

Clinical treatment of arm lymphedema in an outpatient setting: Two years of follow up

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Abstract

The aim of this study is to report on a multidisciplinary outpatient approach to the clinical treatment of lymphedema adapting the conditions of an existing work. The reduction in breast-cancer related lymphedema over two years was evaluated in a retrospective study for a group of 31 women with ages ranging between 35 and 83 years old (mean 56.6 years) in the Godoy Clinic in São José do Rio Preto. The treatment involved manual lymph drainage using the Godoy & Godoy technique, active and passive exercises utilizing facilitating apparatuses designed for these patients, a home-made compression sleeve made of a cotton-polyester fabric, nutritional guidance, psychological support, guidance about occupational activities (day-to-day activities, work and handicraft activities) and directed hydrogymnastics. Constant readjustments were made to the compression sleeves by a professional seamstress. Monthly evaluations were made by water-displacement volumetry. Analysis of variance was employed for statistical analysis with an alpha level of 5% (p-value < 0.05) being considered acceptable. The mean reduction in the first year was 55.2% and in the second year it was 75.8%, respectively, both of which were statistically significant (p-value < 0.001). Significant reduction of breast-cancer related lymphedema and maintenance of the results is possible, however routine check-ups and guidance should continue for periods determined by the treatment team.

Key words: Lymphedema, breast cancer, treatment

Introduction

Destruction of the lymphatic system causes a progressive and chronic condition with functional impairment and disabilities limiting patients in their daily activities, and thus involving nearly all aspects of their quality of life^{1,2}. Lymphedema is a public health issue deserving greater attention. More systematic surveillance for earlier detection and the potential benefits of physical activity to prevent lymphedema and mitigate symptoms warrant further clinical integration and research³. Strong correlations have been found between the severity of edema and fear of movement. There is a significant negative relationship between the

fear of movement with quality of life and with home-based exercise programs⁴.

The management of sequelae of conservative breast treatment must therefore involve a multidisciplinary approach; patients not only expect better cosmetic appearance, but also want to focus on other treatment advances such as improvement of psychological and sensory outcomes⁵. One study suggests that quality of life significantly improves during the maintenance phase of upper limb lymphedema treatment, which was necessarily correlated to a reduction in limb volume⁶.

An association of therapies is suggested in the treatment of lymphedema including lymph drainage, compression therapy, myolymphokinetic exercises and activities, and skin care⁷. The aim of the current study is

to report on the two-year evolution of a group of patients under treatment for breast-cancer related lymphedema.

Method

In a group of 31 women, the reduction in breast-cancer related lymphedema over a two-year treatment period was retrospectively evaluated in the Godoy Clinic in São José do Rio Preto. The patients' ages ranged from 35 to 83 years old with a mean age of 56.6 years. After diagnosis of breast-cancer related lymphedema, the patients, on arrival in the clinic and after accepting to participate in the research, were consecutively included in the study group. Using water-displacement volumetry, arms with differences of more than 200 mL compared to the contralateral arm were considered lymphedematous. In this period, one patient died and one patient relapsed and required chemotherapy. Patients who were unable to participate in this type of therapy for any reason, including due to the distance between their homes and the treatment center and the impossibility of going to the treatment center every week were excluded from the study.

The medical team was formed of a physician, occupational therapist, physiotherapist, dietitian, psychologist, physical educator and a seamstress.

The diagnosis of lymphedema was made by the physician who correlated all the information from the treatment team. Routine evaluations were generally made on a monthly basis but, when necessary, weekly or daily assessments were made to check the efficacy of each form of treatment. The reduction in volume of the limb was routinely assessed by water-displacement volumetry.

The job of the seamstress was to make compression sleeves and adjust them whenever necessary and so she became responsible for the compression mechanisms. The efficacy of compression was evaluated by the physician, occupational therapist and physiotherapist. Guaranteeing an efficacious compression mechanism is perhaps the most important part of the treatment. Perimetry, measurement of the amplitude of movements, evaluation of the day-to-day activities and of occupational practices were frequently performed by physiotherapists and occupational therapists. Psychologists carried out specific evaluations (assessments of depression, anxiety, body image and quality of life) and the dietitian made a nutritional check up using detailed diet records and bioimpedance.

The patients participated in group sessions once or twice per week depending on their necessities. The sessions lasted about 4 hours per day. From 7:00 to 8:00 a.m. the patients participated in a hydrogymnastics program aimed at improving joint mobility and

lymphovenous return. Next they ate breakfast in the clinic and immediately after they performed one hour of different active exercises under supervision using facilitating apparatuses specially created for these patients. Then they participated in handicraft activities for 40 minutes coordinated by the occupational therapist and physiotherapist. For about 90 minutes the patients were submitted to manual lymph drainage using the Godoy & Godoy technique⁸, mechanical lymph drainage⁹ using an apparatus specially designed for this purpose and cervical stimulation¹⁰. Nutritional evaluation and guidance was carried out once per month and a psychological evaluation was provided. For patients who needed, individual psychological support was made available. The compression sleeves were adjusted on a weekly basis. Participants took turns among the different activities during this period.

The Godoy & Godoy manual lymph drainage method uses manual compression (30 to 40 mmHg - subjectively gauged) sliding the hand along the course of the lymphatic vessels up to the corresponding lymph nodes. In these patients only alternative systems (cephalic and posterior currents) were drained. In the other regions only light compression was utilized (30 to 40 mmHg - subjectively gauged) without moving the hand. The contralateral hemithorax was drained with displacement movements being used between the nipple and the axilla and just manual compression (30 to 40 mmHg - subjectively gauged) in the other regions of the thorax⁸.

Passive mechanical lymph drainage involves flexion and extension movements of the forearm utilizing an apparatus⁹.

Active exercises are performed with facilitating devices (eight apparatus): each patient chose her preferred apparatus. These devices were developed with the objective of making the programming and evaluation of activities possible. Thus, the velocity, time and manner of using each device with each patient are determined with assessments being achieved using volumetry before and after each activity.

The occupational therapist transformed occupational activities into a form of lymphedema treatment utilizing the movements of the arms as a form of myolymphokinetic exercises or activities. Myolymphokinetic exercises or activities are considered therapeutic when they cause a reduction in the volume of the limb. Thus, the individual evaluation of patients involved guidance in respect to the speed and intensity of movements and the duration of each activity. A compression sleeve of a cotton-polyester material was worn during all the activities.

Ethics Committee of the Medicine School in São José do Rio Preto (FAMERP), Brazil. ANOVA and t test paread

was utilized for the statistical analysis with an alpha level of 5% (p-value < 0.05) being considered statistically significant.

Results

The reduction in the volume of lymphedema during treatment was significant (one-way analysis of variance: p-value < 0.0001).

Table 1 shows the volumes of the healthy and lymphedematous limbs at the start of the study and then after one and two years of treatment. Table 2 shows the statistical data of treatment.

The mean volume of the normal limb before treatment was 1682.1 grams and lymphedematous limb 2265.5 grams, after 2 years of treatment it was 1824.3 grams lymphedema limb (comparison between the lymphedematous and healthy arms – paired t-test: p > 0.05).

The lymphedematous limbs of all patients reduced in volume over the two years of treatment. However the volume of the lymphedematous limb of one patient at the final measurement (two years) was greater than at one year.

This was due to an outbreak of erysipelas close to the final measurement. The mean reduction in the first year was 55.2% and in the second year it was 75.8%.

Table 1: Volumes of the healthy and lymphedematous limbs at one and two years of treatment

Patient	Before treatment		After treatment	
	Healthy (Control)	Diseased-(after)	1 year	2 years
1	1400	1860	1608	1513
2	2346	3100	2612	2476
3	1876	3326	2376	2043
4	1652	1964	1803	1755
5	1623	1923	1738	1623
6	1478	1689	1498	1476
7	1527	2396	1652	1585
8	1798	2176	1896	1831
9	2236	2885	2337	2256
10	1163	1625	1252	1252
11	1464	1827	1738	1653
12	1236	1439	1363	1295
13	1484	1998	1503	1494
14	1688	1978	1725	1692
15	1411	1680	1438	1422
16	1876	2208	2076	2100
17	2363	2738	2493	2394
18	1329	2597	2363	1798
19	1996	2668	2079	1993
20	1683	2236	1970	1843
21	1296	1638	1596	1342
22	1836	2392	1931	1886
23	1698	2487	2038	1914
24	1738	2200	1996	1836
25	1794	2159	1879	1785
26	1752	2416	2019	1928
27	1507	2298	1915	1876
28	1644	2208	2165	1987
29	1765	3012	2817	2645
30	1689	2529	2189	1886
31	1798	2578	2187	1984
mean	1682.1	2265.5*	1943.6	1824.3*

P value 0.0001 One-way Analysis of Variance (ANOVA)

Table 2: Statistical relationships of volume loss of limbs during treatment

Comparison	Mean difference	q	p-value
Normal vs. diseased	-583.35	8.760	*** < 0.001
Normal vs. diseased at 1 year	-261.48	3.927	* < 0.05
Normal vs. diseased at 2 years	-140.87	2.115	> 0.05
Diseased initial vs. 1 year	321.87	4.833	** < 0.01
Diseased initial vs. 2 years	442.48	6.645	*** < 0.001

Discussion

The current study shows a constant and significant reduction in volume of breast-cancer related lymphedema. In the literature there are no long-term follow-up studies that include all the characteristics of this treatment method. This group was the second group that utilized this treatment protocol; the first was evaluated for only one year and some characteristics were modified from the first group in an attempt to constantly improve treatment and make it dynamic.

New patients were counseled by healthcare professionals, but the existing members had an important role in their integration in the group. When ten new patients had been added to the initial group, a second group was formed, that is, the group of the current study. During this period, adaptations were made both at the clinical level and in the day-to-day activities. The essence of this treatment is the compression mechanisms and adjustments to daily life activities. Studies have shown that just daily life activities associated with the use of a cotton-polyester compression sleeve is sufficient to treat 11.

This approach corresponds to the main component of the physical aspect, however psychological support, either in group or individual settings, helps to identify the patients' complaints, difficulties and treatment proposals. As this model is dynamic it can be adapted to the necessities of each region or each culture and each patient. The interaction between patients in the activities was fundamental for the development of social exchange. Active exercises and occupational programs within the group help to unify the social aspects, but even so, the true sedimentation of the work comes from improvement of lymphedema.

The entire evolution of this model was developed and adapted from several forms of treatment. The development of active and passive exercising devices allows individual control and assessment of how each patient performs these activities. For this, each patient performed activities using all the different apparatuses; they were made aware of the necessity to correctly follow the guidance for activities, in particular related to the speed, intensity and duration of the activities. Then they were allowed to do the exercises in their own way but using volumetric evaluation to show the importance of correctly following the guidance given; if they did not an increase in volume occurred. Thus, the active devices were essential to make the patients aware of constraints such as speed and duration in relation to the other types of activities.

Psychological support was fundamental and required by the professionals of the treatment team themselves in order to unify the group. Nutritional control, mainly related to weight, was a nuisance, but necessary. The

seamstress became responsible for adjustments of the compression mechanisms and the creation of individual adaptations for each patient.

This approach is important as although lymphedema is incurable 12, it is possible to maintain the limb within a normal size range compared to the contralateral. The follow-up of these patients is another crucial point; constant reminders by the medical team make patients aware of the disease at all times. Additionally, some control instruments, such as providing the patient with an evolution chart, on which monthly volumetric measurements are plotted, help to maintain the results. Over these two years, it was observed that not all patients maintain the losses achieved in the previous month, however monthly evaluations serve to reassess the treatment thereby allowing changes when necessary. In the last evaluation of the two-year period, one patient (Patient 16) suffered an increase the volume of the arm compared to the measurement of the previous year. Even so the volume was still lower than at the start of treatment. This fact was due to an episode of erysipelas close to the two-year measurement day.

In this group social interaction was very important and even after total reduction of the edema the patients chose to continue participating in the group. The group gave them support in their lives and assisted them to solve their problems; they had created something that was important to them. For some patients the objective was to completely reduce the lymphedema. Others reported that they are happy with the reductions in size that they had achieved and just wanted to maintain the results. These options were respected by the medical team. One patient (Patient 21) did not achieve a good loss in the first year but had a very good evolution in the second year. Thus, personal psychological problems should be adapted to the reality of each moment in time.

In the literature, several forms of treatment for lymphedema have been described however continuous control of patients has not been reported. This aspect should be reevaluated by treatment groups, as although we cannot cure the patients, we can improve the size of limbs to close to normal.

Conclusion

A multidisciplinary approach and adaptations of conditions both of the team and the patient, utilizing proven techniques, efficacious in the reduction of edema, allow a progressive reduction and maintenance of the size of lymphedematous limbs.

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