ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

A COMPARATIVE STUDY ON THE ROLE OF QUILTING IN THE REDUCTION OF SEROMA AFTER MASTECTOMY

R Maheswari[1],Gowbath Marliya S[2]

[(1)]Professor, Department of general surgery,Sree Mookambika institute of medical sciences, Kanyakumari, Tamilnadu

[(2)]Junior Resident, Department of general surgery,Sree Mookambika institute of medical sciences, Kanyakumari, Tamilnadu

Corresponding author : Gowbath Marliya S,Junior Resident, Department of general surgery,Sree Mookambika institute of medical sciences, Kanyakumari, TamilnaduEmail: marliyagowbath@gmail.com

ABSTRACT

Introduction: Postoperative seroma is most prevalent following mastectomy accompanied by axillary lymph node dissection, with reported incidence rates ranging from 15.5% to 90%. Seroma may cause discomfort, infections, and potential reconstruction failure. The mechanical sealing of the dead space was consistently demonstrated to be highly effective.

Aims and objectives: The aim of the present study was to determine the seroma formation after mastectomy and to compare the role of quilting suture technique with respect to non-quilting suture technique in reducing seroma formation after mastectomy

Materials and methods: A Comparative observational study was conducted in the Department of General Surgery, Sree Mookambika Institute of Medical sciences for a period of 18 months. The study comprised 70 patients who were randomized into two equal groups, A and B, with quilting conducted on group A. Group B utilized a non-quilting suture technique. The patients were monitored for daily drain output and seroma formation following drain removal. The data was presented as numbers, percentages, means, and standard deviations. The analysis was conducted using version 20.0 of the Statistical Package for Social Sciences.

Results: The mean age of patients with breast carcinoma in groups A and B was 54.85±10.74 and 54.54±7.55 years, respectively. The majority of patients complained for less than a year. The average tumor size in groups A and B was 7.45±1.46 and 7.53±1.14, respectively. None of the patients in group A who underwent the quilting

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

suture technique had seroma, whereas three patients (8.57%) in group B who underwent the non-quilting suture technique had seroma. The mean volume drain on
Days 1, 2, 3, and 4 in group B was higher than in patients who underwent quilting technique, and this difference was statistically significant. (p=0.001). In groups A and B, one (2.86%) and two (5.71%) patients, respectively, developed surgical site infections.
Conclusion: Quilting proved to be an efficient method for lowering the incidence of seroma that developed after a mastectomy.
Keywords: Breast cancer, Dead space, Mastectomy, Quilting technique, Seroma.

Introduction

Seroma formation is the most frequent complication encountered after a breast surgery. Seroma formation affects the Prognosis of the patient and also delay the initiation of adjuvant therapy. It prolongs the hospital stay. Seroma formation occurs due to inflammatory exudates in reaction to trauma caused due to surgery. The extent of the axillary lymph node involvement also plays a major role in the seroma formation. Seroma formation leads to delay wound healing and wound dehiscence.

The pathogenesis of seroma is yet to be understood clear as various factors such as age, comorbid conditions, extent of lymph nodes involvement, breast size has taken into consideration in the formation of seroma requiring drainage. Unfortunately, no technique has been proven till now to reduce the formation of seroma in post mastectomy surgeries. The exact pathogenesis of seroma formation is not yet well understood and it is believed that quilting suture technique prevents seroma formation by minimising dead space. This in turn reduces hospital stay and promotes early recovery after surgery. So a study analysis explaining the relationship of quilting suture technique to reduce seroma formation is necessary as it leads to speedy recovery after mastectomy surgery and thus helping in early starting of adjuvant therapy

By doing this study, patients presenting with carcinoma breast is evaluated and quilting suture technique is done before closing the mastectomy flaps and thus leading to reduction of seroma formation requiring multiple aspirations

AIMS AND OBJECTIVES

• To determine the seroma formation after mastectomy
• To compare the role of quilting suture technique with respect to non-quilting suture technique in reducing seroma formation after mastectomy

MATERIALS AND METHODS

Study design : Comparative observational study
Study setting : Department of general surgery, Sree Mookambika Institute of Medical

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

sciences
Duration of study :18 months
Study participants (human)
Inclusion criteria
• All adult female patients posted for mastectomy in department of general surgery
Exclusion criteria
• Patients who have undergone previous breast surgeries
Number of groups to be studied, identify groups with definition :2
• Group A: All adult female patients posted for mastectomy surgery in department of general surgery who underwent quilting suture technique
• Group B: All adult female patients posted for mastectomy surgery in department of general surgery who underwent non-quilting suture techniq

Sample size :A total of 35 patients underwent axillary quilting and mastectomy in a row as part of the case group (group A). Group B comprised 35 randomly chosen patients undergoing identical reconstructive and oncological procedures, but without quilting. The clinical characteristics of the group were balanced to assess the procedure's effectiveness and reduce bias.

Ethical Consideration : Patients were allowed to participate in the study only after receiving approval
from the Institutional Human Ethical Committee and Institutional Research Committee, as well as after the participants gave their informed consent. Individual patients were assigned to either Group 1 or Group 2.

RESULTS

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

Table-1: Comparison of incidence of seroma between the groups

Incidence of Seroma	Group-A		Group-B		p value
	Number	Percentage (%)	Number	Percentage (%)	
Yes	0	0.00	3*	8.57	0.05
No	35	100.00	32*	91.43	0.05

(*p<0.05 significant difference compared between the groups)

In group A, patients who underwent quilting suture technique none of the patients had seroma while 3(8.57%) patients in group B who underwent non quilting suture technique had seroma. Comparison between groups statistical significance was noted

Graph 1 :Bar diagram showing comparison of incidence of seroma between the groups.

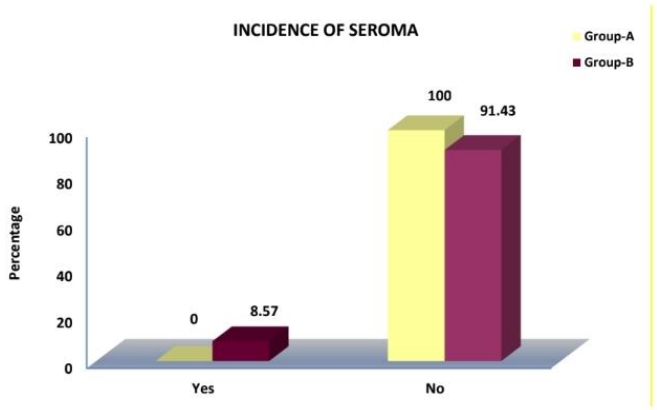


Table-2 :Comparison of mean drain volume on Day 1 between the groups

Groups	Day-1 Drain volume (mL) (MEAN±SD)	p value
Group-A	147.11±40.37	0.0001
Group-B	190.94±32.76*	

(*p<0.05 significant difference compared between the groups)

The mean volume drain on Day 1 in group A was 147.11±40.37 and in group B was 190.94±32.76, which was higher when compared to the patients who underwent quilting technique and was considered statistically significant. (p=0.001).

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

Table-2 :Comparison of mean drain volume on Day 2 between the groups

Groups	Day-2 Drain volume (mL) (MEAN±SD)	p value
Group-A	120.69±28.79	0.0001
Group-B	162.71±23.77*	

(*p<0.05 significant difference compared between the groups)

The mean volume drain on day 2 in group A was 120.69±28.79 and in group B was 162.71±23.77 and was considered statistically significant. (p=0.001)

Table-3: Comparison of drain removal between the groups

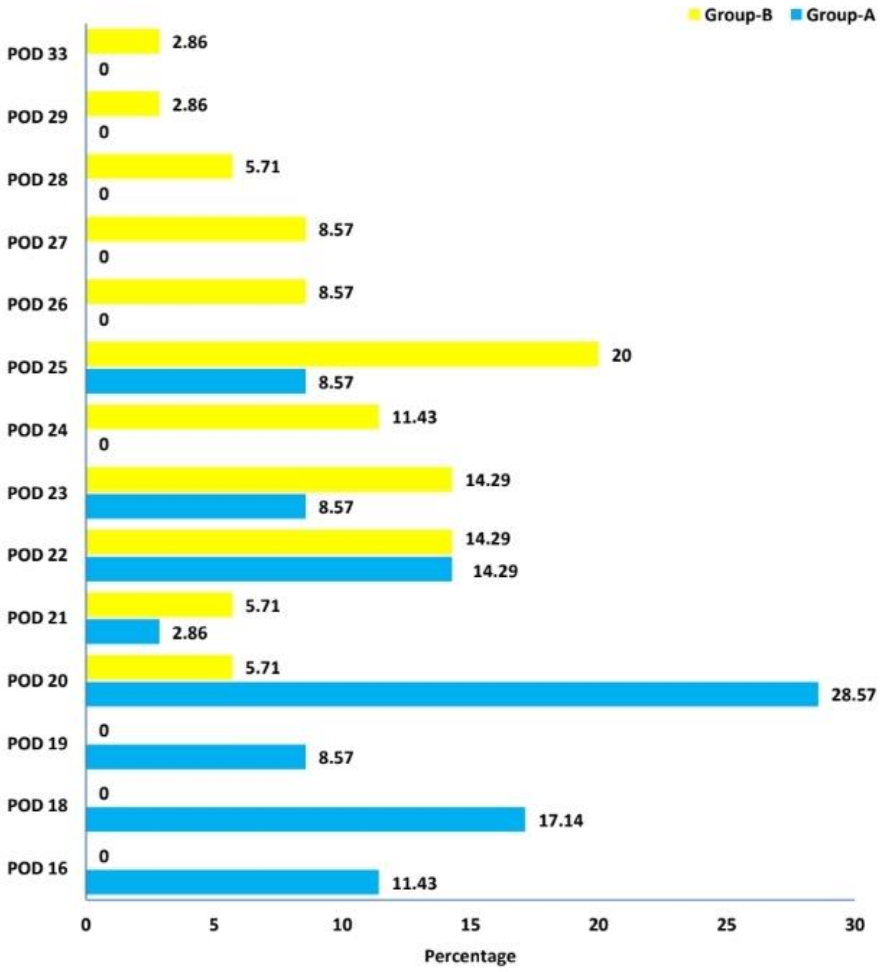
Drain removal	Group-A		Group-B	
	Number	Percentage (%)	Number	Percentage (%)
POD 16	4	11.43	0	0.00
POD 18	6	17.14	0	0.00
POD 19	3	8.57	0	0.00
POD 20	10	28.57	2*	5.71
POD 21	1	2.86	2	5.71
POD 22	5	14.29	5	14.29
POD 23	3	8.57	5	14.29
POD 24	0	0.00	4	11.43
POD 25	3	8.57	7	20.00
POD 26	0	0.00	3	8.57
POD 27	0	0.00	3	8.57
POD 28	0	0.00	2	5.71
POD 29	0	0.00	1	2.86
POD 33	0	0.00	1	2.86

(*p<0.05 significant difference compared between the groups)

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

In group A, majority of the patients 10(28.57%) had drain removal on day 20 and none of the patients had drain after 25 days of postoperative period. In group B, most of the patients 7(20.00%) had drain removal on day 25 and 10 patients had drain removal after postoperative day 25.

Graph-2 : Bar diagram showing comparison of drain removal between the groups



DISCUSSION

Reducing the formation of seromas is of utmost importance, particularly in

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

cases when urgent breast reconstruction is conducted. This is because the accumulation of fluid can raise the possibility of local infection, which can ultimately lead to the removal of medical implants. Numerous studies have found that the flap fixation technique, which involves suturing skin flaps over the underlying muscles as well as fascia to completely obliterate the axillary space, is a low-cost and straightforward treatment that effectively reduces seroma growth.

In group A, none of the patients who underwent the quilting suture technique developed seroma, but 3 (8.57%) patients in group B, who received the non-quilting suture approach, experienced seroma. Comparison between groups statistical significance was noted. (p=0.05)

In the study conducted by Hashemi E et al.77 seroma developed in 35% of participants which was higher than the incidence in the present study. A multivariate logistic regression study revealed a connection between postoperative seroma production and modified radical mastectomy outcomes (OR = 2.83, 95% CI 1.01–7.90, P = 0.04).

A study conducted by Lisa A et al.84 revealed that the incidence of seromas necessitating aspiration was 11% for the control group and 3.7% in the case group.

Awad AT et al.85 found that at 14 day post-drain removal, seroma manifested in 87 (21.75%) patients in group A (non-quilting), a considerably greater incidence compared to group B (quilting), where it occurred in only 14 patients (3.5%) ($P < 0.001$).

Bhagchandani M et al.86 noted that the occurrence of seroma formation during follow-up was markedly reduced in the intervention group compared to the nonintervention group (23% versus 58%; $p < 0.05$), while no significant differences were observed regarding, necrosis of flap, superficial skin necrosis, and wound gaping between the two groups. Additionally, the resolution of seroma occurred more rapidly in the treatment group (4 days compared to 9 days; $p < 0.001$), accompanied by a reduced length of stay in the hospital (4 days versus 9 days; $p < 0.001$).

Van Zeelst LJ et al.87 similarly observed a seroma incidence of 12.9% in the quilted cohort compared to 62.3% in the non-quilted cohort ($p < 0.001$). Infections at the surgical site were much fewer in the quilted group.

Wu Y et al.88 observed that the occurrence of Grade 2 and 3 seroma was markedly greater in the conventional suture group than in the quilted suturing group (19.3% vs. 9.5%, $p = 0.032$), that was ascribed to the delayed seroma in Grade 2 and 3. Quilting suture resulted in a prolonged duration for flap fixation compared to conventional suture (504.7 seconds vs. 109.1 seconds, $p < 0.001$), but yielded a reduced volume of drainage.

In contrast to the current study, Yilmaz S et al.81 reported that there was no significant difference between the groups for any of the following: the duration of the hospital stay ($p = 0.3$), rates of seroma formation ($p = 0.7$), duration of drain removal

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

(p = 0.5), or numbers of aspirations (p = 0.6). The fixation duration was found to exceed that of the traditional technique (p = 0.02).

DRAIN VOLUME

The present investigation demonstrated a notable decrease in the volume drained within the quilting group. The average volume drain on Days 1, 2, 3, and 4 in group A was 147.11±40.37, 120.69±28.79, 101.49±27.90, and 81.20±29.79, respectively. In group B, the mean volume drain on Days 1, 2, 3, and 4 was 190.94±32.76, 162.71±23.77, 143.97±27.39, and 126.26±25.59, respectively, which was significantly greater than that of patients who underwent the quilting technique. p = 0.001. Since the very first postoperative day, this huge change has been noted, and as a result, there has been a significant reduction in the number of seroma formations. This was similar to the study undertaken by Awad AT et al.85 in their study Group B (Quilting) exhibited a substantial decrease in the mean volume of fluid drained (246.08 ± 78.94 mL) ($p < 0.001$) in comparison to group A (non-Quilting) (664.75 ± 69.43 mL), alongside a significant reduction in the incidence of seroma formation, with rates of 21.75% as well as 3.5% ($P < 0.001$) for groups A as well as B, respectively

DRAIN REMOVAL

In group A, majority of patients, 10 (28.57%), underwent removal of drain on day 20, and no patients retained drains after 25 days postoperatively. In group B, the majority of patients, 7 (20.00%), underwent drain removal on postoperative day 25, while 10 patients had removal of drain subsequent to day 25.

In the present study, drains were extracted from patients in the quilted group much earlier than from those in the non-quilted group. In the Yilmaz S et al.81 study, the mean interval between flap fixation and classic surgery for drain removal was 3.9 days and 4.6 days, respectively, although the difference was not considered statistically significant.

Similar to the current study, Lisa A et al.84 reported that the case group exhibited a decreased duration of drain maintenance: 16 days compared to 20 days for the non-quilted category ($p < 0.05$).

Similar findings have been documented in studies conducted by Khater et al.90 The postponed drain removal contributed to an extended hospital stay. It is possible that this delay will have a negative impact on the prognosis of patients and may postpone the beginning of adjuvant therapy.

In a prospective randomized study by Faisal et al.91 involving patients undergoing MRM, the duration until drain removal was markedly reduced, and the total drainage volume was significantly lower in patients who received axillary exclusion compared to those who underwent conventional surgery.

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

CONCLUSION

Prior literature and the results obtained in the current study confirm that quilting with flap fixation markedly reduces drain maintenance duration, facilitates earlier drain removal, and diminishes the occurrence of seroma, its subsequent complications, and associated social costs.

Minimizing potential dead space through flap fixation may be beneficial in mitigating seroma formation in patients undergoing mastectomy for breast cancer; however, meticulous surgical technique and diligent patient follow-up are imperative. Although the study sample was small, it was still appropriate to suggest mechanical obliteration of dead space via flap fixation for patients undergoing MRM. During MRM, this flap-fixation technique proved effective in minimizing seroma formation, facilitating early drain removal and enhancing patient satisfaction and earlier advocation of adjuvant therapy

LIMITATIONS OF THIS STUDY : sample size is limited

FINANCIAL SUPPORT AND SPONSORSHIP : nil

CONFLICTS OF INTEREST : There are no conflicts of interest

REFERENCES

1. Cuthrell KM, Tzenios N. Breast Cancer: Updated and Deep Insights. International Research Journal of Oncology. 2023;6(1):104-18.
2. Huang J, Chan PS, Lok V, Chen X, Ding H, Jin Y et al. Global incidence and mortality of breast cancer: a trend analysis. Aging (Albany NY). 2021 Feb 2;13(4):5748.
3. Kashyap D, Pal D, Sharma R, Garg VK, Goel N, Koundal D et al. Global Increase in Breast Cancer Incidence: Risk Factors and Preventive Measures. BioMed research international. 2022;2022(1):9605439.
4. Kartal M, Kalaycı T, Bilici AE. Pathological factors affecting morbidity in breast cancer with modified radical mastectomy after neoadjuvant therapy. Age (years). 2021;48(13.98):29-88.
5. Eliav T, Novack V, Krieger Y. Effect of quilting on seroma formation in mastectomies: A meta-analysis. Surgical Oncology. 2021 Dec 1;39:101665.
6. Rocha CL, paula VB. Functional nutrition in postoperative plastic surgery: focus on seroma and fibrosis prevention. Revista Brasileira de Cirurgia Plástica. 2023 Jun 30;29:609-24.
7. Miri Bonjar MR, Maghsoudi H, Samnia R, Saleh P, Parsafar F. Efficacy of fibrin glue on seroma formation after breast surgery. International Journal of Breast

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 04, 2025

Cancer. 2012;2012(1):643132.
8. Gillman N, Lloyd D, Bindra R, Ruan R, Zheng M. Surgical applications of intracorporal tissue adhesive agents: Current evidence and future development. Expert Review of Medical Devices. 2020 May 3;17(5):443-60.