

Physiotherapy Management of Musculoskeletal Disorders in Coronavirus Disease: Case Report

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Abstract

One aspect of Covid 19 is the various musculoskeletal and motor problems that patients face. Due to the novelty of this disease, a study which has examined its various side effects has not yet been published. Therapists have dealt with a number of issues in their clinical experience. Thus, an investigation of musculoskeletal disorders is essential in this disease. In this study, physiotherapy treatments for a case of Covid 19 hospitalization at Masih Daneshvari Hospital were present. A complete evaluation of the patient's musculoskeletal status was reviewed along with a review of respiratory symptoms, and then a treatment plan. Due to the novelty of this disease, many of its dimensions are unknown. Due to movement disorders in Covid-19 patients, physiotherapy is one of the important components of the treatment program, especially after discharge from the hospital. This small study provides a platform for extensive research on this topic.

Keyword: Coronavirus Disease, Covid-19, Musculoskeletal Disorders, Physiotherapy

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Introduction

Coronavirus disease (Covid-19) is caused by a new CORONA virus that appeared in 2019. Studies to date have shown that the virus is mainly transmitted from one person to another through respiratory secretions (1, 2). Large droplets are spread from coughing, sneezing, or nasal discharge up to 2 meters from an infected person. The virus is transmitted to another person by hand contact with an infected surface, and then by touching the mouth, nose or eyes. Airborne contaminants (aerosols) resulted from sneezing or coughing, stay in the air for at least three hours. These particles in the air can be inhaled by someone else or placed on the mucous membranes of the eyes. People with Covid-19 can develop a flu-like illness and respiratory tract infection which includes fever (89%), cough (68%), fatigue (38%), sputum production (34%) or shortness of breath (19%) (2). The severity of the disease varies from an asymptomatic infection, mild upper respiratory tract disease, severe viral pneumonia with respiratory failure, or death. A current report estimated that 80% people with coronavirus disease are asymptomatic or mild, 15% are severe (infection requires oxygen), and 5% are severe, requiring ventilation and vital assistance (3).

One of the aspects of this disease is the various musculoskeletal and motor problems that patients face. Due to the novelty of this disease, to my best knowledge, a study that has examined its various side effects has not yet been published. Therapists have dealt with a number of issues in their clinical experience. Therefore, an investigation of musculoskeletal disorders is essential in this disease.

Extensive research is being conducted at several medical centers in Tehran to investigate musculoskeletal problems in Covid 19. In this study, the Persian version of the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) was used (4). Preliminary results of this study showed that the most common problems reported by patients included low back pain, and mobility problems including general weakness and inability to walk.

On the other hand, physiotherapy treatments in this disease are more focused on respiratory or limb physiotherapy. However, there are several side effects which need to be evaluated and treated with physiotherapy. In this study, some of the musculoskeletal disorders observed in a patient with Covid-19 hospitalized at Masih Daneshvari Hospital and the physiotherapy treatments for him were present.

Case Presentation

A 42-year-old man with no previous history of illness was admitted to the hospital with symptoms such as fever, dry cough and shortness of breath, and was hospitalized after a medical examination. He was 176 cm height and weighed 69 kg. After testing, he was diagnosed with the coronavirus (right + Polymerase chain reaction (PCR)).

Past medical history: The patient did not report any previous medical history or physical weakness. The patient was not a smoker and did not drink alcohol. His level of physical activity was moderate and he did not exercise regularly. The patient's oxygen saturation level (SPO₂) on the day of admission was 84 at rest. The patient had shortness of breath and the rate of dyspnea was 6 according to the modified Borg score.

Treatment plan: The patient underwent medication to control the symptoms. Due to the decrease in oxygen levels, oxygen therapy was started from the first day. The patient was hospitalized in the normal ward for 20 days. From the seventh day, the patient's fever and cough was decreased. But dyspnea and desaturation remained.

The patient was discharged from the hospital on the twentieth day. Dyspnea was 3 based on Borg score on the day of discharge. Saturation by pulse oximeter was 90 and oxygen therapy continued. Doctors advised the patient to use oxygen at home as well.

Complications of disease: As mentioned above, Covid- 19 disease has different side effects on the body's organs. Some of these side effects include headache, low back pain, neck and thoracic pain, movement problems such as inability to walk, urinary incontinence, skin problems, and more. The biggest problem with this patient was the inability to walk.

Examination: The physiotherapy treatment program began on the seventh day of hospitalization. The results of the evaluation on the seventh day were as follows:

Pulse oximeter: Heart rate (at rest): 87

Oxygen saturation (spo₂): 85 (without oxygen) and 93 (with oxygen 2 liter/min)

Respiratory rate: 24 (at rest)

Borg scale:

Dyspnea at rest: 5

Fatigue: 4

Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) score:

Pain frequency: 12 (low)

Pain intensity: 35 (moderate)

Effect on ADL: 30 (high)

6-minute walk test: The patient was unable to perform the test due to his inability to walk.

Manual muscle test (MMT):

Right Quadriceps: 4

Left Quadriceps: 3

Handgrip: normal in both sides

Right hip abduction: 4

Left hip abduction: 4

Physiotherapy plan:

Patient had hyperventilation syndrome due to anxiety and breathing pattern disorder. Breathing pattern was apical or upper chest. The first goal of the physiotherapy program was to correct the breathing pattern, and reduce the number of breaths as well as shortness of breath. Because Covid 19 is a restrictive lung disease, it reduces the lung volume as well as the ventilation. Therefore, it is necessary to perform the exercises which increase the lung volume. In addition, the patient had general weakness and inability to walk because of prolonged immobility. The exercise capacity and the amount of physical activity were reduced. On physical examination, it was determined that the strength of the quadriceps muscles on both sides was sufficient (4) for walking. Therefore, the main reason for the inability to walk was related to the general weakness of the body and shortness of breath. Based on this, the physiotherapy program was adjusted as follows:

The first week:

Diaphragmatic exercise: In the supine position, the patient placed his hands on his abdomen, moved his hands outward when the inhalation, and returned his hands when the exhalation. The inhale was done from the nose and exhale through the mouth, and the exhalation time is longer. The patient was advised to repeat this exercise regularly (at least 10 repetitions every hour).

Deep breathing: The patient breathed in through the nose and held his breath. He held his breath as long as he could, and then exhaled through his mouth. This exercise was repeated alternately.

Quadriceps exercise: It was initially recommended the patient to perform the isometric exercises using a pillow. Exercises were done in flexion, abduction, and adduction. The patient is then asked to sit on the edge of the bed and raise his legs one by one.

The next step was to stand by the bed and keep his balance. Also, if possible, the subject was asked to take a few steps.

Second week:

After the initial exercises, the next goal was to increase the patient's exercise capacity as well as physical activity. Because it was not possible to transfer to the physiotherapy department due to restrictions on the transmission of the infection in Covid 19, necessary training was transferred to the subject through the remote physiotherapy facilities.

The patient was asked to walk in his room daily. In order to provide a measure of the subject's gait, he was asked to use a smart counting step. Due to the patient's severe weakness, the first exercise was to adjust 50 steps per day, then 5 and 10 extra steps per day was added. It should be noted that the patient did all exercises with oxygen during walking, and the amount of oxygen was adjusted to 4 liters per minute. Due to the improved conditions, doctors discharged the subject from the hospital on the twentieth day. The status of the parameters on the day of discharge was as follows:

Pulse oximeter:

Heart rate (at rest): 85

spo2: 85 (without oxygen) and 94 (with oxygen 2liter/min)

Respiratory rate: 18 (at rest)

Borg scale:

Dyspnea at rest: 3

Fatigue: 2

CMDQ score:

Pain frequency: 5 (low)

Pain intensity: 12 (low)

Effect on ADL: 15 (low)

MMT:

Right quadriceps: 5

Left Quadriceps: 5

Handgrip: normal in both sides

Right hip abduction: 5

Left hip abduction: 5

Number of steps per day: 100

Discussion

At present, due to little information, it is not yet clear whether the decrease in the muscle strength and the occurrence of musculoskeletal disorders in COVID-19 is due to the patient's immobility or a pathology resulted from the virus itself. However, because of the fact that the patient reported no the muscle weakness and the movement deficit before the disease onset, it seems that we should not see such a decrease in this short hospital stay. Especially, since the patient did not undergo any surgery or invasive procedure. However, this requires an extensive research.

Exercise, as seen, did not improve the oxygen saturation much, but it improved the patient's mobility. The strength of the quadriceps muscles was improved, the rate of shortness of breath and fatigue decreased, and the patient's ability to walking increased. On the other hand, the breathing exercises reduced the

breathing rate per minute and improved the patient's breathing pattern. It may take longer for the oxygen saturation level to improve and for the patient to leave the oxygen therapy. During the discharge, the doctors advised the patient to use oxygen at both rest and during activity. In order to continue the patient's progress, the physiotherapy program at home continued through Tele-physiotherapy methods.

Conclusion

The role of physiotherapy is very important due to the occurrence of various motor complications in patients with Covid 19. Although there is little evidence regarding the effectiveness of physiotherapy in resolving the multiple respiratory and the motor problems in these patients, clinical experience has shown that physiotherapists, as a member of the treatment team, play an important role in increasing the exercise capacity and relieving the musculoskeletal problems in these patients.

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