Evaluation of the Clinical Effectiveness of Physiotherapeutic Management of Lymphoedema in Palliative Care Patients

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Objective: Lymphoedema is a common sequel of cancer or its treatment that affects lymph node drainage. The physiotherapist, as member of the multiprofessional team in palliative care, is one of the keys to successful rehabilitation and management of patients with cancer and non-malignant motoneuron disease such as amyotrophic lateral sclerosis and palliative care needs. The aim of the study was to evaluate the frequency and effect of manual lymphatic drainage in palliative care patients with lymphoedema in a far advanced stage of their disease.

Methods: Retrospective study (reflexive control design) of data of the 208 patients admitted to our palliative care unit from January 2007 to December 2007. Demographic and disease-related data (diagnosis, symptoms, Karnofsky performance status and effect of manual lymphatic drainage interventions) were documented and compared. Statistics: mean ± SD, median; Wilcoxon’s test.

Results: Of the 208 patients, 90 who reported symptom load due to lymphoedema were included; 67 (74.4%) had pain, 23 (25.6%) dyspnoea due to прогредент trunk oedema. Mean age 65.5 ± 13.0 years; 33 (36.7%) male; Karnofsky index 50% (30–80%), mean length of stay 15.6 ± 8.0 days. The mean number of physiotherapeutic treatment interventions was 7.0 ± 5.8. Manual lymphatic drainage was well tolerated in 83 (92.2%) patients; 63 of 67 (94.0%) patients showed a clinically relevant improvement in pain, and 17 of 23 (73.9%) in dyspnoea.

Conclusions: The majority of the patients showed a clinical improvement in the intensity of symptoms after manual lymphatic drainage.

Key words: palliative care – lymphoedema – manual lymphatic drainage – physiotherapy – symptom control

INTRODUCTION

Lymphoedema is defined as the abnormal accumulation of protein-rich fluid of the lymphatic system (1) due to failure of physiological lymphatic drainage in the interstitial tissue. It is a common concomitant symptom of terminal cancer or sequel of antineoplastic cancer therapy such as chemotherapy and/or radiation therapy and one of the most underestimated and least researched complications of cancer diseases or its treatment. The incidence is highest among patients who have undergone resection and/or irradiation of a lymph node bed. Upper-extremity lymphoedema most often occurs with breast cancer and lower-extremity lymphoedema most often with prostate cancer, uterine cancer, lymphoma or melanoma (2).
Patients undergoing axillary surgery and/or radiation therapy for breast cancer are at higher risk for developing lymphoedema of the arm (3,4). Breast cancer survivors with arm lymphoedema have been found to be more disabled and have more psychological distress than do survivors without lymphoedema (5,6). In addition, patients having lymphoedema reported significantly lower quality of life with multiple functional assessments (7). Patients with lymphoedema may report a wide variety of complaints: heaviness or fullness related to the weight of the limb, a tight sensation of the skin or a decreased flexibility of the affected joint and not least increasing pain and dyspnoea. Lymphoedema has been reported to occur within days and up to 30 years after treatment for breast cancer (8). Eighty per cent of patients experience onset within 3 years after surgery; the remainder develop oedema at a rate of 1%/year (7). The prevalence and incidence of pain in lymphoedema are not well known. No prospectively controlled data exist, nor are there any large population-based reviews attempting to define the scope of pain in this population. Its prevalence has been reported as ranging from 30 to 60%. However, these numbers are based on small studies of women with breast cancer receiving therapy for lymphoedema. Therefore, these reports may be biased towards over-representation. Clinical experience does suggest that pain is present in a significant number of women with post-axillary node dissection lymphoedema. Part of the difficulty in determining the prevalence of pain is that different types of pain are encountered in individuals afflicted with lymphoedema. Additionally, an important question remains unanswered: is lymphoedema itself painful, or is pain reported due to concomitant pathologies in the affected region, such as loss of muscle tissue and function; or scar tissue causing shortening of muscles and less movement at joints; or is pain the result of oedema causing increased pressure on certain structures in sensitive areas (9).

However, the occurrence of lymphoedema is a devastating problem of patients suffering from cancer and may have a major impact on their quality of life. In most cases, it indicates the progression of illness and also results in multiple physical changes, which add to the already existing disease-related impairments. Therapeutic interventions are limited and symptoms due to lymphoedema are mostly challenging for the therapeutic team. Current management consists of combined physical therapy and pharmacological symptom control.

In palliative care (PC), physiotherapy has an important supportive role in the management of pain and other distressing symptoms, such as respiratory symptoms due to lymphoedema. Most often used in PC patients is manual lymphatic drainage (MLD), a sophisticated procedure based on a technique developed by Vodder (10) and perfected by Foldi (11) and other investigators, which requires specialized and costly training.

It has been stated that the absence of physiotherapy intervention would be detrimental to patient care and the ability of the patient to cope with the effects of the disease or its treatment on their functional capacity and quality of life (12). On the PC agenda, rehabilitation is finally enjoying a high profile. Within the context of cancer, the primary goal of rehabilitation is to assist the person with cancer in achieving maximum physical, psychological functioning and performing the activities of daily living within the limits imposed by disease or treatment (13). Adopting a rehabilitative approach shifts the focus from a preoccupation with the disease to one which is needs-led (14). Cancer patients may present with a wide range of needs that may benefit from physiotherapeutic intervention (15).

McDonnell and Shea (16) stated that the role of physiotherapy in oncological rehabilitation includes restoring function, reducing pain, reducing disability, increasing conditioning and mobility, and ultimately improving quality of life. There are few powerful studies concerning the efficiency and hardly any concerning combined or comparative management of lymphoedema in PC patients, and none in PC patients in a far advanced stage of their disease. Supportive therapy options are rarely being discussed.

In our PC unit, physiotherapists with expertise in MLD are frequently used for the management of lymphoedema in our patients with far advanced cancer and amyotrophic lateral sclerosis (ALS). The aim of the present study was to evaluate the patient documentation for frequency and effects of these measures with regard to a reduction in lymphatic oedema, pain and dyspnoea.

**PATIENTS AND METHODS**

In a retrospective study, data of the 208 patients with far advanced cancer or ALS admitted to our PC unit from January 2007 to December 2007 were evaluated. Patients with lymphoedema and receiving MLD were included. Documented demographical patient and disease-related data, such as diagnosis, symptoms and side effects, Karnofsky performance status, intensity of pain and dyspnoea at admission and daily during the course of stay were analysed. In all patients, pain therapy with opioids and co-analgesics was adjusted prior to the first MLD. The effect of MLD interventions, as evaluated and documented by the physiotherapist in charge at our PC unit at the time of treatment, was evaluated. Compared, using a reflexive control (before and after) design, were data on the intensity of pain and dyspnoea at admission with documented data directly prior to and after MLD and reduction of lymphoedema as documented after each individual MLD. The occurrence of adverse effects of medications had been categorized as either absent or existing; thereafter, side effects and symptoms were assessed and documented on a daily basis.

**ASSESSMENTS**

The intensity of pain and dyspnoea was measured on a numeric rating scale (NRS) (NRS: 0, no pain/dyspnoea; 10,
worst possible pain/dyspnoea), rated by the patients themselves, and the reduction of lymphoedema was measured using a four-point Likert scale (reduction: ‘none’, ‘little’, ‘moderate’ or ‘good’), rated and documented by the physiotherapist (17). The Karnofsky performance scale index (0–100%) was used to classify patients’ functional impairment (18,19).

DATA ANALYSIS AND STATISTICS

SPSS software was used for statistical evaluation of the anonymized data. Descriptive methods (mean ± SD) were used for comparative quantification of pain and dyspnoea at admission and before/after MLD. Karnofsky performance index was given as a median (range). Wilcoxon’s test was used for comparative testing. The P values cited were two-sided, and P values < 0.05 were regarded as statistically significant.

RESULTS

Of the 208 patients, 90 with symptom load due to lymphoedema were included; at admission, 67 (74.4%) reported pain and 23 (25.6%) suffered dyspnoea due to progredient trunk oedema. Mean age was 65.5 ± 13.0 years; 33 (36.7%) male; the median Karnofsky index was 50% (30–80%), mean length of stay 15.6 ± 8.0 days; survival time after admission 22.0 ± 33.0 days. Fifty-nine patients had somatic pain and eight somatic and neuropathic pain. Demographics and diagnoses at admission are shown in Table 1. The number of MLD interventions during stay was in mean 7.0 ± 5.8 and individual treatment interventions lasted in mean 41.3 ± 19.4 min (dependent on the affected body region). MLD was well tolerated in 83 (92.2%) patients; 63 of the 67 (94.0%) patients with pain showed a clinically relevant reduction of pain intensity (Fig. 1), and in 17 of 23 (73.9%) patients with dyspnoea, a significant relief was achieved (Fig. 2). In four patients with neuropathic pain components, the physiotherapeutic treatment was discontinued due to increased pain during manual therapy.

Prior to physiotherapy, all patients were treated with WHO Step III opioids in combination with WHO Step I analgesics and co-analgesics. After improvement in pain or dyspnoea mostly on day 2 or 3 after admission, MLD was begun and performed daily until discharge or as long as compatible with the patients’ performance status. The reduction of lymphatic oedema was documented as ‘little’ in 17 (18.9%) patients, as ‘moderate’ in 58 (64.4%) and as ‘good’ in 15 (16.7%) patients; the category ‘none’ was not used in the documentation for any of the patients.

DISCUSSION

In this study, we evaluated the effect of MLD on the intensity of pain and dyspnoea in PC patients with lymphoedema.

Table 1. Patient and disease-related data (n = 90)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n</th>
<th>Per cent</th>
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</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33</td>
<td>36.7</td>
</tr>
<tr>
<td>Female</td>
<td>57</td>
<td>63.3</td>
</tr>
<tr>
<td><strong>Primary cancer diagnosis or other disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thoracic</td>
<td>16</td>
<td>17.8</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>14</td>
<td>15.6</td>
</tr>
<tr>
<td>Gynaecologic or genitourinary</td>
<td>33</td>
<td>36.7</td>
</tr>
<tr>
<td>Breast</td>
<td>10</td>
<td>11.1</td>
</tr>
<tr>
<td>Pancreas</td>
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<td>5.5</td>
</tr>
<tr>
<td>CUP</td>
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<td>3.3</td>
</tr>
<tr>
<td>Other cancer disease</td>
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<td>7.8</td>
</tr>
<tr>
<td>ALS</td>
<td>2</td>
<td>2.2</td>
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<tr>
<td><strong>Type of pain (n = 67)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somatic</td>
<td>59</td>
<td>88.1</td>
</tr>
<tr>
<td>Somatic and neuropathic</td>
<td>8</td>
<td>11.9</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>23</td>
<td>25.6</td>
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<tr>
<td><strong>Survival time</strong></td>
<td>22.0 ± 33.0 days</td>
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Figure 1. Intensity of pain at admission (n = 67) (A), after adjusted analgesic treatment and prior to first physiotherapeutic intervention (B) and after first (C) and second (D) manual lymphatic drainage. Wilcoxon’s test: $P_{AB} < 0.0001; P_{BC} < 0.0001; P_{BD} < 0.0001; P_{CD} < 0.0001$.

As in all patients who are admitted to our PC unit for pain therapy and symptom control, the medical pre-treatment was optimized (dose adjustment, switching of the medication). Physiotherapy was begun on a daily basis after the patients experienced a significant decrease in pain intensity within the first few days of their stay. We found that each of pain...
assessments directly after the first two MLD interventions showed another, again significant reduction in pain intensity in nearly all patients. Those without benefit from this measure and in whom it was stopped during or after the first intervention were overly sensitive to touch due to somatic pain with neuropathic components. Patients with dyspnoea also showed a significant decrease in the intensity of breathlessness after the first intervention, whereas the second MLD led to no further significant relief. These positive outcomes may be related to physical and/or psychological effects of this intervention.

Physiotherapy takes places in a calm, relaxed and trustful atmosphere; it is a one-to-one encounter where the patient gets the full attention of a caring health professional that will explain every single step and stop at any time, if this is the patient’s wish. This may contribute to the relief of pain and dyspnoea which are both known to have also psychological aspects (20,21). Furthermore, the role of physiotherapist should include thinking beyond the physical restoration of the client and incorporate elements of psychosocial support, i.e. attention to the individual, non-physical aspects of client care (15,22). A mixed-method study, undertaken by Smith et al. (23) to collect information for preparing massage therapists for what to expect when providing therapy to people with advanced cancer, showed that most patients looked forward to sessions with positive anticipation and expectations of pleasure. They expressed regret when sessions were ending. Therapists noted that a few patients without experience of massage therapy were anxious at the beginning, often due to concerns about pain and other symptoms. Patients also shared more general assessments of their mood such as happy, sad, anxious or tense, and concerns about death, family and financial issues. Another study explored how patients with incurable cancer experience physical therapy, identifying positive categories such as participation, motivation and encouragement, independence, relief and well-being, security and hope (24).

The physical effects of MLD include an increase in the contraction rate of lymphatics (25), increased reabsorption of protein into lymphatics (26), reduced microlymphatic hypertension (27) and improved collateral lymph drainage between the lymphatic territories of the skin (28). Improved drainage enables fluid to be redirected away from oedematous areas towards the functioning lymph nodes in unaffected areas, an important principle in lymphoedema management. Wittlinger and Wittlinger (29) also suggest that MLD influences the sympathetic nervous system, promoting relaxation. In lymphoedema, the displacement of interstitial fluid as a result of the calliper pressure is influenced by the degree of oedema, thus adding to the sensation of pain and discomfort (29). The relief of limps and rump from interstitial fluid by means of careful manual drainage has a pain-reducing effect in limps and rump; it will also take pressure from the midriff/diaphragm and thus has a positive effect on breathing capacity. In general, one of the supporting measures for relief of dyspnoea could be a head-up position with leg elevation, but this was not feasible in patients with severe trunk oedema.

Intensive lymphoedema management, often referred to as combined decongestive therapy (CDT), aims to reduce limb volume, restore limb shape and improve skin and tissue condition. Together with MLD, it may include multilayer bandaging, isotonic exercises, skin care and, for some, pneumatic compression pumps. This is followed by a maintenance phase of self-treatment when the person wears elastic hosiery and undertakes regular self-massage, skin care and exercise. These additional measures, however, are also scarcely possible in PC patients with far advanced disease and poor performance status. Therefore, along with MLD, in this study, only kinesiastics were used in some patients, whereas massages, heat/cold interventions and elastic compression played a very marginal role. Research into the benefit of physiotherapy in far advanced PC patients is scarce. Most studies are concerned with cancer patients at much earlier stages of their disease, mostly with CDT or at least two combined methods (30–32). A recent systematic review in physiotherapeutic interventions included studies with advanced cancer patients, but excluded all non-randomized studies and those that went beyond ‘classical massage’, e.g. MLD (33).

A major concern about MLD some years ago was to what extent this measure may stimulate cancer cell activity and spread cancer, respectively. However, it is known that many factors cause the growth of metastases, and cancer research supports the contention that this therapy does not contribute to the spread of disease and should not be withheld from patients with metastases (11,34,35).
LIMITATIONS OF THE STUDY

We are well aware that the retrospective, reflexive control design of the study with the group serving as its own control group is a limitation. We have been using MLD interventions in our patient group for some time and were always given a mostly very positive feedback. Therefore, we find it difficult, for ethical reasons, to exclude these very far advanced patients with lymphoedema at the end of life from MLD treatment and therefore from probable benefit in order to form a control group.

In this study, it would have been very interesting to analyse the effect of MLD over the whole period of stay. Documentation standard at the time, however, was to document assessment results of the outcome of the first and second MLD interventions; thereafter, only major changes or discontinuation of this therapy were documented. Another limitation may be that possible further influence of drug therapy on the intensity of pain and dyspnoea cannot be excluded. However, the assessments of pain and dyspnoea intensity were undertaken immediately before and after MLD which lasted 60 min at the longest. This is a very short time slot for a significant reduction without any dose increase in pain and other medication.

CONCLUSIONS

The majority of the patients showed a clinical improvement in the intensity of symptoms immediately after MLD. These findings suggest that adjuvant physiotherapeutic MLD interventions may improve pain and symptom management in PC patients with lymphoedema. Further research should explore the sustainability of this pain and symptom-relieving effects in this patient group, using a prospective and if possible a randomized design.

Conflict of interest statement

None declared.

References