e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(2); 643-646

Original Research Article

A Comparative Study of Single Suction Drain versus Double Suction Drain Following Modified Radical Mastectomy

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Received: 01-11-2025 / Revised: 15-12-2025 / Accepted: 21-01-2026

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Conflict of interest: Nil

Abstract

Background: Breast cancer remains the most common malignancy among women worldwide and is a leading cause of cancer-related mortality. Modified Radical Mastectomy (MRM) continues to be a commonly performed surgical procedure, particularly in developing countries where patients often present with locally advanced disease. Postoperative seroma formation is one of the most frequent complications following MRM and contributes to patient discomfort, prolonged hospital stay, risk of infection, and delayed adjuvant therapy. Closed suction drainage is routinely employed to reduce seroma formation; however, the optimal number of drains remains controversial.

Objectives: This study aimed to compare the outcomes of single suction drain versus double suction drain placement following Modified Radical Mastectomy, with particular emphasis on seroma formation, postoperative pain, surgical site complications, and patient acceptability.

Methods: A comparative study was conducted over an 18-month period in the Department of General Surgery at Guru Gobind Singh Medical College and Hospital, Faridkot. Eighty female patients undergoing MRM for carcinoma breast were enrolled and divided into two equal groups: Single Drain Group (SDG, n=40) and Double Drain Group (DDG, n=40). Patients were followed postoperatively for complications including seroma, hematoma, surgical site infection, flap necrosis, pain, and need for secondary suturing. Statistical analysis was performed to compare outcomes between the two groups.

Results: Seroma formation was observed in 7 patients (17.5%) in the SDG and 4 patients (10%) in the DDG, with no statistically significant difference. Postoperative pain scores were significantly lower in the single drain group, and patient comfort and acceptability were higher compared to the double drain group. No significant differences were noted between the groups regarding drain duration, drain volume, surgical site infection, flap necrosis, or hematoma formation.

Conclusion: Single suction drain placement following Modified Radical Mastectomy is as effective as double drain placement in preventing postoperative seroma and other complications, while offering the advantages of reduced postoperative pain and improved patient comfort. Routine use of a single suction drain may therefore be recommended following MRM.

Keywords: Breast cancer, Modified Radical Mastectomy, Seroma, Single suction drain, Double suction drain.

DOI: 10.25258/ijcpr.18.2.103

Introduction

Breast cancer is a major global health problem and represents nearly one-quarter of all cancers diagnosed among women worldwide. According to global cancer statistics, over 1.7 million women were diagnosed with breast cancer in 2012, and the incidence has continued to rise steadily.

In India, breast cancer has overtaken cervical cancer as the most common malignancy among women and accounts for approximately 14% of all female cancers. The disease commonly presents in the fourth and fifth decades of life, and late presentation remains a major contributor to poor survival outcomes [1,2]. Surgical management remains the cornerstone of treatment for operable breast cancer. Modified Radical Mastectomy has evolved as a preferred surgical option due to its oncological safety, reduced morbidity compared to radical mastectomy, and acceptable cosmetic outcomes. Despite advancements in surgical techniques, postoperative complications following MRM remain common and contribute significantly to patient morbidity [3].

Seroma formation is the most frequently reported complication after MRM, with reported incidence

ranging from 3% to as high as 85%. Seroma may lead to wound infection, flap necrosis, delayed wound healing, prolonged hospital stay, and patient discomfort. It also necessitates repeated aspirations, increasing the risk of infection and delaying initiation of adjuvant therapy [4,5,6] .

Closed suction drainage is widely employed to minimize seroma formation by obliterating dead space and promoting adherence of skin flaps to the chest wall. However, there is no consensus regarding the optimal number of drains to be used. While some surgeons advocate the use of double drains to reduce fluid accumulation, others suggest that a single drain is equally effective and better tolerated by patients. This study was therefore undertaken to compare single versus double suction drain placement following Modified Radical Mastectomy in terms of postoperative outcomes.

Methodology

This comparative study was conducted in the Department of General Surgery, Guru Gobind Singh Medical College and Hospital, Faridkot, after obtaining approval from the Institutional Ethical Committee. The study duration was 18 months, and a total of 80 female patients undergoing Modified Radical Mastectomy for carcinoma breast were included.

Study Design and Population: All female patients aged more than 35 years diagnosed with carcinoma breast and planned for Modified Radical Mastectomy were considered eligible. Patients with metastatic disease, those undergoing simple mastectomy, male breast cancer patients, patients on steroid therapy, and those with significant comorbid conditions such as anemia, hypoalbuminemia, liver cirrhosis, or renal failure were excluded.

Sample Size and Group Allocation: A total of 80 patients were enrolled using a non-random convenient sampling technique. Patients were divided into two equal groups using an envelope method:

- Single Drain Group (SDG): 40 patients received one closed suction drain placed in the axilla.
- Double Drain Group (DDG): 40 patients received two closed suction drains, one in the axilla and one beneath the flap.

Surgical Technique : All patients underwent Modified Radical Mastectomy under general anesthesia using the Austin technique. Level I and II axillary lymph node dissection was performed in all cases. Closed negative suction drains were secured using silk sutures, and the wound was closed using skin staples.

Postoperative Care and Follow-up: Postoperative management was standardized for all patients. Pain was assessed using the Visual Analogue Scale. Patients were followed for two weeks postoperatively to assess for seroma formation, hematoma, surgical site infection, flap necrosis, pain, numbness, and need for secondary suturing.

Statistical Analysis: Data were tabulated and analyzed using appropriate statistical tests. Continuous variables were expressed as mean ± standard deviation, and categorical variables as frequencies and percentages. A p-value <0.05 was considered statistically significant.

Results

The study included 80 patients, with 40 patients in each group. The mean age of patients in the Single Drain Group was 51.25 ±13.21 years, while in the Double Drain Group it was 49.68 ±11.46 years, with no statistically significant difference between the groups. Seroma formation was observed in 7 patients (17.5%) in the Single Drain Group and 4 patients (10%) in the Double Drain Group. The difference was not statistically significant, indicating comparable efficacy of both techniques in preventing seroma formation (Table 1)

Table 1: Distribution of patients according to seroma formation

Seroma formation	Single drain group (SDG)		Double drain group (DDG)		p-value
	Number	Percentage (%)	Number	Percentage (%)	
Yes	7	17.5 %	4	10 %	0.322
No	33	82.5 %	36	90 %	
Total	40	100(%)	40	100(%)	

P-value> 0.05: Insignificant p-value < 0.05: Significant

Postoperative pain scores were significantly lower in patients who received a single drain compared to those with double drains. Patients in the Single Drain Group reported greater comfort, fewer sleep disturbances, and easier mobilization.

As measured by VAS at 1 hour, 6 hours, 12 hours, and 24 hours, the mean and standard deviation of pain at the drain site for the 40 patients in the SDG group were 5.2 ± 1.5, 4.2 ± 1.4, 2.9 ± 2.9, and 1.8 ± 1.8, respectively. In contrast, for the 40 patients in the DDG group, the mean and standard deviation of pain at the drain site were 7.1 ± 1.8, 6.4 ± 1.5, 5.1 ± 1.3, and 2.8 ± 1.1, respectively. Patients undergoing DDG reported much more average discomfort at the drain site compared to those undergoing SDG (Table no.2)

Table 2: Distribution of patients according to pain at drain site

Pain	Single drain group (SDG)		Double drain group (DDG)		p-value
	Mean	SD	Mean	SD	
1 hour	5.2	1.5	7.1	1.8	0.00*
6 hours	4.2	1.4	6.4	1.5	0.00*
12 hours	2.9	1.1	5.1	1.3	0.00*
24 hours	1.8	0.9	2.8	1.1	0.00*

P-value> 0.05: Insignificant p-value < 0.05: Significant

Among the 40 patients of SDG, SSI was seen in 2(5%) of the patients. out of 40 patients of the DDG, SSI was seen in 3(7.5%) of the patients. The statistical analysis, Non-significant differences was observed (Table 3).

Table 3: Distribution of patients according to SSI

SSI	Single drain group (SDG)		Double drain group (DDG)		p-value
	Number	Percentage (%)	Number	Percentage (%)	
Yes	2	5 %	3	7.5 %	0.580
No	38	95 %	37	92.5 %	
Total	40	100 (%)	40	100 (%)	

P-value> 0.05: Insignificant p-value < 0.05: Significant

Five (12.5%)patients , out of the forty SDG patients had a hospital stay of seven days or less, whereas thirty-five patients (87.5%) had stays of seven days or longer. 7(17.5%) of patients out of forty patients treated with DDG had a hospital stay of 7 days or less, whereas 33 (82.5%) patients had stays of 7 days or longer. In the SDG group, patients stayed in the hospital for an average of 5.5 ± 0.91 days, whereas in the DDG group, it was 5.4 ± 0.45 days. When comparing the average length of stay in the hospital between the two groups, no statistically significant differences were found (Table 4).

Table 4: Distribution of patients according to hospital stay (days)

Hospital stay(days)	Single drain group (SDG)		Double drain group (DDG)		p-value
	Number	Percentage (%)	Number	Percentage (%)	
≤7	5	12.5 %	7	17.5 %	0.525
More than 7	35	87.5 %	33	82.5 %	
Total	40	100 (%)	40	100 (%)	
Mean ± SD	5.5 ± 0.91		5.4 ± 0.45		

P-value> 0.05: Insignificant p-value < 0.05: Significant

Discussion

Seroma formation remains a challenging postoperative complication following Modified Radical Mastectomy. Multiple factors including extent of axillary dissection, dead space, lymphatic disruption, and surgical technique contribute to its development. Drain placement aims to minimize these effects, but the ideal number of drains has been debated for decades.

The findings of the present study demonstrate that the use of a single suction drain is as effective as double suction drain placement in preventing seroma formation following MRM. These findings are consistent with multiple studies cited in the literature, which report no significant reduction in seroma incidence with the use of additional drains. Seroma development was seen in 7 (17.5%) of the 40 patients treated with SDG and 4 (10%) of the 40 patients treated with DDG. The findings did not reach a statistically significant level. Comparative studies conducted by Khan et al. and Kapur N et al. found that seromas developed in 13.4% and 22% of SDG patients, and in 6.1% and 20% of DDG patients, respectively. Statistical analysis did not reveal any statistically significant difference in any investigation [7,8].

As measured by VAS at 1 hour, 6 hours, 12 hours, and 24 hours, the mean and standard deviation of pain at the drain site for the 40 patients in the SDG group were 5.2 ± 1.5, 4.2 ± 1.4, 2.9 ± 2.9, and 1.8 ± 1.8, respectively. In contrast, for the 40 patients in the DDG group, the mean and standard deviation of pain at the drain site were 7.1 ± 1.8, 6.4 ± 1.5, 5.1 ± 1.3, and 2.8 ± 1.1, respectively. Patients undergoing DDG reported much more average discomfort at the drain site compared to those undergoing SDG.

The level of discomfort at the incision site was 5 on the visual analog scale for SDG patients and 4 for DDG patients, respectively, as reported by Guneri et al. [9]. Patients with DDG reported significantly higher levels of discomfort (VAS: 5.2) than those with SDG (VAS: 2.5), according to Khan et al. [8].

Among the 40 patients of SDG, SSI was seen in 2(5%) of the patients. out of 40 patients of the DDG, SSI was seen in 3(7.5%) of the patients. The statistical analysis, Non-significant differences was observed.

In their studies Khan et al and Khawaja MA et al. reported that SSI in 3% and 3.125% of the patients of the SDG, respectively while in patients with DDG it was 4 % and 0 %, respectively [8,10].

In the SDG group, 5 patients (12.5%) had a hospital stay of 7 days or less, while 35 patients (87.5%) had a stay of more than 7 days. In the DDG group, 7 patients (17.5%) had a stay of 7 days or less, while 33 patients (82.5%) had a stay of more than 7 days. Patients undergoing DDG had an average hospital stay of 5.40 ± 0.45 days, whereas those undergoing SDG had an average of 5.50 days ± 0.91 days. When looking at the average length of stay in the hospital for the two groups, we found no statistically significant difference.

Patients in the SDG group stayed in the hospital for 5.54 and 3 days, respectively, in the studies by Kapur N et al. and Guneri et al, while patients in the DDG group were in the hospital for 5.54 and 3 days, respectively [7,9].

Shorter hospital stays and reduced expenses were seen in patients receiving modified radical mastectomy who were given a single drain in the trials conducted by Terrell GS et al. and Saratzis A et al., respectively [11,12].

Importantly, this study highlights the advantage of reduced postoperative pain and improved patient comfort associated with single drain usage. Additional drains increase patient discomfort, restrict mobility, and negatively affect quality of life without providing significant clinical benefit.

From a practical perspective, single drain placement also reduces cost, nursing workload, and potential drain-related complications. Given that oncological outcomes and complication rates remain unchanged, the routine use of double drains appears unnecessary.

Conclusion

This study concludes that single suction drain placement following Modified Radical Mastectomy is equally effective as double suction drain placement in preventing postoperative seroma and other surgical complications. Single drain usage offers significant advantages in terms of reduced postoperative pain, improved patient comfort, and higher acceptability without increasing morbidity. Based on these findings, routine use of a single suction drain is recommended following Modified Radical Mastectomy.

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