radiological investigations before starting the study such as

- 1) **Personal details:** Name, age, sex, address.
- 2) Chief complaints and brief presenting illness.
- 3) Past history of comorbidities.
- 4) Local examination in detail.
- 5) Relevant radiological and histopathological/cytological investigations.

All patients who fulfil the inclusion and exclusion criteria will undergo flap fixation during modified radical mastectomy.

Post operatively the patients will be examined on daily basis to look for seroma formation,

the amount and character of the drain fluid will be assessed daily.

Postoperative complications like SSI and flap necrosis will also be looked for and documented.

Day of drain removal and day of discharge are also recorded.

Patients will be evaluated regularly till the day of discharge, and on POD 7, 10 and 14 on OPD basis.

## Statistical methods

### Result

A total of 45 subjects were included in the final analysis. All 45 subjects underwent FAP fixation and the results are as follows.

**Table 1:** Descriptive analysis of age in study population (N=45)

Parameter	Mean $\pm$ SD
Age	53.76 $\pm$ 12.06

The mean age of the subjects participated in the study is 53.76  $\pm$  12.06.

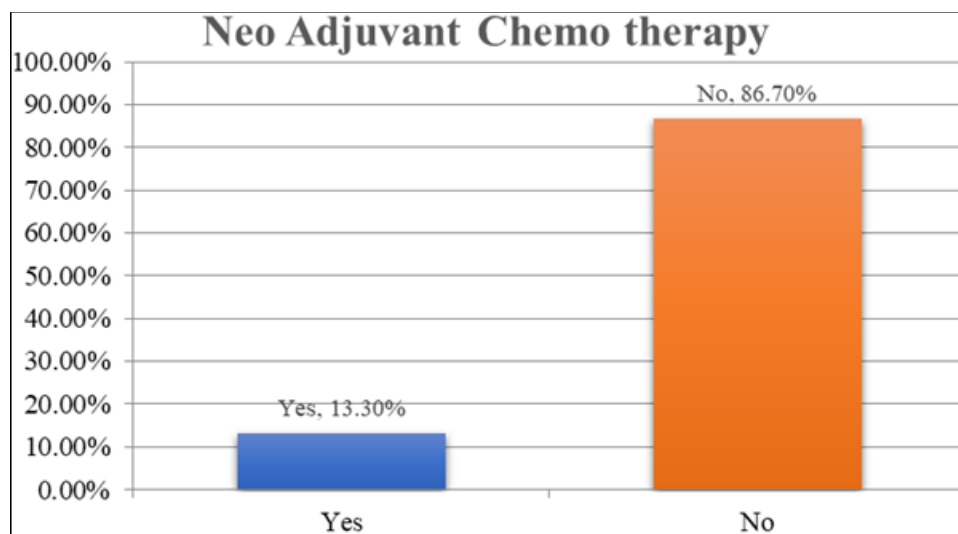
Minimum age of the subjects included being 32 years and maximum age being 80 years.

**Table 2:** Age Distribution

Age	Percentage
32-40	13.3%
41-50	31.1%
51-60	22.2%
61-70	22.2%
71-80	11.1%
Total	100%

**Table 3:** Descriptive analysis of Comorbidities in the study population (N=45)

Comorbidities	Frequency
<b>Diabetes</b>	
Yes	7
No	38
<b>Hypertension</b>	
Yes	11
No	34
<b>Others</b>	
Asthma	2
Hypothyroidism	3
None	40



**Fig 2:** Neo adjuvant chemotherapy in the study population (N=45)

**Table 4:** Descriptive analysis of date of drain removal in study population (N=45)

Parameter	Mean $\pm$ SD
Day of drain removal	6.64 $\pm$ 1.97

The mean age of drain removal among the study population is 6.64 with minimum of 3 days and maximum of 12 days.

**Table 5:** Post op days for Drain removal

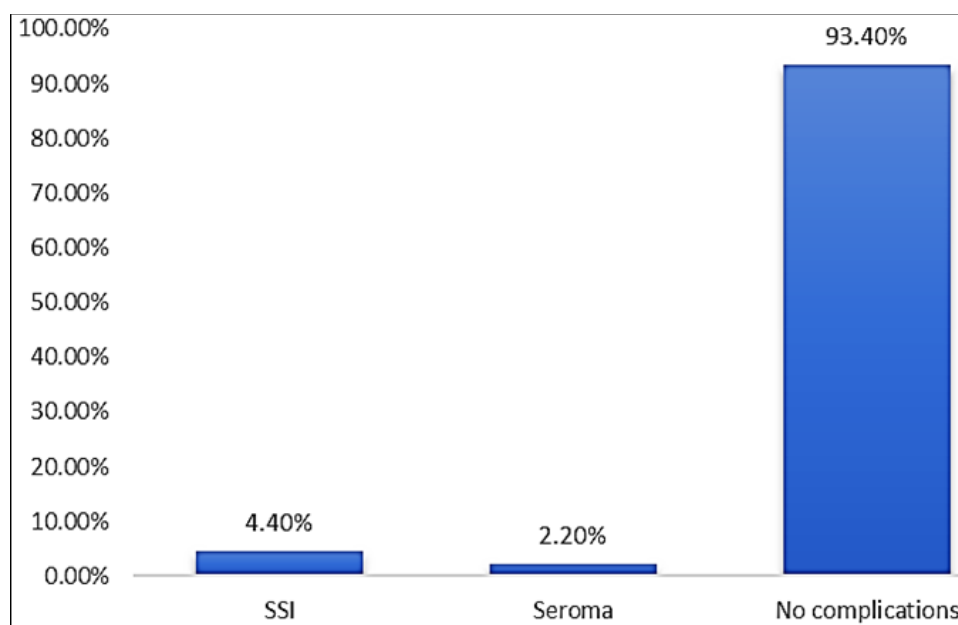
Day of drain removal	Percentage
< 6	60%
> 6	40%
Total	100%

**Table 6:** Descriptive analysis of number of days of post-operative hospital stay in study population (N=45)

Parameter	Mean $\pm$ SD
Number of days of post-operative hospital stay	7.64 $\pm$ 2.44

**Table 7:** Descriptive analysis of post-operative complications in the study population (N=45)

Post-Operative Complications	Percentages
<b>Seroma</b>	
Yes	2.2%
No	97.8%
<b>SSI</b>	
Yes	4.44%
No	95.56%



**Fig 3:** Post-operative complications

## Discussion

Seroma development is a fairly common complication after mastectomy, and it is associated with severe morbidity. It also leads to a longer hospital stay, an increase in the number of days with a drain in place, and the necessity for invasive treatments such as recurring aspirations, all of which have an impact on the patients' day-to-day activities.

Pectoral flap fixation in modified radical mastectomy is a well-established procedure that has been shown to improve outcomes after modified radical mastectomy by reducing seroma occurrence, removing drains earlier, and reducing the amount of drain fluid, resulting in faster postoperative recovery of the patient.

This study lasted 18 months and was carried out at JSS Hospital in Mysore. After receiving sufficient informed consent, all patients undergoing MRM throughout this time period were included in the study. The study included 45 patients who had flap fixation and all of the study individuals had MRM with axillary dissection. Flap fixation was accomplished by utilizing interrupted sutures with vicryl at 2-3cm intervals.

This technique was performed in addition to the installation of suction drains in the axilla and behind the pectoral flap. As a result, flap fixation aids in reducing the excess dead space formed after removing the breast tissue and axillary dissection, limiting seroma formation and reducing the amount of drain fluid in the following days.

Only one (2.2%) of the study individuals developed seroma following flap fixation in modified radical mastectomy at the conclusion of the study period.

At the end of the trial, only two patients (4.4%) had SSI, and none of the patients experienced flap necrosis after flap fixation.

In the current study, the average length of hospital stay is 7.64 days, with a minimum of 4 days and a maximum of 16 days.

The mean age of drain removal in this study is 6.64 days, with a minimum of 3 days and a maximum of 12 days.

There was no link established between diabetes or hypertension and the occurrence of seroma. There was also no increase in the relationship between seroma development and neoadjuvant treatment.

Despite the fact that our study was descriptive and the other studies were comparative, the results were analyzed and compared.

According to Erum *et al.*, the Flap fixation group had two occurrences of seroma development. In the control group, there were three incidences of seroma development. The statistical difference between the two groups was small ( $p=0.643$ ).

However, according to another study conducted by James van *et al.*, 35% of patients in the flap fixation group had seroma, whereas the control group had a 59.1% incidence. Thus demonstrating the efficacy of flap fixing in reducing seroma incidence.

Thus, our study demonstrates that flap fixation during MRM greatly reduces seroma formation, thereby lowering postoperative morbidity. Flap fixation also reduces the number of days with the drain in place, as well as the drain output.

## Conclusion

This study shows that reducing dead space following mastectomy with flap fixation lowers the risk of seroma development and recurrent seroma aspirations. Suction drainage has been employed by breast surgeons to minimize dead space for the past 20-30 years. However, even if a suction drain is placed, a large proportion of patients develop seroma post-operatively.

Flap fixation shortens the hospital stay, shortens the day of drain removal, and minimizes the volume of drain by obliterating extra dead space.

As a result, flap fixation, in addition to suction drain placement, can be considered a good technique for reducing the incidence of seroma and the number of postoperative hospital stays, particularly in high-risk patients such as those who have undergone neoadjuvant chemotherapy and those who are obese.

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