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Case study: Indicating the effectiveness of physical therapy on patient with Primary lower extremities Lymphedema and Cellulitis using objective measuring tools.

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Abstract
Background: *The incidence and prevalence of lymphedema in breast cancer survivors is variable, and some researchers have been able to establish risk factors for the development of lymphedema. A study by Armer J et al in 2004, found that six to thirty percent of breast cancer survivors will develop lymphedema. Its onset usually occurs up to three years following surgery, and there is a 49% chance of latent symptom expression (greater than 3 years following surgery) [1.] According to Badger et al in 2004 about a quarter of patients with lymphedema will have at least one episode of cellulitis infection in the affected limb[2]. The physical therapy interventions are important cornerstones of effective lymphedema management, which can play a vital role in patient comfort and acceptance of swelling[3.]*
Study Design: *the case study was used to high light the role of physical therapy in the management of the primary lower extremities lymphedema and cellulitis.*
Case Description: *36 year-old Saudi female, had bilateral lower limb primary lymphedema, and recurrent cellulitis on monthly bases, referred to physical therapy department by vascular clinic.*
PT management and outcomes: *the patient received daily sessions for three weeks included: multilayer bandaging (compression therapy) – manual lymphatic drainage – skin / nail care education – decongestive exercises. At the end of third week the patient weight decreased by 13.3KG, circumference measurements dramatically decreased, and her gait and endurance improved.*
Discussion: *the case study had provided an interesting progression toward knowledge and evidence-based care. Additionally, showed that the physical therapy interventions are safe, effective in reducing Lymphedema, and overall QOL.*

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I. Introduction

Lymphedema (LE) is a swelling of the soft tissues that results from the accumulation of protein-rich fluid in the extracellular spaces[4]. There are two main types of LE – primary and secondary. In Primary Lymphedema intrinsic abnormalities is usually established at birth and develops at different times during a life span but is more common in adolescence. Secondary lymphedema occurs following surgery or radiotherapy when the lymphatic system becomes damaged. Infection, severe injury, burn, or trauma may also be a cause. Our case study condition was primary lymphedema with cellulitis. LE is a chronic, progressive condition that impairs mobility and joint movement as the swollen areas increase in size and weight, often causing postural alterations and pain as the individual struggles to perform activities of daily living[5.]

Cellulitis is defined as an acute inflammation of the skin and subcutaneous tissue which is commonly caused by streptococcus pyogenesis or staphylococcus aureus [6]. The lower leg is the most affected site, accounting for 75-90% of all cases [7.] Nowadays, the physical therapy interventions (Decongestive therapy– manual lymphatic drainage – skin / nail care education – decongestive exercises) for such a conditions became more familiar, and the result is often satisfactory. According to Bonnie, et al in 2012 reported that complete decongestive therapy (CDT) with manual lymph drainage are currently recognized as the standard of care in LE management[5.] Furthermore, Fadi et al in 2006, showed that decongested exercises to enhance lymphatic pumping, meticulous skin care of the affected areas, fitting of appropriate compression garments to maintain the reductions achieved through physical therapy treatment and patient education in self-care is critical for successful long-term outcomes [8.]

Study Design: the case study was used to high light the role of physical therapy interventions in the management of primary lower extremity lymphedema and cellulitis.

Case Description:

Patient History

36 year-old Saudi female arrived to physical therapy clinic with bilateral lower limb primary lymphedema and cellulitis, which altered her current level of function including ADL's, work responsibilities, body image, family roles, reduce mobility, and the scar tissue formation that limits normal range of motion (ROM) and disrupts normal lymphatic drainage. During the first session a full assessment of the patient was carried including setting long and short-term goals. Long term goals: were to be independent with self-massage techniques, independent with lymphedema prevention and risk factor reduction strategies, maintain reduction of limb girth achieved in phase 1 of treatment, Maximize ROM and strength of lower extremities, to reach normal gait, independence with postural correction in various positions and maximize independency with functional activities long term goals to be met with first follow up visit in 6 months. As for the short-term goals: they were to reduce limb girth by 25-50%, to be independent with home exercise program, and independent with compression bandaging and skin care education.

Examination:

Observation:

• Skin: tight, fibrosed, hard and presence of edema in bilateral lower extremities and lower abdomen.
• Scars: None.
• Wounds: None.

Palpation/Skin and scar assessment:

• Assessment of skin tissue texture: dry skin, presence of deep folds with poor hygiene, brownish and fibrotic tissue over both lower legs.
• Assess scar tissue: None.

Limb girth:

- Classifications of lymphedema using the American system: Severe > 5.0 cm
- Grades or stages of lymphedema according to the International Society of Lymphology:
  Grade II: non-pitting edema, brownish skin, not reversible with elevation

Height and Weight:

Weight= 102.2 kg
Height= 157 cm
Body Mass Index (BMI): 41.5 (obese).

Pain:

No pain reported.

Sensation:

• Assessment of light touch, pain, and proprioception: all intact.

ROM:

• Bilateral hips, knees, and ankles: limited
• End feel: Soft due to presence of edema

Coordination:

• Heel-to-shin: Impaired due to heaviness and limited ROM.

Functional Status:

• Activities of daily living (ADL): patient's ADL's were severely affected due to her impairment such as dressing, she was hardly finding cloths that fits her, poor hygiene due to folds and edema.
• Instrumental activities of daily living (IADL): patient takes longer time with her housework activity as she has low endurance and heaviness.
• Recreational activities: Her social life was affected as she ashamed of her condition, she prefer to isolate herself instead of explaining her condition during community outing.
• Vocational activities: as a teacher her impairment affected her work as she works less hours compared to her colleagues, she sits on a chair instead of standing during her classes, takes ground floor classes.

Findings:

Patient presents with increased lower limbs size, girth and weight, which had caused loss of lower extremity ROM, and impaired several functions such as strength of lower extremities, skin integrity, and endurance. The patient had antalgic/limping gait. In addition, the above impairments contributed to functional independency. The patient unaware about lymphedema treatment and prevention strategies.

Intervention:

Daily at the lymphedema clinic for three weeks, treatment to include the following at table 1

Table 1: Patient treatment protocol

Decongestive exercises	Twice a day with 10 repetition
Manual lymphatic drainage	daily
Skin / nail care and hydrate	daily
Compression bandage	daily
Intermittent Pneumatic Compression therapy	1 hour daily
Home program: Walking	20 – 30 minutes daily with compression bandage on.

Outcomes:

After three weeks of treatment the weight of the patient decreased by 13.3kg., all the circumference measurements decreased as shown at table 2 &3 and normal gait pattern.

Table 2: Weight of the patient's before and after the intervention:

Before the treatment program	**After the treatment program**	**Total weight of fluid lost after treatment**
102.2 kg	88.9 kg	13.3 kg

Table3: Circumference measurements before and after the intervention:

Before treatment		***After treatment***	
Right leg	***Left leg***	***Right leg***	***Left leg***
10/20	*10/20*	*10/20*	*10/20*
15/49	*15/70*	*15/35*	*15/38*
24/51	*24/79*	*24/41*	*24/47*
30/49	*30/80*	*30/45*	*30/53*
38/43	*38/74*	*38/43*	*38/48*
55/61	*55/72*	*55/59*	*55/67*
63/64	*63/81*	*63/63*	*63/78*

New plan of care:

Follow up every six months to review the decongestive exercises, MLD and issuing new pressure garment.

New goals for the maintenance phase:

Continue to pursue long term goals. Transition to the maintenance phase: patient was fitted with compression garment, educated, and instructed to do manual lymphatic drainage, and decongestive exercises.

II. Discussion:

Based on the result, we strongly supported the physical therapy modalities in the treatment of patient with primary lower extremities Lymphedema and Cellulitis such as: Manual lymphatic drainage, decongestive exercises, compression bandage, pneumatic compression therapy and walking program. That goes with Maureen Barrett (2009) who proved the impact of physical therapy modalities in controlling and decrease lymphedema in lower extremities and cure cellulitis. Additionally, Bonnie et al. 2012 confirmed that complete decongestive therapy (CDT) is effective for various degrees of LE mild, moderate, or sever; early or late onset; recent or chronic; in patients with active cancer; and in palliative care situations. CDT is associated with the greatest reduction in volumes after the first 5 days of treatment, with reductions continuing at a slower rate in the next weeks until progress plateaus, improving overall QOL and symptoms. This case study provided a strong learning opportunity for the junior LE therapists to be able to design a complete plan of treatment for LE patients. Furthermore, this study provided a basis of care for other patients with similar conditions in the future.

III. Conclusions:

The physical therapy intervention is effective in reducing lymphedema, improve patient gait pattern and improved QOL.

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