



Osteopathic manipulative treatment for post mastectomy lymphedema: A case report



ABSTRACT

Keywords:
Osteopathy
Manual lymph drainage
Lymph edema
Breast cancer
Mastectomy

The purpose of present case study was to explore the efficacy of osteopathic manipulative treatment (OMT) on post mastectomy lymphedema (PML) induced disabilities. 55 year old female who presented with the chief complaint of swelling in the right upper extremity along with pain in the neck, arm and thoracic spine hindering her activities of daily living (ADL). The OMT sessions were planned as 2 sessions per week for 5 weeks. The OMT resulted in the reduction in the volume of the lymph, modified truncated cone method (1878ml to 564ml), pain level, visual analogue scale (VAS) (7.8 to 3.4), disability of the upper limb, Disabilities of the Arm, Shoulder and Hand (DASH) Score (33.56 to 5.04) and improvement in quality of life, European Organization for Research and Treatment of Cancer (EORTC) Breast Cancer-Specific Quality of Life Questionnaire (QLQ-BR23) (31.28 to 34.22). The OMT might be an effective treatment option in the management of patients with PML.

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Introduction

Post mastectomy lymphedema (PML) can develop soon or years after surgery. It results from damage to the lymph nodes and imbalance in transportation of protein rich interstitial fluid leading to an accumulation of exudates in the subcutaneous tissues [1] which delay recovery and lead to chronic disability and impaired quality of life.[2,3]. PML increases the weight of the affected extremity leading to the various myofascial restrictions and the postural misalignments. Breast cancer – related lymphedema affects 25% of breast cancer survivors and may impact use of the upper limb during activity [4]. PML has a great negative impact on quality of life of the sufferer which results in severe disability [5]. The treatment of PML is multidisciplinary, which includes medical, surgical, palliative and physical therapy approaches that include exercise, compression sleeve, massage therapy, pneumatic compression pump and manual lymphatic drainage [6]. Manual lymphatic drainage is a specialized hands on technique designed to improve fluid removal from congested areas where the lymphatics are not functioning properly and into lymph vessels and lymph nodes that are functioning [7]. Here we aimed to explore the efficacy of OMT approach on PML induced disabilities.

Case report

A 55 year old housewife presented with right arm lymph edema post modified radical mastectomy and the complained of pain in the upper thoracic spine, cervical spine and shoulder region respectively. She had a past medical history of right breast cancer and she had been operated for the same by the surgical procedure of modified radical mastectomy. She subsequently developed right arm

lymph edema and was also given chemotherapy. She did not drink alcohol and reported no known allergies.

On presentation, her blood pressure was 140/80 mm Hg; pulse 74 bpm and weight 88 kg. The right upper extremity was markedly voluminous with an extensive pitting edema extending from fingers to the anterior chest on the right side. The patient assumed a kyphotic posture. The range of motion of the right shoulder was markedly restricted in all the planes as compared with the left shoulder. The neck range of motion was also reduced. She was tender to palpation over the right upper trapezius, latissimus dorsi and serratus anterior muscles respectively. Tightness was evident in the right scalene muscles. The first rib was hypomobile and elevated on the right side.

Through global listening (a diagnostic technique used to identify the key visceral fascial restrictions through palpation of fascial structure) [8–10]. Restricted mobility was found in the right hypochondrium region. Somatic dysfunction [11–13] was present at the hyoid and thoracic inlet diaphragms on palpation respectively. Clinical examination based osteopathic treatment was provided to the patient for 2 sessions per week for 5 weeks (total 10 sessions). The patient underwent osteopathic manipulative approach, consisting of all the major diaphragms' release namely pelvic diaphragm, abdominal diaphragm, thoracic outlet release (caudo-lateral myofascial release (MFR) on bilateral supraclavicular fossa by thumb) [14] and hyoid diaphragm release respectively. During the diaphragm release, manual contact was made by hypothenar eminence and medial three finger underneath of 7th to 10th costal cartilages and aligning the forearm with patient's shoulder [15]. During inspiration phase, cephalad and lateral traction was maintained while medial traction during expiration phase in the direction of maximal resistance [16]. Two sets of each maneuver was

performed for the each diaphragm release with 10 breath cycles/set. This maneuver was performed until decrease in resistance and increased diaphragm mobility were observed [15,16]. The mid cervical aponeurosis release [17] on the right side, muscle energy technique (MET) for the 1st rib, myofascial release (MFR) for the upper trapezius, latissimus dorsi, serratus anterior muscles, pectoralis minor muscles respectively were given. The PML drainage using osteopathic lymphatic drainage techniques namely chest recoil, harmonic pumping technique, first rib, clavicle, cubital, axillary pump techniques, upper limb circular drainage were incorporated. Scar tissue mobilization was also included in order to release deep tissue restrictions and also to augment fluid movement. The patient was also advised to wear a compression garment at home to sustain the possible therapeutic effect of OMT and also to elevate the affected limb to augment fluid drainage. Postural re-education training was also given to improve the kyphotic posture. The patient was also instructed to perform deep breathing exercises after the treatment session and at home, to improve lymph flow in the thorax and thereby facilitating the lymphatic drainage [18]. As, OMT were administered twice a week, compression garment, limb elevation and breathing exercises would be beneficial in sustaining the treatment effect and improving the lymphatic drainage, regardless of lymphadenectomy/damage to lymph node.

Pre-treatment and post-treatment changes were documented (Table 1) using the following outcome measures: Modified truncated cone method was used to measure the volume of the lymphedema, Visual analogue scale (VAS) for pain measurement, Disabilities of the Arm, Shoulder and Hand (DASH) Score [19] to measure the upper limb function and, the European Organization for Research and Treatment of Cancer (EORTC) Breast Cancer-Specific Quality of Life Questionnaire (QLQ-BR23) [20,21] to measure the quality of life.

According to the modified truncated cone method, first the arm circumferences were measured using a cloth measuring tape at four levels: the metacarpophalangeal joints, wrist joint, 15 cm distal to the lateral epicondyle, and 10 cm proximal to the lateral epicondyle in both supine (C1) and prone (C2) positions while maintaining the elbow in extension. The mean difference in arm circumferences (C1 and C2) in the above two positions were used in calculations of arm volume using the formula below:

$$V = h (C1^2 + C1C2 - C2^2) / 12\pi^2$$

Where V is the volume of the segment measured, π is the constant, 3.142 and h is the distance between them [22]. The noticeable changes were documented in the patient variables such as Volume of lymph edema (ml), visual analogue scale (VAS), disabilities of the arm, shoulder and hand (DASH) and EORTC QLQ-BR23 after the completion of the treatment sessions (Table 1). Hence, OMT might be a potential treatment option in reducing volume of lymph edema, pain, disabilities and improving quality of life (QoL) in the patient with PML induced disabilities. As this was data from a single

case study, the extrapolation of the study results should be interpreted with caution.

Discussion

There is no cure for lymph edema, however; the conservative physical treatment program consisting of manual lymphatic drainage (MLD), compression sleeves, exercises, skin care is the standard for the PML management [23]. The introduction of the exercises in the PML has shown to reduce the disability in upper limb function [24,25].

The purpose of the present case study was to explore the outcomes of osteopathic manipulative treatment (OMT) on PML induced disabilities in the patient. There are no studies available regarding beneficial effect of OMT on PML. Hence, there is a definite need to create clinical data for evidence based osteopathic medicinal community [26]. According to Zink, “gravitational forces and other stresses of life cause a drag on these fasciae, which offers considerable resistance in the large veins and lymphatic vessel.” [27].

Application of the MFR technique may have contributed to the opening of congested lymphatic vessels by reducing fascial tightness and restrictions by the breakdown of fascial cross-links in the upper extremity, axillary and neck region by the application of guided mechanical forces [28,29]. This may lead to the transformation of gel to sol form of fascia in the extracellular matrix and viscoelastic properties of fascia decreases [29]. The lymphatics from the upper extremity drain centrally into the main lymphatic duct located in the thoracic inlet region [30]. The thoracic diaphragm release may augment the drainage of the main lymphatic duct into the jugular and subclavian vein.

Kyphotic posture with rounded shoulders assumed in the present case, produces engorgement of the structures present in the thoracic inlet space. Spasm in the scalene muscles and elevation of the first rib produces the somatic pain in the neck and thoracic region [31,32]. Addressing the scalene spasm and first rib mobility through OMT may have reduced the congestion in the space and hence may have enhanced the movement of fluid centrally into the main streams.

The application of OMT may have led to the reduction of sympathetic tone and increase in the parasympathetic tone. The reduction in the somatic dysfunction of the first rib, thoracic region would cause dilation of the lymphatic vessels [33]. Also, the improved posture and reduced fascial restrictions would contribute to the increased breathing which further increases the pressure gradient between the chest and the upper extremity. The increased pressure gradient pulls the lymph centrally in the venous system [34]. According to the Zink, the inefficient negative intrathoracic pressure would lead to the decreased lymphatic return to the thorax and hence the buildup of fluid in the intercostal fascial spaces across the chest wall, the progressive increase of the fluid pressure will cause the backward flow of the fluid into the periphery and hence the accumulation of the fluid in the arm [35].

Table 1

Pre and post Osteopathic Manipulative Treatment (OMT) approach changes in the patient with postmastectomy Lymphedema (PML).

S.No.	Variables	Pre-treatment Score (Baseline)	Post treatment Score (After 5 weeks)
1.	Volume of lymph edema (ml)	1878	564
2.	VAS (cm)	7.8	3.4
3.	DASH (%)	33.56	5.04
4.	EORTC QLQ-BR23	31.28	34.22

Abbreviations: VAS - visual analogue scale; DASH - Disabilities of the Arm, Shoulder and Hand; EORTC QLQ-BR23 - European Organization for Research and Treatment of Cancer (EORTC) Breast Cancer-Specific Quality of Life Questionnaire (QLQ-BR23).

Conclusion

OMT has the potential to reduce lymphedema, pain and disability and improve quality of life measures in patients with post-mastectomy lymphedema. The improvements observed in this single case study support further investigation in to the use of OMT in the management of PML.

Conflict of interest

None of the authors have competing interest declared.

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Author's contributions

MG and KG conceived and designed the study, conducted research (intervention), provided research materials, collected and organized data and wrote initial draft. AJS and KN wrote revised and final draft of this case report. NA analyzed, interpreted data and provided intellectual content review. All the five authors (MG, KG, KN, AJS and NA) approved the final version.

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