

CASE REPORT

**USE OF COMPLEX DECONGESTIVE THERAPY
WITH LOW COST MATERIAL IN A PATIENT WITH
LYMPHEDEMA LIVING IN AN ENDEMIC AREA FOR
FILARIASIS**

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ABSTRACT

Lymphatic filariasis affects millions of people around the world and may have disabling consequences. Lymphedema stands out as a chronic manifestation in patients with this disease, affecting the lower limbs and limiting motor function. This study aimed to propose a treatment protocol to decrease lower limb lymphedema of treated patients and to show the efficacy of Complex Decongestive Therapy (CDT) as an auxiliary resource for this condition. This is a case study of a patient treated with CDT, making use of compression methods with alternative materials and instructions for asepsis during 10 weeks. The results demonstrated that this treatment reduced lymphedema in the right lower limb of the patient from grade V to grade III, with areas of measurement reduction of up to 41%. In addition, acute dermatolymphangioadenitis (ADLA) manifestations stopped in the treated patient. CDT associated with low-cost compression material, has been shown to be effective in reducing lower limb lymphedema and ADLA crises, as well as in promoting improved locomotion and performance of daily activities by the patient.

KEY WORDS: Filariasis; elephantiasis; lymphedema.

INTRODUCTION

Lymphatic Filariasis (LF) is a parasitic disease, transmitted by *Culicidae* vectors, caused by three filarial helminths: *Brugia malayi*, *Bruguia*

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timori and *Wuchereria bancrofti*, the latter being the most prevalent and responsible for 95% of cases worldwide. These helminths inhabit the lymphatic system of individuals of both sexes and of all ages, causing damage to this system. Globally, 1.4 billion individuals are at risk of acquiring this parasite and about 120 million individuals are infected in 73 endemic countries. One of the sequelae that individuals infected with this parasitosis present is lymphedema, a lymphatic fluid accumulation that occurs in the lower limbs and even in the scrotal sac (urogenital manifestation). According to World Health Organization (WHO) statistics, around 300 million people are affected by pathologic edema of limbs and almost 15 million, mostly women, have lymphedema or elephantiasis of the leg (Olszewski & Zaleska, 2015). In fact, lymphedema is one of the most stigmatizing, debilitating and disfiguring causes of work incapacity worldwide, in addition to causing physical sequelae and psychological and social changes (Dreyer et al., 1997; WHO, 2010).

In 2000, WHO launched the Global Program for the Elimination of Lymphatic Filariasis (GPELF) with the purpose of eliminating this parasitic disease by the year 2020 (Yuvaraj et al., 2008; Rocha et al., 2010; Dome et al., 2014). To achieve this goal, the GPELF established two important strategies: i) interruption of parasite transmission, by means of mass drug administration (MDA) to the population, using diethylcarbamazine drugs in association with ivermectin or albendazole; ii) to alleviate the suffering of individuals with chronic clinical manifestations, mainly lymphedema, using sustainable and reproducible means that provide a better quality of life for these people (Yuvaraj et al., 2008; Rocha et al., 2010).

GPELF has made tremendous progress in terms of MDA, however the second pillar, which aims to treat morbidity, has gained very little in view of the irreversibility of most cases and the need for action by a multidisciplinary team, to follow patients with chronic sequelae for an indeterminate period, demanding continuous programs and the availability of financial resources for their viability (Lawenda et al., 2009; Rocha et al., 2010).

The International Society of Lymphology (ISL) recognizes Complex Decongestive Therapy (CDT) as the gold standard for the treatment of lymphedema, regardless of its cause (ISL, 2009). However, this technique was developed to treat upper limbs of women who developed post-mastectomy lymphedemas. Thus, most of the studies are focused on the treatment of the upper limbs (Erylmaz et al., 2009; Franks et al., 2006; Lawenda et al., 2009; ISL, 2009; Torres et al., 2010) and few studies are concerned with the physiotherapeutic intervention of lymphedema in the lower limbs, related to patients coming from areas endemic for filariasis.

Studies in filariasis-endemic areas highlighted the importance of repeated episodes of acute bacterial dermatolymphangioadenitis (ADLA) in the progression of lymphedema severity. ADLA shows inflammatory episodes

associated to fever, accelerates damage to the peripheral lymphatic channels in the skin and leads to a chronic status (Addiss et al., 2010).

Currently, Pernambuco has a National Center of Lymphatic Filariasis (NCLF), at the Aggeu Magalhães Institute (IAM), Oswaldo Cruz Foundation unit in Pernambuco. The NCLF is the first health service in the world, in a tropical disease area, to be accredited by the Joint Commission International (JCI) and treats, through a multi-professional team, patients affected by filariasis in its initial stage or in the chronic state of the disease with characteristic lymphedemas (Rocha, 2014). In addition, at the NCLF, a scientific study is being developed that aims to apply CDT in patients with lymphedema who come from endemic areas for filariasis, using low cost material and aiming to contribute to the objective of GPELF in relieving the suffering of patients with this morbidity. From this study, we want to prove that Complex Decongestive Therapy, used to treat lymphedema of the upper limbs, can also be used with success in patients with lymphedema in the lower limbs. In this sense, the present case report demonstrates the first significant results promoted by Complex Decongestive Therapy in a patient with lymphedema coming from an endemic area for filariasis.

CASE REPORT

MLFA is a 42-year-old woman living in Congo, Angola (Africa), an endemic area for filariasis. She was admitted to the NCLF at the IAM of the Oswaldo Cruz Foundation, Pernambuco, Brazil, in July 2012 for evaluation and treatment of lymphedema in her lower limbs (Figure 1). Her main complaints were the difficulty of obtaining adequate footwear and difficulty in walking because of significant lymphedema that presented repetitive episodes of erysipelas. In addition, she complained about the “weight of the legs” she feels during the performance of activities of daily life. She presented bilateral lymphedema of the lower limbs, with greater intensity in the right lower limb (RLL).

Furthermore, according to the patient’s report, symptoms had started 8 years ago, with an episode of skin infection very characteristic for ADLA, especially between the toes. Her general symptomatology was characterized by fever, malaise, headache, hyperemia of the lower limbs, presence of blisters on the skin and localized edema. This condition remained for approximately 20 days. After repeated episodes of ADLA, the patient began to observe persistent residual edema in the RLL and 4 years ago the left leg also began to present lymphedema. The last episode of ADLA occurred a little over a year ago.



Figure 1. Anamnesis Phase in patient MLFA, a resident of Congo (Africa), coming from an endemic area for filariasis, at the moment of her admission as a patient at the National Center of Lymphatic Filariasis (NCLF), FIOCRUZ-PE, Brazil.

Legend: A: Anterior view. B: Posterior view. C and D: Views of the left and right sides, respectively. At this moment, the posture and degree of lymphedema presented by the patient were analyzed. The other clinical aspects were tabulated in a follow-up clinical record.

During anamnesis, it was observed that, according to Addis and Dreyer's classification (Addis & Dreyer, 2000), the lymphedema presented in the RLL was classified as grade V, with deep folds in the skin (Figure 2). The lymphedema in the left lower limb (LLL) of the patient was classified as grade II, mainly characterized by the light form and without cutaneous alterations.

As a prior disease, the patient had an episode of poliomyelitis, causing atrophy and decreased length of the right leg, with consequent lameness in ambulation. The patient reported that she had been submitted to corrective orthopedic surgery, but still maintained a difference of 2 centimeters in the RLL in relation to the left one. During the evaluation it was also observed that the patient needed help from a caregiver to perform some of her daily activities, such as bathing, dressing and feeding. For locomotion, she used a cane.

For evaluation and follow-up of the lymphedema in this study, measurements were taken, with reference to the apex of the patella. Four points of circumference were measured below the reference, with a distance of seven centimeters between them.

The protocol proposed for physiotherapeutic treatment was CDT. The CDT consists of the association of manual lymphatic drainage, functional compression bandaging and general care and hygiene orientations for the limbs affected by lymphedema. This therapy consists of two phases, an initial one, called the attack phase, which aims to reduce the volume of lymphedema as much as possible and a second phase, in which the gains obtained in the first phase are maintained through the daily use of a high compression sock.

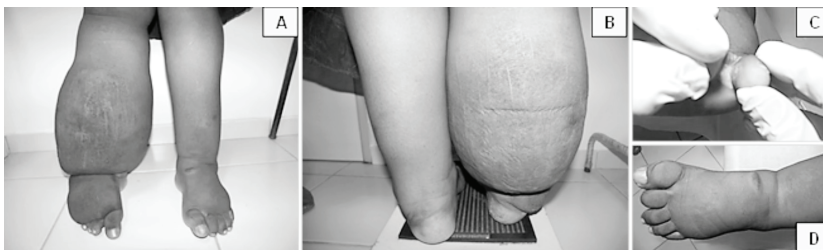


Figure 2. Anamnesis stage of patient MLFA, a resident of Congo (Africa), coming from an endemic area for filariasis, at the moment of her admission as a patient of the National Reference Service for Filariasis, FIOCRUZ, PE, Brazil.

Legend: Approximate view of grade V (RLL) and grade II lymphedema (LLL). A and B: Anterior and posterior views of the right and left lower limbs, respectively. C: Presence of infection between the toes of the RLL. D: Edema located on the patient's feet (LLL).

As the RLL presented grade V lymphedema, it was treated with CDT in two phases. Meanwhile, the left lower limb only showed grade II lymphedema, and was therefore indicated for the second phase of CDT. However, the compression sock was prescribed at the end of the treatment for daily use on both legs.

The therapeutic plan was applied for 10 continuous weeks, twice weekly, totaling 20 sessions of 50 minutes each. The patient attended the sessions in the afternoon. The protocols were performed by the same professional, trained and specialized in the application of the technique. This procedure was approved by the Research Ethics Committee of the Oswaldo Cruz Foundation of Pernambuco, under decision number 547,562.

Initially, manual lymphatic drainage was performed using the Foldi technique (Foldi et al., 2006). Afterwards, kinesiotherapy was applied with the use of isotonic resistance exercises with a strong elastic band (orange color), in which the patient performed 3 sets of 10 repetitions, with a 30-second interval between sets. Although some authors cite the use of exercises after bandaging (Oliveira & Artmann, 2009; Cohen, 2011) it was decided, in our protocol, to change this sequence in order to verify if the effect of lymphedema reduction could still be obtained. The limb was then hydrated with a layer of moisturizing cream (Nivea®) and covered with a mesh tube (Santric®), to protect the skin from heat.

In this study, in the bandaging step, a study was made (Soares et al., 2016; Santana et al., 2016) of the best fabric to be applied after CDT. An attempt was made to combine the resistance of the fabric with its low cost. As such, after application of CDT, a three-layer bandage (10 cm wide by 2

meters long) was applied using 100% plain cotton cambric fabric (also known as Batiste), which shows low elasticity, and achieves the goal of minimizing lymphedema fibrosis and facilitates lymphatic return (Figure 3). Association of bandaging, using low cost fabric with CDT in lower limbs can be promising with regard to reducing lymphedema in subjects from poor countries. The overlapping of the bandaging was 75% from one layer to the next and at the end the bandaging was protected with a mesh tube. The patient was advised to maintain the bandages until the next attendance date.

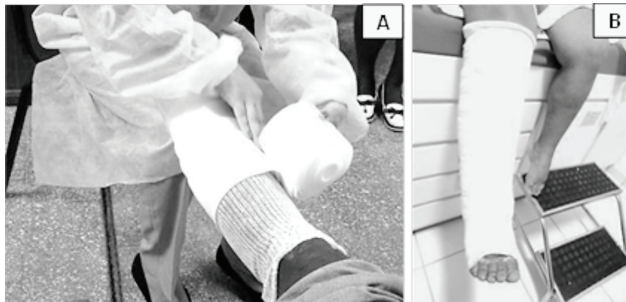
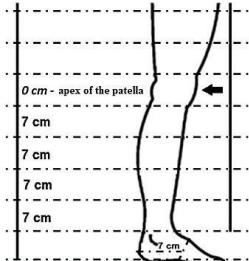


Figure 3. Representation of the bandaging, using 100% plain cotton cambric fabric applied to patient after CDT at the National Reference Service for Filariasis, FIOCRUZ, PE, Brazil. A: Beginning of bandaging the RLL over the mesh tube (Santric®) and B: Finished bandage.

At each session, the general care and hygiene of the limb with lymphedema were explained to the patient since the bandages should be removed by the patient at home, in the morning of the day of return to the NCSF. Thus, the patient was instructed to remove the bandages from the limb with lymphedema in the morning, wash the limb with clean water and neutral soap, cut nails, and avoid nail polish and cuticle removal. After these procedures, the patient returned in the afternoon to repeat the CDT procedures at the NCSF. In addition, through an illustrated primer and with the aid of a check-list, the patient was also instructed to avoid spending many hours in a standing position and to always inspect the skin and interdigital regions. This care was also followed by the physiotherapist who attended to the patient in the sessions.

At the end of the CDT treatment, the grade of lymphedema in the right leg was reduced from grade V to grade III, according to the Dreyer scale, and the patient was instructed to use high-compression $\frac{3}{4}$ socks (30-40 mmHg - Sigvaris®), without tips, on both legs (Table 1).

Table 1. Representative data of lymphedema measurements (perimetry) of patient MLFA, a resident of Congo (Africa) and coming from an endemic area for filariasis, before and after treatment at the National Reference Service for Filariasis, FIOCRUZ, PE, Brazil in the year 2012.

| Schematic representation | Measurements (*) | Measurements before CDT (cm) | | Measurements after CDT (cm) | | Reduction of RLL (%) |
|---|------------------|------------------------------|------|-----------------------------|------|----------------------|
| | | RLL | LLL | RLL | LLL | |
|  | 0 cm | 41.0 | 40.0 | 40.0 | 39.5 | 2.4 |
| | 7 cm below | 50.5 | 41.4 | 44.5 | 40.3 | 11.8 |
| | 14 cm below | 65.5 | 39.5 | 47.0 | 37.3 | 28.2 |
| | 21 cm below | 69.0 | 36.0 | 46.0 | 31.7 | 33.3 |
| | 28 cm below | 66.0 | 33.9 | 39.0 | 25.8 | 41.0 |

CDT: Complex Decongestive Therapy

* Measurements taken from the RLL: Right Lower Limb; LLL: Left Lower Limb; 0 cm: Apex of the patella

The percentage reduction in the volume of lymphedema in the right lower limb (RLL) showed a progressive decrease (from the apex of the patella to the ankle) reaching up to 41% before and after treatment (Table 1; Figure 4). These results had repercussions for the quality of life of the patient with improvement in ambulation and postural adequacy. The patient reported being able to wear shoes without any adaptation of the shoes. In addition, over the three months of treatment no ADLA cases were observed in either of the treated limbs (Figure 4).

Three years after the care at the NCLF, patient returned and it was possible to make a comparative analysis between the patient's condition after CDT treatment (between May and July 2012) and upon her return, with maintenance of the techniques of hygiene, self-care and daily use of compression socks on both legs, 3 years after the first treatment (Table 2). The results showed that in addition to the patient presenting no more manifestations of adenolinfangitis, there was a progressive reduction of lymphedema in both lower limbs of the patient.

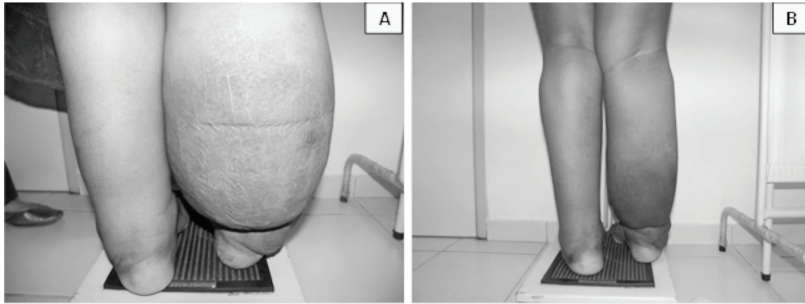


Figure 4. Representative photographs of patient MLFA, a resident of Congo (Africa), coming from the endemic area for filariasis, attended at the National Reference Service for Filariasis, FIOCRUZ, PE, Brazil and submitted to the treatment of CDT.

Legend: A: presentation of the lower limbs of the patient before CDT and B: presentation of the lower limbs of the patient after CDT.

Table 2. Measurement of RLL and LLL before and after treatment with CDT, of patient MLFA attended at the NCLF, FIOCRUZ-PE, Brazil, in 2012 and after three years (2015) of the patient’s own treatment, through hygiene, self-care and daily use of compression socks on both legs.

| Measurements of the patient’s lower limbs | JULY 2012 | | | | OCTOBER 2015 | |
|---|-----------------|------|----------------|------|------------------------------------|------|
| | Before CDT (cm) | | After CDT (cm) | | Return of the patient to NCSF (cm) | |
| | RLL | LLL | RLL | LLL | RLL | LLL |
| 0 cm | 41.0 | 40.0 | 40.0 | 40.0 | 35.0 | 39.5 |
| 7 cm below | 50.5 | 41.4 | 44.5 | 40.0 | 40.0 | 39.0 |
| 14 cm below | 65.5 | 39.5 | 47.0 | 39.0 | 40.0 | 38.0 |
| 21 cm below | 69.0 | 36.0 | 46.0 | 35.0 | 39.5 | 32.0 |
| 28 cm below | 66.0 | 33.9 | 39.0 | 33.0 | 32.5 | 28.5 |

Measurements taken from the RLL: Right Lower Limb; LLL: Left Lower Limb; 0 cm: Apex of the patella

DISCUSSION

Lymphedema manifests itself as an excessive and persistent accumulation of extravascular and extracellular fluid and proteins in the tissue spaces, due to the inefficiency of the lymphatic system (Leal et al., 2009). The signs and symptoms associated with lymphedema are increased limb diameter, tightening of the skin with risk of rupture and infection, stiffness and decreased range of motion in joints of the affected limb, various sensory disorders and reduced limb use in functional tasks. Thus, as a consequence, lymphedema may promote aesthetic deformity, decreased functional ability, physical discomfort, episodes of erysipelas and psychological stress (Andersen et al., 2000).

The treatment of lymphedema with the use of CDT is a challenge for the professionals who use it, since it is not possible to obtain a cure (Eryilmaz et al., 2009; Franks et al., 2006; Lawenda et al., 2009; Torres et al., 2010; Tacani et al., 2012). However, CDT corresponds to a combination of procedures such as manual lymphatic drainage, compression bandages, myolymphokinetic exercises, skin care and precautions in daily activities, which seems to promote a behavioral change in the treated patients evidenced by the emphasis on self-care and improvement of psychosocial aspects. In addition, patients who are instructed in self-care and after observing the significant improvement that the therapy promotes, play a decisive role in maintaining continued treatment (Leal et al., 2009).

Some studies have pointed to CDT as the main therapeutic tool for lymphedema. In one study, 36 women who presented post-surgical, upper-limb lymphedema and underwent CDT achieved a mean reduction percentage of 30.5% in volume of the limb after the intensive phase and this reduction was maintained throughout the study periods, which were between 6 and 24 months after CDT intervention (Meirelles et al., 2006). In a larger study with 537 mastectomized patients treated over a year, Vignes et al. (2007) obtained a 44.5% reduction in lymphedema, but half of the sample had their lymphedema volume increased above 10% from their value at the end of the intensive decongestive physiotherapy treatment phase. Similar to these results, our study achieved a percentage of progressive reduction that reached 41% and was maintained through self-care by the patient three years after CDT. However, we observe in this and in another study performed by our group (Soares et al., 2016) that degrees III to V lower limb lymphedemas present a greater reduction profile than other degrees when treated with CDT.

CDT is a specific technique that requires skill and continuous monitoring of hygiene care in its application. However, patients coming from endemic areas for filariasis and treated by specialized health services receive CDT as an initial intervention method and need, after the care in the health service, to maintain limb hygiene and daily use of compression socks. Most of these patients come from areas lacking basic sanitation, education, and access

to health care. In this sense, the lack of hygiene often occurs due to the lack of access to hygiene items such as soaps, moisturizing creams and even water suitable for washing the limb affected by lymphedema (Foldi et al., 2006).

The patient treated in our study did not present any episode of erysipela during the application of the protocol. Addiss et al. (2010) demonstrated in their study that compression bandaging, using commercially available Comprilan® bandages, while reducing lymphedema of lower limbs in patients from endemic areas for filariasis, increased the incidence of ADLA episodes of treated patients. However, the same authors affirm that, along with the high number of episodes of ADLA, there was the use of commercial bandages without the previous cleansing of the limbs affected with lymphedema by the subjects of the research, since they came from very poor villages in Haiti and did not have access to appropriate hygiene items. We believe that the limitation of this study occurs because the patient lives in another country and we cannot see her frequently.

Another important aspect of this study was the application of CDT followed by a compression technique using low cost material (cotton cloth); the total cost of treatment for the patient in this study over a period of ten weeks was US\$72. This expense is much lower than the worldwide costs observed with the treatment and use of compression material, costing around US\$769 (Shih et al., 2009).

The CDT, using low cost material, proved to be effective in the treatment of lymphedema in the patient participating in this study. The reduction in volume of the lower limbs of the patient promoted an aesthetic improvement. Moreover, the results observed upon return of the patient to NCLF, three years after intervention, lead us to conclude that it is imperative that the patient adhere to self-care after the CDT treatment in order to minimize edema and possible seizures of ADLA.

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