



(CASE REPORT)



SECONDARY LYMPHEDEMA OF THE LOWER LIMB: A CASE REPORT

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ABSTRACT

Secondary lymphedema is a chronic condition resulting from acquired damage to the lymphatic system, leading to impaired lymphatic drainage and progressive interstitial fluid accumulation. Poorly controlled diabetes represents a significant predisposing factor, contributing to the development and progression of lymphedema through microvascular dysfunction, recurrent skin infections, delayed wound healing, and chronic inflammation. We report on the case of a patient with poorly followed diabetes for eight years who developed secondary lymphedema of the lower limb. This case highlights the diagnostic challenges related to the coexistence of diabetic complications, as well as the therapeutic difficulties encountered in the context of long-standing glycemic imbalance. Early and multidisciplinary management of diabetes is essential to prevent the onset and progression of secondary lymphedema.

Keywords: Lymphedema; Diabetes Mellitus; Microvascular Complications; Lower Extremity; Chronic Inflammation.

1 INTRODUCTION

Secondary lymphedema of the lower limb is a chronic and debilitating condition resulting from an acquired alteration of the lymphatic system, leading to insufficient lymphatic drainage and progressive accumulation of interstitial fluid. In poorly controlled diabetic patients, several mechanisms promote its onset and progression: microangiopathy, local immunosuppression, repeated skin infections and chronic inflammation.

For the plastic surgeon, advanced lymphoedema can pose significant functional and aesthetic problems, sometimes requiring surgical intervention (debulking, liposuction or lymphatic reconstruction). This article reports the case of a diabetic patient who had not been properly monitored for eight years and developed secondary lymphedema of the lower limb, highlighting the diagnostic and therapeutic challenges encountered in this context.

2 CASE PRESENTATION

We report the case of a 48-year-old female patient with a history of type 2 diabetes mellitus for several years, treated with oral antidiabetic medications, but with irregular follow-up and repeated episodes of glycemic imbalance.

Over approximately eight years, the patient developed chronic lymphedema of the left lower limb, gradually progressing to elephantiasis. The condition was characterized by a massive increase in leg volume, marked skin thickening with a pachydermic appearance, deep skin folds, and recurrent episodes of erysipelas according to the patient's history. This pathology caused significant functional impairment, limiting ambulation, and had a profound psychological and social impact, adversely affecting the patient's quality of life.

Given the severe progression of the lymphedema, the patient underwent a debulking surgical procedure two years ago, aimed at reducing the excess skin and subcutaneous tissue of the leg. The surgery was associated with a skin graft to cover tissue defects. The immediate postoperative course was marked by gradual healing, requiring prolonged local wound care and close monitoring of diabetes to minimize the risk of complications.

The patient is currently being monitored in specialist consultations for:

- Monitoring of potential complications, including recurrent infections, trophic disturbances, or recurrence of lymphedema,
- Assessment of the cutaneous and functional status of the operated limb,
- Optimization of metabolic management (blood glucose and HbA1c) and lymphatic care (compression therapy, manual lymphatic drainage, physiotherapy).

2.1 Surgical management

The patient was placed in the supine position under general anesthesia. The affected leg was carefully prepared and draped in a sterile fashion.



Figure 1: Pre-operative appearance of right lower limb elephantiasis showing marked enlargement with thickened, deformed skin.



Figure 2: Intra-operative view of volume reduction surgery with excision of lympho-fibrotic tissue and exposure of deeper



Figure 3: Excised lympho-fibrotic tissue following debulking surgery of the right lower limb.

Preoperative markings were made to delineate the excess cutaneous and subcutaneous tissue to be excised. A *debulking* procedure was performed to reduce the volume of hypertrophic tissue while preserving important neurovascular structures.

After excision, the recipient bed was carefully prepared to receive the skin graft. A split-thickness skin graft was harvested from the donor site (e.g., the thigh) and applied to the denuded area, then secured with interrupted sutures.

The sutures were placed without tension, and a compressive dressing was applied to ensure graft take and minimize postoperative edema.



Figure 4: Immediate post-reduction result after excision and cutaneous closure, demonstrating significant decrease in limb volume.



Figure 5: Late postoperative appearance of the right lower limb showing improved contour and skin condition



Figure 6: Plantar and distal view of the right foot demonstrating resolution of massive edema and restoration of limb anatomy.

3 DISCUSSION

Lymphedema is a chronic disorder resulting from impaired lymphatic drainage, leading to interstitial fluid accumulation, chronic inflammation, and progressive tissue remodeling. It is generally classified into primary and secondary forms. Primary lymphedema arises from congenital or genetic malformations of the lymphatic system and can be further subclassified according to the International Society of Lymphology (ISL) staging:

- Stage 0 (latent): subclinical lymphatic dysfunction without visible swelling;
- Stage I: early edema that is pitting and may reduce with limb elevation;
- Stage II: non-pitting edema with fibrotic changes, less responsive to elevation;
- Stage III (lymphostatic elephantiasis): severe swelling with skin thickening, papillomatosis, and irreversible deformity [1]

Secondary lymphedema results from acquired lymphatic injury. The most frequent causes include oncologic treatments, particularly axillary lymph node dissection and radiotherapy for breast cancer, with reported incidences between 5% and 20% depending on patient population and assessment methods [2]. Worldwide, lymphatic filariasis remains the leading cause of secondary lymphedema in endemic tropical regions due to chronic lymphatic obstruction by filarial parasites [3]. Other causes include trauma (fractures, burns, or direct lymphatic injury), recurrent bacterial infections such as cellulitis, and chronic venous insufficiency or thrombosis, which overload the lymphatic system and impair drainage [4,5]. Obesity and prolonged immobility have also been recognized as contributing factors [4].

Pathophysiologically, lymphedema extends beyond simple fluid accumulation; it involves chronic inflammation, adipose tissue hypertrophy, and fibrosis, with alterations in local immune cell populations. Histopathologic studies demonstrate hypertrophied adipose lobules, thick collagen fibers, excess interstitial fluid, and impaired tissue remodeling, explaining the progressive and often irreversible nature of the disease [6]. These structural changes contribute to recurrent infections, pain, functional impairment, and decreased quality of life [7].

In the context of plastic and reconstructive surgery, understanding the etiology and pathophysiology of lymphedema is critical for tailoring management. Conservative treatment—manual lymphatic drainage, compression therapy, exercise, and meticulous skin care—remains the first-line approach. However, surgical interventions are indicated in selected cases depending on lymphedema stage and severity. Physiologic procedures, including lymphaticovenous anastomosis (LVA) and vascularized lymph node transfer (VLNT), aim to restore functional lymphatic drainage, particularly in early

to moderate secondary lymphedema. In chronic cases with significant fibrofatty deposition, excisional procedures such as liposuction or dermolipectomy may be employed to improve limb contour and function [8].

Integration of surgical management requires multidisciplinary coordination, especially in patients with comorbidities like diabetes or recurrent infections, to optimize outcomes, minimize complications, and maintain long-term benefits. Postoperative care with continued compression and physiotherapy is essential to prevent recurrence and sustain functional improvement [8].

4 CONCLUSION

Lymphedema is a chronic, progressive condition that may complicate diabetes or arise from other secondary causes such as surgery, infection, or venous insufficiency. Early recognition and staging are essential to guide management and prevent irreversible tissue changes. Conservative therapy remains the first-line approach, but plastic surgical interventions—physiologic (lymphaticovenous anastomosis, vascularized lymph node transfer) or excisional (liposuction, dermolipectomy)—are indicated in chronic or refractory cases to restore function and improve limb contour.

Clinical note: In patients with poorly controlled diabetes, optimizing glycemic control preoperatively, careful lymphatic imaging, and structured postoperative care including compression and physiotherapy are crucial to minimize complications and maximize surgical outcomes. Early referral to plastic surgery can limit disease progression, reduce infection risk, and improve quality of life.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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