Manual Lymphatic Drainage in Chronic Venous disease: A Forgotten Weapon in our Armory

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Abstract

Objectives: The objective of this study is to evaluate the effect of manual lymphatic drainage (MLD) on venous flow and its effect on wound healing in patients with advanced chronic venous insufficiency (CVI). Design: This was a prospective nonrandomized cross-sectional study. Setting: Participants were assessed from a group of patients presenting to a vascular clinic at a tertiary care center, in South India. Participants: Thirty-eight patients with the venous ulcers were enrolled in this study. Intervention: MLD was applied by a certified physical therapist to the lower limb following a standard protocol. The patient and the caregiver were also educated on methods of MLD so as to carry on the treatment in a home-based setting. Main Outcome Measurements: Subjective analysis of symptom relief and ulcer healing were analyzed at 1 week and at 6 months. Results: There was a significant improvement in patient symptoms with respect to ulcer healing and reduction of edema. Conclusions: MLD is an important adjunct in the treatment of advanced CVI.

Keywords: Clinical, etiologic, anatomic, and pathophysiologic, chronic venous disease, manual lymphatic drainage

Introduction

Venous ulcers are the most advanced stage of chronic venous insufficiency (CVI), as identified by the clinical, etiologic, anatomic, and pathophysiologic (CEAP) C6 classification.[1] They are often recurrent, may persist for years, and result in repeated infections and cellulitis. In addition, venous ulcers have significant socioeconomic and psychological consequences reducing the quality of life.[2]

The mechanism of ulcer formation involves a series of pathophysiologic steps that include (1) obstruction and/or reflux, (2) persistent venous hypertension, and (3) increased capillary filtration and interstitial fluid load. Typically, excess interstitial fluid is removed by the lymphatics, but if the fluid load overwhelms the lymphatic capacity or if the lymphatics are defective, the accumulation of interstitial fluid, macromolecules, and cytokines lead to edema (CEAP C3), breakdown of subcutaneous tissue (C4A, B), and formation of ulcers (C6).[3]

Once formed, an ulcer will not heal unless venous hypertension and excess capillary fluid filtration are ameliorated. The processes to treat venous hypertension include endoablation/open surgery of the superficial veins, phlebectomy, and venous stenting. These procedures have been proven to be useful in patients with normal lymphatic function. However, multiple studies have proven that patients with venous ulcers have abnormal lymphatic drainage.[3-6] Although the lymphatic contribution to venous ulcer formation, recurrence and healing have long been recognized, authoritative reviews on CVI management does not recommend treating the lymphatics as an adjunct to surgical treatment.[7]

The objective of this study was to establish the role of manual lymphatic drainage (MLD) as an adjunct in the treatment of venous ulcers by documenting clinical and subjective improvement in patients with this form of advanced venous disease.

Methods

This study was conducted after obtaining the approval of the Local Institutional Review Board and in accordance with the Helsinki Declaration.

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Clinical criteria
Following informed consent, 38 patients with chronic venous ulcers were enrolled into the study between April 2015 and March 2016. Patients were recruited prospectively as they presented in the clinic and the data collected was analyzed. Inclusion criteria included a minimum age of 18 years and the presence of a venous ulcer (C6) in either leg. Exclusion criteria included inability to tolerate the compression; or clinically significant arterial disease, defined by an ankle-brachial index <0.7, toe pressures <30 mmHg, or transcutaneous oximetry <30 mmHg. Patients with diabetic foot ulcers, exposed bone or tendons, autoimmune disease, or vasculitis were excluded from the study. Patients who opted to use four-layer bandaging for compression therapy were also excluded from the study.

Venous duplex scanning (7-mm linear array transducer scanned at 6–12 MHz) was undertaken with participants in a standing position to confirm the diagnosis of CVI and to determine the exact anatomical location of venous reflux (superficial, perforating and/or deep vein system). Clinical history, symptoms, and severity of disease, according to CEAP clinical class were obtained following established guidelines.

Once identified, the patients underwent a multidisciplinary approach to treatment as is our protocol for all patient with advanced venous disease [Figure 1].

Once diagnosed to have venous ulcers, the patients were initiated on compression therapy using short stretch bandaging, MLD, and dressings. The superficial venous system was evaluated using duplex ultrasound. Any superficial incompetence found was treated with endoablation/Trendelenburg’s operation/phlebectomy, iliac vein stenting, or foam sclerotherapy as appropriate. They were encouraged to continue compression and MLD at home after discharge from the hospital.

Technique of manual lymphatic drainage
The MLD included the CVD limb affected, and it was performed by a trained physiotherapist according to the technique of Vodder [Figure 2]. Each person in the study group underwent a series of five MLD sessions. Each procedure was performed 5 times a week for 20 min each time. The patient and the primary caregiver were encouraged to learn the technique of MLD and continue the same, even at home.

The patients were reviewed after 1 week and a subjective assessment was done. A review assessment was also done at the end of 6 months.

Results
A total of 196 patients were referred for MLD during the study. These included patients with CVI (n = 118) and lymphedema (n = 76). Of the patients that were referred for CVI, n = 22 were for C3 disease, n = 25 were for C4 disease, n = 33 were for C5 disease, and n = 38 were for C6 disease. The latter formed the study group [Figure 3].

The study group was from all over the country, some of them traveling 2000 km from home for treatment. The population demographics were as portrayed in Table 1.

There were 17 patients with duration of symptoms more than 12 months. The predominant pathological incompetence
was at the sapheno-femoral, and sapheno-popliteal junction \((n = 44)\) and the most common intervention performed was foam sclerotherapy [Table 2].

At the first follow-up at 1 week, 25 patients reported a subjective improvement in symptoms of heaviness of legs, edema, and pain.

The second follow-up was done at 6 months, with clinical visits and telephonic interviews. 20 patients were able to continue self-administered MLD and two patients were not able to continue [Table 3]. The patients for whom follow-up was available \((n = 22)\) were assessed for improvement in edema and ulcers that had healed. 19 patients reported an improvement in edema, ulcer decreased in size in 12 patients, and ulcer healing was reported in 8 patients [Table 4].

**Discussion**

In our center, MLD is commonly prescribed as a treatment for patients with CVI, especially when the lymphatic system is affected and edema is present. Even before undergoing surgery for venous insufficiency, MLD also appears to play an important role in improving the reflux volume index, disease severity, quality of life, and venous edema.[9]

Compared to compression therapy and ankle exercises, which predominantly enhance venous blood flow in the deep veins, MLD is able to increase blood flow in both superficial and deep veins.[10]

In conservative treatment of CVI, methods such as elimination of risk factors, pharmacotherapy, compression therapy or physical exercise have a well-proven track record, whereas MLD has not yet achieved the status it deserves. There are not many publications or ongoing research concerning the role of MLD in the treatment of CVI.

In this study, our demographics showed that we have a male preponderance male:female \((8.4:1)\) for advanced venous disease as shown in previous studies of similar nature conducted in India.[10] A large proportion \((n = 27)\) of our patients were in the 18–60 year age group, i.e.: The most economical productive period of patient life. The socioeconomic impact of venous ulcer disease has been demonstrated previously and the trend continues in this study also.[11] Hence, every intervention in this group designed to heal the venous ulcer will have a positive overall economic impact. This study shows that there is an almost immediate effect on starting MLD in patients with advanced CVI (C6) with 25 patients \((65%)\) reporting improvement in symptoms. Compromised lymphatic drainage has been shown to be a copathological factor in patients with venous disease contributing to the development of edema, lipodermatosclerosis, and even venous ulcers.[11] Hence, any improvement in lymphatic drainage will show immediate results as depicted by our study.

The number of endovenous ablations in the study group does not correspond to the number of patients with junctional incompetence [Table 2]. Many of the patients were not willing to wait for interventions and chose to return at a later date. As our study population was spread across a distance of more than 2000 km, the attrition rate was also high, with 16/38 patients \((42%)\) lost to follow up.

There was a significant improvement in ulcer healing in patients that continued to practice MLD as shown in Table 4. These patients continued MLD as an adjunct to compression therapy to achieve improvement in the size of the ulcer and in some cases \((n = 8)\), complete ulcer healing.

Foldi has already reported the ineffectiveness of MLD without compression therapy in their studies.[12] Ochalek and Grądalski claim that it is essential to simultaneously perform compression therapy to prolong the anti-edema effects of MLD.[13] In our practice, we ask our patients to continue both compression with MLD to get the best results.

The results obtained in this study on the use of MLD in the treatment of patients with CVD are comparable with the results obtained by Crisóstomo et al. and Molski et al.[9,10]

The main problem with continuing MLD is the reduced availability of trained professionals to implement the MLD over a long duration. Furthermore, the economics of treatment
for CVI dictate that constant use of the physiotherapists may not be financially viable to the healthcare provider. The median cost of venous ulcer care per year, in the U.S, is US$3036.\(^{12}\)

The use of self-administered MLD after an initial period of supervised learning provides an alternative to the patient to continue MLD at home. With the use of self-administered MLD, we were able to keep venous ulcer care costs to around US$1000 inclusive of total outpatient costs (facility and physician), hospitalizations (if any), dressing supplies, medications (topical and oral), and home healthcare. Despite the demographic variability of our study population, 20/38 patients were able to continue MLD at home.

The small study group makes it difficult to prove any statistically significant outcomes and is one of the limitations of this study. The high attrition rate may be explained by the vast distances which patients traveled to be treated, which makes following up these patients, logistically difficult.

Quality of life (QoL) assessment in patients with CVI seems to be a useful objective method, which contributes to the evaluation of disease severity, as well as to the evaluation of treatment effects. It also provides an objective measure of degree of improvement in patients that have initiated MLD. QoL questionnaires, such as CIVIQ, VCSS, SF-36, and HAD, are considered as very useful and credible in the evaluation of disease severity and in the evaluation of conservative treatment as well as surgical treatment. However, we were not able to implement the above in our study group.

**Conclusions**

Self-administered MLD decreases the degree of disease severity in patients with chronic venous disease, as well as offering an important adjunct to compression in the treatment of CVI.

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**Conflicts of interest**

There are no conflicts of interest.

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