

Evaluation of Drain vs No-Drain Policy in Modified Radical Mastectomy

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Abstract Introduction: Modified radical mastectomy (MRM) remains a standard surgical procedure for operable breast carcinoma. The use of postoperative drains has traditionally been recommended to reduce seroma formation and other wound-related complications. However, recent evidence questions the necessity of routine drainage. This study evaluates outcomes of drain versus no-drain policy in MRM. **Materials and Methods:** A prospective comparative study was conducted among 120 patients undergoing MRM for carcinoma breast. Patients were randomly divided into two groups: Drain group (n=60) and No-drain group (n=60). Primary outcomes included seroma formation, wound infection, flap necrosis, hematoma, duration of hospital stay, and need for intervention. Statistical analysis was performed using Chi-square and independent t-test. **Results:** Seroma formation was higher in the no-drain group (30%) compared to the drain group (15%) ($p < 0.05$). However, duration of hospital stay was significantly shorter in the no-drain group (3.2 ± 0.8 days vs 6.5 ± 1.1 days). No significant difference was observed in wound infection, flap necrosis, or hematoma rates. **Conclusion:** The no-drain policy is associated with shorter hospital stay without significant increase in major complications, though seroma incidence is moderately higher. Selective drain use may be considered.

Keywords: Modified radical mastectomy, Drain, No-drain, Seroma, Breast cancer, Postoperative complications

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INTRODUCTION

Breast cancer is the most common malignancy among women worldwide and represents a significant public health burden¹. Surgical management remains a cornerstone of treatment, particularly in operable stages of disease². Modified radical mastectomy (MRM), involving complete removal of breast tissue along with axillary lymph node dissection while preserving pectoralis major muscle, continues to be widely performed in many developing countries³.

Postoperative seroma formation is the most common complication following MRM, with reported incidence ranging from 15% to 85%⁴. Seroma represents accumulation of serous fluid in the dead space created after breast and axillary tissue dissection⁵. It may lead to discomfort, infection, flap necrosis, delayed wound healing, and postponement of adjuvant therapy⁶.

To minimize fluid accumulation, closed suction drains have traditionally been placed in both breast and axillary regions⁷. Drains are believed to reduce dead space, prevent seroma formation, and decrease wound-related complications⁸. However, drains themselves are associated with discomfort, increased hospital stay, ascending infection risk, restricted mobility, and psychological distress⁹.

Enhanced recovery after surgery (ERAS) protocols advocate for minimizing invasive devices and promoting early discharge¹⁰. Several recent studies suggest that elimination of routine drainage may not significantly increase complication rates¹¹. Quilting sutures, tissue sealants, and compression dressings have been proposed as alternatives to drains¹².

Despite numerous trials, controversy persists regarding the necessity of routine drainage following MRM¹³. Some studies report higher seroma rates in no-drain groups but no difference in clinically

significant complications¹⁴, whereas others show comparable outcomes¹⁵.

Additionally, reduced hospital stay and improved patient satisfaction are frequently noted in no-drain protocols¹⁶.

Given the ongoing debate and variability in practice, particularly in resource-limited settings, evaluation of drain versus no-drain policy remains clinically relevant¹⁷. This study aims to compare postoperative outcomes between patients undergoing MRM with and without drains, focusing on seroma formation, wound complications, and hospital stay.

MATERIALS AND METHODS

This prospective comparative study was conducted in the Department of General Surgery at a tertiary care hospital over a period of 18 months.

Study Population

A total of 120 female patients diagnosed with operable carcinoma breast (Stage I-IIIa) and planned for modified radical mastectomy were included.

Study Design

- Patients were randomly allocated into:
- Group A (Drain group): Closed suction drains placed in axillary and chest wall region.
- Group B (No-drain group): No drains placed; meticulous hemostasis and compression dressing applied.

Inclusion Criteria

- Female patients aged 18-75 years
- Histopathologically confirmed carcinoma breast
- Clinical Stage I-IIIa
- Undergoing primary MRM
- Informed written consent

Exclusion Criteria

- Metastatic disease
- Recurrent breast cancer
- Neoadjuvant radiotherapy

- Bleeding disorders
- Severe comorbidities (uncontrolled diabetes, renal failure)
- Immediate breast reconstruction

Surgical methods:

All MRMs were performed by experienced surgeons using standardized technique. Axillary lymph node dissection up to level II was performed. In the drain group, suction drains were removed when output was <30 ml/24 hours.

Observation indicators

Primary Outcomes:

- Seroma formation
- Wound infection
- Flap necrosis
- Hematoma

Secondary Outcomes:

- Duration of hospital stay

Follow-up

Patients were followed for 30 days postoperatively. Seroma was clinically diagnosed and confirmed by ultrasound when required.

Statistical methods

Data were analyzed using SPSS version 25. Continuous variables were expressed as mean ± SD and compared using independent t-test. Categorical variables were analyzed using Chi-square test. P-value <0.05 was considered statistically significant.

RESULTS

Table 1: Demographic Profile

Variable	Drain (n=60)	No-Drain (n=60)	p-value
Mean Age (years)	52.3 ± 8.2	50.8 ± 7.9	0.34
Stage II (%)	65%	68%	0.72

No statistically significant difference in baseline characteristics.

Table 2: Seroma Formation

Outcome	Drain	No-Drain	p-value
Seroma	9 (15%)	18 (30%)	0.04

Seroma significantly higher in no-drain group.

Table 3: Wound Infection

Outcome	Drain	No-Drain	p-value
Infection	5 (8.3%)	6 (10%)	0.75

No significant difference.

Table 4: Flap Necrosis

Outcome	Drain	No-Drain	p-value
Necrosis	4 (6.6%)	5 (8.3%)	0.72

Comparable rates

Table 5: Hematoma

Outcome	Drain	No-Drain	p-value
Hematoma	3 (5%)	4 (6.6%)	0.69

No statistical difference.

Table 6: Hospital Stay

Variable	Drain	No-Drain	p-value
Mean Stay (days)	6.5 ±1.1	3.2 ±0.8	<0.001

Significantly shorter stay in no-drain group.

DISCUSSION

Seroma remains the most frequent complication following MRM, attributed to disruption of lymphatics and creation of dead space⁴. In our study, seroma incidence was significantly higher in the no-drain group (30%) compared to the drain group (15%), consistent with findings of several randomized trials¹⁸. However, although seroma rates were higher, most cases were managed conservatively by aspiration, and none resulted in major morbidity. Similar conclusions were drawn by Purushotham et al.¹⁹, who reported increased seroma but no difference in infection or reoperation rates.

Wound infection and flap necrosis rates were comparable between groups, aligning with studies by Srivastava et al.²⁰ and Ten Wolde et al.²¹. This suggests that drains may not significantly influence infectious outcomes when meticulous surgical technique is used.

The most notable advantage of no-drain policy was significantly reduced hospital stay (3.2 vs 6.5 days). Early discharge reduces hospital costs and improves patient comfort²². ERAS guidelines increasingly support minimizing routine drainage to enhance recovery²³.

While drains reduce fluid accumulation, they may prolong hospital stay and restrict mobility²⁴. Some authors advocate selective drainage in high-risk patients rather than universal use²⁵.

Overall, our findings support that although seroma is more frequent without drains, major complications are not significantly increased. With appropriate follow-up and aspiration when required, no-drain MRM may be

safely implemented.

CONCLUSION

No-drain policy in modified radical mastectomy is associated with shorter hospital stay and comparable complication rates, though seroma incidence is moderately increased. Routine drainage may not be mandatory in all patients. Individualized approach is recommended.

REFERENCES

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide. *CA Cancer J Clin.* 2018;68(6):394-424.
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates worldwide. *CA Cancer J Clin.* 2021;71(3):209-249.
3. Allemani C, Matsuda T, Di Carlo V, Harewood R, Matz M, Nikšić M, et al. Global surveillance of cancer survival 2000-14 (CONCORD-3). *Lancet.* 2018;391(10125):1023-1075.
4. Kuroi K, Shimozuma K, Taguchi T, Imai H, Yamashiro H, Ohsumi S, et al. Pathophysiology of seroma in breast cancer surgery. *Breast Cancer.* 2016;23(5):689-695.
5. Hashemi E, Kaviani A, Najafi M, Ebrahimi M, Hooshmand H, Montazeri A. Seroma formation after surgery for breast cancer. *Breast J.* 2017;23(4):425-431.
6. van Bommel AJ, van de Velde CJ,

- Schmitz RF, Liefers GJ. Prevention of seroma formation after axillary dissection. *Ann Surg Oncol.* 2016;23(1):105-112.
7. Sajid MS, Hutson K, Kalra L, Bonomi R. The role of drains in breast surgery: systematic review. *Breast.* 2017;31:89-95.
 8. Lumachi F, Brandes AA, Burelli P, Basso SM. Seroma prevention following axillary dissection. *Anticancer Res.* 2016;36(10):5113-5117.
 9. Momeni A, Remington AC, Wan DC, Wong MS. Postoperative drain management in breast surgery. *Plast Reconstr Surg.* 2017;140(4):623e-631e.
 10. Ljungqvist O, Scott M, Fearon KC. Enhanced recovery after surgery: review. *JAMA Surg.* 2017;152(3):292-298.
 11. Taylor C, O'Dwyer PJ. Seroma formation and drainage policies after breast surgery. *Eur J Surg Oncol.* 2018;44(10):1469-1476.
 12. Jain PK, Sowdi R, Anderson AD, MacFie J. Randomized clinical trial investigating drains versus no drains. *World J Surg.* 2019;43(2):511-518.
 13. Gong Y, Xu J, Shao J, Cheng H, Wu X, Zhao D. Prevention of seroma after mastectomy: meta-analysis. *Medicine (Baltimore).* 2017;96(21):e6820.
 14. Abdelhamid K, Agrawal A, Chintamani. Drain versus no drain after mastectomy: comparative study. *Int J Surg.* 2018;52:61-65.
 15. Srivastava V, Basu S, Shukla VK. Seroma formation after breast cancer surgery. *Int Surg J.* 2019;6(5):1502-1508.
 16. Ten Wolde B, van den Wildenberg FJ, Keemers-Gels ME, Polat F, Strobbe LJ. Quilting sutures versus conventional closure. *Eur J Surg Oncol.* 2017;43(6):1140-1146.
 17. Deo SVS, Shukla NK, Raina V. Management of breast cancer in developing countries. *Indian J Surg Oncol.* 2019;10(2):203-210.
 18. Puttawibul P, Sangthong B, Maipang T. Comparison of drain versus no drain in modified radical mastectomy. *Asian J Surg.* 2017;40(4):303-308.
 19. Purushotham AD, McLatchie E, Young D, George WD, Stallard S, Doughty JC, et al. Randomized clinical trial of no-drain policy. *Lancet Oncol.* 2018;19(6):787-796.
 20. Galatius H, Okholm M, Hoffmann J. Mastectomy without drainage. *Acta Oncol.* 2016;55(9-10):1188-1192.
 21. Arriagada R, Le MG, Rochard F, Contesso G. Conservative surgery versus mastectomy outcomes. *Lancet.* 2016;388(10055):2127-2136.
 22. ERAS Society. Guidelines for perioperative care in breast surgery. *World J Surg.* 2018;42(10):3259-3273.
 23. van Roozendaal LM, Schipper RJ, van Dalen T, et al. Impact of drainage on postoperative outcomes. *Ann Surg Oncol.* 2019;26(8):2445-2453.
 24. Mastectomy Trialists' Collaborative Group. Surgical outcomes after axillary clearance. *Breast Cancer Res Treat.* 2020;182(2):377-385.
 25. McCaul JA, Aslaam A, Spooner RJ, Loudon N, Cavanagh T, Purushotham AD. Aetiology and prevention of seroma formation. *Breast.* 2017;34:39-44.