Preoperative preparation of a patient with grade II leg Lymphedema for his third hip replacement surgery

Maria de Fátima Guerreiro Godoy (PhD, OT) (Prof).a,c,∗, Livia Maria Pereira de Godoy (Undergraduate student) (Research Group).b,c,1, Renata Lopes Pinto (PhT, Physiotherapist Master’s student) (Researcher).c,1, Jose Maria Pereira de Godoy (MD, PhD) (Professor).a,c,1

a Medicine School of Sao Jose do Rio Preto (FAMERP) and Clinic Godoy, Sao Jose do Rio Preto, Brazil
b Medicine School of Lusíadas-Santos-Brazil and Godoy Clinic, Sao Jose do Rio Preto, Brazil
c Godoy Clinic, Sao Jose do Rio Preto, Brazil

1. Introduction

The treatment of lymphedema remains a challenge to modern medicine, due to the characteristics of the disease. Lymphedema predominantly affects poor populations, usually there is no cure and there are few therapeutic options in the public and private healthcare sectors. This situation is exacerbated in less developed countries where the lack of government resources and specialized health professionals has led to the marginalization of the disease [1].

Lymphedema is an accumulation of water, salts, electrolytes, high molecular weight proteins and other elements in the interstitial space resulting from dynamic or mechanical changes of the lymphatic system that lead to a progressive increase in the volume of an extremity or body region with decreased functional and immunological capacity, weight gain and morphological changes [2].

A combination of therapies is recommended in the treatment of lymphedema, with the three most important being myolymphokinetic exercises, lymphatic drainage and compression therapy [1,3]. Myolymphokinetic exercises cause muscle movements that stimulate the veno-lymphatic return and under certain conditions help to reduce the volume of lymphedema, particularly when the movements are assisted [4].

The aim of this study was to evaluate the use of intensive treatment using Mechanical Lymphatic Therapy associated to grosgrain compression therapy to reduce leg volume of a patient with grade II
leg lymphedema before his third hip surgery to replace an artificial hip.

Case report

The case of a 75-year-old patient with leg lymphedema is reported. The patient was referred to the Clinica Godoy in Sao Jose do Rio Preto to treat lymphedema in June 2012. That patient was born with hip luxation and always walked with a limp. At age 45, he went to an orthopedic doctor complaining of pain in the left hip. An examination of the joint was performed, and osteoarthritis of the hip was diagnosed; hip replacement surgery was indicated. One year later he performed the same surgery on the right leg.

At that time he noticed that his legs had slight ankle edema, mainly of the left leg. In 2011 the entire left leg was affected by lymphedema. After two years he visited a vascular specialist complaining of pain and swelling. An ultrasound was performed which diagnosed only edema. The patient was advised to use an elastic knee-length stocking.

In 2005, he began to experience moderate pain of around 5
on a scale of 0–10 in the left knee and hip. After consulting the orthopedic doctor, osteoarthritis of the left knee joint was diagnosed.

In 2011, the entire left leg was affected by edema and the joint pain had increased in intensity, albeit intermittently, at around 8 on a scale of 0–10. The patient returned to the orthopedist, who recommended a third surgery to replace the left hip prosthesis however the patient was referred to a specialist to treat the edema before the surgery.

At the clinica Godoy the patient was diagnosed with lymphedema of both legs. On evaluating by bioimpedance (body composition analyzer InBody S10 – BioSpace, Seoul, Korea), the volumes of the right and left legs were 5.52 and 7.241, respectively.

The patient was submitted to intensive treatment for five consecutive days. Treatment consisted of Mechanical Lymphatic Therapy (RAGodoy®) for 8h/day, Manual Lymphatic Therapy (one hour daily) and a low-stretch compression stocking (grosgain) worn continuously for 24h/day with adjustments being made daily. There was significant improvement by the fifth day with the volume of the right leg dropping to 4.45 l and of the left leg to 5.57 l. The patient was discharged and advised to continue wearing the grosgain stocking and walking to maintain the results. In this period, he was followed up on an outpatient basis, and during the subsequent three months he had a continuous improvement reducing the volume of the right leg to 4.14 l and of the left leg to 4.16 l (Table 1).

Soon after the edema was normalized bilaterally, he was submitted to surgery.

This study was approved by the Research Ethics Committee of FAMERP (# 200264-11/12/12) and the participant gave his informed consent.

2. Discussion

In this case report intensive treatment was used to reduce the volume of leg edema prior to a surgery to replace a hip prosthesis in a patient with grade II leg lymphedema. Five days of intensive treatment significantly reduced the size of both legs. After this, the reduction in leg volume continued until the surgery was scheduled. The maintenance of the results and further reductions were supervised on a continuous outpatient basis; fortnightly or monthly monitoring is essential. Small positive and negative changes, which are common in the evolution of this type of case, were observed but the end result was a total reduction of the edema. In the literature, there are no reports of this type of approach being used in the preoperative period to prepare a patient for surgery.

Intensive treatment in this case was based on the association of Mechanical Lymphatic Therapy (RAGodoy®) for about 8 h daily, Manual Lymphatic Therapy for one hour and grosgain compression stockings worn continuously (24 h/day). The RAGodoy® mechanical drainage device reproduces the physiological movements of the muscles of the calf and foot. The calf muscles function as a venous and lymphatic ‘pseudo-heart’, as external forces help the contraction mechanism of the lymphatic vessels and stimulate contractions of lymphangions. Muscle activity is critical in natural lymph drainage.

This approach not only significantly reduced the edema, but also controlled muscular trophism and joint mobility because of the dorsiflexion motion provided by the mechanical lymphatic drainage device.

Mechanical lymph drainage is critical to rapidly reduce limb volume, but compression is necessary to maintain the results. The use of inelastic compression is indicated to treat lymphedema because of the working pressures caused by muscle activity that favor drainage. It is important to educate patients about the need to use well-adjusted compression mechanisms during exercising and daily activities. The mechanism used must be correctly adjusted to avoid any discomfort, pain or pinching of the skin.

Mechanical Lymphatic Therapy (RAGodoy®) associated with low-stretch compression mechanisms, such as grosgain stockings, has a synergistic effect in reducing the volume of lymphedematous limbs. The association of active programmed exercises with low-stretch stockings may have a synergistic effect in reducing limb volume. It is possible to reduce the limb volume to normal or near to normal and maintain the reductions by keeping the compression stocking well-adjusted.

Lymphedema treatment prior to the occurrence of an orthopedic surgery no is related in the literature.

The treatment of lymphedema before orthopedic surgery can reduce the fibrosis and facilitating surgery.

Therefore this study presents a new therapeutic option for these patients and a way to reduce complications.

Competing interests

The authors declare that they have no competing interests (political, personal, religious, ideological, academic, intellectual, commercial or any other) in relation to this manuscript.

Ethical approval

The study was approved by the Ethical Committee of FAMERP (# 200264-11/12/12) and the participant gave his informed consent.

Consent

The participant gave his informed consent and signed.

Table 1

| Date   | Left leg | Right leg |
|--------|----------|-----------|
| 25/06/12 | 5.52     | 7.24      |
| 26/06/12 | 4.93     | 6.34      |
| 27/06/12 | 4.45     | 5.57      |
| 02/07/12 | 4.35     | 4.71      |
| 06/07/12 | 3.85     | 4.59      |
| 12/07/12 | 3.95     | 3.94      |
| 27/07/12 | 4.04     | 4.08      |
| 17/08/12 | 4.07     | 3.86      |
| 17/09/12 | 4.14     | 4.16      |
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Authors’ contributions

All authors participated and contributed to all phases of the study.

Guarantor

Prof. Maria de Fátima Guerreiro Godoy.

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