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Case Study

Role of ICU Physiotherapy in Covid-19: A Case Study

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Abstract: Coronavirus disease 2019 (COVID-19) is the 3rd coronavirus infection in two decades that was originally described in Asia, after severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). As the COVID-19 pandemic spreads worldwide, intensive care unit (ICU) practitioners, hospital administrators, governments, policy makers, and researchers must prepare for a surge in critically ill patients. Physiotherapists, mainly respiratory physiotherapists, are among the healthcare professionals involved in the management and care of these patient's population and play a key role in the non-invasive support management, postural changes, mobilization, as well as during the weaning from invasive mechanical ventilator support. To determine the recent research evidences for the importance of physiotherapist during COVID-19 pandemic. We report one cases of patients with COVID-19 from PSMMC hospital that illustrate the various indications for physical therapy, clinical challenges, potential treatment methods, and short-term response to treatment. Physical therapists actively treated patients with COVID-19 in the intensive care unit. Interventions ranged from patient education, to prone positioning, to early mobilization and respiratory therapy. Patients were often unstable with quick exacerbation of symptoms and a slow and fluctuant recovery. Additionally, many patients who were critically ill developed severe weakness, post-extubation dysphagia, weaning failure, or presented with anxiety or delirium. In this setting, physical therapy was challenging and required specialized and individualized therapeutic strategies. Most patients adopted the proposed treatment strategies, and lung function and physical strength improved over time. Physical therapists clearly have a role in the COVID-19 pandemic. Based on our experience we recommend that physical therapists routinely screen and assess patients for respiratory symptoms and exercise tolerance on acute wards. Treatment of patients who are critically ill should start as soon as possible to limit further sequelae. More research is needed for awake prone positioning and early breathing exercises as well as post-COVID rehabilitation.
Keywords: COVID-19, Physiotherapy, Physiotherapy Management, ICU.

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a new coronavirus that emerged in 2019 and causes coronavirus disease 2019 (COVID-19)[1,2]. SARS-CoV-2 is highly contagious. It differs from other respiratory viruses in that it appears to have human to human transmission approximately 2 to 10 days prior to the individual becoming symptomatic[2-4]. The virus is transmitted from one person to another through respiratory discharges. Large droplets from coughing, sneezing or rhinorrhoea land on surfaces within 2 meters surrounding COVID positive patients. SARS-CoV-2 remains viable for at least 24 hours on hard fomites and up to 8 hours on soft fomites[5]. Individuals with COVID-19 can present with an influenza-like, respiratory tract infection symptoms such as fever (89%), cough (68%), fatigue (38%), sputum production (34%) and/or shortness of breath (19%)[4]. In Middle East Respiratory Syndrome Coronavirus (MERS-CoV) has plagued the Middle East since it was first reported in 2012[6]. As of January 2020, the World Health Organization (WHO) has been notified of 2494 laboratory-confirmed cases with 858 mortalities[7].

At the end of December 2019, a cluster of pneumonia cases were reported from Wuhan city, Hubei Province, China, linked to a wet seafood market with a new coronavirus identified as the etiologic agent currently named SARS-CoV-2[8-9]. The Global Surveillance Interim guidance by WHO developed[10]. (I)- Patient with severe acute respiratory infection (fever and cough) and requiring admission to the hospital AND there is no other etiology that fully explains the clinical presentation AND a history of travel to or residence in China during the 14 days prior to symptoms onset. (II)- Patient with any acute respiratory illness AND at least one of the following during the 14 days prior to symptoms onset: (a) Contact with a confirmed or probable case of COVID-19 infection or (b). Worked in or attended a health-care facility where patients with confirmed or probable COVID-19 acute respiratory disease patients were being treated. In contrast, the Saudi Center for Disease Prevention and Control (SCDC) defined a suspected case as the following[11]. A person with acute respiratory illness (ARI) (fever with cough and/or shortness of breath) AND any of the following: (a) A history of travel to China in the 14 days prior to symptom onset. (b) A close physical contact in the past 14 days with a confirmed case of COVID-19 infection. The new COVID-19 guidance document[11] produced by Saudi CDC provides HCFs with a new visual triage (VT) for ARI that has a checklist for placing patients in isolation precautions with score ≥6, with the weight of the points to history of travel in the last 14 days prior to symptoms onset, which is given five points[12].

In February 2020, Italy, especially the northern region, was hit by an epidemic of the new SARS-Cov-2 coronavirus that spread from China between December 2019 and January 2020[13]. The entire healthcare system had to respond promptly in a very short time to an exponential growth of the number of subjects affected by COVID-19 (Coronavirus disease 2019) with the need of semi-intensive and intensive care units. In these regions, hospitals entire buildings and wards have been converted in semi-intensive and intensive care units and trained dedicated COVID-19 teams consisting of physicians (intensivists or pneumologists or other trained specialists as well as infectiologists and nurses have been recruited to work on and on with rest. Physiotherapists, mainly respiratory physiotherapists, are among the healthcare professionals involved in the management and care of these patient's population. They play a key role in the non-invasive support management, postural changes, mobilization, as well as during the weaning from invasive mechanical ventilator support[14]. Therefore, our aim is to share information with worldwide physiotherapists involved in the management of patients affected by COVID-19. Considering the complexity and frailty of COVID-19 patients, we recommend, when possible, to have as a task force, physiotherapists with expertise and/or dedicated training in Respiratory Physiotherapy (RT)[14].

The aim of this case report is to provide information to physiotherapists and acute care healthcare professionals about the potential role of ICU physiotherapy in the management of hospital-admitted patients with confirmed or suspected COVID-19. Physiotherapists who work in primary healthcare centers are likely to have a role in the management of patients admitted to hospital with confirmed or suspected COVID-19. Physiotherapy is an established profession throughout the world. Globally, physiotherapists often work in acute hospital wards and ICUs. In particular, cardiorespiratory physiotherapy focuses on the management of acute and chronic respiratory conditions and aims to improve physical recovery following an acute illness. Physiotherapy may be beneficial in the respiratory treatment and physical rehabilitation of patients with COVID-19. Although a productive cough is a less common symptom (34%)[4].

Physiotherapy may be indicated if patients with COVID-19 present with copious airway secretions that they are unable to clear independently. Physiotherapists who work in the ICU setting may also provide airway clearance techniques for ventilated patients who show signs of inadequate airway clearance and they can assist in positioning patients with severe respiratory failure related with COVID-19, including the use of proning to optimize oxygenation[15]. Given the intensive medical management for some COVID-19 patients–including prolonged protective lung ventilation, sedation and use of neuromuscular blocking agents–those who are admitted to ICU may be at high risk of developing ICU-acquired weakness[15].

Patient Information

Case Study

A 45-year-old male patient complains of shortness of breath (SOB) and fever and admitted to ICU and tested as COVID-19 positive case. He is unresponsive. His FIO2 is 60%, sedation on propofol 100mg and fentanyl 300 mcg, his GCS is 4/15 unconscious, he is not following any commands, stable on inotropic support 0.08mcg noradrenaline, arterial line and central venous line, intermittent HD, Non pitting edema in both hand.

Treatment

The Physiotherapy session began with patient education followed by breathing control and thoracic expansion exercises in supine as well as in sitting and ended with prone positioning which patient maintained for 2 hours. Strengthening exercises of the upper and lower limb were included as the patient's condition stabilized. The patient showed good recovery and was further progressed to exercises in standing. Standing balance was done. Sit to stand independently, patient mobilized with hand held only. Spot Marching was given before progressing to walking around the bed and later to walking in ICU. Patient got independent of functional activates and walking safely on supervisions of physiotherapist. As the patient was middle aged he could tolerate the exercises well and made a quick recovery. Sessions were concluded with prone positioning.

Discussion

COVID-19 is a highly communicable viral infection associated with overactive host immune response resulting in pneumonia and ARDS. The duration of symptoms is approximately 4 to 19 days with complications setting in between 7 to 19 days 9 to 14% of patients have severe disease while 5% of patients are critical[16]. On account of the increased risk of exposure to infection, Personal Protective Equipment (PPE kit) was used while treating these patients. Assessment by Physiotherapist was limited to observing breathing pattern and respiratory rate, use of finger pulse oximeter which displays oxygen saturation and pulse rate, and cardio scope which displays heart rate and BP. Furthermore, patient assessment and Physiotherapy management should not exceed 10-15 minutes to reduce risk of exposure[17].

Patients with COVID-19 pneumonia and ARDS are admitted to ICU with Type 1 respiratory failure. They are unable to maintain the oxygen saturation in the blood and hence are put on oxygen therapy. During the natural course of the disease, the primary goal of a Physiotherapist in ICU is to prevent the accumulation of or to clear broncho pulmonary secretions and to prevent ICU acquired muscle weakness. As all the above patients had dry cough with no secretions, interventions were directed to reduce hypoxemia with positioning, to relieve dyspnea with a diaphragmatic breathing exercise and general exercises to prevent muscle weakness[17].

Physiotherapy management was started with patient education which helped in reducing anxiety and fear about the COVID 19. Patients were given position changes every to 2 hours (prone, lying on the left side, sitting upright 60-90 degrees and lying on the right side) as per the CARP protocol to improve hypoxaemia[18].

Graded exercises were given to prevent complications of bed rest and deconditioning. Patients were given exercises of the upper and lower extremity in supine and progressed to sitting at the edge of the bed, standing, spot marching and walking in ICU with adequate rest-pause. Exercises helped to optimize oxygen transport by improving alveolar ventilation and V/Q matching and also in maintaining normal fluid distribution in the body and also helped in reducing the fear of activity[19].

Our patient was attended on one to one basis by a Physiotherapist for 15 minutes 3 times a week. The breathing exercises and general mobility exercises performed in the presence of Physiotherapist probably reduced their anxiety and improved their confidence to perform basic activities with less breathlessness. Positive outcomes were obtained with physiotherapy interventions in our patient.

Conclusion

Thus we conclude that physiotherapy intervention was well tolerated by the patients and hence can be administered safely in COVID 19. It helped in reducing their anxiety and fear which had a positive effect on the level of oxygen saturation and level of breathlessness. Our patient showed early recovery which helped him to go back to the community with good functional capacity.

Conflicts of interest: Author declares no conflict of interest.

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