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REDUCING SEROMA AFTER MODIFIED RADICAL MASTECTOMY: THE ROLE OF FLAP-MUSCLE SUTURES APPLIED ON MASTECTOMY FLAPS

Aisha Shaikh[1], Saira Fatima[2*], Ibrahim Asgher[3], Nargis Shaikh[4], Zoya Mehran[5], Muhammad Muqeem[6]

[1]Associate Professor General Surgery, Shaheed Mohtarma Benazir Bhutto Medical University Larkana. Email: aashys19@gmail.com
[2*]Associate Professor General Surgery, Shaheed Mohtarma Benazir Bhutto Medical University Larkana. Email: sairafatimashaikh@yahoo.com
[3]Assistant Professor General Surgery, Gambat Institute of Medical Sciences Gambat. Email: ibrahimabbasy@gmail.com
[4]Consultant General Surgeon Chandka Medical College Hospital Larkana. Email: nargis_shaikh90@yahoo.com
[5]Consultant General Surgeon Chandka Medical College Hospital Larkana. Email: zoya.sikander@ymail.com
[6]Assistant Professor General Surgery, Gambat Institute of Medical Sciences Gambat. Email: jmuqeem142.mm@gmail.com

***Corresponding Author:** Saira Fatima
*Associate Professor General Surgery, Shaheed Mohtarma Benazir Bhutto Medical University Larkana. Email: sairafatimashaikh@yahoo.com

Abstract

Background: A common problem following a modified radical mastectomy is seroma formation; incidence rates have been found to range from 15% to 81%. This consequence increases the likelihood of flap necrosis, infections, slows down the healing process, reopened wounds, pain, and further extension of recovery time. Because of this, different flap-fixing techniques have been tried in an effort to lessen the problems associated with local wounds.

The goal is to find out if mastectomy flap-muscle sutures to the chest wall muscles can reduce the amount and length of drained fluid as well as the number of cases of seroma after a modified radical mastectomy.

Study design: an analytical cross-sectional study

Place and Duration: This study was conducted at **Shaheed** Mohtarma Benazir Bhutto Medical University Larkana from June 2020 to June 2023

Methodology: There were a total of 80 patients who participated in this investigation. All of the participants were booked for a modified radical mastectomy. Women diagnosed with breast cancer scheduled for a modified radical mastectomy were included in the study. All 80 patients were equally divided into 2 groups (study group and control group), with 40 patients in each group. After the study group's modified radical mastectomy was finished, the mastectomy flaps were sutured together using polyglactin 3-0 sutures, and the underlying chest wall (pectoral fascia and muscle) was secured with flat-muscle sutures.

Results: The removal of drains happened significantly faster in the study group than in the control group ($p < 0.001$). Furthermore, the research group's total drained fluid volume was considerably lower ($p < 0.001$). In addition, the study group showed a much lower incidence of seroma formation than the control group.
Conclusion: For patients following modified radical mastectomy, the mastectomy flap-muscle suture technique is a successful surgery that significantly lowers the incidence of seroma formation.

Keywords: modified radical mastectomy, mastectomy flap-muscle suture technique, seroma formation.

INTRODUCTION

A common problem following a modified radical mastectomy is seroma formation; incidence rates have been found to range from 15% to 81% [1, 2, 3, 4]. This consequence increases the likelihood of flap necrosis, infections, slows down the healing process, reopened wounds, pain, and further extension of recovery time [5]. By removing empty areas and improving fluid drainage, the modified radical mastectomy flaps should be closed as effectively as possible to minimize serum oozing and lymphatic leakage.
Because of this, different flap-fixing techniques have been tried in an effort to lessen the problems associated with local wounds [6, 7]. It is unknown what causes seroma formation pathophysiology. Many different factors can influence the formation of seroma. Dead space establishment may enhance postoperative seroma development. The primary cause of seroma formation is the persistent leakage of tiny blood vessels and damaged lymphatics into dead space following surgery. While it cannot totally prevent seroma formation, mechanical closure of the dead space following axillary dissection for breast cancer can aid in limiting its formation. Compared to closed suction drainage, flap fixation allowed patients without drains to be freed sooner, although the rates of seroma remained the same.
The purpose of this study was to evaluate the efficacy of mastectomy flap-muscle sutures to the muscles of the chest wall in decreasing the quantity and length of drained fluid in addition to the incidence of seroma after a modified radical mastectomy.

METHODOLOGY

There were a total of 80 people who participated in this investigation, from June 2020 to June 2023. All of the participants were planned for a modified radical mastectomy. Women diagnosed with breast cancer scheduled for a modified radical mastectomy were included in the study. Every participant was briefed about this study, and their written consent was obtained.

Exclusion criteria: Those people who had altered blood clotting or immune systems, had severe obesity, were on anticoagulant treatment, had advanced liver disease, and had uncompensated diabetes mellitus were not a part of this research. Moreover, those who had previous surgery on the axillary lymphatic system or an immediate reconstructive procedure were also not part of this research.
All 80 patients were equally divided into 2 groups (study group and control group), with 40 patients in each group. After the study group's modified radical mastectomy was done, polyglactin 3-0 sutures were used to connect the mastectomy flaps, and flat-muscle sutures were used to secure the chest wall, which is made up of pectoral fascia and muscle. To make sure the wound was completely closed, several alternate flap-muscle sutures were put in place two to three centimeters apart, covering different flap areas like the axilla and the edges of the incision.
After the modified radical mastectomy, the flaps at the edges were brought together using standard techniques in the control group. For both groups of patients, closed suction drains were installed. Patients' characteristics, the nature of their tumors, and the surgical circumstances were all documented in detail. Every day, records were made of the drained fluid's look and quantity. When

the volume of collected fluid dropped to less than 10 cc in a 24-hour period, drain removal took place. Two weeks post-drain removal, a comprehensive inspection of the flaps and axilla was performed, supplemented in cases of doubt by local chest wall ultrasonography to confirm or exclude the presence of collections or seromas. Records were kept of the total volume of drained fluid and the incidence of seroma. Later, Mann-Whitney test was used to compare the results between both groups.

RESULTS

A total of 80 people were part of this research. Table 1 shows the tumor characteristics of both the groups. No significant differences were seen in respect to grade of tumor, age, neoadjuvant chemotherapy, and histological type.

Table no. 1: tumor characteristics of both the groups

Characteristics	Control group	Study group
Age (years)		
● Mean	54 (38 to 72)	51 (37 to 62)
Histological type		
● Intralobular carcinoma (ILC)	4	4
● Intraductal carcinoma (IDC)	34	34
● Mixed	2	2
Grade		
● II	31	32
● III	9	8
N stage		
● N0	13	24
● N1	20	13
● N2	7	3
T stage		
● T1	2	2
● T2	20	31
● T3	12	7
● T4	6	0
Neoadjuvant chemotherapy		
● Yes	12	6
● No	28	34

Table number 2 shows the operative features of the two groups. (Note that all values are in terms of mean).

Table no. 2: operative features of the two groups

Features	Control group	Study group
Area of skin removed (cm2)	821.9	827.7
Total no. of lymph nodes removed	20.8	18.9
Volume of tumor mass removed (ml)	465.5	332.8
No. of positive lymph nodes removed	5.9	2.8

Table number 3 shows postoperative outcome measures.

Table no. 3: postoperative outcome measures

Measures	Control group	Study group
Amount of drained fluid in the last 3 days (ml)	213.0	207.8
Total amount of drained fluid (ml)	2017.8	524.8
Amount of drained fluid in the last day (ml)	51.5	35.0
Day of drain removal	13.4	5.0

Table number 4 shows the frequency of seroma and implications.

Table no. 4: frequency of seroma and implications

	Control group	Study group
Complications		
● **Partial flap necrosis**	4	4
● **Cellulitis**	4	0
Seroma (ultrasonographic)		
● **G1**	4	4
● **G2**	12	4
● **G3**	4	0
● **No seroma**	20	32
Seroma (clinical)		
● **G2**	14	4
● **G3**	2	0
● **No seroma**	24	36

DISCUSSION

When axillary lymphadenectomy is performed as a part of modified radical mastectomy, the chance of seroma formation goes up by a huge amount; rates have been reported to range from 15% to 81% [8, 9, 10, 11]. This disorder slows down the healing of wounds, increases hospital stays, and postpones the start of adjuvant chemotherapy and radiation. Based on the Common Terminology Criteria for Adverse Events 6 v 3.0, seroma severity is categorized. Grade 1 represents asymptomatic cases (only ultrasonography can detect them), Grade 2 represents symptomatic cases (needing simple aspiration or medicinal intervention), and Grade 3 represents symptomatic cases requiring surgical or interventional radiology techniques.

In the initial stages of wound healing, seroma is believed to result from acute inflammatory reactions brought on by surgical trauma. A large number of tiny blood vessels and lymphatic channels are damaged during mastectomy and axillary lymphadenectomy procedures, which causes blood and lymphatic fluid to seep from the exposed raw tissue surfaces. This fluid buildup keeps the flaps from aligning properly with the chest wall bed by separating them from the axilla and chest wall. As a result, this disruption of appropriate alignment adds to the postponement of wound healing.

The main thing that affects the growth of seroma, according to Petrek et al., is the number and level of lymph nodes in the armpit that are affected [12]. Some of the first people to suggest connecting skin flaps to deeper structures around the edges to cover the contents of the axilla and get rid of the empty space behind the clavicle were Halsted et al. Instead of using a drain, they used a skin graft to close the remaining wound gap [13].

Later, Larsen et al. recommended using 35 to 50 little cotton sutures to secure subcutaneous sutures to the deep muscles and fascia after radical mastectomy, along with a thick pressure dressing [14]. Drains were not installed until an anomalous amount of moisture was seen in the chest wall or if there was a persistent empty gap. The usefulness of subcutaneous tacking sutures using absorbable

material to stabilize the flaps was assessed by Aitken et al. [15]. According to O'Hea et al., utilizing a front-fastening Surgi bra that was loosely fitting was a better dressing technique for reducing postoperative drainage and seroma formation than using an external compression dressing [16]. Chen et al. also failed to find any appreciable benefit to wearing a pressure garment [17].

According to Purushotham et al., performing breast surgery without drainage did not raise the risk of surgical or psychological problems, such as seromas [18], as long as flaps were stitched in place. Numerous investigators have noted that flap fixation methods have a positive effect on lowering the incidence of seroma [19]. Studies have shown that the overall drainage volume could be anywhere from 2 to 5 liters when the flap attachment technique is not used [20]. Furthermore, research has shown that the majority of surgeons remove drains when the drainage volume is less than 30 to 50 milliliters within 24 hours, frequently up to 10 days after surgery.

CONCLUSION

The mastectomy flap-muscle suture technique is a successful surgery that greatly reduces the chance of seroma formation in people who have had a modified radical mastectomy.

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Conflict in the interest

The authors had no conflicts related to the interest in the execution of this study.

REFERENCES

1. Madhu BS, Kalabairav S, Reddy AV, Mallikarjunappa SS. A randomized controlled trial evaluating the efficacy of mastectomy flap quilting sutures in reducing post modified radical mastectomy seroma formation. International Surgery Journal. 2017 Jan 25;4(2):714-8.
2. Bhagchandani M, Shukla V, Maurya RK, Chaudhary A, Kumar K. A Comparative Study Between Mastectomy Flap Quilting Sutures with Axillary Drain Versus Conventional Sutures with Axillary and Pectoral Drain in Reducing Post-Modified Radical Mastectomy Seroma Formation. Indian Journal of Surgery. 2023 Apr 6:1-6.
3. Vettuparambil A, Subramanya C. Flap fixation as a technique for reducing seroma formation in patients undergoing modified radical mastectomy: An institutional experience. Indian journal of surgical oncology. 2021 Mar;12(1):48-53.
4. Trefoux-Bourdet A, Body G, Jacquet A, Hebert T, Kellal I, Marret H, Ouldamer L. Quilting suture after mastectomy in prevention of postoperative seroma: a prospective observational study. Gynecologie, Obstetrique & Fertilite. 2015 Feb 21;43(3):205-12.
5. Khater A, Elnahas W, Roshdy S, Farouk O, Senbel A, Fathi A, Hamed E, Abdelkhalek M, Ghazy H. Evaluation of the quilting technique for reduction of postmastectomy seroma: a randomized controlled study. International journal of breast cancer. 2015 Jul 12;2015.
6. Myint ST, Khaing KS, Yee W, Mon SM, Lwin T. Quilting suture versus conventional closure in prevention of seroma after total mastectomy and axillary dissection in breast cancer patients. ANZ journal of surgery. 2020 Jul;90(7-8):1408-13.
7. Awad AT, Alhussini MA, Balbaa MA. Quilting of mastectomy flaps; a simple way to avoid postmastectomy seroma. Indian Journal of Surgery. 2020 Feb;82:9-13.
8. Najeeb E, Rashid R, Zaffar S. Effect of flap fixation technique in modified radical mastectomy on incidence of postoperative seroma formation. J Coll Physicians Surg Pak. 2019 May 1;29(5):410-3.
9. Van Bastelaar J, Granzier R, Van Roozendaal LM, Beets G, Dirksen CD, Vissers Y. A multi-center, double blind randomized controlled trial evaluating flap fixation after mastectomy using sutures or tissue glue versus conventional closure: protocol for the Seroma reduction After Mastectomy (SAM) trial. BMC cancer. 2018 Dec;18(1):1-8.

10. Hakseven M, Avşar G, Çetindağ Ö, Deryol R, Benk MS, Sırgancı G, Culcu S, Ünal AE, Bayar S. Prospective Study on Avoiding Seroma Formation by Flap Fixation After Modified Radical Mastectomy. The American Surgeon™. 2023 May 15:00031348231175497.
11. Boolsen S, Nielsen VB, Jensen J, Bak S. Post mastectomy seroma. a study of the nature and origin of seroma after mastectomy. Dan Med Bull. 1989;36:487-9.
12. Petrek J, Peters M, Nori S, Knauer C, Kinne D, Rogatko A. Axillary lymphadenectomy. A prospective, randomized trial of 13 factors influencing drainage, including early or delayed arm mobilization. Arch Surg. 1990;125:378-82.
13. Halsted WS. Developments in the skin grafting operations for cancer of the breast. JAMA. 1913;60:416-51.
14. Larsen BB, Hugan C. Fixation of skin flaps in radical mastectomy by subcutaneous sutures; observations. AMA Arch Surg. 1955;71:419-23.
15. Aitken DR, Hunsaker R, James AG. Prevention of seromas following mastectomy and axillary dissection. Surg Gynecol Obstet. 1984;158:327-30.
16. Hea BJ, Ho MN, Petrek JA. External compression dressing versus standard dressing after axillary lymphadenectomy. Am J Surg. 1999;177:450-3.
17. Chen CY, Hoe AL, Wong CY. The effect of a pressure garment on post-surgical drainage and seroma formation in breast cancer patients. Singapore Med J. 1998;39:412-5.
18. Purushotham AD, Mclatchie E, Young D, George WD, Stallard S, Doughty J, et al. Randomized clinical trial of no wound drains and early discharge in the treatment of women with breast cancer. Br J Surg. 2002;89:286-92
19. Gonzalez EA, Saltzstein EC, Riedner CS, Nelson BK. Seroma formation following breast cancer surgery. Breast J. 2003;9:385-8.
20. Hashemi E, Kaviani A, Najafi M, Ebrahimi M, Hooshmand H, Montazeri A. Seroma formation after surgery for breast cancer. World J Surg Oncol. 2004;2:44.