

LYMPHEDEMA TREATMENT DECREASES PAIN INTENSITY IN LIPEDEMA

G. Szolnoky, E. Varga, M. Varga, M. Tuczai, E. Dósa-Rácz, L. Kemény

Department of Dermatology and Allergology (GZ, EV, MV, ED-R, LK), University of Szeged, Hungary, Physiotherapy Private Practice (MT), and Dermatological Research Group of the Hungarian Academy of Sciences (LK), Szeged, Hungary

ABSTRACT

Lipedema is a disproportional obesity featuring light pressure-induced or spontaneous pain. On the basis of our clinical observations, lymphedema therapy, as practiced in our clinic, reduces the perception of pain beyond leg volume reduction. We therefore aimed to measure pain intensity prior and subsequent to treatment. 38 women with lipedema were enrolled in the study with 19 patients undergoing treatment and 19 serving as the control group using exclusively moisturizers. Treatment consisted of once daily manual lymph drainage (MLD), intermittent pneumatic compression (IPC), and multilayered short-stretch bandaging performed throughout a 5-day-course. Pain was evaluated with a 10-item questionnaire, a pain rating scale (PRS), and the Wong-Baker Faces scale. Treatment resulted in a significant reduction of pain with a decrease in mean scores of all three measures. In the control group, only PRS showed significant decrease. Our study results indicate that this treatment regimen not only reduces leg volume and capillary fragility, but also improves pain intensity in patients with lipedema.

Keywords: lipedema, lipedema treatment, pain intensity, questionnaire, pain rating scale

Lipedema is a distinct clinical entity and is described as disproportional obesity that

nearly exclusively affects women and is characterized by bilateral, symmetrical, biker's hosiery-shaped fatty swelling of the legs (1-4). Lipedema is presumably associated with endocrinological and genetic background (4,5) It is easily distinguishable from other entities like lymphedema and phlebedema based on striking clinical features. Lipedema is often combined with common obesity, although lipedematous tissue hardly or never responds to diet and weight-loss. One of the leading hallmarks is the frequent hematoma formation due to even minor traumatic injuries (2-6). Lipedema is associated with local circulatory abnormalities, although major venous dysfunction is rare (7). Lipedema patients nearly always complain of pain upon palpation that worsens with aging (5,6).

The peculiar enlargement of subcutaneous fat is presumably linked with microangiopathy and altered microcirculation leading to increased permeability and protein-rich fluid extravasation that further enhances the amount of lymph. Therefore, in early stages of lipedema, increased lymph flow may be visualized by lymphoscintigraphy (8) as lymph vessels raise their transport capacity because of this augmented capillary filtration and increased volume of interstitial fluid. Fluorescent microlymphography demonstrates lymphatic microaneurysms and dilated vessels of the uppermost lymphatic network which indicates that lymph vessels are also involved (9).

In prolonged courses of lipedema, lymph vessels are unable to maintain their function and altered microcirculation leads to impaired lymph transport capacity and accumulation of lymph fluid. The high protein and fat content of lymph fluid evokes subsequent fibrosis and further deposition of fat leading to non-pitting edema characterized by the Stemmer's sign (5).

Combined decongestive physiotherapy consists of gentle manual massage (MLD), multilayered compression with short-stretch bandages, regular walk-training, and meticulous skin care (5,10). MLD is a standard and effective therapeutic tool against various forms of primary and secondary lymphedemas. Pressotherapy (IPC) is an adjunctive treatment to MLD, that mainly reduces oedema and improves the venous flow (10,11). Multilayered compression bandaging plays a crucial role in the further reduction of leg volume enhancing the continuous pumping mechanism using the active involvement of muscle pumps. Our original evidence concerning the conservative approach to lipedema treatment found that IPC as an adjunctive method was at least equally effective with MLD as a component of complex decongestion (11). Based on these data, in our clinical practice we always combine these two distinct elements to treat lipedema patients more efficiently.

We have also observed that beyond volume reduction, treatment of lipedema also reduced the incidence of hematoma formation and capillary fragility (12) along with noting that patients complain of less severe pain by the end of the full conservative treatment cycle. We therefore aimed our study to measure pain prior and subsequent to treatment in patients with lipedema.

PATIENTS AND METHODS

This study included a total of 38 women who had developed bilateral leg lipedema and were first seen at the lymphedema outpatient care unit of the Department of Dermatology

and Allergology. All subjects completed written informed consent approved by the Institutional Review Board of Albert Szent-Györgyi Medical and Pharmaceutical Centre, University of Szeged, Hungary. 38 legs of 19 patients [median age: 53.89 years (range: 31-68 years) were treated and 38 legs of 19 (median age: 55.7 years (range: 42-80 years)] women were included in the control group. The control group had no treatment with physiotherapy or compression and used the same moisturizer (non-ionic hydrophil ointment) once daily. Prior to inclusion, each patient was examined to rule out previous deep vein thrombosis with color Duplex ultrasonography. Treatment consisted of 30 minutes of MLD by Vodder's method (5) performed by a specially trained physiotherapist with an additional IPC (Lympha Press Plus device (Mego Afek, Israel) for another 30 minutes at 30 mmHg pressure followed by skin care with moisturizers and multilayered short-stretch bandaging with appropriate padding. Patients took part in walk-training twice daily for 30 minutes. Each patient underwent a 5-day-course with once daily treatment. Outcome measures comprised volumetry and pain measurement.

Leg volumes were measured with the classical Kuhnke's disc method (13). Percent reduction in leg volumes was calculated as follows: $(\text{initial volume} - \text{final volume} / \text{initial volume}) \times 100$.

Pain assessment was performed with three distinct methods. Since pain of lipedematous limbs is complicated to describe, we first used a 30-item questionnaire to characterize the most typical adjectives to pinpoint lipedematous pain (14). These adjectives could be matched with four distinct terms as "fits exactly," "fits fairly well," "fits to a limited extent," and "does not fit." Ten items (pressing, dull, heavy, pulling, torturing, enervating, violent, unbearable, exhausting, stabbing) were shown to describe more precisely the pain characteristics and also contribute to a lipedema grading system to a limited degree. In our serial experiments,

TABLE 1
Pain Assessment in Study Group Prior and Subsequent to CDP Treatment
(Mean Scores±SD)

	Pretreatment mean score	Posttreatment mean score	p
Item 1 (questionnaire)	1.79±1.182	1.32±0.478	0.024
Item 2 (questionnaire)	2.47±1.307	1.79±0.976	0.017
Item 3 (questionnaire)	3.16±1.214	2.00±0.943	0.001
Item 4 (questionnaire)	3.26±1.046	1.89±0.937	0.0001
Item 5 (questionnaire)	2.37±1.257	1.63±1.065	0.011
Item 6 (questionnaire)	2.58±1.071	1.63±0.831	0.002
Item 7 (questionnaire)	2.74±1.147	1.53±0.841	0.002
Item 8 (questionnaire)	1.84±0.898	1.11±0.315	0.006
Item 9 (questionnaire)	2.26±1.195	1.42±0.692	0.003
Item 10 (questionnaire)	2.11±1.286	1.21±0.535	0.01
Pain Rating Scale	5.89±1.868	3.34±2.561	0.0001
Wong-Baker Faces	5.26±2.423	3.05±3.009	0.003

these ten most sensitive adjectives were applied and scored from 1 to 4 depending on severity (none=1, mild=2, moderate=3, severe=4). Secondly we also used a special numerical analog scale from 0 to 10 called pain rating scale (PRS) (15). Finally, to further improve patient pain assessment, the Wong Baker Faces scale was applied (16). Statistical analysis was performed with Wilcoxon's signed-ranks test.

RESULTS

Measurement of limb volume reduction is the most common approach to quantify the extent of lipedema and evaluate therapeutic success. After 5 days of therapy, a 5.6±2.78% mean volume reduction was achieved. This volume reduction was significant compared to baseline mean volume ($p<0.05$). No significant volume change was detected in the control group. Therapy also resulted in a marked reduction of mean scores in each item of the lipedema questionnaire, PRS, and Wong Baker Faces (*Table 1*) in distinction to the control group where the single significant

improvement was detected using PRS (*Table 2*).

DISCUSSION

Earlier evidence has shown that both MLD- and MLD+IPC-based treatments efficiently reduced volume of lipedematous legs (11). MLD directs the lymph away from the edematous parts, reduces the volume of the limb by diminishing the persistent lymph stasis and fibrosis, and increases protein resorption (5). Intermittent pneumatic devices have been demonstrated to share similarities to results with MLD in some trials (11). Furthermore, IPC increases venous flow, tissue oxygenation, accelerates wound healing, and reduces relapse rate of leg ulcers. IPC can also have an adjunctive role to MLD and acts on limb volume reduction nearly at the same level of efficacy as MLD. Short-stretch compression bandages play an active role as patients use their muscle pumps by keeping the pumping mechanism active and in the maintenance phase, patients usually wear compression class 2 or 3 stockings (11).

TABLE 2
Pain Assessment in Control Group Prior and Subsequent to Moisturizer Treatment
(Mean Scores±SD)

	Pretreatment mean score	Posttreatment mean score	p
Item 1 (questionnaire)	2.68±0.885	2.74±0.806	0.655
Item 2 (questionnaire)	2.79±0.787	2.68±0.820	0.157
Item 3 (questionnaire)	2.63±0.955	2.53±0.841	0.157
Item 4 (questionnaire)	3.05±0.705	3.00±0.667	0.564
Item 5 (questionnaire)	2.21±1.032	2.11±1.10	0.157
Item 6 (questionnaire)	2.42±0.902	2.42±0.902	1.00
Item 7 (questionnaire)	2.68±0.820	2.58±0.769	0.317
Item 8 (questionnaire)	2.32±1.003	2.26±0.991	0.317
Item 9 (questionnaire)	2.21±1.273	2.16±1.214	0.317
Item 10 (questionnaire)	1.63±0.895	1.63±0.895	1.00
Pain Rating Scale	5.37±1.950	4.74±1.910	0.001
Wong-Baker Faces	5.16±2.340	4.95±2.147	0.157

The major and most highlighted effect of treatment is volume reduction that consequently diminishes the sensation of heavy legs and improves joint mobility. It also reduces hematoma formation with the improvement of capillary fragility (12). Based on our experience, treatment also seemed to be capable of altering the pain perception of lipedema patients. Pain assessment is a crucial outcome measure in lymphology (15), especially among lipedema patients. Patients find pain an extremely distressing symptom in lipedema (14), and there is a strong relationship between pain and health-related quality of life (17). We found that pain evaluation in lymphedema can be measured using the short form-36 (SF-36), McGill short pain form, and the modified Barthel scale (18).

Our treatment regimen produced an overall substantial improvement in the perspective of pain with each measurement tool demonstrating significant reduction in mean scores. In contrast to the effects of treatment, we were unable to see similar effects from topical skin care with a moisturizer. To our knowledge, this is the

first measurement of change in pain intensity due to treatment in lipedema. It clearly demonstrated that beyond edema and capillary fragility reduction, our treatment program has a beneficial effect on pain perception.

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Gyöző Szolnoky MD, PhD
Department of Dermatology and Allergology
University of Szeged
P.O. BOX 427
H-6720 Szeged, HUNGARY
Tel: +36-20-326-6161
Fax: +36-62-545-954
e-mail: szolnoky@dermall.hu