Novel Physiotherapies

Ahmed, J Nov Physiother 2013, 3:3
http://dx.doi.org/10.4172/2165-7025.1000155

Research Article Open Access

Endermologie Technique versus Decongestive Lymphatic Therapy on Post-mastectomy Related Lymphedema

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Abstract

Background: Lymphedema is a common sequela post mastectomy representing a complex therapeutic challenge.

Study aim: To study the effectiveness of Endermologie therapy on reducing arm edema, edema, and shoulder function in women post mastectomy.

Subjects and methods: Twenty women with unilateral post mastectomy lymphedema were assigned for the study, aged from 30 to 50 years. They were divided into two groups of equal number, study group received Endermologie therapy 4 days per week for 4 weeks and a decongestive physical therapy (DLT) group. Limb volume, pain, and shoulder range of motion (Flexion, and abduction) were measured before and after 4 weeks of treatment.

Results: The results showed significant reduction in limb volume, and pain in the Endermologie group as compared to the DLT group (p value<0.001), and increased shoulder ROM (flexion, and abduction)in Endermologie group as compared to the DLT group (p value<0.001).

Conclusion: Endermologie therapy can be introduced as a safe modality for post mastectomy lymphedema.

Keywords: Post mastectomy lymphedema; Endermologie therapy; Decongestive physical therapy

Introduction

Secondary arm lymphedema still remains a problem for those who have undergone surgery and/or radiotherapy for breast cancer, with a recent review stating that in excess of 30% [1] of women who have undergone such treatment will go on to develop lymphedema. It is known that secondary lymphedema is chronic in nature [2] and therefore there is a continual focus on establishing therapies which will not only reduce the limb swelling but also the detrimental tissue changes and the accompanying subjective symptoms.

Lymphedema is defined as arm edema in the breast cancer patient caused by interruption of the flow of the axillary lymphatic system from surgery or radiation therapy, which results in the accumulation of fluid in the subcutaneous tissue of the arm, with a decrease in tissue distensibility around the joints and an increased weight of the extremity [3]. Breast-cancer-related Lymphedema may have a physical, psychological, and functional impact, and it increases the risk of repeated episodes of superficial infection [4-7]. It is worthy to place importance on the intervention of breast-cancer-related lymphedema.

Decongestive lymphatic therapy (DLT) is a common management for lymphedema. A program combining skin care, manual lymphatic drainage, exercise, and compression therapy (multilayer bandage or garment) is recognized as the best practice in lymphedema management. There have been numerous prospective investigations with different treatment frequency and duration showing the effect of DLT [8-12].

Endermologie is a machine-assisted massage system that allows positive pressure rolling, in conjunction with applied negative pressure to the skin and subcutaneous tissues. It involves the use of a motorized device with two adjustable rollers and controlled suction, which creates a symmetrical skin-fold allowing for smooth and regulated deep tissue mobilization. It was originally developed to soften scars but now it is widely used as an alternative method for altering fat distribution in the subcutaneous plane [13,14]. Lymphedema treatment remains a problem even with modern treatment modalities, since clear therapeutic protocols do not exist [15].

The purpose of the current study was to study the effectiveness of Endermologie technique in comparison with DLT in the reduction of post mastectomy lymphedema.

Material and Methods

Subjects

Forty women treated for unilateral breast cancer with secondary upper limb lymphedema post mastectomy were recruited from the out patients clinic of Nasser Medical Institute and National Tumor Institute in Cairo Governate, Egypt. Their age was ranged from 30 to 50 years. They were diagnosed as having secondary Lymphedema of the upper limb with a limb circumference difference of at least 2 cm compared to the contra lateral limb, all women have finished treatment with radiotherapy and/or chemotherapy at least six months before the study began and all of them have signed consent of approval to participate in the study. Those who had underlying primary lymphedema, recurrent cancer, current or recent cellulitis, or who had received active treatment in the past month were excluded from the study.

Treatment procedures

The women were divided into two groups of equal number, the

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Received April 06, 2013; **Accepted** May 29, 2013; **Published** June 02, 2013

Citation: Ahmed ET (2013) Endermologie Technique versus Decongestive Lymphatic Therapy on Post-mastectomy Related Lymphedema. J Nov Physiother 3: 155. doi:10.4172/2165-7025.1000155

first group received Endermologie therapy sessions in addition to skin care, 1-h pneumatic compression therapy (at 40 mm Hg), application of a short-stretch bandage, and a 20-min physical therapy exercise twice weekly for four weeks (total 8 sessions) and the second group who received decongestive lymphatic drainage for four weeks which included skin care, 30-min manual lymphatic drainage, 1-h pneumatic compression therapy (at 40 mm Hg), application of a short-stretch bandage, and a 20-min physical therapy exercise.. All women were examined and have received general explanation about the evaluation and the treatment procedures.

Procedure

Evaluation Procedures: The evaluation procedure had been done for all patients before starting the program and after 4 weeks of treatment.

Pain Intensity Level: Pain was evaluated by using visual analog scale (VAS; 0–10 cm; 0 means no pain, 10 means severe pain). The distance between the extreme left of the

Scale ("no pain") and the subject's mark was measured to the nearest millimeter. High levels of reliability and validity of VAS had been reported [16,17].

Shoulder Range of Motion: Active shoulder flexion and abduction were measured by the electrogoniometer device through a stander measuring procedure [18]. Three repetitive measurements were taken continually, with their mean values was used for analysis.

Limb size: Water-displacement volumetric measurements were used to quantify limb size at each evaluation. Each limb was immersed in a water-filled tank. The displaced fluid was collected and measured. The inter- and intra-rater reliability of water-displacement measurements was high [19] (r=0.99).

Statistical analysis

All data were analyzed using SPPS (version 16.0). The paired sample student T-test was used to analyse within group variables and the independent sample T-test was used to analyse between group variables, where $p<0.05$ is significant.

Results

Twenty women with unilateral post-mastectomy lymphedema were participated in this study who randomly assigned into two groups of equal number. The mean of their age, weight and height and post operative duration are shown in table 1. There is no statistical significant differences between both groups regarding the ages, weights, heights and post operative durations ($p>0.05$).

Pre treatment measurement of pain , limb volume and shoulder function (flexion, and abduction) for patients treated by Endermologie technique or decongestive physical therapy technique (DLT) have shown no statistical significant difference ($p>0.05$) which means that any improvement will be due to only treatment intervention as shown in tables 2 and 3.

Items	Endermologie Group	DLT Group	P value
	Mean ± SD	Mean ± SD	
Age (years)	46.100 ± 1.197	46.900 ± 2.234	>0.05
Weight (kg)	76.500 ± 1.716	74.200 ± 2.044	>0.05
Height (cm)	165.00 ± 1.247	164.60 ± 3.950	>0.05
Post operative duration (months)	61.600 ± 2.221	59.100 ± 2.601	>0.05

Table 1: Patients demographic data of both groups.

Groups	VAS		Limb volume		Within group comparison
	Mean ± SD		Mean ± SD		
	Pre	Post	Pre	Post	
Endermologie Group	8.900 ± 0.402	3.930 ± 0.283	498.40 ± 4.142	346.30 ± 4.347	P<0.001
DLT Group	8.780 ± 0.446	6.150 ± 0.227	499.00 ± 2.867	375.60 ± 13.632	P<0.001
Between groups comparison	P>0.05	P<0.001	P>0.05	P<0.001	P value

Table 2: Comparison of pain and limb volume within each group and between both groups at pre and post treatment.

Groups	Shoulder flexion		Shoulder abduction		Within group comparison
	Mean ± SD		Mean ± SD		
	Pre	Post	Pre	Post	
Endermologie Group	47.860 ± 0.998	108.16 ± 1.578	43.640 ± 1.078	97.040 ± 1.863	P<0.001
DLT Group	46.810 ± 0.769	99.490 ± 1.463	44.090 ± 0.965	86.700 ± 1.059	P<0.001
Between groups comparison	P>0.05	P<0.001	P>0.05	P<0.001	P value

Table 3: Comparison of shoulder flexion and abduction within each group and between both groups at pre and post treatment.

A highly significant decrease in pain and limb volume ($p<0.001$) have been found between pre and post treatment of both groups as shown in table 2. Similarly, a highly significant increase in shoulder function (flexion, and abduction) has been found between pre and post treatment of both groups as shown in table 3.

Comparison of both treatment regarding pain, limb volume and shoulder function (flexion, and abduction) have shown a highly significant difference ($p<0.001$) between both groups as shown in tables 2 and 3.

Discussion

This study was designed to determine if the treatment with Endermologie technique has an effect on reducing the secondary lymphedema in women post mastectomy.

The Endermologie machine was frequently used in the cosmetic field in the treatment of cellulite and body contouring, there are not enough studies carried on about its therapeutic role in the treatment of secondary lymphedema as the machine therapeutic techniques considered to be new. This study will add more support in using the Endermologie technique in the future as an accredited physical therapy method for the treatment of Lymphedema as there is no absolute cure for lymphedema yet without hazardous side effects and the Endermologie machine has no side effects [13].

The result of this study came in agreement with the result of the study conducted by Campisi et al. [20], who found decrease of the excess limb volume from 5% to 10% after Endermologie therapy and reduction of the fibrotic tissue components, softening of the skin and superficial tissue through improving the lymphatic drainage of the affected limb in patients with secondary Lymphedema of arm and leg treated by combining physical therapy through applying Endermologie technique along with microsurgical operations.

Chang et al. reported that both manual lymph drainage and Endermologie treatment plus compression bandaging applied over a minimum of two weeks are beneficial for the treatment of secondary arm lymphedema but Endermologie treatment has a 33% shorter treatment time than manual lymph drainage [14].

Endermologie therapy accompanied by elastic compressive treatment two sessions a week for four weeks induced significant reduction in the circumference of the affected limb as well as significant improvement of microcirculation of the Cutaneous oxygenation and of the interstitial metabolism in the patients underwent surgery for malleolar and calf lipolymphedema [21].

Conclusion

It can be concluded that Endermologie therapy for a post-mastectomy upper limb lymphedema induced improvement in the form of decrease upper limb edema and decreased pain and improved the range of motion (flexion, and abduction) of the affected limb.

Acknowledgement

We are indebted to Cairo University, Cairo, Egypt, Faculty of Physical Therapy, and Department of Physical therapy for Surgery, for their permission to commencement the study in our patient's clinic of Nasser Medical Institute and National Tumor Institute in Cairo Governate, Egypt and to the participants.

Conflict of Interest

We certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Source of Funding

This research received no specific grant from any funding agency in the public, commercial, or not/for profit sectors.

Ethical Clearance

We certify that this study involving human subjects is in accordance with Helsinky declaration of 1975 as revised in 2000 and that it has been approved by the relevant ethical committee.

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