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OLGU SUNUMU / CASE REPORT

COVID-19 May Reduce the Effectiveness of Complex Decongestive Physiotherapy in Breast Cancer-Related Lymphedema: A Case Report

COVID-19, Meme Kanseriyle İlişkili Lenfödemde Kompleks Dekonjestif Fizyoterapinin Etkinliğini Azaltabilir: Olgu Sunumu

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Abstract

The results of treatment for a patient with breast cancer-related lymphedema who was diagnosed with COVID-19 in a treatment period are presented. A 47-year-old female patient had unilateral breast cancer-related lymphedema. The patient received complex decongestive physiotherapy for 10 and 15 sessions before COVID-19 diagnosis and after the patient recovered from COVID-19, respectively. The limb volume was calculated using the frustum formula, relying on arm circumference measurements. The level of pain severity on the affected limb was assessed using an 11-point numeric pain rating scale. Before COVID-19 diagnosis, the patient had no pain, and the limb volume of the patient decreased by about 61% after complex decongestive physiotherapy. After the patient recovered from COVID-19, the patient had a pain score of 8 on her affected limb. The limb volume decreased by about 3% and 17% at the end of the 10th and 15th sessions, respectively. The pain scores were 4 and 0 at the end of the 10th and 15th sessions, respectively. The effectiveness of complex decongestive physiotherapy in limb volume may be reduced in patients with breast cancer-related lymphedema who have experienced COVID-19. To achieve optimal results from complex decongestive physiotherapy in this patient population, clinicians are advised to consider the patient's COVID-19 status or relevant medical history when determining the treatment duration and assessing the effectiveness of the treatment.

Keywords: Breast neoplasm, COVID-19, Lymphedema, Pain.

Öz

Tedavi sürecinde COVID-19 tanısı alan meme kanseriyle ilişkili lenfödemi olan bir hastanın tedavi sonuçları sunulmaktadır. Kırk yedi yaşındaki kadın hastanın tek taraflı meme kanseriyle ilişkili lenfödemi vardı. Hasta, COVID-19 tanısından önce ve COVID-19'dan iyileştikten sonra sırasıyla 10 ve 15 seans kompleks dekonjestif fizyoterapi tedavisi aldı. Uzuv hacmi, çevre ölçümüne dayalı olarak frustum formülü kullanılarak hesaplandı. Etkilenmiş uzuvda ağrı şiddetinin seviyesi, 11 puanlık sayısal ağrı değerlendirme ölçeği kullanılarak değerlendirildi. COVID-19 tanısından önce hastada ağrı yoktu ve uzuv hacmi kompleks dekonjestif fizyoterapi sonrasında %61 azaldı. Hasta, COVID-19'dan iyileştikten hemen sonra kolunda ağrı skoru 8'di. Uzuv hacmi, 10. ve 15. seanslar sonunda sırasıyla %3 ve %17 azalmıştı. Ağrı skorları, 10. ve 15. seanslar sonunda sırasıyla 4 ve 0'dı. COVID-19 geçirmiş meme kanseriyle ilişkili lenfödemi olan hastalarda kompleks dekonjestif fizyoterapinin uzuv hacmi üzerindeki etkisi azalabilir. Bu hasta popülasyonunda kompleks dekonjestif fizyoterapiden en iyi sonuçları elde etmek için klinisyenlerin tedavi süresini belirlerken ve tedavinin etkinliğini değerlendirirken hastanın COVID-19 durumunu veya ilgili tıbbi geçmişini dikkate almaları önerilir.

Anahtar Kelimeler: Meme neoplazmı, COVID-19, Lenfödem, Ağrı.

1. Introduction

Severe acute respiratory syndrome coronavirus 2 that causes the coronavirus disease (COVID-19) has globally infected many people and has caused high mortality. Multiple organs are affected in patients with the virus, and immune patterns are associated with the progression of COVID-19 (1,2).

Breast cancer-related lymphedema (BCRL) is a frequent consequence of breast cancer surgery or radiation therapy. Lymphedema is a protein-rich fluid accumulation in the interstitial space due to damage to the lymphatic system (3). Complex decongestive physiotherapy (CDP) is a common treatment approach to reduce limb volume for lymphedema (4). Understanding the relationship between lymphedema and COVID-19 is crucial. With an increasing number of patients diagnosed with COVID-19, it may affect a significant number of this patient population. It is unclear whether COVID-19 has any effect on limb volume or causes additional symptoms. Furthermore, the impact of COVID-19 on edema reduction, which is an important outcome measure of the treatment, in patients with lymphedema treated with CDP is unknown.

This case report presents the results of a patient with BCRL diagnosed with COVID-19 in a CDP treatment period and the effectiveness of CDP in limb volume before and after the diagnosis of COVID-19.

2. Materials and Methods

Written and verbal informed consent was obtained from the patient for the procedures performed. The assessment and treatment protocol are presented below.

2.1. Ethical Considerations

Written and verbal informed consent was obtained from the patient for the procedures performed. No formal ethics approval was requested because the local ethics committee in Turkey stated that there was no need for ethical approval for this kind of study.

3. Case Report

A 47-year-old female patient (body mass index = 29.41 kg/m2) who underwent total mastectomy of the left breast and left axillary dissection followed by adjuvant therapy (chemotherapy and radiotherapy) in 2010 was diagnosed with lymphedema in the left upper limb in 2019. The patient attended the clinic for treatment and was treated from January 2022 to March 2022.

The patient did not report a medical comorbidity except for breast cancer. The patient had received two doses of the Pfizer-BioNTech COVID-19 vaccine before the treatment. The level of pain severity at rest on the affected limb was assessed using an 11-point numeric pain rating scale (0 = no pain, 10 = worst pain possible). The circumference measurements were taken with a tape measure with the patient in a supine position and the arm abducted at 30º. The circumference was measured every 5 cm, from the ulnar styloid to 40 cm proximal to the arm. The volume of each segment was then calculated by using the frustum formula, relying on arm circumference measurements (ulnar styloid–5 cm = V1, 5–10 cm = V2, …, 35–40 cm = V8), and the limb volume was obtained by summing the volume calculations of all segments (V1 + V2 + … + V8 = limb volume) (5).

The patient received CDP, which involved patient education, skin care, manual lymph drainage, multilayer compression bandaging, and exercises (6). The manual lymph drainage began at the base of the neck and then progressed to the anterior and posterior trunk and the affected limb. After that, a low-pH skin lotion was applied to the skin. The fingers and hand were wrapped in gauze, and the arm was wrapped in a stockinette and a layer of cotton, respectively. Bandages (6, 8, and 10 cm) were sequentially applied in a spiral fashion around the limb, with the smallest bandage starting at the hand and gradually decreasing compression from distal to proximal areas. The patient was instructed to perform breathing and muscle pumping exercises at home and to wear the bandage for 24 hours. The patient was treated five days a week on consecutive days.

At baseline, the patient had no pain in her affected limb. The difference between the affected and unaffected limb volume (i.e., lymphedema volume) was 707.23 ml. The severity of the patient's lymphedema was identified as moderate lymphedema according to the International Society of Lymphology criteria (4). At the end of the 10th session of the treatment, the limb volume decreased by about 61%. The patient kept the bandage on for about 21 hours. After completing the 12th session, the patient was diagnosed with COVID-19 and quarantined for 11 days. During the quarantine period, the patient did not receive any treatment for lymphedema and did not exercise. After the COVID-19 test result was negative, the patient was started on treatment again. Before the second phase of the treatment period, the difference between the affected and unaffected limb volume was 620.88 ml. After the patient recovered from COVID-19, the limb volume decreased by about 3% and 17% at the end of the 10th and 15th sessions of the treatment, respectively. The bandage compliance was the same as the first phase of the treatment period. The change in the lymphedema volume over time is presented in Figure 1. The patient had a pain score of 8 on her affected limb after COVID-19 diagnosis. The pain scores were 4 and 0 at the end of the 10th and 15th sessions, respectively.

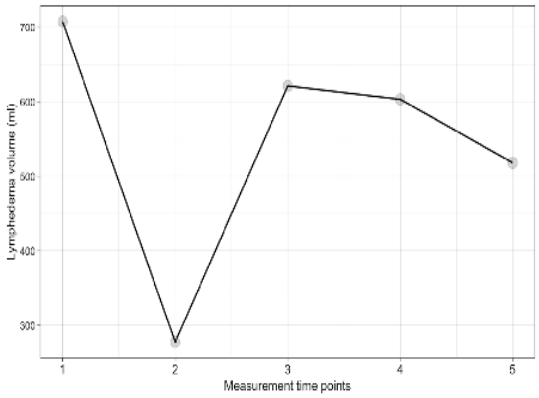

Figure 1. The Change in the Lymphedema Volume Over Time in the Patient. The Descriptions of the Time Points are as Follows: 1, at Baseline; 2, at the End of the 10th Session; 3, at the Beginning of the Post-COVID-19 Period; 4, at the End of the 10th Session After the Patient Recovered from COVID-19; 5, at the End of the 15th Session After the Patient Recovered from COVID-19.

4. Discussion

In this case report, the patient's limb volume reduction after the treatment was dramatically lower in the post-COVID-19

period than in the pre-COVID-19 period; Figure 1 shows this phenomenon. Since such a situation has not been reported in the literature, only cautious interpretations can be made about the causes. This phenomenon was possibly related to a further increase in lymphatic load in the patient after COVID-19. In BCRL, a reduction in the transport capacity of the lymphatic system leads to swelling of the affected area (3). The lymphatic system is an important part of the immune system. The virus leads to an impaired immune system; uncontrolled inflammatory responses and increased lymphocyte degeneration and macrophage proliferation occur in patients infected with the virus (1,2). Since the waste products and macromolecules are transported through the lymphatic system, the lymphatic system may have become more overwhelmed in the patient. The rapid increase in limb volume of the patient during the short quarantine period supports this hypothesis. Furthermore, the absence of pain before the COVID-19 diagnosis and pain only in the affected arm after the COVID-19 diagnosis also supports the hypothesis of overloading the lymphatic system after the virus infection. Increased pressure in the interstitial space causing compression on a nerve bundle or stretching of nerve fibers within the skin can cause pain in patients with BCRL (7,8). This can be presented as evidence that the patient's lymphatic system was overloaded during the quarantine period and had trouble transporting macromolecules due to the infection. In the patient, pain disappeared at the end of the 15th session. It can be speculated that additional symptoms, such as pain, may diminish or resolve via CDP in a relatively short period in patients with BCRL who have a history of COVID-19.

Another reason for the reduced effectiveness of the lymphedema treatment after COVID-19 diagnosis in the patient may be related to damage to the lymph nodes due to the virus in regions that were not affected by the breast cancer surgery. Manual lymph drainage and compression bandaging are used to move lymph fluid away from the affected limb to healthy regions via interterritorial anastomoses (3,6). In infected patients, apoptosis is observed in the lymph nodes (9); in the patient, this may have caused a reduced drainage of lymph fluid due to damaged lymph nodes, and thereby, transportation of the lymph fluid into the venous system may have decreased.

The patient had received two doses of the vaccination. In the literature, it has been reported that some patients with breast cancer experienced swelling in their arms (< 3%) as a side effect after vaccination (10). The patient did not report increased swelling after vaccination. The reduction in limb volume in the patient before contracting COVID-19 was significantly better than in the post-COVID-19 period. This situation strengthens the idea that the main reason for the decrease in the effectiveness of the treatment is the patient contracted COVID-19, not the vaccine.

5. Conclusion

The effectiveness of CDP in limb volume may be reduced, and additional symptoms, such as pain, may occur in patients with BCRL who have experienced COVID-19. Two possible reasons may explain this result: a rapid and progressive increase in lymphatic load, and a damage to the lymph nodes of the patient. The findings of this report included the patients who received CDP immediately after recovering from COVID-19; the results may differ in patients who have had COVID-19 much earlier.

6. Contribution to the Field

To achieve optimal results in the conservative treatment of patients with BCRL, clinicians are advised to consider the patient's COVID-19 status or relevant medical history when determining the treatment duration and assessing the effectiveness of the treatment. A longer treatment period for lymphedema may be necessary to achieve optimal benefit in this patient population.

Ethical Aspect of the Research

Written and verbal informed consent was obtained from the patient for the procedures performed. No formal ethics approval was requested because the local ethics committee in Turkey stated that there was no need for ethical approval for this kind of study.

Conflict of Interest

This article did not receive any financial fund. There is no conflict of interest regarding any person and/or institution.

Authorship Contribution

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