Evaluating the Efficacy of Manual Lymphatic Drainage, Stretching, Conservative Exercises, and Home-Based Interventions on Quality of Life in a Patient with Axillary Web Syndrome: A Case Report

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Abstract

Background

Breast cancer is the most prevalent cancer among women, especially post-menopausal women due to decreased estrogen levels. Axillary Web Syndrome (AWS) is a common postoperative complication in women undergoing breast cancer treatment, particularly following axillary surgery. Characterized by visible or palpable cord-like subcutaneous tissue, AWS often causes pain and restricted shoulder mobility.

Case presentation:

This case report describes a 62-year-old woman who developed AWS within 20 days post-surgery, presenting with pain and reduced shoulder range of motion (ROM). During physical examination, string-like cords were observed extending from the armpit to the inner arm.

Interventions

A comprehensive rehabilitation strategy was implemented, including MLD, stretching, conservative exercises, and home-based interventions. MLD sessions focused on reducing lymphatic congestion and promoting fluid drainage. Stretching and conservative exercises targeted the pectoralis major and minor, biceps brachi, latissimus dorsi, and rotator cuff muscles. Home-based interventions included self-massage and low-intensity exercises.

Outcome

The patient experienced immediate symptom relief post-MLD session, with pain reduction from 9/10 to 0/10, increased shoulder abduction from 110^0 to 170^0, and improved shoulder flexion from 120^0 to 180^0. Muscular strength improved, and the Breast cancer-specific Quality (EORTC QLQ BR-23) score increased from 50 to 90.

Conclusion

This case demonstrates the efficacy of combining MLD, stretching, conservative exercises, and home-based interventions in managing AWS. The approach led to significant pain reduction and improved arm functionality. Although the results are promising, further research with a larger sample size is necessary to validate these findings and explore the long-term effects. This holistic approach should be considered for clinical practice in managing AWS, emphasizing patient education and self-management for sustained benefits.

Keywords:- Lymphatic Drainage, Stretching, Conservative Exercises

INTRODUCTION

Breast cancer is the most common cancer in women due to lack of estrogen in post-menopausal women, it is more commonly seen in them. Amongst women undergoing breast cancer treatment, Axillary Web Syndrome (AWS) emerges as a prevalent complication, often observed within the early postoperative period (occurring within 8 weeks) after axillary surgery. While Moskovit et al. introduced the term "axillary web syndrome," the phenomenon was initially observed and described as superficial lymphatic thrombosis by Ferrandez and Serin in 1996.[1] Axillary web syndrome (AWS) is described by the presence of visible or palpable cord-like subcutaneous tissue. It mainly emerges beneath the axilla but may extend towards the inner arm, and potentially reach down to the antecubital fossa and wrist.[2] The axillary web syndrome causes pain during shoulder abduction and flexion, resulting in a loss of functionality and restricted mobility in the affected upper limb. Breast cancer survivors are at a higher risk of developing axillary web syndrome (AWS) following breast reconstruction, with an occurrence rate of 48.8% compared to 28.1% after surgery without reconstruction.[3] Additionally, about 5.4% of patients experience pain in the same-side upper limb associated with AWS, while approximately 11.4% suffer from restricted shoulder joint movement.[4]

The most commonly accepted mechanism underlying the development of AWS involves iatrogenic damage to the lymphatic and/or venous system during breast cancer surgery. This damage leads to local stasis, hypercoagulation, and inflammation of the affected superficial vein or lymphatic vessel. Some researchers have suggested that AWS may be a variant of Mondor disease, characterized by thrombophlebitis of a subcutaneous vein. However, recent imaging studies on AWS have refuted this hypothesis of thrombophlebitis. Despite ongoing research, the precise etiology and pathophysiology of AWS remain unknown.[5]

Numerous case reports suggest a range of interventions including patient education, active shoulder exercises, therapeutic massage with passive shoulder movements,[6] fascia mobilization techniques,[7] administering antiphlogistic medication alongside physical therapy,[8] applying moist heat to the axilla[9] and inner arm along with arm exercises, and utilizing shoulder exercises with cohesive bandaging. Manual lymphatic drainage (MLD) is a specialized massage technique designed to stimulate the lymphatic system, facilitating the removal of excess fluid and metabolic waste products, thereby reducing edema and promoting tissue healing. MLD has been shown to effectively alleviate symptoms and improve lymphatic flow in patients with AWS, leading to an enhanced range of motion and reduced pain. The purpose of this study was to enhance the Quality of Life in Axillary Web Syndrome Patients through Manual Lymphatic Drainage, Stretching, and Home-Based Exercise Interventions.

CASE PRESENTATION:

A 62-year-old female healthy woman was diagnosed with left modified radical mastectomy with removal of six axillary lymph nodes on the non-dominant side. Within 20 days of surgery, she presented with AWS extending distally down the upper extremity and proximally through the breast and trunk wall. She conveyed discomfort when elevating her left shoulder and described experiencing pain ranging from her left armpit to the inner region of her arm.

During the physical examination, string-like cords were observed and felt, stretching from the armpit to the inner arm when the shoulder was raised on the

same side. The patient reported intense pain while moving her left shoulder away from her body and her Shoulder range of motion decreased from 180° to 110°, as assessed using a goniometer. No signs of inflammation such as redness, warmth, or any other erythema-related indications were noted in the patient. Using the Visual Analogue Scale, she rated her pain as 9 out of 10. Throughout the follow-up period, the patient experienced numbness and tightness. She was observed to be in good health during the physical examination, exhibiting a body mass index (BMI) of 29.5 kg/m2. Upon inspection, a 12 cm subcutaneous band or cord was observed extending from the left armpit to the inner side of the left arm. This study adheres to the CARE guidelines for reporting. The patient provided written informed consent for the publication of clinical data and relevant images about this case report.

CLINICAL IMPRESSION:

Based on the examination results, a physical therapy diagnosis of left axillary web syndrome (AWS) was indicated. AWS resulted in a restricted range of motion in shoulder abduction and flexion, impairing the capacity to reach and lift objects.

INTERVENTIONS:

Sr. No.	Phase	Goals	Treatment	Dosage
1.	**Phase 1** (0-1 week)	• Reduce pain and discomfort	• Hot fermentation for pain relief and relaxation [9]	• 2-3 sessions throughout the week
		• Improve range of motion	• Included a 10-minute warm-up and cool-down period.[6]	
			• Investigating stretching regimens aimed at the pectoralis major and minor, biceps brachii, triceps brachii, latissimus dorsi, and rotator cuff muscles.[4]	• at least once daily, either before or after performing a self-lymph massage.
			• Active shoulder exercises[1]	• 1 to 3 sets of 5 to 10 repetitions, 1 to 3 times per day
		• Promote lymphatic drainage	• Utilizing specific thumb Manual Lymphatic Drainage (MLD) techniques, applying resorption strokes on the taut cords to progressively enhance their flexibility. 1) Mainly on the axilla and medial aspect of the arm, progressing from the proximal to the distal third of the arm. 2) Specific thumb Manual Lymphatic Drainage (MLD) on the taut cords according to their characteristics and size from the axilla to the forearm. 3) On the axilla and proximal third of the arm.[1]	• 20 to 30 minutes [1]

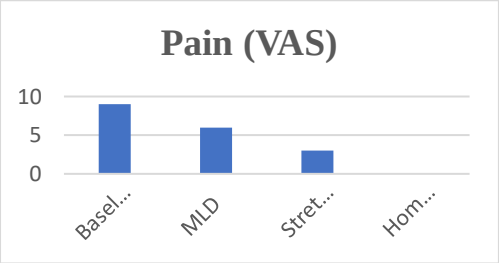
2.	**Phase 2** (2-3weeks)	• Enhance strength and stability	• Shoulder flexors, shoulder abductors, elbow flexors strengthening exercise.[10]	• 3 sets of 10 repetitions using TheraBand (6-8 on OMNI resistance)[10]
			• Active proprioceptive Neuromuscular Facilitation exercises. (Diagonal symmetrical bilateral patterns and asymmetrical reciprocal patterns.) [1]	• 3 sets of 10 repetitions using TheraBand
3.	**Phase 3** (3-4 weeks)	Enhance Flexibility and Functional Use	• Butterfly wings	• 10 repetitions/5 sec hold/1 set/ 2times a day
			• Child pose	• 10 repetitions/1 set/ 2 times a day
			• Seated ball pushes forward	• 10 repetitions/1 set
4.	**Phase 4**	Home-based exercises	• Self-tissue stretching[11]	• At least once a day
			• Stretching exercise (corner stretch, Chest stretch, T and Y stretch)[11]	• Repeated gentle movements toward the end range, holding for a few minutes at the pain-free limit.
			• Aqua lymphatic therapy exercise (Performing breaststroke-type arm movements)[11]	• 15 minutes (Twice a week)

RESULTS

Outcome measures	**baseline**	**MLD**	**Stretching and conservative exercise**	**Home-based interventions**
Pain (VAS)	9/10	6/10	3/10	0/10
Range of motion	110^0 shoulder abduction	120^0 shoulder abduction	150^0 shoulder abduction	170^0 shoulder abduction
	120^0 shoulder flexion	140^0 shoulder flexion	165^0 shoulder flexion	180^0 shoulder flexion
Muscular strength	2	3	3	4
Breast Cancer-Specific Quality of Life (EORTC QLQ-BR23 score)	50	60	80	90

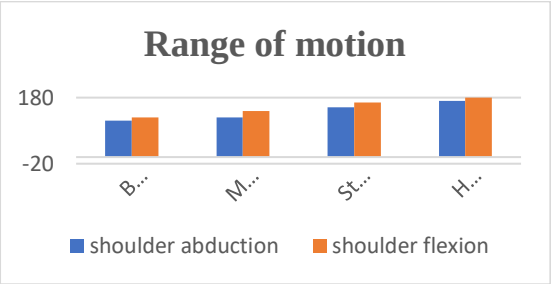
As shown in Graph 1, at baseline, the patient reported a pain level of 9/10 on the Visual Analog Scale (VAS). After Manual Lymphatic Drainage (MLD), the pain level decreased to 6/10. Further reduction in pain was observed with stretching and conservative exercise, bringing the pain level down to 3/10. Ultimately, with home-based interventions, the patient's pain level was reduced to 0/10.

Graph no 1: Visual Analogue Scale



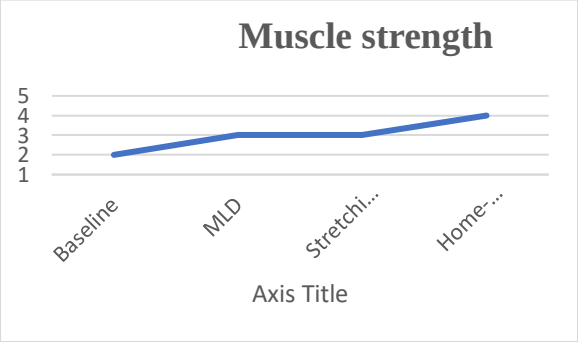
The range of motion in shoulder abduction (Graph 2) initially measured 110 degrees. Post-MLD, shoulder abduction increased to 120 degrees, further improved to 150 degrees with stretching and conservative exercise, and reached 170 degrees with home-based interventions. Similarly, shoulder flexion showed progressive improvement: starting at 120 degrees at baseline, increasing to 140 degrees after MLD, 165 degrees following stretching and conservative exercise, and achieving a full range of motion at 180 degrees with home-based interventions.

Graph no 2: Range of motion



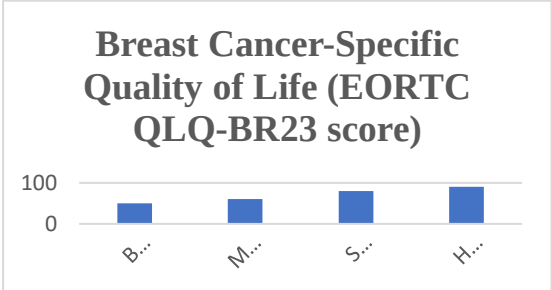
Muscular strength, as detailed in Graph 3, was initially graded at 2. Following MLD, it improved to 3 and remained at 3 with stretching and conservative exercise. With home-based interventions, muscular strength further improved to 4.

Graph no 3: Muscle strength



The patient's quality of life, assessed using the EORTC QLQ-BR23 score (Graph 4), improved significantly throughout the interventions. The baseline score of 50 increased to 60 after MLD, then to 80 with stretching and conservative exercise, and finally reached 90 following home-based interventions.

Graph no 4: Breast Cancer-Specific Quality of Life



DISCUSSION:

This case report demonstrates the positive outcomes of a comprehensive rehabilitation strategy, including manual lymphatic drainage, stretching, conservative exercises, and home-based interventions, in enhancing the quality of life for a patient with Axillary Web Syndrome.

The patient reported immediate relief in symptoms post-MLD sessions, including reduced pain and tension in the affected area. This finding is consistent with recent studies that highlight the benefits of MLD in alleviating lymphedema and associated symptoms in breast cancer patients. MLD was observed to have a significant impact on reducing lymphatic congestion and promoting fluid drainage, which are critical in managing AWS For instance, a study by Ridner et al. (2022) demonstrated that MLD effectively reduced lymphedema volume and improved QoL in breast cancer survivors with AWS.[12]

Stretching and conservative exercises were crucial in restoring the ROM and reducing the web-like structure characteristics of AWS. These exercises likely contributed to breaking down the fibrotic cords and enhancing tissue elasticity. A systematic review by Dayes et al. (2021) concluded that regular stretching and targeted exercises significantly improve shoulder ROM and reduce pain in patients with AWS.[13]

Home-based interventions, including prescribed self-massage, regular stretching, and low-intensity exercises, were integral to the patient's rehabilitation program. The patient's active participation and adherence to the home-based protocol were instrumental in maintaining the benefits achieved during clinical sessions. For instance, a study by Tamar Jacob et al. (2018) highlighted the effectiveness of home-based exercise programs in maintaining arm function and reducing AWS symptoms.[11]

The holistic approach combining MLD, stretching, conservative exercise, and home-based interventions led to significant enhancement in the patient's QoL. The reduction in pain and increase in arm functionality allowed the patient to resume daily activities with greater ease and confidence. A recent study by de Groef et al. (2024) emphasized that comprehensive rehabilitation, including physical therapy and home exercise, significantly improves QoL in breast cancer patients with AWS.[14]

LIMITATIONS AND FUTURE DIRECTIONS

While the results of this case report are promising, several limitations must be acknowledged. The findings are based on a single patient's experience, which limits the generalizability of the results. Future research should include larger sample sizes and diverse patient populations to validate these findings. Additionally, the long-term effects of the combined interventions on AWS need further exploration. Randomized controlled trials comparing the efficacy of different therapeutic combinations could provide more robust evidence for clinical practice.

CONCLUSION

This case report underscores the efficacy of a comprehensive approach involving MLD, stretching, conservative exercises, and home-based interventions in improving the QoL of patients with AWS. The positive outcomes observed highlight the potential of these interventions to alleviate symptoms, restore functions, and enhance overall well-being. Clinicians should consider incorporating these strategies into their therapeutic arsenal for managing AWS, with an emphasis on patient education and self-management to sustain long-term benefits.

CLINICAL MESSAGE

Clinical Implications: Understanding how manual lymphatic drainage, stretching, exercises, and home-based treatments impact axillary web syndrome helps healthcare providers tailor more effective treatment plans for patients.

Preventive Measures: This study's findings can inform individuals about the benefits of these treatments, empowering them to manage symptoms and potentially prevent the recurrence of axillary web syndrome.

Research Direction: The study contributes to existing knowledge and may inspire further research to explore these interventions' effectiveness in larger patient groups or to investigate additional treatment options.

Educational Value: For students and researchers in physiotherapy and related fields, this case study serves as a practical example of effective treatment strategies for axillary web syndrome, emphasizing evidence-based practice in patient care.

AUTHOR CONTRIBUTIONS

All authors have made substantial contributions to the sections below:

1. Conception and design of the study.
2. Data analysis and interpretation.
3. Final approval of the version to be submitted.

Specifics:

- **AK and SV:** Conception and design, interpretation of data, manuscript preparation.
- **NN and SD:** Data collection and analysis.
- **ST, MB, SH:** Statistical expertise.
- **SV, PT, SZ:** Critical article revision for important intellectual content.

All authors read and approved the final manuscript. The primary authors, Ayushi Kshatriya, and Sonali Vispute take responsibility for the integrity of the work from inception to the finished article.

CONFLICTS OF INTERESTS-

The authors declare no potential conflicts of interest concerning the research, authorship, and/or publication of this study.

COMPETING INTEREST STATEMENT

The authors certify that the grant sponsor is not involved in study design, collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

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