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THE EFFECTS OF COMPLETE DECONGESTIVE THERAPY ON BREAST CANCER RELATED LYMPHEDEMA

O.M. BALTAG[1] A.I. SINGURAN[1] M. APOSTU[1] M. CORDUN[1]

Abstract: *Breast cancer related lymphedema is the most common side effect that occurs after the treatment. There are four stages of evolution of the lymphedema and the most frequent treatment used is complete decongestive therapy (CDT). The aim of this study is to analyse the effectiveness of CDT in the treatment of breast cancer related lymphedema. After the final assessment, the data were processed statistically and we found that the evaluated circumferences decreased, which demonstrated the effectiveness of the CDT.*

Key words: *breast cancer, lymphedema, complete decongestive therapy.*

1. Introduction

The treatment applied for breast cancer consists of surgery and adjuvant treatment (chemotherapy and local radiation). Although the adjuvant treatment is designed to minimize the risk of cancer recurrence and reduce mortality, it has negative effects on the human body such as: cardiotoxicity, pneumonia, pain, lymphedema, decreased mobility of the shoulder, myelosuppression, peripheral neuropathy, infertility, weight gain, anxiety, depression, fatigue [1].

The most common side effect is lymphedema, which is classified into 3 forms: mild, moderate and severe [9]. Lymphedema is characterized by an accumulation of lymph liquid, resulting from the removal of the lymph nodes during mastectomy [8]. We can act on lymphedema through all specific and non-specific physical therapy means, including hydrotherapy.

Tretbar [13] differentiate 4 lymphedema development stages: stage 0 (it's reversible, it occurs after physical activity and decreases after rest), stage 1 (lymphedema doesn't disappear after rest, but can be reduced with proper treatment), stage 2 (lymphedema persists after treatment because the tissue fibroses) and stage 3 (also known as elephantiasis, it is an irreversible form).

According to Hayes et al. [5] breast cancer related lymphedema is an issue of public concern that has detrimental effects on quality of life. It needs special consideration and systematic surveillance

[1]National University of Physical Education and Sport, Bucharest.

for an early diagnosis. The authors concluded through a study that 33% of patients developed lymphedema 6 months after surgery. The clinical signs used to identify lymphedema are the pitting sign and the Stemmer sign [3].

The perimeter test is the most popular technique for determining lymphedema, but there are also some paraclinical investigations used: MRI, perometry, bioelectrical impedance, lymphoscintigraphy [10,11].

Performing low-intensity exercises, manual lymph drainage and using the compression sleeves during and after the adjuvant treatment can prevent the appearance of lymphedema and decrease the upper limb volume [4].

The most popular and successful treatment for managing lymphedema is complete decongestive therapy (CDT) [2,6]. It includes low-intensity physical activity, manual lymph drainage and multi-layered compression bandages. Early CDT treatment has beneficial long-term outcomes [7].

Lymphedema management requires manual lymph draining. The techniques applied include: fixed circular movements (figure 1), pumping technique (figure 2), pressures applied with the palmar face of the hands placed in a bracelet position (figure 3).

Fig.1. *Stationary circular movements*

Fig.2. *Pumping technique*

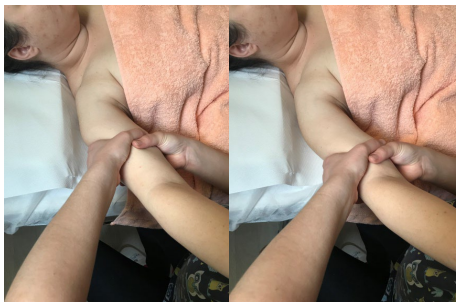

Fig.3. *Pressures applied with the palmar face of the hands placed in a bracelet position*

Lymphedema self-management is a very important factor in the prophylaxis and treatment [12]. Thus, we consider that the patient should be taught different techniques of lymphedema self-management, such as: massage, exercises, dry brushing, hydration, diet.

This study aims to evaluate CDT's efficacy in treating breast cancer related lymphedema, in order to lessen its volume.

2. Material and Methods

10 subjects between the ages of 33 and 55 years old made up our sample. All the subjects underwent radical mastectomy, chemotherapy and local radiation therapy.

We evaluated the circumferences at the following points: metacarpophalangeal

joints, distal radio-ulnar junction, 10 cm distal of the lateral epicondyle, 5 cm proximal to the elbow joint and 10 cm proximal to the lateral epicondyle. The assessment was performed on both upper limbs, before and after applying the CDT, in order to obtain comparable measurements.

CDT includes manual lymph drainage, multi-layered compression bandage and low-intensity exercises. It has been applied for 10 straight days, then twice a week for 2 months.

In order to effectively treat lymphedema caused due to breast cancer, manual lymph drainage is crucial. The techniques considered are:

- ✓ Make stationary circular motions with the fingers on the limbs and the ganglion station;
- ✓ Light upward pressures are used with the palmar faces of the fingers as part of the pumping technique;
- ✓ Thumb and index fingers pressures applied while holding a bracelet position; pressure is applied is upward in a distal to proximal manner.

The aim of multi-layered compression bandage is to maintain the effects obtained after performing the manual lymph drainage.

Low-intensity exercises are performed after the manual lymph drainage and their role is to activate the upper limb muscles.

3. Results

Measuring the metacarpophalangeal joint revealed that the average value decreased by 1 cm from the first assessment, which was 18.7 cm, to 17.7 cm at the final evaluation. From 19 to 17.8, the median value decreased. The averages of the two evaluations differed statistically significantly distinct, according to the bilateral t-test; the t value was 5.74 and the p value was less than 0.000 <0.05. The impact size value of 0.66 confirmed the therapeutic protocol's effectiveness (table 1).

Statistic indicators – perimetry of the metacarpophalangeal joint Table 1

Assessment	Mean	Median	Standard deviation	Amplitude	Variaton Coefficient	T test (t value)	P value	Effect size
Initial	18.7	19	0.97	3	5%	5.74	<0.000	0.66
Final	17.7	17.8	1.01	3	5%			

The average value was reduced by 1.7 cm at the distal radioulnar joint, from 18.8 cm in the first evaluation to 17.1 cm in the last evaluation. When compared to the average measurement taken in the other limb, which is 16.7 cm, this number is lower by 0.4. The variance coefficient dropped from 8% to 6%, a 2% decrease. Additionally, the standard deviation fell from 1.43 to 1.05. The t test demonstrates a statistically significant difference between the averages of the two scores, with p=0.006<0.05 and the t value is 3.18. The size of the effect (0.66) as indicated in table 2, is closely proportional to the advancement made after implementing the treatment procedure.

The average value for measurements taken 10 cm away from the laterally

epicondyle dropped by 2.9 cm, from 26.1 cm during the first assessment to 23.2 cm during the final assessment. The average at the final evaluation was 1.5 cm higher than the average value for measurements taken in the other limb (unoperated), which is 21.7 cm. The amplitude decreased from 6.5 to 5.5. The variation coefficient remained constant at 8%. According to the findings of the bilateral t-test, with a p value of 0.003 and a t value of 6.64, the averages of the two evaluations were statistically significantly different. The therapy schedule is effective, as evidenced by the effect size's value of 0.97 (table 3).

From 32.1 cm at the initial assessment to 29.2 cm at the final assessment, we noticed a drop in the average of 2.9 cm when the measures were taken 5 cm near the lateral epicondyle. The average of the results from the final evaluation is 1.1 cm greater than the average of the values obtained from the measurements made in the opposite limb, which is 28.1 cm. The amplitude reduced by 2.2 while the median shrank by 3.5. From 2.39 to 2.38, the standard deviation fell. A statistically significant difference is revealed using the t test. $p = 0.0002<0.05$ for the difference between the two evaluation averages for $t = 4.92$. Table 4's data illustrates how the size of the effects (0.73) is related to the progress made after adhering to the therapy plan.

The arm's circumference, measured at a point 10 cm from the lateral epicondyle, decreased on average by 2 cm from 34 to 32 at the time of the final assessment. The final evaluation's average is 0.4 cm greater than the 31.6 cm average of the data measured in the other leg. From 3.60 to 4.13, the standard deviation increased. The variance coefficient increased by 2% while the median dropped from 32 to 31.8. According to results of the bilateral t test, with a p value of $0.001<0.05$ and a t value of 4.07, the averages of the two evaluations were statistically significantly distinct (table 5).

Statistic indicators – perimetry measured at the distal radio-ulnar joint Table 2

Assessment	Mean	Median	Standard deviation	Amplitude	Variaton Coefficient	T test (t value)	P value	Effect size
Initial	18.8	18.5	1.43	4.5	8%	3.18	0.006	0.66
Final	17.1	17	1.05	4	6%			

Table 3

Statistic indicators – perimetry measured 10 cm distal to the lateral epicondyle

Assessment	Mean	Median	Standard deviation	Amplitude	Variaton Coefficient	T test (t value)	P value	Effect size
Initial	26.1	26.3	1.98	6.5	8%	6.64	0.003	0.97
Final	23.2	23	1.76	5.5	8%			

Table 4

Statistic indicators – perimetry measured 5 cm proximal to the lateral epicondyle

Assessment	Mean	Median	Standard deviation	Amplitude	Variaton Coefficient	T test (t value)	P value	Effect size
Initial	32.1	32.5	2.39	9.2	7%	4.92	0.002	0.73
Final	29.2	29	2.38	7	8%			

Table 5

Statistic indicators – perimetry measured 10 cm proximal to the lateral epicondyle

Assessment	Mean	Median	Standard deviation	Amplitude	Variaton Coefficient	T test (t value)	P value	Effect size
Initial	34	32	3.60	13	11%	4.07	0.001	0.34
Final	32	31.8	4.13	14.5	13%			

4. Conclusions

Since treating lymphedema treatment is of the utmost priority, we think it's crucial to start using manual lymph drainage as soon as possible following surgery since it helps to stimulate the removal of extra lymphatic fluid.

The lymphatic capillaries' pumping mechanism is activated by engaging the upper limb muscles, which is something we advise doing in addition to light exercise.

We saw that the circumferences shrank after the assessment was carried out at the upper limb next to the surgical area. This fact shows how effective the CDT is, and statistically speaking, the results are significant because the significance level (p) was set as less than 0.05.

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