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SUCCESSFUL MULTI-MODAL TREATMENT OF GRADE IV LYMPHEDEMA IN LYMPHATIC FILARIASIS: A CASE STUDY

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ABSTRACT

We present an integrated therapeutic approach performed on a 37 year old female with giant lymphedema (Grade IV) due to lymphatic filariasis of 27 years duration. Our therapeutic approaches consisted of a basic foot care program for two weeks, followed by a course of oral penicillin for a week including conservative treatment with complete decongestive therapy (CDT) together with respiratory physiotherapy and walking exercises. In addition, advanced surgical techniques with supra-fascial excision of alternate lumps in three stages over an interval of ten days followed by a nodo-venal shunt resulted in reversing the stage IV lymphedema condition. Over a ten year follow-up, the patient remains essentially unchanged confirming the success of the treatment without any recurrence or complications. Finally, by combining multimodal treatment, we were able to achieve a near normal limb in Stage III and Stage IV lymphedema of the lower limb in lymphatic filariasis.

Keywords: lymphedema, treatment, nodo-venal shunt, MLD

CASE STUDY

Lymphatic filariasis is a neglected mosquito-borne tropical disease. It is endemic in 58 countries putting 856 billion people at risk globally with an estimated 120 million infected. It is the second leading cause of permanent or long-term disability with over 40 million infected people suffering from pathological manifestations like lymphedema, hydrocoele, chyluria, and elephantiasis (1).

Filarial infection causes a form of secondary lymphedema which occurs when the lymphatic flow is interrupted or hindered due to damage from the worms and/or associated infection. This etiology, usually as a result of lymphogranuloma venereum or an infestation by *Wuchereria bancrofti* filarial, can account for 20% of the cases of the male population in tropical countries (2). Other infectious causes may also be associated with chronic lymphedema, such as recurrent cellulitis mainly caused by Streptococcus sp and urethritis caused by Chlamydia trachomatis (3-4).

In advanced stages of lymphedema the skin is thickened and enlarges into folds, often with hypertrichosis, black pigmentation, nodules, warty growth, intertrigo in the webs of toes, or chronic non-healing ulcers (5). The swelling may be so large that the patient is incapacitated requiring help even for personal needs. Fungal infections in the interdigital region and in deep folds are a common finding in advanced lymphedema. There are various surgical options available to offer relief of lymphedema, like lymph nodo-venous shunts, omentoplasty, and excision with skin grafting (6). Even after

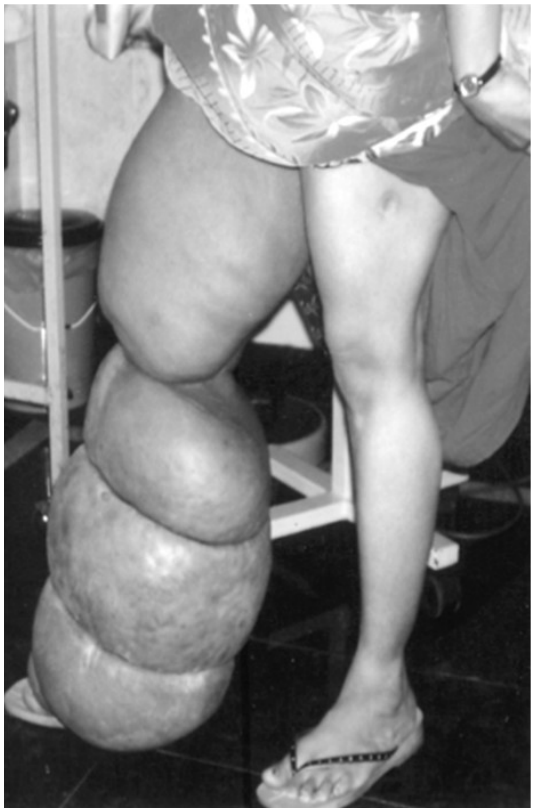

Fig. 1. Giant lymphedema (Grade IV) of the right leg of the patient.

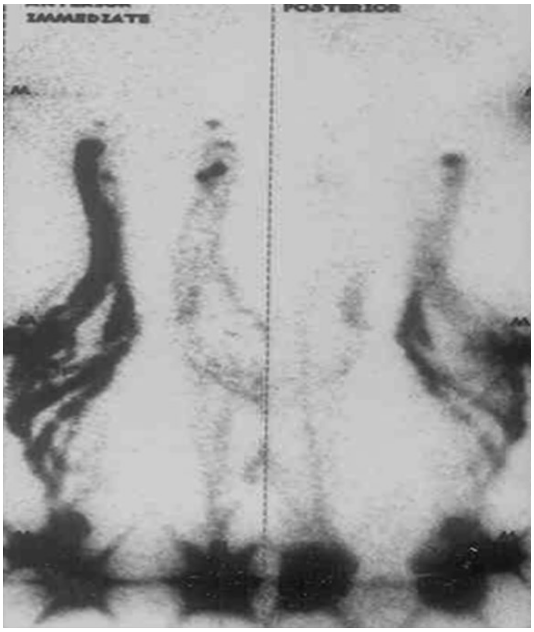

Fig. 2. Pre-operative lymphoscintigram image demonstrating multiple lymphatic channels with significant dermal backflow as well as multiple inguinal lymph nodes in this late image.

surgery the local care of the limb should be continued for life, so that acute dermato-lymphangitis attacks and recurrence of the swelling are prevented (7).

Here we present a 37 year old female admitted with giant lymphedema (Grade IV) due to lymphatic filariasis of 27 years duration (*Fig. 1*). This case was unique for its size and presentation of the right lower limb. Preoperative lymphoscintigraphy revealed multiple lymphatic channels with substantial dermal backflow and multiple inguinal lymph nodes (*Fig. 2*).

There has been more recent availability of therapists trained in conservative treatments [manual lymph drainage (MLD) and complex decongestive therapy (CDT)] in India. We decided to pair this availability with surgical interventions learned from our earlier work with grade I and grade II lymphedema (8) in a multi-modal approach for treatment of this patient.

The treatment plan started with two weeks of basic foot care in the form of daily cleaning with Betadine scrub and application of antifungal powder with foot elevation. A course of oral penicillin (800 mg/twice daily) was administered for one week. The patient then underwent MLD and multi-layer bandaging for ten days. This was done twice daily with respiratory physiotherapy and walking. The surgical procedures were then undertaken.

We performed a new technique of superficial excision of alternate lumps in three stages at an interval of 6 weeks. Briefly, alternative superficial lumps were removed in a single stage excising superficial to the deep fascia without making an incision in the deep fascia. This superficial excision or debulking was done under tourniquet control to avoid blood loss, and the tourniquet was

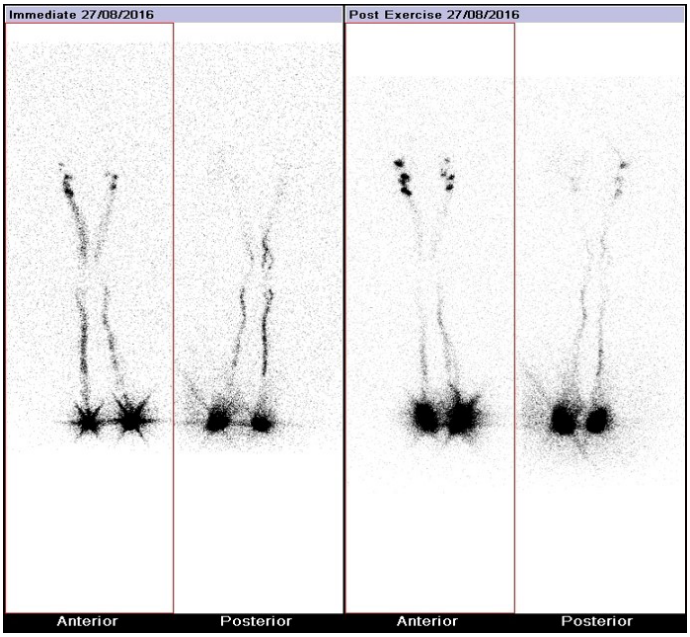

Fig. 3. Three-year post-operative lymphoscintigram showing an almost normal pattern of lymphatic flow and on the right side which likely demonstrates functioning of the nodo-venal shunt.

released after securing homeostasis and then the wound was closed in two or three layers, depending upon the width of the excised tissue. All the wounds were closed with sustained drains. The drainage tubes were removed on the 4th or 5th day, once the drainage levels reduced to less than 10ml. After all operations, bandages were applied with attention to avoid wound dehiscence since we mobilized the patient early.

Next, we carried out a nodo-venal shunt to retain the achieved results and to avoid recurrence of lymphedema. The strategy for nodo-venal or lympho-venal shunts decided upon is based on the functional availability of the nodes or the lymphatic channels usually assessed by lymphoscintigram. The functionality of the shunt is evaluated periodically at the interval of two years by lymphoscintigraphy (*Fig. 3*).

Existing surgical procedures for massive lymphedema mostly focus on debulking rather than nodo-venal shunts performed by only a few surgeons. We feel this approach produces a poor aesthetic result due to recurrence of lymphedema with bottleneck deformities (caused mainly due to excision of the lymphatic tissue along with the deep fascia). Patients are very dissatisfied and defer from undertaking these operations after seeing the poor results. These results led us to combine both approaches for this patient.

Although not yet widespread in India, this patient demonstrates the value of conservative treatment since it has contributed over 40-50% of the total volume reduction outcome by utilizing MLD, bandaging, foot hygiene, limb elevation, and pressure garments.

Our treatment plan with this multi-modal treatment provided functional and aesthetic results that were important to the patient. The successful treatment results (before and after) are displayed in *Figs. 1 and 4*. The patient was monitored for a period of ten years with continued conservative management postoperatively consisting of foot care, auto massage, leg elevation at

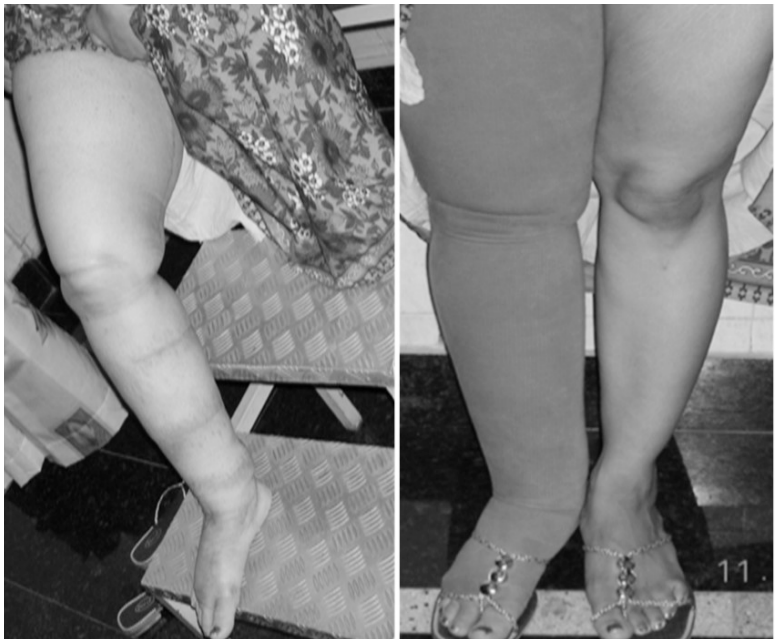

Fig. 4. Results without (left) and with a compression garment (right) demonstrating a reversal of Grade IV lymphedema after multi-modal treatment at 3 year (left) and 10 year (right) post-operative follow-up.

bed time, and utilization of a pressure garment during the day. This continued care prevented any recurrences or complications. Our results indicate that use of this multimodal treatment for Grade III and IV lymphedema could be undertaken as a regular practice for morbidity control in advanced lymphatic filariasis.

CONFLICT OF INTEREST

All authors declare that no competing financial interests exist.

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