Case Study

Lower Limb Lymphedema Successfully Treated with Flap Monitoring – A Case Report

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Abstract

Background: Lymphedema is a chronic, progressive pathologic condition of the lymphatic system with interstitial accumulation of protein-rich fluid and inflammation, adipose tissue hypertrophy and fibrosis. Protein-rich lymph initiates inflammatory response and increase susceptibility to infections, which can lead to disfigurement or dermal changes.

Case Report: A 42-year-old lady was referred to a tertiary care hospital for chronic lymphedema of the left lower limb. She has been having this ailment for the past 20 years, she has a history of traumatic injury of left ankle and the swelling gradually increase in size over the years and developed pulmonary embolism a few years ago. Flap monitoring was done on this patient frequently. During the stay, vacuum assisted closure (VAC) dressing was applied after free muscle coverage of the lower extremity.

The patient was given health education on skin care to improve hydration and lower the risk of infection by applying moisturizing emollient to soothe and support the skin.

Keywords: Lymphedema, flap care, vacuum assisted closure

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Introduction

Lymphedema is a chronic, progressive pathologic condition of the lymphatic system with interstitial accumulation of protein-rich fluid and inflammation, adipose tissue hypertrophy and fibrosis. Lymphedema affects up to 250 million people worldwide. [1] This condition can lead to disfigurement as well as decreased mobility and quality of life. Even though lymphedema has been seen as refractory or incurable for centuries, more attention is being given recently in the area of lymphedema pathophysiology, as well as diagnostic and therapeutic tools due to its clinical complication of malignancy treatment. [2] Treatment aims to reduce the swelling and its associated sequelae and improve quality of life. Various treatment modalities exist, ranging from compression garments, exercise, skin care and manual lymphatic drainage to surgical interventions.

Case report

Ms C, a 42-year-old lady was referred to a tertiary care hospital for chronic lymphedema of the left lower limb **[Figure-1]** She has been having this ailment for the past 20 years. Ms C was tested for Filariasis to rule out Lymphatic filariasis, and the result was negative. She had

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Figure–1 Front view and back view of lower limb lymphedema

history of traumatic injury of left ankle and the swelling gradually increase in size over the years. Lymphedema can have major psychosocial effect as the patient had reduced mobility, discomfort and altered body image. Ms C also has asthma since childhood and developed pulmonary embolism few years ago. She was treated in critical unit and was prescribed long term anticoagulant.

She underwent below-knee Charles procedure (debulking surgery and split skin graft) **[Figure 2].**

Treatment and care:

Effective lymphedema management needs appropriate skin care and prevention of infection as these are the important cornerstones for patient comfort. It also requires skillful and qualified healthcare professionals involved in direct patient care. Free flap post-operative monitoring is an essential component for patients undergoing reconstructive surgery and it remains a gold standard for post-operation evaluation. It consists of any combination of assessments of flap skin color, surface temperature, capillary refill time, sensation, pulse, edema, blister, hematoma, sign of bleeding and limb movement. The frequency of clinical monitoring post-operative is commonly done every 1-2 hourly for the first 24 hours followed by 2-4 hourly for the next subsequent days. Early recognition of neurovascular assessment and prompt intervention improve the chances for flap salvage. Nurses play a critical role in the management of post-operative care by continuous vital sign and flap monitoring as early detection of any signs of deterioration can result in successful intervention and salvage of the flap.

Figure–2 Debulking surgery and split skin graft

Figure–3 Healthy and granulating wound after dressing

Post-Operative Flap Care:

Post-Operative Flap care is essential for the healthcare professionals to intervene early as the flap needs to be systematically well perfused as it is a prerequisite for good perfusion of the flap. In this case, the neurovascular assessment and flap monitoring were performed by the nurses frequently to ensure good outcome of the flap and recovery of the wound. **[Figure-3]**

Post-operatively, the patient was managed in intensive care for a few days and then transferred to general surgery ward for continuous care. During the stay, vacuum assisted closure (VAC) dressing was applied after free muscle coverage of the lower extremity [**Figure – 4].**

Figure–4 VAC dressing

The VAC dressing is known to optimize blood flow, decrease local tissue edema and remove excess fluid from the wound bed. [3] In this way, the free muscle flap does not increase in its thickness postoperatively, preventing the swelling normally seen following microsurgical transfer to the lower extremity. Another advantage of the VAC dressing is that it regularly irrigates the flap to prevent desiccation. The VAC dressing also has been shown to assist in the survival of skin grafts over the free muscle flap. [4] Blood pressure should be checked regularly because it can impede arterial inflow or venous outflow. The anatomic site of the flap also needs to be monitored to prevent any unnecessary pressure over the site. In this case surgical dressings were examined to ensure it was not tight, especially the circumferential bandages. The involved limb was elevated to control edema to prevent any accumulation of fluid that can cause more pressure on the microvascular. Ms C was taught how to restrict movements, especially weight bearing and motions, to avoid tension on the flap.

Monitoring:

- Capillary refill assessment is a method to observe the return of blood flow to the affected area and it is described in terms of timing (usually 2-3 seconds) or whether brisk or delayed. Delayed capillary refill indicates slow arterial inflow and brisk refills indicates venous outflow problem which may cause flap tissue to become engorged.
- The color of the flap should be monitored; pink color indicates good blood flow. A purplish flap indicates accumulation of venous blood flow. This can be challenging, generally among Asian and specifically among the Indian patients with darker pigmentation.
- Body temperature is another clinical parameter to be monitored closely to ensure good perfusion to the affected area, either using a thermometer or by physical examination.
- Skin turgor is a parameter used to identify the balance between vascular inflow and outflow. It is important to compare the turgor of the affected area with adjacent sites as systemic blood flow can alter the turgor.
- Intake and output monitoring is to ensure adequate intravascular volume and replacement volume for good perfusion.
- Nutrition has to be prioritized for wound recovery as it provides the foundation for recovery after surgery, and opportunities to optimize outcomes exist from the first patient assessment to the early days after surgery.
- In this case, Ms C was advised for a high protein diet and oral supplement as her intake was inadequate. Her estimated intake was 1000 kcal/day in which the energy requirement was 1600-1800 kcal/day.
- Vital sign assessment and flap monitoring were done every 2 hours by the nurses and reported immediately to the surgeon for early intervention because patients may be relatively hypotensive postoperatively after opioid usage and other medications.

- Wound assessment was cleaned every shift with acetic acid and hydrogen peroxide cover upper third and lower third aspect of leg and secured with bandage, showing healthy granulation and pink in color, hemoserous with moderate exudate was seen.

Health education:

The aim of Ms C's care was to educate her on her condition, to support self-care by minimizing risk factors and to facilitate long term management. The long-term management focused on the functioning of the lymphatic system by limiting further deterioration of swelling through skin care, compression therapy, movement, and exercise. Ms C was given health education on skin care to improve hydration and lower the risk of infection by applying moisturizing emollient to soothe and support the skin.

The final common path of lower limb lymphedema approaches regardless of conservative or surgical treatment, is the use of compression stockings. [5] **[Figure-5]**. After achieving a steady progress, by reducing the excess edema volume, compression stockings need to be worn continuously with treatment and renewed based on the clinical assessments. A few weeks after surgery, measurements were taken on the patient to assess her readiness to use below knee compression stockings. Bandage was maintained until the knee compression stockings were applied.

Ms C was encouraged to exercise including diaphragmatic breathing exercises using incentive spirometry to enhance lymph and venous flow. She was also taught by physiotherapist on the simple range of movement while sitting and motivation on self-management regimens.

Figure–5 Compression stocking (Copyright 2020. Mayo Clinic)

Conclusion

This case report provides a lifelong learning curve for the healthcare professionals in providing holistic care of lower limb lymphedema. Lymphedema remains unrecognized especially when it is not malignant. It requires a multidisciplinary approach with comprehensive medical therapy to identify and treat the risk factors. Since it is a chronic condition, the patient and family need to be educated and supported for long-term management on self-care strategies to control the swelling and progression.

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Authors' Contributions: **KK, HAS, KC** conceived the case study, concepts, design, draft article, reviewed and revised the full case study article.

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References

1. Rockson SG, Rivera KK. Estimating the population burden of lymphedema. Annals of the New York Academy of Sciences 2008;1131(1):147-154. **DOI:** https://doi.org/10.1196/annals.1413.014
2. Warren AG, Brorson H, Borud LJ, Slavin SA. Lymphedema: a comprehensive review. Ann Plast Surg 2007;59(4):464-472. **DOI:** https://doi.org/10.1097/01.sap.0000257149.42922.7e **PMID:** 17901744
3. Venturi ML, Attinger CE, Mesbahi AN, Hess CL, Graw KS. Mechanisms and clinical applications of the vacuum-assisted closure (VAC) device: a review. American Journal of Clinical Dermatology 2005;6(3):185-94. **DOI:** https://doi.org/10.2165/00128071-200506030-00005 **PMID:** 15943495
4. Lambert KV, Hayes P, McCarthy M. Vacuum assisted closure: a review of development and current applications. Eur J of Vasc Endovasc Surg 2005;29(3):219-226. **DOI:** https://doi.org/10.1016/j.ejvs.2004.12.017 **PMID:** 15694791
5. McGrath A. The management of a patient with chronic oedema: a case study. Br J Community Nurs 2013;18(4 Suppl):S12-9. **DOI:** https://doi.org/10.12968/bjcn.2013.18.Sup4.S12 **PMID:** 23752211