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ROLE OF PHYSIOTHERAPY IN PREVENTION AND MANAGEMENT OF LYMPHEDEMA IN POST-OPERATIVE BREAST CANCER PATIENTS

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Abstract: After surgery for breast cancer, the most common postoperative complication is secondary lymphedema which may sometimes be more challenging to manage than the disease itself. This systematic literature review aims to highlight the role of physiotherapy in management of secondary lymphedema in post-operative patients of breast cancer and its current status. The literature review has been conducted using available textbooks and online database of PubMed, Medline, SciELO, LILACS (Latin American and Caribbean Literature) and EMBASE. Online search has been made through English literature mainly, from 1990 to 2015 and focused on research or review articles. Review found physiotherapy; with appropriate combination of techniques, started early; has been very effective in prevention and management of lymphedema in post-operative breast cancer patients.

INTRODUCTION

Treatment of breast cancer includes multiple modalities. Surgery, radiation therapy, hormonal therapy, chemotherapy, and biologic therapy can all be used in different combinations and sequences based on a patient's specific disease.¹

After surgery, the most common postoperative complication is secondary

lymphedema. Incidence has been reported from 5% to 83%. After axillary lymph node dissection the incidence of secondary lymphoedema is about 23-38% if the criterion used to identify it is, a greater than 2 cm increase in upper arm circumference measured at two adjacent points, compared with the circumferences in the other arm. Most women (71%) develop secondary lymphoedema within 12 months after surgery for breast cancer.^{2,3}

Other common complications after surgery are: changed angle of motion in the shoulder, upper chest muscle weakness, numbness in small upper part of body, feeling of physically unfit, mood changes, decreased body part movements, web syndrome, tingling, itching, burning, partial dislocation of the shoulder, shoulder pain and chest wall pain.⁴⁻⁷

Lymphedema is a chronic medical condition caused by an abnormal accumulation

of protein-rich lymphatic fluid in the extra-vascular (interstitial) space, causing recurrent or progressive swelling associated with physical, psycho-social, and occupational performance complaints. Symptoms of this chronic condition may include swelling, restricted joint mobility and pain.⁸ Lymphedema following breast cancer treatment remains a long-term disabling complication which cannot be treated in a decisive and radical manner.⁹

International Society of Lymphology has assigned grades and stages of lymphedema based on presentations (Table 1 and 2)

Table 1 - Grades of Lymphedema

Grade of lymphedema	Description of symptoms
Grade 1	Pitting edema with pressure, may be reduced with elevation
Grade 2	No pitting, larger fibrotic limb, skin and nail changes
Grade 3	Elephantiasis, thick skin with huge folds, marked skin deterioration

Table 2 - Stages of Lymphedema development

Stage of lymphedema	Features observed
Stage 0 (Subclinical/ Latent)	No visible changes in arm, hand or upper body Sensory changes like mild tingling, heaviness or unusual tiredness
Stage 1 (Mild)	Mild (non-tense) swelling over arm, hand, chest wall or trunk Pitting on pressure reduces on elevation of part. No skin changes
Stage 2 (Moderate)	Tense swelling over the area, non-pitting, not reduced by elevation Skin inflammation/ thickening/ hardening
Stage 3 (Severe)	Morbid and bulky limb/ part Skin is puckered, leathery and wrinkled, fluid may be oozing

Physiotherapy techniques and their importance in lymphedema

Pharmacotherapy has been used to treat the condition in the past. The benzopyrone group of drugs such as Coumarin, reportedly increases macrophages in the affected extremity, thereby stimulating proteolysis and reducing lymphoedema. Rehabilitation or physical

techniques, improve patients psychologically as well as physically.¹⁰

Physiotherapy techniques to treat lymphoedema were first proposed in 1892 by Winiwarter.¹¹

The purpose of this review is to examine the effectiveness of physiotherapy treatment for secondary lymphoedema caused by surgery used

to treat breast cancer. Following are the common physiotherapy techniques mentioned in literature

- Complex Decongestive Therapy (CDT)
- Pneumatic Compression or Pressure Therapy (PC/PT)
- High Voltage Electrical Stimulation (HVES)
- Laser Therapy

Complex decongestive therapy (CDT)

CDT, also sometimes called *Complex Physical Therapy* (CPT), is a treatment schedule that includes- manual lymph drainage (MLD), myolymphokinetic (MLK) exercises,

compression bandaging and supportive garments, and meticulous skin care. CPT is carried out in two phases. *Phase I (Reductive CPT)* includes all maneuvers and is done with the purpose to mobilize the accumulated lymph, reduce the fibrous tissue and improve the health of the skin. Duration varies from 2-3 weeks with additional instructions to patients regarding use of multilayer bandages, hygiene care of the skin. *Phase II (Maintenance CPT)* is 3 to 8 weeks exercise program. Compression bandaging/elastic sleeves, regular self massage and physical exercises are the components of second phase¹²⁻¹⁵



Manual Lymph Drainage



Compression bandaging



Hygiene care of upper skin

The amount of exercise that should be performed on a daily basis also must take into account the patient's life style and how much exercise they do in the course of their daily work. On days of heavy and unusual work, therapeutic exercises should be lessened accordingly.

Pneumatic Compression or Pressure Therapy (PC/PT)

Pressure therapy is a technique that consists of compressed air pumps, aimed at pressuring the limb with edema. It is composed of different forms of air chambers (gloves or boots). Basically, two types of compression pump exist: *segmental* or *sequential* or *dynamic*, and *static* or *non-segmental*. Static PC involves the affected limb with a single continuous high-pressure chamber, which compresses the entire limb at once. This form of compression is out of use, as it promotes the collapse of lymph vessels and

impairs the venous system. Dynamic pressure therapy contains a number of individually regulable compartments or not. Usually, there are at least three compartments that fill up separately, producing a pressure level that goes from distal to proximal, turning fluid drainage more efficient.¹⁶⁻¹⁸

High Voltage Electrical Stimulation (HVES)

Electrical stimulation produces muscle contractions and relaxation, it increases the venous and lymphatic flow.¹⁰ Among different electrical current forms, high-voltage stimulation (HVES) is clinically indicated for acute and chronic pain, to increase the speed of tissue regeneration, neuromuscular reeducation, to increase the venous blood flow and absorb the edema.¹⁹

Laser Therapy

Role of Laser therapy to treat lymphedema is based on belief that it can stimulate lymphangiogenesis, lymph activity, lymphatic movement, macrophages and the immune system and also reduces fibrosis.²⁰

Rehabilitation technique programmes

Rehabilitation techniques are very important in preventing or treating lymphedema. Physical activity increases the lymph volume which is drained from the thoracic duct into the venous system from 2 liters/ 24 hours to over 3 liters/ 24 hours. In fact, a better result may be achieved by doing the trunk clearance exercises only and then lying and resting with the limb elevated for 30 minutes, with periodic flexion and extension of the hand.²¹

METHOD

Available textbooks and online database of PubMed, Medline, SciELO, LILACS (Latin American and Caribbean Literature) and EMBASE has been searched. Online search has been made through English literature mainly, from 1990 to 2015 and focused on research or review articles. Descriptors used were- Breast cancer, CDT, Exercise, HVES, Laser therapy, Lymphedema, MLD, Physiotherapy in various combinations and by putting a plus (+) sign.

RESULTS

Review reveals that CDT has been extensively practiced, studied and found effective physiotherapy modality for management of lymphedema in post-operative patients of breast cancer.

CDT applied to 62 lymphedema patients effectively reduced the volume and circumference of the affected limb, decreased the fear of movement and improved quality of life.¹⁴

Studied in postoperative 356 women of breast cancer, the limb volume was reduced after the intensive phase with CDT. But measures increased during the maintenance phase. The

authors attributed this to lack of adherence to sleeve use which is recommended to maintain the results obtained in the intensive phase.¹⁵

It is noteworthy that the exercise technique has not been found to cause any change in the perimeters and volume of the affected limb. In a research involving 60 women, a directed and a free exercise protocol were compared. It was concluded that shoulder ROM became more functional in the directed exercise group, albeit with no significant difference between the groups in terms of the lymphatic disorder.²²

Few studies also present data, not in favour of the above.^{12, 23} In a study over 138 women with post-breast cancer surgery lymphedema, the protocols applied in three groups were: CDT, MLD and a program to be followed at home (self-massage and exercises). All three techniques effectively reduced the volume of the affected limbs, without any significant difference.¹² Another study examining whether adding MLD to exercise, skin care and sleeve use improves the lymphedema, concluded that no better effects could be found with addition of MLD.²³

Some studies have mentioned dubious results with PC¹⁶, while some have shown good results, though in combination with MLD.¹⁷ In latter randomized study, involving 23 lymphedema patients without previous treatment, compared two interventions: CDT-CP and CDT alone. In this group, it was found that greater limb volume reduction was achieved when applying PC and this result continued on further evaluations.¹⁷

HVES has been explored in limited studies and found effective in reducing the perimeters, volume and severity of the lymphedema.^{19, 24-26}

The only randomized study compared placebo laser, one-cycle and two-cycle laser

therapy in 55 patients. The results indicated a significant reduction in the volume, extracellular fluid and solidity of the affected member, 2 to 3 months after treatment. Two-cycle treatment was better than the one-cycle which in turn was better than placebo treatment.²⁰

CONCLUSION

Since, survival in breast cancer patients is on the rise with the availability of advanced modalities, addressing the complications is the need of the day; amongst which lymphedema stands atop. Based on this literature review, it can be concluded that, physiotherapy holds promise for lymphedema management. Complex

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