

Physiotherapeutic Interventions for Breast Cancer Related Lymphedema in Women-A Review Study

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ABSTRACT

The commonest cancer found in the females is breast cancer where the treatment following the chemotherapy, surgery and radiation therapy leading to the post-surgical complication known as breast cancer related lymphedema where this complication can arise at any age post-surgical treatment. This lymphedema needs to be managed and prevented as this is unable to be cured. Lymphedema measuring is essential to prevent and maintain it so it can be followed with the help of various methods either by volume difference or the circumferential difference. The objective behind the study was to describe significance of the physiotherapeutic interventions creating a space to decrease and prevent the presence for BCRL, present with various techniques which including manual lymphatic drainage, compression bandaging, kinesio-taping, intermittent pneumatic compression, compression sleeves, low level laser therapy, exercises and complex decongestive therapy. In this study many articles were reviewed from various systematic reviews, meta-analysis, randomized control trials and many more. Studies were congregated from different scientific platforms like google scholars, Pubmed, Science direct and Research gate. In this study 100 articles were culled and scrutinized from which the 76 articles were meeting the inclusion criteria. The review articles derived that the combination therapy works better in several studies as the individual therapy in various studies came to be not so much as significant or having placebo effect, that is either altering the volume change or no change but leading to the better quality of life and volume difference. Hence the complex decongestive therapy came to be more significant in case of management as the concerted and maintenance phase results better following by the low-level laser therapy.

Keywords: Lymphedema; Kinesio-taping; Chemotherapy

INTRODUCTION

Breast cancer is the global burden in already these years [1] and will be increasing according to the statistics present according to world health organization with 2.09 million cases and in India 14% of total cancer in women according to national health portal in 2019 as per month of breast cancer [2]. The extent of occurrence of getting BCRL is 8% to 56% within 2 years of surgery depending on the extent of dissection of axillary lymph nodes and presence of ongoing radiation and chemotherapy [3]. The surgery is variable according to the extent of removal of lymph nodes that can lead to variation of different percentage. But according to the study it has been found that prevalence of lymphedema occurrence is 3-4 months posts surgery [4]. The lymphedema is defined as the obstruction in the circulation of lymph fluid leading to the accumulation of fluids leading to edema in the arm [5-6]. The fluid accumulation leads to various problems leading to disturbed quality of life [7]. Lymphedema if not managed early can be great

burden so as to solve the permanent changes that will occur such as infection, sarcoma and many more financial problems [8]. This can be solved by physiotherapeutic intervention with numerous of techniques presenting with extent of results. This management requires daily assessment and management which will prevent it to occur and reduce if there but not act as the cure, hence it generally turns with high costings [9]. Due to concern for lymphedema there are regular assessments that will lead to the determination of the change in the limb volume [10], these diagnosis are created by the method such as limb girth circumferential measurement that is done by measuring limb circumference at different levels and differentiating with the other arm [11], other test is water displacement method which is done by placing the arm in the water tank comparing both the arms and differentiate in water volume respectively that was displaced outside the vessel [12], the other is infrared perometry which is just like X ray which takes the image and calculates the limb volume, the other is bioelectrical impedance analysis which comes with the procedure by measuring

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extracellular fluid resistance where there is the application for the lower frequency and enlisting the lymphedema index for bilateral upper limb and the change between them [13]. The appearance of lymphedema patients such as increase in limb size, declined range of motion of the affected limb, weakness in the affected limb, different texture of the skin, pain, restricted joint motion of the limb and heaviness in the limb leading to decrease activity of the surgical site limb [14-15]. The representation may vary according to the type of surgery and treatment [16-17]. The lymphedema is presented with the grades which classify the distinctive change for management and recovery in future [18]. 4 grades are there in case of lymphedema that is 0 to 3 presenting from absence of edema, pitting edema, non-pitting edema, edema with non-pitting and fibrosed skin in nature respectively [19].

METHODOLOGY

Here the study objectifies various physiotherapeutic intervention presented in literature reviews but with article describing comparison with one another of the all the physiotherapeutic intervention. Hence various articles were scrutinized to describe all the comparisons under one article.

Here various articles were studied to create this literature review, the work done by all the three authors were equal from selection to screening to review and draft the article. In this the database was scrutinized from the various journal site such as Pubmed, google scholar, science direct, research gate. Where the inclusion criteria were only breast cancer patients, only in females; where the exclusion criteria were to be no males and no other cancer to be included. The articles were identified with the keywords of breast cancer lymphedema manual lymphatic drainage, complex decongestive therapy, kinesio-taping, pneumatic compression, laser, bandaging and exercises in breast cancer related lymphedema. 100 articles including full text and abstracts were reviewed from which 72 articles were eligible and crossed the screening process and 72 were removed due to not with breast cancer and duplication (Figure 1).

RESULT

According to the literature reviewed there are many physiotherapeutic interventions that are provided for postoperative breast cancer, these articles in brief explained about the aid of the intervention which if provided in the early phase will prevent the further damage such as fibrosis of skin and head properly and be decreased soon, but only the condition is that it cannot be healed only managed and prevented [20-21].

Manual lymphatic drainage: The manual lymphatic drainage is the

technique that was developed in 1930s by Emil Vodder [22] where he accepted that gentle massage without oils efficiently increasing the lymphatic flow without increasing the capillary infiltration [23]. The manual lymphatic drainage is integrated technique of the hand movements on the patient's arm so as to drain the lymph in the agile lymph nodes, it is the procedure holding with the superficial massage as a reason leading to superficial contraction of the lymphatic flow increasing the lymph drainage efficiently [24]. There are many researches presenting where only manual lymphatic drainage was utilized as only technique for facing the post breast cancer related lymphedema which does not come to be proven as that only systematic tool for drainage of lymph [25]. Where there are studies disclosing the fact of difference in the grade of the lymphedema changing the results but came to be notable with only manual lymphatic drainage [26-27]. The results acceptance came from few studies disclosing that the manual lymphatic drainage does not work significantly if alone but when integrated with the other techniques for the regime of lymphedema came to be significant [28]. The study also interpreted that the manual lymphatic drainage in the inclusion to other techniques provides the equal results in the randomized control trials [29].

Intermittent pneumatic compression

It is the device also known as pneumatic compression device which is having the mechanism to control and generate the pressure with uniformity in intermittent manner to the limb from distal to proximal with the aim to drain the lymph in the direction to its way [30], it is present with chamber that allows different gradient of the pressure as dependent on the grade of the lymphedema, the mechanism follows to inflate and deflate at the given interval which creates it more efficient and useful [31]. The usage of intermittent pneumatic compression device is easy and easily adaptable at home [32]. The IPC played a role in the decline of the lymphedema when provided alone but in some studies it derived with only placebo affect when combined with the different further techniques for the treatment [33]. The studies presented with the additional benefit with not in decrease of the circumference of the arm but may have provided with the reduction for arm heaviness and produced better quality of life when provided with combination therapy such as complex decongestive therapy [34-36].

Exercises

Exercises for the breast cancer lymphedema post operatively are quite helpful pre and post breast cancer surgery, according to the studies the exercises play a role in creating the pumping mechanism which directly is responsible for the muscle contraction guiding to better and efficient lymph and venous drainage [37-38]. As post-

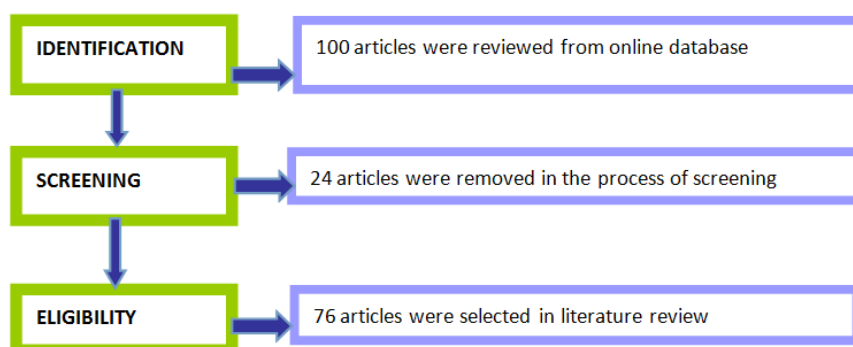


Figure 1: Screening of the articles.

surgery due to the scar development there is reduced in the joint range in the limb leading to the pain and decrease cardiovascular fitness and increase lymph drainage and leading to decrease in the circumferential growth [39]. The studies which interpret that the exercise in the post breast cancer surgery leads preventive measures for the decrease in the development for further lymphedema, whereas the exercises were always progressive in the nature starting from active to resistance training which thereby increasing the muscle contraction and providing in the prevention and management of lymphedema [40,41]. There are few studies that support on the fact that the exercises are not the solution to the lymphedema alone [42] as need to be combined with the other modes of therapy to make it more efficient [43], where the studies proved that the exercises even are not only significant in reducing of the limb but still in improving the quality of life [44].

Bandaging

Bandaging is the process for compression therapy where the multiple layer bandage is surrounded around the limb with two to four layers with various techniques, bandaging plays a role in regulated pressure to the limb in the directional manner that provides the pressure low to higher from distal to proximal respectively [45,46]. The bandaging covers from fingers to the tip of the shoulder, these bandages are short stretched elastic bandage which stretch up to its ten percent encouraging in finished and tubular bandaging. The positive impact of the bandaging is that it does reduce the circumference of the limb and volume reduction in the affected limb encouraging in the maintenance therapy [47] so as to maintain that was reduced with the help of the other combination therapy, according to the result the significance is efficient in volume reduction either alone or combined [48-50]. The negative impact according to the studies as challenged by the patients difficult to maintain for the given period of time and tightness causing skin irritation to some extent leading disruption in quality of life, limited range of motion [51].

Compression sleeves

Compression sleeves plays a role in breast cancer lymphedema post operatively when there is new surgery so as to halt the upcoming lymphedema in limb post mastectomy, these sleeves are preventive therapy [52]. According to the study this act as preventive therapy like by elasticity present and equality in pressure comforting the patient in better movement of the arm and better cosmetic look making patient look confident and not odd one out as present with the same skin tone of the patient color and size respectively [53]. The compression sleeves in studies are highly comparable in the studies with the other compression therapy such as bandaging, kinesio taping [54]. The studies find that the compression sleeves do not decrease the circumference but act as the preventive and maintenance therapy, easily accepted in the work environment due to ease in wear and looks compare to the other compression therapy [55,56]. The study presents its significance only when combined with the other lymphedema therapy in grades of lymphedema but not alone; as the study suggest that the compression sleeves cannot be the only measure to reduce the volume of the limb as some study presented it with placebo effect [57,58].

Low level laser therapy

Low level laser therapy is the upcoming therapy also termed as photo modulation therapy proven to be successful in the lymphedema

management post breast cancer surgery where the wavelength of laser is 650 to 1000 nano meter where the focus for the therapy is to increase the drainage and reduce inflammation. It works at the cellular level by increasing the cellular metabolism causing lymphatic stimulation and guiding to better circulation at local blood vessels [59,60]. This leads to the reduction of inflammation, increased lymphatic circulation and better regeneration in lymphatic system and reducing the lymphedema and decreasing pain [61,62]. According to the journal data interpreting the results that due to the low level laser therapy there is a change at the physiological level and cellular level which alters after the implication of the laser therapy and leading to its benefits [63,64], there were few questions that came as low level laser therapy leading to the metastasis which came to be insignificant, hence came that low level laser therapy is tool for the post-operative breast cancer surgery lymphedema [65].

Kinesio taping

Kinesio taping is the part of the kinesiology that plays a role in sports medicine but in nowadays this kinesio taping is moving toward the management to breast cancer related lymphedema [66]. The kinesio taping is done after the intensive therapy whereas the kinesio taping moves towards the preventive and maintenance phase where the lymph is maintained to its motion as the taping is done distal to proximal with the addition to the anchors placed at each level maintaining the lymph accumulation at that place [67,68]. According to studies that taping can work with the maintenance phase and preventive therapy [69]. According the research reviews the taping cannot replace the compressive multi-layer bandaging as it had the ability to reduce the circumference of the affected limb whereas the kinesio taping does not reduce but just maintain and ease the quality of life only when combined with the different therapy of the lymphedema management [70,71]. The study reviews that the pragmatic impact of kinesio taping over the compression garments is to improve the range of motion better and effective and thus having an active impact on the quality of life [72].

Complex decongestive therapy

Complete decongestive therapy also termed as the complex decongestive therapy, which is inclusive of all the combination therapy that is manual lymphatic drainage, exercises, compression therapy and skin care. This CDT is inclusive of two phases that make it programmed and significant [73,74]. The phases are intensive phase where the patient was allowed to be intensified and give intense management such as exercises specified with the breast cancer related lymphedema, pooling of the lymph by the manual technique for lymphatic drainage where the lymph which was allowed to be directional in flow to the active lymph nodes processing the lymph drainage by increasing circulation on superficial level; Then the second phase that arises termed as the maintenance phase in which the lymph was pooled is returned back to the active lymph nodes and the decrease that occurred in the circumference of the limb and reduction in volume is seen in the limb and is maintained for longer hours that will lead to the decrease in all over the lymphedema related disability leading to the increased quality of life in all means such as physical life changes, social problems and professional issues[75,76]. According to the studies proving that the CDT allows in the decline in discomfort occurred, decrease in the heaviness, increased range of motion, progressive recovery, decline pain, decline in the burning sensation,

better skin condition [77,78]. The CDT allows the patient to get recovery by the intense phase in the limited period of time such as three to eight weeks which is also termed as the reductive phase and can be maintained for longer years by the compression garments and the bandaging allowing the patient to active in personal and professional life, making socially active in the activities of daily living. Hence the studies established that complex decongestive therapy is the long-lasting therapy for the management and future prevention of the breast cancer lymphedema post-operatively [79-82].

DISCUSSION

The aim of the study was to review the different research articles providing the research of breast cancer related lymphedema. After the reviewing different articles presenting with different criteria of the research such as randomized control trial, comparative studies, systemic review studies and experimental design. The data mentioned that the breast cancer related lymphedema can be threatening if not managed and not prevented at correct time as can lead to permanent changes that cannot be reversed and may lead to further complications such as sarcoma, axillary web syndrome and many more lymphatic system disorders [83,84]. The role of physiotherapy plays a wide role in breast cancer related lymphedema from prevention to the management to create the healthy life [85]. There was various therapy that are significant at the level such as manual lymphatic drainage, intermittent pneumatic compression which are thought as the significant at some level but are more efficient when combined with the combination therapy [86,87]. The role of compression garments to bandaging to kinesi taping plays a wide role in maintaining in the lymphedema but where the bandaging cannot be replaced by the compression sleeves or the kinesi taping as it has the ability to reduce the circumferential difference but kinesi taping and compression sleeve work as the maintenance but does not efficiently reduce the limb volume [88]. The modality therapy that is low-level laser therapy in which have been proven to be significant in the results of the not only the of the decline in volume but also the reduction in the pain, reduced inflammation and better joint range [89]. The exercises are specialized for the lymphedema which not only aims to return to the range of motion but also to improve coordination of the arm, increase cardiovascular ability and breathing control as weaken by the radiation and the chemotherapy, according to the studies there are various exercises that are planned according to the patient's capacity and ability to be progressive [90,91]. Complex decongestive therapy plays the role in the accumulation of various aspects of the lymphedema management under one umbrella with the different goals to kept under two phases such as reductive phase and the maintenance phase which is followed for years with more significant and manageable and preventable results [92-95].

CONCLUSION

Studies scrutinized came to the closure with the strongest support with complex decongestive therapy accompany by the low-level laser therapy. The studies came to the conclusion the outcomes are significant with the combination of various therapy together, hence the lymphedema need to be assessed according to measurement and grades and managed accordingly.

CONFLICTS OF INTEREST

There are no conflicts among the authors for the publications.

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