

A comparative study of mastectomy skin flap anchoring and seroma formation

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ABSTRACT

Background: Seroma development is a common postoperative consequence following modified radical mastectomy (MRM), leading to patient discomfort, prolonged drainage durations, and increased risk of infection. Numerous proposals for surgical techniques have been put out to mitigate the danger of seroma development. Mastectomy flap attachment has received significant attention due to its potential to eliminate dead space. This study aimed to evaluate the effect of mastectomy flap fixation on postoperative seroma development in patients following modified radical mastectomy.

Material and Methods: The present prospective study was conducted over twelve months in the Department of Surgery at a tertiary care facility. Seventy patients with breast cancer undergoing modified radical mastectomy (MRM) were recruited and randomized into two groups: Group A (n = 35) received MRM with flap fixation, while Group B (n = 35) underwent MRM without flap fixation. Postoperative outcomes were assessed by the incidence and severity of seroma (per CTCAE v4.0), daily and cumulative drain output, the day after drain removal, surgical duration, surgical site infection (SSI), and skin dimpling.

Results: The incidence of seroma was significantly lower in Group A compared to Group B (5.7% vs 22.9%, $p = 0.040$). In Group A, one patient developed a Grade 1 seroma, while another developed a Grade 2 seroma, with no occurrences of Grade 3 seroma. In Group B, five individuals exhibited Grade 1 seroma, whereas three presented with Grade 2 seroma. No Grade 3 seromas were present. Group A exhibited a markedly reduced mean daily drain output (76.4 ± 5.3 ml compared to 86.97 ± 6.58 ml), total drain output (272.2 ± 47.11 ml versus 532.06 ± 79.20 ml), and mean duration until drain removal (3.6 ± 0.60 days versus 6.11 ± 0.76 days) ($p = 0.001$). The disparity in operation time between the groups was minimal ($p = 0.078$).

Conclusion: Mastectomy flap fixation is a simple and effective technique that significantly reduces postoperative seroma formation, drain output, and the duration of drain installation, without prolonging operating time or increasing postoperative problems. Consistent flap attachment during modified radical mastectomy may improve postoperative outcomes and patient comfort.

Keywords: Seroma, Breast Cancer, Modified Radical mastectomy, Prospective study

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Introduction

A modified radical mastectomy encompasses the excision of the complete breast tissue, including the skin, nipple-areolar complex, and axillary lymph nodes. This procedure is routinely conducted in breast cancer patients with suspected or confirmed lymph node involvement to ensure sufficient local and regional disease management.¹ Although modified radical mastectomy is an effective treatment for breast cancer, it is related with early complications including seroma, infection, and hematoma, as well as long-term difficulties like lymphedema, shoulder stiffness, and persistent discomfort.²

A seroma following breast surgery is characterized as a collection of serous fluid that forms beneath the skin flaps or within the axillary dead space subsequent to mastectomy and/or axillary dissection.³ Seroma is considered to develop from an acute inflammatory exudation occurring in reaction to surgical trauma during the early period of wound healing. Oertli et al.⁴ proposed that increased fibrinolytic activity at the surgical site contributes to fluid accumulation. Extensive tissue dissection following mastectomy and axillary lymphadenectomy compromises multiple blood vessels and lymphatics, resulting in increased exudation of blood and lymphatic fluid from an expanded raw surface area.⁵ Petrek et al.⁶ determined that the degree of axillary lymph node involvement is a critical predictor, while Gonzalez et al.⁷ and Hashemi et al.⁸ indicated that the type of surgery is the sole important factor, noting increased seroma rates after modified radical mastectomy in comparison to breast-conserving surgery.

The occurrence of seroma formation following breast surgery ranges from 2.5% to 51%.⁸ The detrimental effects of seroma include repeated aspirations, surgery site infections (SSIs), skin flap necrosis, multiple outpatient clinic visits, and delays in adjuvant therapy, all contributing to patient anxiety and distress.⁹ A primary strategy to minimize seroma production is the elimination of dead space. Quilting, octreotide therapy, suction drains with early removal, passive low suction drains, sharp dissection, and sclerotherapy were utilized as preventive measures.¹⁰ In recent years, mastectomy with flap fixation has garnered interest, and its use has progressively broadened. Flap fixation, or quilting, entails anchoring the mastectomy skin flaps to the underlying pectoralis major muscle with sutures or tissue adhesives, therefore decreasing dead space and mitigating postoperative fluid collection.¹¹ Flap fixation is probably the most effective method for preventing seroma development following mastectomy.¹² Hence, this study was planned to determine the efficacy of flap fixation during modified radical mastectomy surgery among breast cancer patients.

Review of literature

Seromas in the axillary region post-breast surgery might result in considerable morbidity and postpone the commencement of adjuvant therapy. A seroma is an accumulation of serous fluid in the dead space of the post-mastectomy skin flap, axilla, or breast following modified radical mastectomy (MRM) or breast-conserving surgery (BCS), and it is the most prevalent early complication. A seroma develops from acute inflammatory exudate due to

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surgical trauma during the initial phase of wound healing. Diverse techniques can be employed to eliminate this dead space, including the anchoring of mastectomy flaps to the chest wall or utilizing adjacent soft tissue for reconstruction following conserving surgery. The application of sealants seems promising but remains unproven, whereas compression dressings have been predominantly discontinued. The utilization of drains to remove accumulation in the dead space is arguably the most contentious.⁵

In the prospective study by Raju et al¹³, the patients were divided into two groups, one treated by flap fixation with axillary exclusion using fine interrupted absorbable sutures (study group, n = 36) and another treated by traditional wound closure (control group, n = 36). Patients undergoing flap fixation with axillary exclusion had a significantly lower total drain output (mean: 306.67 mL vs 531.11 mL, $p < 0.01$) and more timely drain removal (mean: 4 days vs 6.25 days, $p < 0.001$) compared with the control group. The study group had a significantly lower incidence of seroma (11.1% vs 41.7%). The same rates of postoperative discomfort, flap necrosis and surgical site infections (SSI) in the groups suggested that flap fixation with axillary exclusion did not lead to increased morbidity but gave an acceptable cosmetic result. The sample size consisted of 114 patients in the study by Zia et al¹⁴. Random allocation was made, where the patients were allocated to either flap fixation (Group A) or non-flap fixation (Group B). Both groups of patients were followed for development of seromas up to forty-eight hours after surgery. Only in sickness stage IIIA a statistically significant difference (p -value ≤ 0.05) for generation of seroma was seen. Seroma developed in 22.8% of

patients (n=13) in group A (Flap Fixation) but in only 45.6% of patients (n=26) in group B (NonFlap Fixation).

Material and Methods

This prospective study was carried out over twelve months in the Department of Surgery at Trichy SRM Medical College Hospital and Research Centre, a tertiary care facility. The study aimed to assess the impact of mastectomy flap fixation on postoperative drain output, duration till drain removal, and the occurrence of seroma formation in patients undergoing modified radical mastectomy (MRM) for breast cancer.

The study environment encompassed both preoperative inpatient wards and after surgical units for patient management and follow-up. The study population comprised patients diagnosed with breast cancer scheduled for modified radical mastectomy during the study period. The study excluded advanced disease and distant metastases patients. Patients unsuitable for general anesthesia during the pre-anesthetic exam were also removed.

The sample size was determined using basic statistical formulas for the comparison of two proportions. A study by Deepanshu Sharma et al. in 2018 at a tertiary care hospital in Chennai found the seroma development incidence of 8% in operated cases with skin flap anchoring and 20% in controls. The sample size was determined based on analogous observations in the current investigation, with a power of 80% and a significance threshold of 5%, with a 1:1 allocation ratio. The determined sample size was 130 patients in each group, yielding a total of 260 patients. Given the availability of eligible patients at Trichy SRM Medical College Hospital, it was determined to enroll all eligible patients presenting during

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the study period. It was anticipated that around six patients per month would receive a modified radical mastectomy. A total of 70 patients were incorporated into the trial. Seventy patients were randomized into two groups in a 1:1 ratio, with 35 patients assigned to each group. Patients were assigned to two groups using simple random allocation. Group A comprised patients receiving a modified radical mastectomy with flap fixation (flap anchoring group). Group B comprised patients receiving modified radical mastectomy without flap fixation (non-anchoring group). Randomization was executed to mitigate selection bias and to ensure comparability between the two groups.

Data were gathered utilizing a semi-structured questionnaire specifically created for the study. The questionnaire comprised sections on demographic information, clinical attributes, intraoperative observations, postoperative results, and complications. The questionnaire was pre-tested and adjusted as necessary before its application in the study. Data were gathered in the Department of Surgery utilizing a semi-structured questionnaire via interviews, following the acquisition of informed consent from the subjects. Seventy consecutive patients diagnosed with breast cancer and undergoing modified radical mastectomy were included. Preoperative baseline demographic and clinical data were documented. Intraoperative information was recorded from surgical documentation, and postoperative results were noted during hospitalization and follow-up appointments.

All patients received a modified radical mastectomy under general anesthesia in accordance with established

surgical standards. A mastectomy was conducted utilizing monopolar and bipolar electrocautery as necessary. Axillary dissection was performed in accordance with oncological principles. Haemostasis was diligently accomplished in all instances. In the flap fixation group (Group A), the subcutaneous tissues of the superior and inferior skin flaps were secured to the underlying pectoralis major muscle using four to five interrupted sutures during the closure of the mastectomy flaps. Several rows of interrupted 2/0 polyglactin (Vicryl) sutures were employed to secure the flaps to the underlying muscle. The sutures were positioned roughly 2.5 cm apart, and all were buried. Meticulous attention was devoted to preventing damage to the long thoracic nerve during the anchoring of the axillary flaps. In the non-anchoring group (Group B), a modified radical mastectomy was executed without securing the skin flaps to the underlying musculature. All patients had one or two closed suction drains inserted beneath the mastectomy flaps and in the axilla if axillary dissection was conducted. Drains were fastened and linked to suction reservoirs. The outflow from the postoperative drain was measured and documented regularly. Drains were extracted when the drainage volume was below 20 ml of serous fluid for two consecutive days. Postoperative treatment was uniform for both groups. Patients received standard postoperative care, which included analgesics, antibiotics according to hospital protocol, and wound management. Pain was evaluated on the Visual Analog Scale. Wounds were examined daily for indications of infection or flap necrosis.

Seroma is characterized as an atypical accumulation of fluid beneath the mastectomy flaps that is symptomatic and

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necessitates therapy through aspiration or surgical intervention. Only Grade 2 and Grade 3 seromas were deemed meaningful for analysis. As to the Criteria for Adverse Events Classification (CTCAE) version 4.0, a Grade 1 seroma is asymptomatic and necessitates no intervention, a Grade 2 seroma is symptomatic and requires aspiration, while a Grade 3 seroma is symptomatic and mandates surgical or radiological intervention.⁶ Surgical site infection (SSI) was characterized by clinical manifestations, including erythema, discharge, wound dehiscence, or purulent drainage occurring within 30 days post-surgery.¹⁵

Patients were monitored for 30 days following surgery. During follow-up appointments, patients were assessed for the emergence of seroma, surgical site infection, and other complications. Seroma formation was clinically detected and validated through aspiration as necessary. The principal outcome measures included the incidence of seroma formation, total postoperative drain output, and duration till drain removal. The secondary outcome measures were postoperative pain scores, the occurrence of surgical site infections, and flap necrosis. The impact of flap fixation on the timing of early drain removal and the decrease in seroma production was examined. Data were entered into Microsoft Excel 2021 and analyzed utilizing version 26 of the Statistical Package for Social Sciences (SPSS) software. Continuous variables were represented as mean and standard deviation, whilst categorical variables were represented as frequencies and percentages. The independent t-test was employed to compare continuous variables between the two groups. The Chi-square test and Fisher's exact test were employed to

evaluate relationships among categorical variables. A p-value below 0.05 was deemed statistically significant. Age was documented as a continuous variable and represented in years. Additional variables included the time of operation, total postoperative drain output, the day of drain removal, and the incidence of postoperative sequelae, such as seroma, discomfort, surgical site infection, and flap necrosis.

Detailed information regarding the study's nature and purpose was provided to all participants, and written informed consent was obtained from each participant before enrollment. The Institutional Ethics Committee of SRM Medical College Hospital and Research Centre, Trichy, reviewed and approved the study protocol before it commenced.

Results

The study comprised 70 patients, with 35 individuals assigned to Group A (modified radical mastectomy with flap fixation) and 35 to Group B (modified radical mastectomy without flap fixation). Table 1 summarizes the baseline demographic and clinical attributes of the research participants across both groups. The average age of patients in Group A was 50.71 ± 5.45 years, whereas the average age in Group B was 51.09 ± 4.89 years. The age distribution of the two groups was analogous, suggesting that both groups were adequately matched in terms of age. A right-sided modified radical mastectomy was conducted in 24 patients (53.3%) from Group A and 21 patients (46.7%) from Group B. Left-sided surgery was performed on 11 patients (44%) in Group A and 14 patients (56%) in Group B. The distribution of the surgical site was analogous in both cohorts. The majority of individuals in both groups had stage II breast cancer. Stage II disease was identified in 26 patients

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(48.1%) in Group A and 28 patients (51.9%) in Group B. Stage III disease was detected in 9 patients (56.3%) in Group A and 7 patients (43.8%) in Group B. The disease stage distribution was similar between the two groups, indicating sufficient baseline comparability.

Table 1: Descriptive data of participants				
S N o	Variables		Group A (n = 35)	Group B (n = 35)
1	Age	Me an age	50.71±5. 453	51.09±4. 889
2	Site of Surge ry	Rig ht side	24 (53.3%)	21 (46.7%)
		Left side	11 (44%)	14 (56%)
3	Stage of Disea se	II	26 (48.1%)	28 (51.9%)
		III	9 (56.3%)	7 (43.8%)

Table 2 illustrates the surgical duration and postoperative drain-associated metrics between the two cohorts. The average operating time in Group A was 117.12 ± 5.87 minutes, whereas in Group B it was 115.09 ± 2.39 minutes. The operating time in the flap fixation group was comparatively longer, but the difference between the two groups was not statistically significant ($p = 0.078$), suggesting that flap fixation did not significantly prolong the surgery duration. The average daily drain volume was markedly reduced in Group A relative to Group B. Group A patients had a

mean daily drain output of 76.4 ± 5.3 ml, while Group B patients demonstrated a greater mean daily drain output of 86.97 ± 6.58 ml. The difference was statistically significant ($p = 0.001$). The average day of drain removal was much earlier in Group A. Drains were withdrawn at an average of 3.6 ± 0.60 days in the flap fixing group, compared to 6.11 ± 0.76 days in the non-anchoring group. The observed difference was statistically significant ($p = 0.001$), indicating that flap fixation expedited drain removal. Likewise, the overall drain output was markedly reduced in Group A compared to Group B. The average total drain volume was 272.2 ± 47.11 ml in Group A, while it was 532.06 ± 79.20 ml in Group B. The difference was statistically significant ($p = 0.001$).

Table 2: Comparison of Operating time and Drain output				
S N o	Varia ble	Group A (n = 35)	Group B (n = 35)	p val ue
1	Opera ting time	117.12± 5.866	115.09±2. 393	0.0 78
2	Drain volum e per day	76.4±5.3	86.971±6. 577	0.0 01
3	Drain remov al day	3.6±0.60 4	6.11±0.75 8	0.0 01
4	Total drain	272.2±4 7.11	532.057± 79.198	0.0 01

Figure 1 shows the comparison of postoperative seroma between the two groups. In Group A, seroma development

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occurred in 2 of 35 patients, resulting in an incidence rate of 5.7%. Among these, 1 patient (2.9%) experienced Grade 1 seroma, which was asymptomatic and necessitated no intervention, whereas another patient (2.9%) acquired Grade 2 seroma, which was symptomatic and required aspiration. No patients in Group A experienced Grade 3 seroma necessitating surgical or radiological intervention. Of the remaining 33 patients (94.3%) in this cohort, none developed seroma throughout the postoperative follow-up period. Consequently, most individuals who received flap fixation did not develop seromas.

Conversely, Group B exhibited a greater prevalence of seroma development. Seroma occurred in 8 of 35 patients, representing 22.9% of instances in the non-anchoring group. Among them, 5 patients (14.3%) experienced Grade 1 seroma, which was asymptomatic, whereas 3 patients (8.6%) developed Grade 2 seroma necessitating aspiration. Like Group A, Group B exhibited no instances of Grade 3 seroma. Of the remaining 27 patients (77.1%) in Group B, none developed seroma.

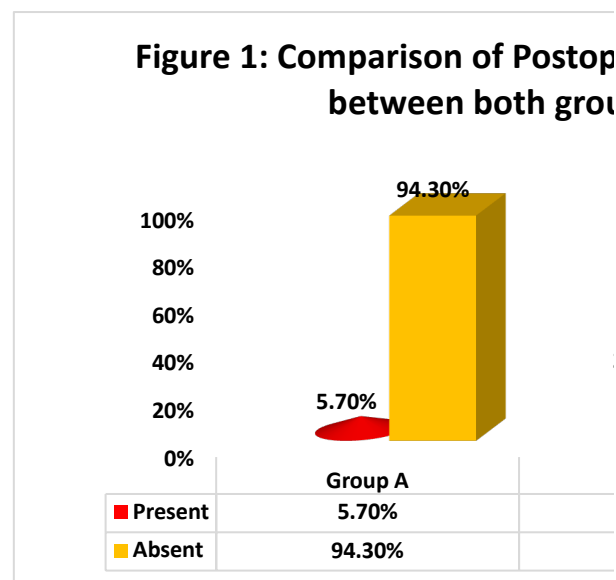


Table 3 presents a comparison of postoperative complications between the two groups. The incidence of seroma development was markedly reduced in Group A relative to Group B. In the group of patients who got seroma, two (20%) were from Group A and eight (80%) were from Group B. The difference was determined to be statistically significant, with a p-value of 0.040. In contrast, the lack of seroma was found in 33 patients (55%) in Group A and 27 patients (45%) in Group B, demonstrating a protective effect of flap fixation against seroma formation. A modest incidence of surgical site infection (SSI) was noted in both groups of patients. SSI occurred in 1 patient (33.3%) in Group A and in 2 patients (66.7%) in Group B. The vast majority of patients did not get SSI; specifically, 33 patients (49.3% of the total) in Group B and 34 patients (50.7%) in Group A were infection-free. The disparity in SSI rates between the two groups was not statistically significant ($p = 0.555$). Skin dimpling was an additional postoperative complication evaluated in the study. Skin dimpling was observed in 3 patients (30%) in Group A and 7 patients (70%) in Group B. Skin dimpling was absent in 32 patients (53.3%) in Group A and 28 patients (46.7%) in Group B. The flap fixation group had a reduced incidence of skin dimpling; however, the difference between the two groups was not statistically significant ($p = 0.172$).

Table 3: Comparison of postoperative complications

S	Variables	Group A (n = 35)	Group B (n = 35)	p value
N				
O				

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1	Sero ma	Pres ent	2 (20%)	8 (80%)	0.0 40
		Abse nt	33 (55%)	27 (45%)	
2	SSI	Pres ent	1 (33.3 %)	2 (66.7 %)	0.5 55
		Abse nt	34 (50.7 %)	33 (49.3 %)	
3	Skin dimpl ing	Pres ent	3 (30%)	7 (70%)	0.1 72
		Abse nt	32 (53.3 %)	28 (46.7 %)	

Discussion

This study aimed to assess the effectiveness of flap fixation versus the traditional closure method in patients after modified radical mastectomy. Both groups were analogous for baseline demographic and clinical attributes. The average age of patients in the flap fixation group was 50.71 ± 5.45 years, whereas in the non-anchoring group it was 51.09 ± 4.89 years, indicating no significant difference. The surgical site distribution was comparable between the groups, with right-sided mastectomy conducted in 53.3% of patients in Group A and 46.7% in Group B, and left-sided surgeries in 44% and 56%, respectively. The majority of patients in both cohorts presented with stage II breast cancer, followed by stage III illness, signifying similar oncological conditions at baseline.

These results align with prior research. Gomaa E et al.¹⁶ from Egypt observed analogous age patterns among research groups, but Zia A et al.¹⁴ exhibited equivalent staging between flap fixation and non-fixation cohorts.

The flap-fixing group in this study had a marginally longer operating time than the non-anchoring group; however, this difference was not statistically significant. This suggests that the incorporation of flap fixation did not significantly extend the surgical duration. These results align with those presented by Raju A et al.¹³ from Bhopal, who similarly noted no statistically significant difference in operating time between patients receiving flap fixation with axillary exclusion (115.83 minutes) and those undergoing conventional wound closure (112.92 minutes). The findings indicate that flap fixation can be included in modified radical mastectomy without significantly prolonging operational time, while providing the advantage of less postoperative morbidity.

Drain volume and drain removal day

The current study indicated that flap fixation resulted in a notable decrease in postoperative drainage and faster drain removal relative to conventional closure methods. Patients in the flap fixation group exhibited a significantly decreased mean daily drain production and a significantly decreased total drain volume compared to those in the non-anchoring group. Drains were extracted notably earlier in the flap fixation group (3.6 ± 0.60 days) than in the non-fixation group (6.11 ± 0.76 days), without a substantial increase in operative duration. The data indicate that flap fixation significantly diminishes dead space, therefore restricting postoperative fluid collection and enabling earlier drain removal.

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Our findings align with numerous previous studies. Raju A et al¹³ documented a markedly reduced total drain output in patients receiving flap fixation with axillary exclusion compared to controls (306.67 mL vs. 531.11 mL), as well as accelerated drain removal (4 days vs. 6.25 days). Hakseven et al¹⁷ from Turkey revealed that total drain volume and drain removal time were considerably reduced in patients who underwent flap fixation compared to those who received classical wound closure.

These findings emphasize the significance of mechanical flap attachment in reducing postoperative drainage. Additional supporting data is provided by Renjin et al.¹⁸ from Kerala, who performed a retrospective analysis including 120 patients receiving modified radical mastectomy. Their study demonstrated a notable decrease in drained serous fluid volume and a reduced time to drain removal in the flap fixation group vs the conventional group. Significantly, infection rates were similar across the two groups, suggesting that flap fixation did not elevate the risk of postoperative infection despite the presence of extra suturing.

Incidence of Seroma

The current study revealed a markedly reduced occurrence of seroma in individuals receiving modified radical mastectomy with flap fixation in contrast to those without flap fixation. In our study, seroma occurred in just 5.7% of patients in the flap fixation group, while 22.9% of patients in the non-anchoring group experienced seroma. Moreover, the incidence of seroma was decreased in the flap fixation cohort, with no instances of Grade 3 seroma recorded. The statistically substantial reduction ($p = 0.040$) underscores the efficacy of flap anchoring

in reducing postoperative fluid accumulation by eliminating dead space. Our results align with multiple published studies. A study by Raju A et al.¹³ from Bhopal, India, documented a markedly reduced incidence of seroma in patients receiving flap fixation compared to controls (11.1% vs 41.7%), with a substantial decrease in both Grade 1 and Grade 2 seromas, emphasizing the efficacy of flap fixation with axillary exclusion in seroma prophylaxis. Zia et al.¹⁴ similarly reported a markedly reduced seroma rate in the flap fixation group (22.8%) compared to the non-fixation group (45.6%), which closely corresponds with our study's findings. The results of a study conducted in central India by Srivastava et al.¹⁹ on 72 patients undergoing modified radical mastectomy were very similar to those of the present study. The overall seroma rate in their series was considerably lower with flap fixation with axillary exclusion (11.1%) than in the control group (41.7%). Most significantly, the flap fixation group experienced a decrease in clinically relevant Grade 2 and Grade 3 seromas from 19.4% in the control group to 2.8%.

Gomma E et al¹⁶ found no significant difference in overall seroma incidence between the two groups; however, they noted a markedly higher need for seroma aspiration in the conventional closure group, indicating that flap fixation may not completely avert seroma formation but can diminish its clinical impact. This observation aligns with our discovery of a reduced incidence of clinically severe seromas in the flap fixation cohort. The Observations by Hakseven et al¹⁷ which was done in Turkey, reported considerably diminished quantities of aspirated seroma and a reduced need for recurrent aspirations in

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patients who underwent flap fixation compared to those who underwent traditional wound closure.

Extensive cohort studies further corroborate our findings. Bastelaar et al.²⁰ from Netherlands exhibited a markedly reduced incidence of seroma in the flap fixation group (35.9%) vs historical controls (59.1%), alongside a considerable decrease in seroma aspirations. Abbasi et al.²¹ from Pakistan showed a low seroma incidence (23.2%) in patients having flap fixation with absorbable sutures, highlighting the advantages of dead space obliteration. The results of our study are supported by a systematic review conducted by Bastelaar et al.²², which determined that both retrospective and prospective studies consistently indicated a higher incidence of seromas and an increase in seroma-related complications in patients who did not receive mechanical flap fixation. The research indicated that flap fixation markedly diminished the necessity for seroma aspirations in the majority of studies.

Other Postoperative Complications

This study indicated a reduced incidence of complications post-surgery, such as skin dimpling and infections at the surgical site, in the flap fixing group compared to the non-anchoring group. However, these disparities were not statistically significant. One patient in Group A and two patients in Group B experienced a surgical site infection ($p = 0.555$). Three patients in the flap fixation cohort and seven patients in the non-anchoring cohort exhibited skin dimpling ($p = 0.172$). Notably, the safety of the technique was confirmed by the absence of Grade 3 seroma in either group and the absence of an increase in significant complications as a result of flap fixation.

The results correspond with the findings of Gomma E et al¹⁶., who observed that skin dimpling following flap fixation was often modest and temporary, persisting in just 8% of cases six months postoperatively.

Conclusion

This study demonstrates that flap fixation after modified radical mastectomy is a secure and efficacious method to reduce the risk of postoperative problems. Flap fixation significantly reduced the incidence of seroma formation, lowered daily and total drain output, and facilitated quicker drain removal compared to traditional wound closure, without a significant increase in operating time. Importantly, the application of flap fixation did not result in a higher occurrence of postoperative problems, such as surgical site infections or skin dimpling, nor were any severe (Grade 3) seromas observed in either group. Flap fixation provides a simple, reproducible, and cost-effective method to eliminate dead space and improve postoperative outcomes after modified radical mastectomy. The regular integration of flap fixation into surgical protocols may expedite patient recovery, diminish the necessity for extended drainage and recurrent aspirations, and enhance the general standard of care in breast cancer surgery.

Limitations

The study had some limitations, such as a limited sample size, absence of blinding, and evaluation of long-term consequences.

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