DOI: https://doi.org/10.53350/pjmhs02024181270

ORIGINAL ARTICLE

A Novel Surgical Approach to Treat Lymphangioma of the Breast and Prevent Seroma

ISLAM UD DIN IFTIKHAR[1], FARAH KANWAL[2], IQRA TAHIR[3], FAISAL RIAZ[4], JAVERIA RAFIQUE[5], MUHAMMAD AHMAD[6]
[1,2]*Surgical Registrar at Cancer Care Hospital and Research Center (CCH & RC)*
[3,4,6]*Medical Officer ,Cancer Care Hospital and Research Center (CCH & RC)*
[5]*House Officer, Bakhtawar ameen Teaching Hospital Multan*
Correspondence to: Islam Ud Din Iftikhar, Email: drislamuddin42@gmail.com, Cell: +92 307 4995525

ABSTRACT

Background: Lymphangioma of the breast is a rare benign lymphatic malformation that often necessitates surgical excision due to cosmetic concerns or progressive enlargement.

Objective: To evaluate the effectiveness of a novel surgical technique incorporating en bloc excision, targeted lymphatic ligation, and fibrin sealant application in minimizing postoperative seroma formation following breast lymphangioma surgery.

Methods: A prospective interventional study was conducted at Cancer Care Hospital and Research Center (CCH & RC) over a period of 6 Months from 1st March 2023 to 30th August 2023 involving 85 patients with clinically or radiologically confirmed breast lymphangioma, selected through non-probability consecutive sampling. Data on demographics, lesion characteristics, operative duration, drain duration, and postoperative complications were collected. Seroma formation, defined as clinically evident fluid collection requiring aspiration or causing wound dehiscence, was the primary outcome.

Results: Out of 85 patients undergoing the novel surgical approach for breast lymphangioma, the mean age was 36.4 years**,** and average lesion size was 5.3 cm**.** The seroma rate was 7.1% (6 patients)**,** markedly lower than the 28.2% seen in historical controls ($p < 0.01$). The average operative time was 58.2 minutes, and mean drain duration was 2.8 days. Only 3.5% experienced minor wound infections, and no readmissions occurred. Overall, the technique was associated with favorable clinical and cosmetic outcomes, minimal complications, and reduced postoperative morbidity.

Conclusion: The novel surgical technique demonstrated a significant reduction in postoperative seroma rates among patients with breast lymphangioma. Incorporating targeted lymphatic ligation and dead-space obliteration appears to be an effective strategy for optimizing surgical outcomes in this rare condition.

Keywords: Lymphangioma, breast surgery, seroma prevention, lymphatic malformation, fibrin sealant, surgical technique.

INTRODUCTION

Lymphangioma of the breast is an uncommon benign malformation of the lymphatic system, characterized by abnormal proliferation of dilated lymphatic vessels within the breast tissue. It can occur congenitally or arise secondary to trauma, surgery, or radiation, and though more commonly seen in the head and neck region, breast involvement is rare and often misdiagnosed[1,2]. Lymphangiomas are classified into capillary, cavernous, and cystic types, with cystic lymphangioma (also known as cystic hygroma) being more frequently encountered in the breast[3]. These lesions, although benign, may present with a palpable mass, pain, or cosmetic deformity, and can raise suspicion for malignancy on imaging studies[4]. The standard management of breast lymphangiomas has traditionally involved surgical excision, given their potential for growth, recurrence, or infection[5]. However, complete excision poses technical challenges due to the proximity of vital structures and diffuse infiltration in some cases. Furthermore, one of the most common postoperative complications following such surgeries is seroma formation, characterized by the accumulation of lymphatic fluid in the dead space left behind after tissue removal[6]. Seroma formation not only delays wound healing and increases the risk of infection but may also necessitate repeated aspirations, prolonged drainage, or even additional surgical interventions. Its incidence following breast surgeries can range from 15% to 85%, particularly in lymphatic-rich or dissected tissues[7]. Traditional preventive measures include the use of suction drains, compression dressings, and quilting sutures, yet these approaches often provide inconsistent results and do not address the underlying lymphatic leak[8].

Given the high recurrence rate of lymphangiomas and the burden of postoperative complications, there is growing interest in refining surgical techniques to minimize lymphatic disruption and improve fluid sealing[9]. Novel approaches focusing on meticulous lymphovascular ligation, tissue gluing with fibrin sealants, and modified flap closure methods have shown promise in reducing seroma formation in other lymphatic surgeries such as axillary clearance and mastectomy[10,11].

Objective: To evaluate the efficacy of a novel surgical technique in reducing postoperative seroma formation following excision of breast lymphangioma.

METHODOLOGY

A prospective interventional study was conducted at Cancer Care Hospital and Research Center (CCH & RC) over a period of 6 Months from 1st March 2023 to 30th August 2023 involving 85 patients with clinically or radiologically confirmed breast lymphangioma, selected through non-probability consecutive sampling.

Inclusion Criteria:

- Patients aged 18 years or older
- Diagnosed with lymphangioma of the breast based on clinical, radiologic, and/or histologic criteria
- Planned for surgical excision

Exclusion Criteria:

- Recurrent or previously excised lymphangiomas
- Patients with coexisting breast malignancies
- History of radiation or prior breast surgery
- Refusal to consent

Data Collection: After obtaining ethical approval and informed consent, 85 patients with clinically or radiologically confirmed breast lymphangioma were enrolled. Baseline demographic information including age, BMI, and comorbidities was recorded. All patients underwent the novel surgical procedure involving en bloc excision, meticulous lymphatic vessel ligation, fibrin sealant application, and layered closure with suction drainage. Intraoperative details such as operative duration, lesion size, and estimated blood loss were documented. Postoperative follow-up was conducted at regular intervals (days 3, 7, 14, and 30) to assess for complications, particularly seroma formation, defined as clinically evident fluid accumulation requiring aspiration or associated with wound dehiscence. Drain output and duration until removal were also recorded. Patient satisfaction and cosmetic

Received on 05-09-2023
Accepted on 27-12-2023

outcome were noted at the final follow-up using a structured questionnaire.

Statistical Analysis: Data were analyzed using SPSS version 17. Quantitative variables like age, lesion size, operative time, and drain duration were expressed as means ± standard deviation. Categorical variables such as presence of seroma, wound infection, or recurrence were summarized as frequencies and percentages. The incidence of seroma was the primary outcome and was compared with historical controls from existing literature using one-sample proportion tests.

RESULTS

The mean age of the 85 patients was 36.4 ± 10.8 years, with similar age distributions between those with right-sided (36.8 ± 10.5 years) and left-sided (35.9 ± 11.2 years) breast involvement. The average BMI was 26.7 ± 3.9 kg/m², indicating most patients were in the overweight category. Hypertension was present in 14.1% of patients, and diabetes in 10.6%, while 75.3% had no comorbid conditions. The average lesion size was 5.3 ± 2.1 cm, with comparable measurements between right (5.4 ± 2.0 cm) and left (5.2 ± 2.3 cm) breast lesions.

Table 1: Demographic and Clinical Characteristics of Patients

Characteristic	Total (n=85)	Right Breast (n=47)	Left Breast (n=38)
Age (years)	36.4 ± 10.8	36.8 ± 10.5	35.9 ± 11.2
BMI (kg/m²)	26.7 ± 3.9	26.4 ± 3.8	27.0 ± 4.0
Hypertension	12 (14.1%)	7 (14.9%)	5 (13.2%)
Diabetes	9 (10.6%)	5 (10.6%)	4 (10.5%)
No Comorbidities	64 (75.3%)	35 (74.5%)	29 (76.3%)
Mean Lesion Size (cm)	5.3 ± 2.1	5.4 ± 2.0	5.2 ± 2.3

The mean operative time was 58.2 ± 15.6 minutes, and the average estimated blood loss during surgery was 76.4 mL, indicating minimal intraoperative bleeding. Postoperatively, the average drain duration was 2.8 ± 1.1 days, and hospital stay averaged 3.5 days. Notably, 22.4% of patients had drain output exceeding 50 mL postoperatively, while 34.1% had their drains removed within 48 hours due to low output, suggesting rapid recovery in a substantial proportion.

Table 2: Operative and Postoperative Parameters

Parameter	Mean ± SD / Frequency (%)
Operative Time (minutes)	58.2 ± 15.6
Estimated Blood Loss (mL)	76.4 ± 20.1
Drain Duration (days)	2.8 ± 1.1
Hospital Stay (days)	3.5 ± 1.4
Drain Output >50 mL post-op	19 (22.4%)
Early Drain Removal (<48 hrs)	29 (34.1%)

Seroma formation occurred in 6 patients (7.1%), a notable reduction compared to typical rates seen in conventional surgery. Wound infections were reported in 3 patients (3.5%), and wound dehiscence occurred in 2 patients (2.4%). Aspiration was required in 5 cases (5.9%), while no patients required readmission. Only 1 patient (1.2%) needed reapplication of fibrin sealant, indicating high procedural efficacy and safety.

Table 3: Postoperative Complications and Interventions

Complication / Event	Frequency (%)
Seroma Formation	6 (7.1%)
Wound Infection	3 (3.5%)
Wound Dehiscence	2 (2.4%)
Aspiration Performed	5 (5.9%)
Readmission Required	0 (0.0%)
Fibrin Sealant Reapplication Needed	1 (1.2%)

When compared to a historical control group receiving conventional excision techniques, the novel surgical method demonstrated a significantly lower seroma rate of 7.1% (6 out of 85 patients), versus 28.2% (24 out of 85 patients) in the control group.

Table 4: Comparison of Seroma Rates with Historical Controls

Group	Sample Size	Seroma Rate	p-value
Novel Technique (Current Study)	85	6 (7.1%)	< 0.01
Conventional Surgery (Historical Control)	85	24 (28.2%)	-

DISCUSSION

This study evaluated a novel surgical technique designed to treat lymphangioma of the breast while minimizing the incidence of postoperative seroma formation a common and troublesome complication in procedures involving lymphatic-rich tissues. Our findings revealed that this technique, which combines excision with meticulous lymphatic ligation, multilayer dead space obliteration, and fibrin sealant application, significantly reduced the seroma rate to 7.1%, compared to reported rates of 25–35% in conventional approaches from previous research. The observed reduction aligns with outcomes from previous research where enhanced closure techniques, such as flap fixation and fibrin sealant application, were used to reduce seroma in breast and axillary surgeries[12,13]. One previous research study demonstrated a seroma rate of 9.6% in modified radical mastectomy patients using fibrin glue, significantly lower than the 27% rate in the conventional closure group. Similarly, another study reported that careful ligation of lymphatic vessels and the use of tissue adhesives led to a reduction in seroma incidence from 31% to 12% post-axillary clearance[14]. The mean operative time of 58.2 minutes and low estimated blood loss (76.4 mL) in our cohort suggest that the additional procedural steps did not considerably prolong or complicate surgery. Postoperative recovery was favorable, with an average hospital stay of 3.5 days and only 3.5% of patients developing minor wound infections. These values compare favorably with other studies, where hospital stays frequently ranged from 5 to 7 days in breast lymphangioma surgeries and minor wound complications occurred in up to 10% of cases[15,16].

In addition, only 5.9% of patients required aspiration for fluid accumulation, and no readmissions were reported. This reflects the utility of our technique in achieving a near-total seal of potential lymphatic leaks. These results are consistent with previous research that showed lower aspiration and readmission rates when fibrin sealants and multilayer closures were employed following breast and lymphatic procedures[17,18]. A unique strength of this study lies in the uniformity of the surgical protocol and its application across a reasonably large sample of 85 patients, making the findings more generalizable. The significant difference in seroma formation when compared to historical controls (7.1% vs. 28.2%, $p < 0.01$) supports the notion that modification of surgical technique can have a direct and measurable impact on postoperative outcomes. However, some limitations remain. This study did not include a contemporaneous control group, relying instead on historical data for comparison.

CONCLUSION

It is concluded that the novel surgical approach consisting of en bloc excision, targeted lymphatic ligation, multilayered dead space obliteration, and fibrin sealant application is highly effective in minimizing postoperative seroma formation in patients undergoing surgery for breast lymphangioma. This technique demonstrated a significantly lower seroma incidence of 7.1%, compared to 28.2% in historical controls, with minimal wound complications, no readmissions, and favorable recovery times. These results suggest that this method provides a safe, efficient, and reproducible alternative to conventional excision techniques, enhancing patient outcomes and postoperative satisfaction.

REFERENCES

1. H Turner, E. Jane, John R. Benson, and Zoë E. Winters. "Techniques in the prevention and management of seromas after breast surgery." Future oncology 10, no. 6 (2014): 1049-1063.

2. Gardner, Antony, Helen A. Pass, and Sarah Prance. "Techniques in the prevention and management of breast seroma: An evaluation of current practice." The Women's oncology review 5, no. 3 (2005): 135-143.
3. Agrawal, Amit, Abraham Abiodun Ayantunde, and Kwok Leung Cheung. "Concepts of seroma formation and prevention in breast cancer surgery." ANZ Journal of surgery76, no. 12 (2006): 1088-1095.
4. Uba, Aba F., and Lohfa B. Chirdan. "Management of cystic lymphangioma in children: experience in Jos, Nigeria." Pediatric surgery international 22 (2006): 353-356.
5. Sood, A., Kotamarti, V.S., Therattil, P.J. and Lee, E.S., 2017. Sclerotherapy for the management of seromas: a systematic review. Eplasty, 17, p.e25.
6. Kurumety, S., Morris, M., & Aydi, Z. B. (2022). New-onset axillary lymphangioma: a case report. Journal of Medical Case Reports, 16(1), 242.
7. Kong, Deguang, Yu Liu, Zhihua Li, Qiuxia Cui, Kun Wang, Kongming Wu, and Gaosong Wu. "OK-432 (Sapylin) reduces seroma formation after axillary lymphadenectomy in breast cancer." Journal of Investigative Surgery 30, no. 1 (2017): 1-5.
8. Manders, Ernest K., Michael J. Schenden, John A. Furrey, Peter T. Hetzler, Thomas S. Davis, and William P. Graham III. "Soft-tissue expansion: concepts and complications." Plastic and Reconstructive Surgery 74, no. 4 (1984): 493-507.
9. Episalla, N.C., Orra, S., Black, C.K., Dekker, P.K., Kim, K.G., Cardella, J.T. and Evans, K.K., 2021. Sclerotherapy as an alternative treatment for complex, refractory seromas. Journal of Surgical Case Reports, 2021(8), p.rjab224.
10. Murdaca, Giuseppe, Paola Cagnati, Rossella Gulli, Francesca Spanò, Francesco Puppo, Corradino Campisi, and Francesco Boccardo. "Current views on diagnostic approach and treatment of lymphedema." The American journal of medicine125, no. 2 (2012): 134-140.
11. Colangeli, W., Facchini, V., Kapitonov, A., Zappalà, M., Bozza, F., & Becelli, R. (2020). Cystic lymphangioma in adult: a case report and a review of the literature. Journal of Surgical Case Reports, 2020(7), rjaa179.
12. Atiyeh, Bishara, Michel Costagliola, Yves-Gerard Illouz, Saad Dibo, Elias Zgheib, and Florence Rampillon. "Functional and therapeutic indications of liposuction: personal experience and review of the literature." Annals of plastic surgery 75, no. 2 (2015): 231-245.
13. Thomas, Damon J., Ram Silfen, Morris Ritz, Andrew Greensmith, and Graeme Southwick. "Superficial parotidectomy for rhytidectomy contour refinement." Plastic and Reconstructive Surgery 124, no. 5 (2009): 255e-256e.
14. Kulungowski, A.M. and Patel, M., 2020, October. Lymphatic malformations. In seminars in pediatric surgery (Vol. 29, No. 5, p. 150971). WB Saunders.
15. Gonfiotti, A., Salvicchi, A. and Voltolini, L., 2022. Chest-wall tumors and surgical techniques: state-of-the-art and our institutional experience. Journal of Clinical Medicine, 11(19), p.5516.
16. Takahashi, Yusuke, Hitoshi Seki, and Akira Kobayashi. "Chronic expanding hematoma mimicking seroma, following a totally extraperitoneal approach for inguinal hernia: a case report." Journal of Surgical Case Reports 2021, no. 6 (2021): rjab260.
17. Kedar, D. J., Pak, C. J., Suh, H. P., & Hong, J. P. (2020, August). Propeller flaps in the posterior trunk. In Seminars in Plastic Surgery (Vol. 34, No. 03, pp. 176-183). Thieme Medical Publishers.
18. Tumbull, L. W., S. Zurrida, V. Galimberti, S. Monti, and A. Luini. "Volume contents (volume 7, 1998)."

This article may be cited as: Iftikhar IUD, Kanwal F, Tahir I, Riaz F, Rafique J, Ahmad M: A Novel Surgical Approach to Treat Lymphangioma of the Breast and Prevent Seroma. Pak J Med Health Sci, 2023; 18(1): 270-272.