

**Research Article**

# Evaluation of Quilting Technique for Reduction of Seroma in Mastectomy Patient-A Prospective Study

**Devesha Rathour<sup>1</sup>, Rashpal Singh<sup>2\*</sup>, Upender Chandel<sup>1</sup>, Ashok Kaundal<sup>1</sup>, Balraj Singh<sup>3</sup>, Venkatesh singhal<sup>1</sup>, Aborishi Garg<sup>4</sup>, Shet Kaushik Pramod<sup>2</sup>**

<sup>1</sup>Department of General Surgery, Indira Gandhi Medical College, Shimla, India

<sup>2</sup>Department of Surgical Oncology, Department of General Surgery, Indira Gandhi Medical College, Shimla, India

<sup>3</sup>Department of Community medicine, Indira Gandhi Medical College, Shimla, India

<sup>4</sup>Department of radiodiagnosis, Indira Gandhi medical College Shimla, Himachal Pradesh

**\*Corresponding author:** Rashpal Singh, Surgical Oncology, Department of General Surgery, Indira Gandhi, Medical College, Shimla, Himachal Pradesh, India

**Citation:** Rathour D, Singh R, Chandel U, Kaundal A, Singh B, et al. (2022) Evaluation of Quilting Technique for Reduction of Seroma in Mastectomy Patient-A Prospective Study. J Oncol Res Ther 7: 10134. DOI: 10.29011/2574-710X.10134

**Received Date:** 07 June, 2022; **Accepted Date:** 16 June, 2022; **Published Date:** 18 June, 2022

## Abstract

**Background:** Breast cancer is a widespread cancer among females. One of the commonest early sequelae of breast cancer surgery is seroma formation, with a highly variable incidence of 3% to more than 90%. Seroma is formed due to acute inflammatory exudates in response to the acute phase of wound healing after surgery. Therefore, meticulous attention is applied to the techniques of breast surgery to minimize leakage from dissected blood and lymphatic vessels.

**Material and methods:** This study is conducted to evaluate the efficacy of the technique of quilting of flaps and obliteration of the axillary space in reducing post-mastectomy seroma formation among fifty patients.

**Result:** Clinical incidence of seroma in the intervention group was 8% and in the control group, it was 48%. The risk ratio was found to be 1/6 with confidence interval of 95%. Hence, the probability of seroma formation in the control group was six times more as compared to the intervention group.

**Conclusion:** Flap-fixation technique significantly decreased the average amount of fluid drained till postoperative day 3. No statistically significant difference in the average length of hospital stays between the intervention and control group.

**Keywords:** Quilting; Post Mastectomy; Seroma Formation; Breast Cancer Patients

**Abbreviations:** IGMC: Indira Gandhi Medical College

## Introduction

Breast cancer is a widespread cancer among women and comprises 23% of female cancers.<sup>1</sup> Since the 1990s, breast cancer rates have increased, and at the same time survival rates have improved due to early diagnosis by breast cancer screening programs and the effectiveness of various treatment modalities [1-3]. Breast cancer is an increasing health problem in India too. The trend of rising incidence rates is likely to continue due to further changes in lifestyle factors such as childbearing and dietary

habits. In India, the age-adjusted incidence rate of breast cancer is 25.8/100,000 [4]. There is a significant increase in the incidence and cancer-associated morbidity and mortality in the Indian subcontinent.

These women undergo a combination of chemotherapy and surgical management for its treatment. One of the commonest early sequelae of breast cancer surgery is seroma formation, with a highly variable incidence of 3% to more than 90% [5]. Seroma is defined as a collection of serous fluid in the dead space of post-mastectomy skin flap and axilla [6]. The pathogenesis of seroma has not been fully understood. Seroma is formed due to acute inflammatory exudates in response to the acute phase of wound healing after surgery [7]. Oertli, et al. [8] believed that fibrinolytic activity contributes to seroma formation. Gonzalez, et al. [9] and

Hashemi, et al. [10] reported that the only statistically significant factor influencing the incidence of seroma formation was the type of surgery. They reported a higher seroma rate in Modified Radical Mastectomy (MRM) than following wide local excision and axillary dissection (BCS). Extensive dissection in mastectomy and axillary lymphadenectomy damages several blood vessels and lymphatics and the subsequent oozing of blood and lymphatic fluid from a large surface area, when compared with breast-conserving surgery, leads to seroma [11].

Risk factors for seroma formation postmastectomy include increased body weight, obesity, and hypertension [12]. Seroma often requires aspirations, turning it into a clinically significant seroma. Such intervention constitutes an entry point for microorganisms. Clinically significant seroma is a risk factor for surgical site infections (SSIs) [13,14]. It causes great discomfort to the patient due to limited motion, anxiety, repeated aspirations, and frequent outpatient clinic visits for several months. If seroma gets infected it leads to delay in wound healing, adjuvant radiotherapy or chemotherapy. Sometimes a persistent seroma has to be evacuated operatively.

Seroma accumulation elevates the flaps from the chest wall and axilla thereby hampering their adherence to the underlying fascia and muscles leading to delayed wound healing, infected wound due to repeated aspiration, wound dehiscence, prolonged hospital stays, delay of adjuvant treatment, and finally generating additional costs [7]. Seroma is graded 1 if asymptomatic, graded 2 if symptomatic but can be managed either medically or by simple aspiration, and graded 3 if symptomatic and requires surgical or radiologic intervention [15].

In practice, several techniques have been reported to prevent or decrease seroma formation such as meticulous techniques of breast surgery using electro-cautery, ultrasonic dissection and Argon enhanced electrosurgery may reduce the incidence of seroma formation at the expense of obvious cost implications for the harmonic scalpel and Argon beam coagulation, use of sealants and sclerotherapy such as fibrin glue, external compression dressing to the chest wall and axilla to obliterate the dead space, use of drains and delayed shoulder exercise [16-20]. There are inconsistent and uncertain outcomes on the beneficial role of these techniques in preventing seroma.

It has been observed that obliterating dead space may reduce the incidence of seroma formation. Therefore, various studies have been done in an attempt to reduce seroma formation either by mechanical methods (suturing of skin flaps to underlying muscle that is quilting technique, use of pressure dressings or pressure garments) or chemical methods (fibrin glue, bovine thrombin application to the axilla, sclerotherapy using tetracycline). Physical closure of the dead space appears to reduce seroma rate, but studies

have failed to address the issues of cosmesis, movement and acceptability with this technique. Thrombin spray, application of fibrin glue, sclerotherapy and mechanical pressure do not reduce the drainage of seroma. Shoulder immobilization is of no advantage to the patient, but delaying shoulder physiotherapy appears to reduce drainage. Closed suction drainage systems appear to be superior to open drainage systems [7,17,19,20]. Therefore, meticulous attention is applied to the techniques of breast surgery to minimize leakage from dissected blood and lymphatic vessels. Halsted first advocated creating a short superior flap and suturing it with interrupted silk to the fascia below the first rib and skin grafting in the remaining part of the defect [21]. It is hypothesized that minimizing the dead space through fixation of the skin flaps to the underlying muscles (quilting) lowers the incidence of seroma [22].

Several preliminary or retrospective studies, and prospective studies, as well as RCTs, were done to evaluate quilting techniques for the reduction of seroma after breast surgery. Recently a study by Laetitia Debry, et al. [23] showed the efficacy of quilting suture in reducing postoperative seroma formation in Breast reconstruction using Latissimus Dorsi Flap. Efficacy was greater when overedge stitches were used. Obese patients benefited more from quilting suture than patients with BMI < 25. The purpose of our study was to evaluate the efficacy of the technique of quilting of flaps in mastectomy and obliteration of the axillary space in reducing postmastectomy seroma.

## Material and Methods

### Objectives

- To evaluate the efficacy of the technique of quilting of flaps and obliteration of the axillary space in reducing post-mastectomy seroma formation.
- Assessment of drain output /seroma till postoperative day 3
- To evaluate the duration of hospital stay in seroma patients.

### Methodology

This study was conducted in the surgical oncology cell, Department of General Surgery of a tertiary care center over a period of one year from April 2020 to March 2021.

### Inclusion Criteria

All biopsy proven patients of breast carcinoma who underwent MRM.

### Exclusion Criteria

- Inoperable malignancy (Inflammatory carcinoma breast/ where flap could not be raised).
- Recurrent cancer breast post mastectomy.

## Materials and Methodology

The study included all cases that met inclusion criteria with effect from April 2020 to March 2021.

Sample size=50

### Methodology

We used the block randomization technique to allocate the patient to the intervention and control groups. Each block comprised a size of 4-6. For each block, a random sequence was generated by computer random sequence generator software.

**Group 1 (Intervention group):** Patients underwent Modified radical mastectomy (MRM) using the scalpel with cautery of the bleeding points only with quilting suture of both the upper and lower flaps to the underlying pectoral fascia together with obliteration of the axillary space.

**Group 2 (Control group):** Patients underwent Modified radical mastectomy (MRM) done conventionally without quilting. All patients signed informed consent after explanation of the technique to be used. All operations were performed by the same team of surgeons.

### Quilting Technique of Mastectomy Flap Fixation



Fig. a



Fig. b

## Technique

Using Vicryl 2/0 suture, we started the quilting technique in the upper flap from medial to lateral by an interrupted suture that fixed the undersurface of the upper flap to the pectoral fascia with care to avoid entangling the dermis which results in unsightly dimpling. The second row was done by the same interrupted suture from lateral to medial till the medial angle. The same was done for the lower flap as shown in Figure 1.

Lastly, the axilla was obliterated by suturing its lateral wall to the fascia of the serratus anterior and medial axillary wall. A negative suction drain was inserted in the axilla in all cases of the study.

**Group 1(Study group):** Patients underwent Modified radical mastectomy (MRM) using the scalpel with cautery of the bleeding points only with quilting suture of both the upper and lower flaps to the underlying pectoral fascia together with obliteration of the axillary space.

**Group 2(Control group):** Patients underwent Modified radical mastectomy (MRM) done in conventional way without quilting.

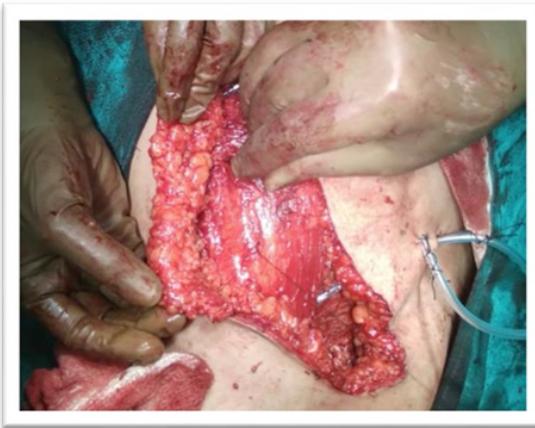


Fig. c



Fig. d

**Figure 1 (a):** Using Vicryl 2/0 suture, we started the quilting technique in the upper flap from medial to lateral by an interrupted suture that fixed the undersurface of the upper flap to the pectoral fascia.

**Figure 1 (b) and (c):** The second row was done by the same interrupted suture from lateral to medial till the medial angle.

**Figure (d):** Skin of the flaps closed with metal clips with negative suction drain kept with one limb in the axilla and another limb below the flaps.

#### Follow Up Protocol Post –Operatively

All patients were followed up routinely for immediate and late complications including hemorrhage, flap necrosis, wound sepsis, recording of the total drainage volume before drain removal, the amount of drainage fluid in the first 3 days, the duration till drain removal (drain was removed when the 48-hour effluent was less than 30 mL). Seroma was diagnosed clinically or ultrasonographically (on routine postoperative ultrasound evaluation if the volume was more than 30 ml). If seroma was diagnosed, we recorded the number of aspirations till resolution, the total aspirated volume, and the number of days before the complete resolution was recorded.

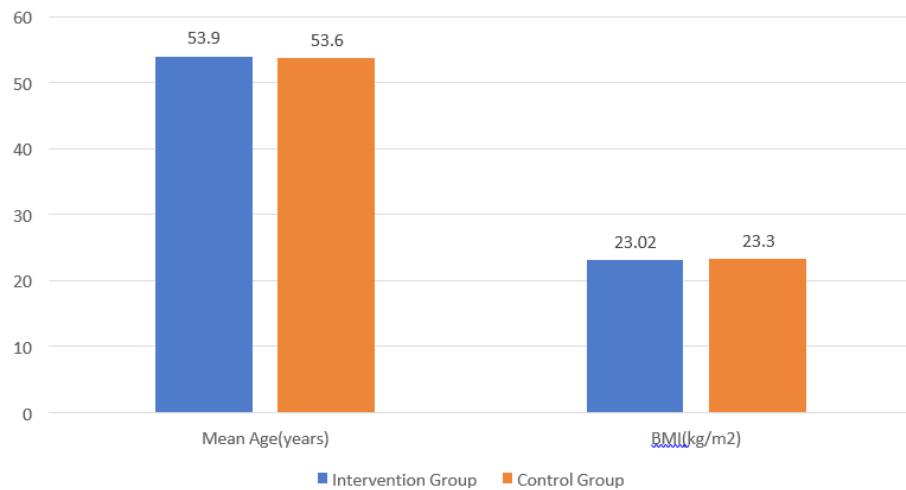
#### Statistical Analysis

We compared qualitative data by the Chi-Square test/Fisher's exact test.  $p$ -value  $<0.05$  was considered statistically significant. We analyzed data using Epi-Info version 7.0.2 or Windows software.

#### Results

A total of 50 patients of Carcinoma Breast who underwent Modified Radical Mastectomy were included in this prospective study

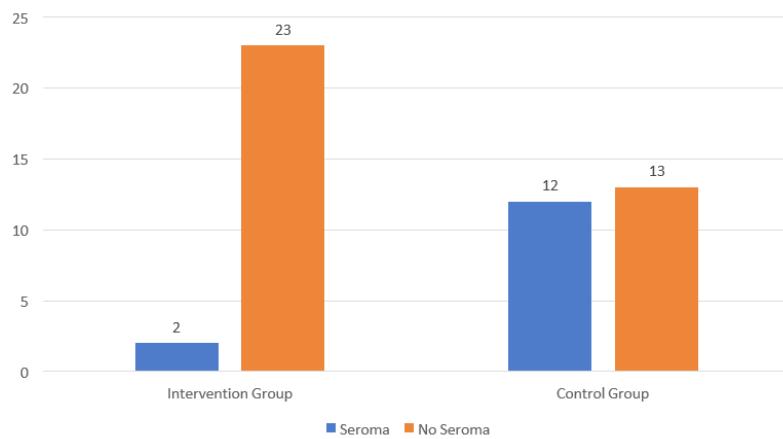
### Comparison of Baseline Characteristics of Intervention and Control Groups:



**Figure 2:** Showing the comparison of baseline parameters of both groups.

In the present study, Figure 2 showing the Control group had mean age of  $53.6 \pm 9.5$  years and the intervention group had mean age of  $53.9 \pm 12.9$  years. There was no statistically significant difference between the ages of intervention and control group ( $p$ -value=0.202). The mean BMI for the control group was  $23.33 \pm 2.0$  and for the intervention group was  $23.02 \pm 2.1$ . There was no statistically significant difference between the BMI of intervention and control group ( $p$ -value=0.727).

### Incidence of Seroma



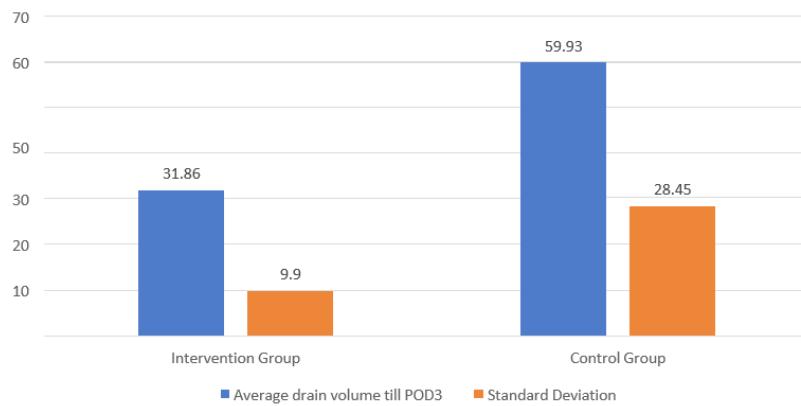
**Figure 3:** showing the incidence of seroma formation in both groups.

In the present study, Figure 3 showing the incidence of seroma formation in the intervention group was compared with the control group. Two out of twenty-five patients in the intervention group (8%) vs twelve out of twenty-five patients in the control group (48%) developed seroma.

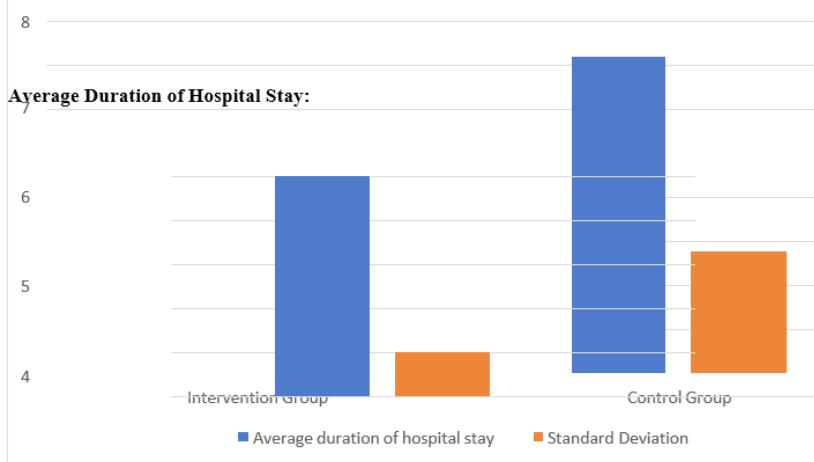
The risk ratio was 1:6 for incidence of seroma between intervention and control group.

Therefore, it can be deduced that the probability of getting seroma with the control group was 6 times more than that of the intervention group ( $p$  value=0.005).

### Average Drain Volume Till Post-Operative Day 3 (ML)

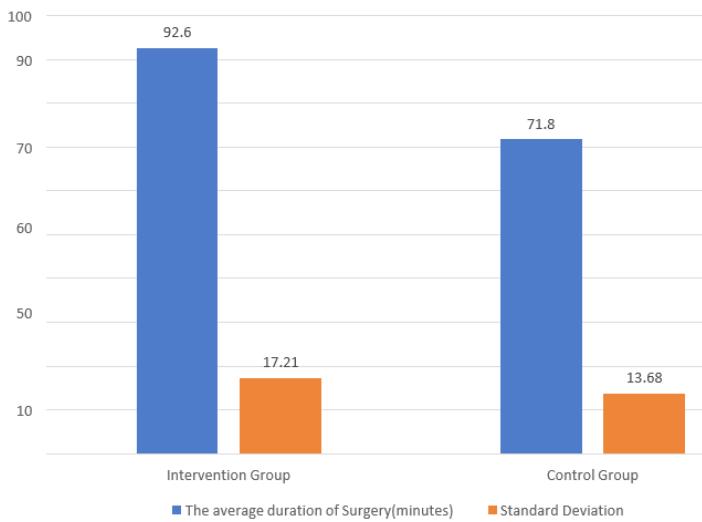


**Figure 4:** showing the average drain volume till postoperative day.



**Figure 5:** The average duration of hospital stay in the control group was 7.2 days and in the intervention group, it was 5.08 days. There was no statistically significant difference between the control and intervention groups. ( $p$  value=0.11).

### Average Duration of Surgery



**Figure 5:** showing the average duration of surgery in both control and intervention group.

### Conclusion

The sample size in the current study was relatively smaller, so a larger study sample may be needed before any further conclusion can be made. If quilting technique is implemented in all post mastectomy patients, the quality of life will be definitely improve.

### Bibliography

1. Parkin D (2012) Global cancer statistics CA. *Cancer J Clin* 55: 74-108.
2. Ferlay J, Parkin D, Steliarova-Foucher EG (2012) Estimated cancer Incidence, mortality and prevalence worldwide in 2012. IARC Cancer Base.
3. Koning HJ (2003) Mammographic screening: evidence from randomized controlled trials. *Ann Oncol* 14: 1185-1189.
4. Gupta A, Shridhar K, Dhillon PK (2015) A review of breast cancer awareness among women in India: Cancer literate or awareness deficit? *Euro J Cancer* 51: 2058-2066.
5. Carless PA, Henry DA (2006) Systematic review and meta-analysis of the use of fibrin sealant to prevent seroma formation after breast cancer surgery. *Br J Surg* 93: 810-819.
6. Kumar S, Lal B, Mishra MC (1995) Post-mastectomy seroma. A new look into the etiology of an old problem. *J R Coll Surg Edin* 40: 292-294.
7. Pogson CJ, Adwani A, Ebbs SR (2003) Seroma following breast cancer surgery. *Eur J Surg Oncol* 29: 711-717.
8. Oertli D (2000) Axillary lymphadenectomy. *Chirurgic* 78: 196-202.
9. Gonzalez EA, Saltzstein EC, Riedner CS, Nelson BK (2003) Seroma formation following breast cancer surgery. *Breast J* 9: 385-388.
10. Hashemi E, Kaviani A, Najafi M, Ebrahimi M, Hooshmand H, et al. (2004) Seroma formation after surgery for breast cancer. *World J Surg Oncol* 2: 44.
11. Loo WT, Chow LW (2007) Factors predicting seroma formation after mastectomy for Chinese breast cancer patients. *Indian J Cancer* 44: 99-103.
12. Burak Jr WE, Goodman PS, Young DC, Farrar WB (1997) Seroma formation following axillary dissection for breast cancer: risk factors and lack of influence of bovine thrombin. *J Surg Oncol* 64: 27-31.
13. Boostrom SY, Throckmorton AD, Boughey JC, Holifield AC, Zakaria S, et al. (2009) Incidence of clinically significant seroma after breast and axillary surgery. *J Am Coll Surg* 208: 148-150.
14. Xue DQ, Qian C, Yang L, Wang XF (2012) Risk factors for surgical site infections after breast surgery: a systematic review and meta-analysis. *Eur J Surg Oncol* 38: 375-81.
15. Chand N, Aertssen AMG, Royle GT (2013) Axillary "Exclusion" A Successful Technique for Reducing Seroma Formation after Mastectomy and Axillary Dissection. *Advances in Breast Cancer Research* 2: 1-6.
16. Gong Y, Xu J, Shao J, Cheng H, Wu X, et al. (2010) Prevention of seroma formation after mastectomy and axillary dissection by lymph vessel ligation and deadspace closure: a randomized trial. *Am J Surg* 200: 352-356.
17. Harada RN, Pressler VM, McNamara JJ (1992) Fibrin glue reduces seroma formation in the rat after mastectomy. *Surg Gynecol Obstet* 175: 450-454.
18. O'Hea BJ, Ho MN, Petrek JA (1999) External compression dressing versus standard dressing after axillary lymphadenectomy. *Am J Surg* 177: 450-453.
19. Gupta R, Patel K, Varshney S, Goddard J, Royle GT (2001) A comparison of 5-day and 8-day drainage following mastectomy and axillary clearance. *Eur J Surg Oncol* 27: 26-30.
20. Shamley DR, Barker K, Simonite V, Beardshaw A (2005) Delayed versus immediate exercises following surgery for breast cancer: a systematic review. *Breast Cancer Res Treat* 90: 263-271.
21. Halsted WS (1913) Developments in the skin grafting operations for cancer of the breast. *JAMA* 60: 416-418.
22. Van Bommel AJM, van de Velde CJH, Schmitz RF, Liefers GJ (2011) Prevention of seroma formation after axillary dissection in breast cancer: a systematic review. *Eur J Surg Oncol* 37: 829-835.
23. Laetitia Debry, et al. (2020) Reducing the seroma volume by quilting suture after breast reconstruction with a latissimus dorsi flap: Single institutional experience. *Bulletin Du Cancer* 03: 006.