

Elephantiasis nostras verrucosa

Swelling with verrucose appearance of lower limbs

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Elephantiasis nostras verrucosa (ENV) is a rare form of chronic lymphedema that causes progressive cutaneous hypertrophy. It can lead to severe disfiguration of body parts with gravity-dependent blood flow, especially the lower extremities. Various factors can cause obstruction of the lymphatic system and result in ENV. Clinically, ENV is characterized by nonpitting edema and superimposed hyperkeratotic papulonodules with a verrucose or cobblestone-like appearance. (Early-stage lesions might exhibit pitting edema; late-stage lesions exhibit nonpitting edema.) It needs to be differentiated from pretibial myxedema, filariasis, lipedema, chromoblastomycosis, lipodermatosclerosis, and venous stasis dermatitis (**Table 1**).¹⁻⁵

Table 1. Differential diagnosis of elephantiasis nostras verrucosa

DIAGNOSIS	CLINICAL FEATURES
Venous stasis dermatitis	Pitting edema, erythematous to brownish pruritic patches with dilated superficial veins over the medial lower leg ¹⁻³
Lipedema	Early age of onset; positive family history; typically affects overweight women; abnormal accumulation of subcutaneous fat in lower limbs and buttocks; always symmetric and bilateral; feet not affected ^{1,4,5}
Lipodermatosclerosis	Related to venous stasis, hyperpigmentation, and nonpitting edema with subcutaneous fibrosis. Characteristic "inverted wine bottle" appearance: swelling of proximal parts and fibrosis of the distal parts of the lower limbs ^{1,4}
Pretibial myxedema	Caused by hyperthyroidism. Mucin accumulation of the dermis resulting in nonpitting edematous papulonodules or plaques over anterior surface of the legs and dorsal aspect of the feet ^{1,4}
Filariasis	Infection by the parasite <i>Wuchereria bancrofti</i> . History of travel to an endemic tropical area. Obstruction of lymphatic ducts causes secondary bacterial infection. Localized lymphedema in the lower legs and genitals ^{1,4}
Chromoblastomycosis	Chronic fungal infection; fungus is commonly found in soil. Infection through minor trauma of skin. Verrucose papulonodules and plaques. Cultures are positive for fungus ⁴

Data from Baird et al,¹ Yang et al,² Guarneri and Vaccaro,³ Sisto and Khachemoune,⁴ and Kerchner et al.⁵

It is important for family physicians to recognize the underlying conditions, clinical presentation, and differential diagnosis of ENV, and to be familiar with its treatment. Therefore, we present a case of ENV in a 74-year-old man who had congestive heart failure, diabetic nephropathy, and obesity.

Case

A 74-year-old man presented to the outpatient department with progressive swelling and numerous protruding masses bilaterally on the lower limbs, which he had had for the past year. He also complained of worsening dyspnea on exertion. His medical history was relevant for congestive heart failure, type 2 diabetes mellitus with nephropathy, and morbid obesity (body mass index 40.4 kg/m²). His surgical, travel, and family histories were unremarkable.

On physical examination, his lower extremities showed pitting edema; lichenification; indurated, cobblestone-like papulonodules; and plaques (**Figure 1**). Kaposi-Stemmer sign (ie, the inability to pinch the dorsal aspect of the skin at the base of the second toe) was present (**Figure 2**).

EDITOR'S KEY POINTS

- Elephantiasis nostras verrucosa (ENV) is a rare form of chronic lymphedema and can be mistaken for other diseases, such as venous stasis dermatitis, filariasis, lipedema, chromoblastomycosis, lipodermatosclerosis, and pretibial myxedema. Several factors, including neoplasms, trauma, radiation treatment, congestive heart failure, obesity, hypothyroidism, chronic venous stasis, and filarial infection can cause secondary lymphedema.

- Nonpitting edema and superimposed verrucose, cobblestone-like nodules on body parts with gravity-dependent blood flow are characteristic of ENV. Protein-rich fluid accumulation and recurrent infection cause ENV, resulting in a vicious cycle.

- Early diagnosis and treatment can reduce the morbidity and mortality of ENV.

POINTS DE REPÈRE DU RÉDACTEUR

- L'éléphantiasis nostras verrucosa (ENV) est une forme rare de lymphœdème et peut être confondu avec d'autres maladies comme la dermatite de la stase veineuse, la filariose, le lipœdème, la chromoblastomycose, la lipodermatosclérose et le myxœdème pré tibial. Divers facteurs, y compris les tumeurs, les traumatismes, la radiothérapie, l'insuffisance cardiaque congestive, l'obésité, l'hypothyroïdie, la stase veineuse chronique et l'infection filarienne, peuvent causer un lymphœdème secondaire.

- Parmi les caractéristiques de l'ENV figurent un œdème ne prenant pas le godet et des nodules verruqueux superposés ressemblant à des pierres sur les parties du corps où la circulation sanguine est influencée par la gravité. L'accumulation de liquides riches en protéines et l'infection récurrente causent l'ENV, entraînant un cercle vicieux.

- Le diagnostic et le traitement précoces peuvent réduire la morbidité et la mortalité de l'ENV.

Case Report

Laboratory evaluation of the patient's samples revealed normal results for the complete blood count and liver function tests. Thyroid function and C-reactive protein levels were found to be in the normal range. Abnormal laboratory results included a blood urea nitrogen level of 17.493 mmol/L (normal range 1.8 to 7.2 mmol/L) and a creatinine level of 221 µmol/L (normal range 50 to 110 µmol/L). Doppler sonography of the deep veins bilaterally in the lower limbs revealed partial thrombi bilaterally in the common femoral vein and in the right deep femoral vein. Magnetic resonance imaging revealed generalized swelling in the subcutaneous layer and lymphedema of the bilateral lower legs

Figure 1. Elephantiasis nostras verrucosa: A) *Verrucose, cobblestone-like papulonodules and plaques bilaterally over the lower legs.* B) *Detailed view of papulonodules and plaques on the right lower limb of the patient.*

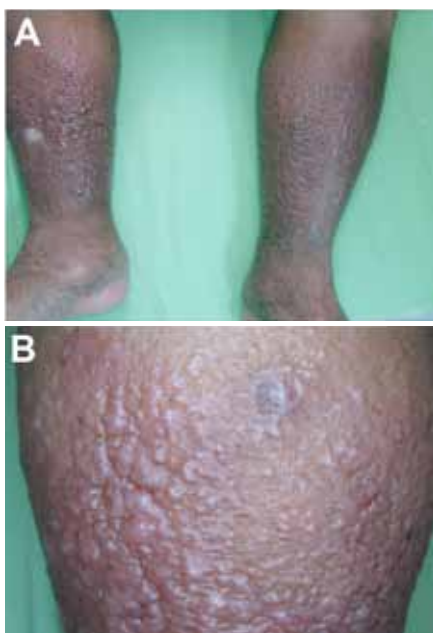


Figure 2. Kaposi-Stemmer sign



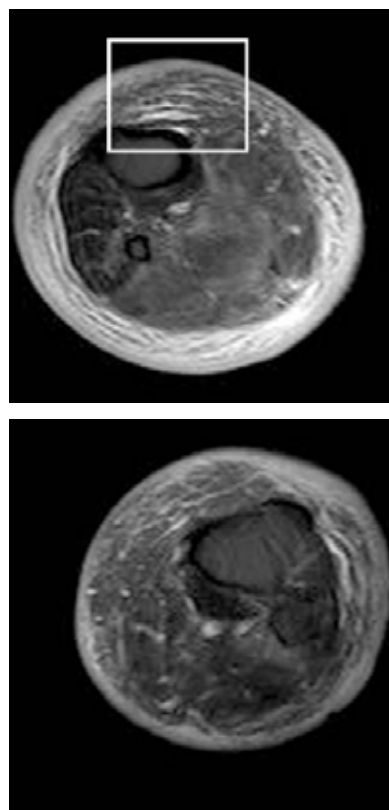
(**Figure 3**). Based on these clinical and imaging findings, the final diagnosis was ENV.

The patient received intravenous furosemide and heparin to control edema and deep vein thrombosis. In addition, we also encouraged him to increase ambulation, elevate his legs, and reduce his body weight. However, his condition did not substantially improve owing to poor compliance. We consulted a general surgeon to manage the deep vein thrombosis, but the patient refused any intervention. His general condition became worse and he was intubated and followed in the intensive care unit owing to respiratory failure. He died 5 days later.

Discussion

Elephantiasis nostras verrucosa is an exaggerated form of secondary nonfilarial lymphedema. The term *elephantiasis* is used to describe a body part that becomes enlarged and disfigured due to edema and fibrosis of the skin. Several conditions that block lymphatic drainage can induce lymphedema, including neoplasms, trauma, radiation treatment, congestive heart failure,¹ obesity, hypothyroidism,⁶ chronic venous stasis,² and filarial infection.

Figure 3. Magnetic resonance imaging of lower limb lymphedema: *Note the thickening of the skin and honeycomb appearance of the subcutaneous tissue (box).*



The pathogenesis of ENV is still unclear. It is conceivable that first the lymphatic channels are damaged and blocked due to one or more of the above-mentioned conditions, and excessive protein-rich fluid accumulates in the dermis and subcutaneous tissues. Second, the protein-rich fluid decreases oxygen tension and might decrease the immunity of the skin. Third, poor immunity increases the skin's susceptibility to infection by microorganisms. Finally, there is swelling, fibrosis, and disfigurement of the affected areas.⁴ Hence, a vicious cycle begins, as the underlying conditions predispose the skin to microbial infections.

Elephantiasis nostras verrucosa is commonly observed in gravity-dependent parts of the body, especially in the lower extremities. In addition, other sites including the upper extremities, abdomen, buttocks, face, or scrotum might be involved.⁷⁻⁹ Elephantiasis nostras verrucosa usually begins at the dorsal aspect of the foot and then progresses to the proximal parts of the limbs. In the beginning, the lesion presents as mild and persistent pitting edema. Later, the affected area loses its elasticity and eventually has a hypertrophic, verrucose, cobblestone-like appearance. During the physical examination, observation of the Kaposi-Stemmer sign—inability to pinch the dorsal aspect of skin at the base of the second toe⁵—is characteristic of lymphedema. This phenomenon is attributed to skin thickening caused by lymphedema.

The diagnosis of ENV is mainly based on patient history, physical examination, and typical cutaneous lesions. To identify causes of secondary lymphedema, skin biopsy and imaging techniques including computed tomography, magnetic resonance imaging, lymphangiography, and lymphoscintigraphy can be necessary.

In this case, the patient denied having traveled to a tropical area, and the blood smear for microfilaria was negative. However, he presented with several medical conditions, including congestive heart failure, partial deep vein thrombosis, and morbid obesity. These conditions can cause poor venous and lymphatic circulation. In addition, the patient had had several episodes of soft tissue infection bilaterally in his lower limbs. It induced fibrosis of the soft tissue and worsened the already deteriorating lymphatic drainage.

Although the clinical presentation is distinct, other diseases such as venous stasis dermatitis, filariasis, lipedema, chromoblastomycosis, lipodermatosclerosis, and pretibial myxedema should be clearly differentiated from ENV (Table 1).¹⁻⁵

In the management of ENV, it is crucial to treat the underlying causes. Lymphostasis can be managed conservatively using medical bandages, compression stockings, and mechanical massages. Elastic bandage compression is reported to be an effective treatment.¹⁰ Diuretics and systemic antibiotics might be needed to reduce edema and control infection. In addition, hyperkeratotic plaques can be treated with topical keratolytics

or systemic retinoids.¹ Owing to the teratogenicity of systemic retinoids, it is important to provide contraception to female patients before treatment. Patients should also receive careful monitoring of serum lipids and liver function. Surgical intervention can be considered in recalcitrant cases when the response to medical treatment is poor.¹¹ However, unsatisfactory outcomes are common in the management of advanced stages of ENV.

The expected survival for a patient with ENV is based on the severity of lymphedema, underlying diseases, and other contributing factors. Early diagnosis and early intervention in the vicious cycle will render a better outcome.

Conclusion

Different conditions can cause ENV. Determining the underlying causes and initiating treatment during the early stage can improve the expected survival. History taking and physical examination are sufficient to diagnose ENV. Laboratory tests and imaging studies will provide more information and assist physicians in differentiating ENV from other diseases.

The goal of treating ENV is to stop the vicious cycle. Physicians must investigate the underlying causes of lymphatic obstruction and prevent complications associated with lymphedema. Minimizing the swelling and restoring functionality of the affected limb are also very important to relieve the stress of patients.⁵ Family physicians should recognize this unusual condition in its initial stage to prevent deformities and impairment of the involved limb. 🌸

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Competing interests

None declared

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References

- Baird D, Bode D, Akers T, Deyoung Z. Elephantiasis nostras verrucosa (ENV): a complication of congestive heart failure and obesity. *J Am Board Fam Med* 2010;23(3):413-7.
- Yang YS, Ahn JJ, Haw S, Shin MK, Haw CR. A case of elephantiasis nostras verrucosa. *Ann Dermatol* 2009;21(3):326-9. Epub 2009 Aug 31.
- Guarneri C, Vaccaro M. What is your call?: cobblestone-like skin. Elephantiasis nostras verrucosa. *CMAJ* 2008;179(7):673-4.
- Sisto K, Khachemoune A. Elephantiasis nostras verrucosa: a review. *Am J Clin Dermatol* 2008;9(3):141-6.
- Kerchner K, Fleischer A, Yosipovitch G. Lower extremity lymphedema update: pathophysiology, diagnosis, and treatment guidelines. *J Am Acad Dermatol* 2008;59(2):324-31. Epub 2008 May 29.
- Ukinç K, Bayraktar M, Gedik A. Hypothyroid Graves' disease complicated with elephantiasis nostras verrucosa (ENV): a case report and review of the literature. *Endocrine* 2009;36(1):6-9. Epub 2009 Apr 24.
- Sarma PS, Ghorpade A. Elephantiasis nostras verrucosa on the legs and abdomen with morbid obesity in an Indian lady. *Dermatol Online J* 2008;14(12):20.
- Boyd J, Sloan S, Meffert J. Elephantiasis nostras verrucosa of the abdomen: clinical results with tazarotene. *J Drugs Dermatol* 2004;3(4):446-8.
- Castellani A. Researches on elephantiasis nostras and elephantiasis tropica with special regard to their initial stage of recurring lymphangitis (lymphangitis recurrens elephantogena). *J Trop Med Hyg* 1969;72(4):89-97.
- Chiang YY, Cheng KL, Lee WR, Hu CH. Elephantiasis nostras verrucosa—a case report of effective management with complete decongestive therapy. *Dermatol Sinica* 2005;23(4):228-32.
- Shimony A, Tidhar D. Lymphedema: a comprehensive review [Comment]. *Ann Plast Surg* 2008;60(2):228.