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REVIEW ARTICLE

Rehabilitation of COVID 19 patients, a review of literature

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Abstract:

The global outbreak of coronavirus disease 2019 has created an unprecedented challenge to the society. Currently, the United States stands as the most affected country, and the entire healthcare system is affected, from emergency department, intensive care unit, post-acute care, outpatient, to home care. Considering the debility, neurological, pulmonary, neuromuscular, and cognitive complications, rehabilitation professionals can play an important role in the recovery process for individuals with coronavirus disease 2019.Many patients presenting with COVID-19 will have no specific airway clearance needs.There have been no reports of COVID-19 positive patients having high secretion loads that would require intensive chest physiotherapy or postural drainage. In Bangladesh in ICU settings physiatrist or physiotherapists are not directly involve in respiratory care management but in mild to moderate case or post-acute care breathing exercises, other musculoskeletal exercises, bed positioning and pressure sore care are advised. This review reveals the global concerns of rehabilitation need of COVID 19 patients.

Introduction

Coronavirus disease 2019 (COVID-19) is caused by SARS-CoV-2, a newly emergent coronavirus, that was first recognized in Wuhan, China, in December 2019. Genetic sequencing of the virus suggests that it is a betacoronavirus closely linked to the SARS virus. By way of definition, a symptomatic COVID-19 case is a person who has developed signs and symptoms suggestive of COVID-19[1].

While most people with COVID-19 develop only mild (40%) or moderate (40%) disease, approximately 15% develop severe disease that requires oxygen support, and 5% have critical disease with complications such as respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, thromboembolism, and/or multiorgan failure, including acute kidney injury and cardiac injury [2].

Coronavirus pandemic has affected over 200 countries in the world and createda panic as well as aunique challenge to the society. Global leaders realized with exigency the negligence in the healthand health care delivery services in the past. Currently, the United States stands as the most affected country, and the entire healthcare system is affected, from emergency department, intensive care unit, post-acute care, outpatient, to home care. Considering the debility, neurological, pulmonary, neuromuscular, and cognitive complications, rehabilitation professionals can play an important role in the recovery process for individuals with coronavirus disease. Clinicians across the nation's rehabilitation system have already begun working to initiate intensive care unit–based rehabilitation care and develop programs, settings, and specialized care to meet the short- and long-term needs of these individuals. We describe the anticipated rehabilitation demands and the strategies to meet the needs of this population[3].

Covid-19 has shown a bright light on the impressive work of National Health Services intensive care units (ICUs) around the UK. Now, as the first patients who have had the new virus and spent days ventilated in ICUs are discharged, the

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Chartered Society of Physiotherapy predicts a "tsunami of rehabilitation needs." Already there are question marks about whether appropriate rehabilitation—physical, cognitive, and psychological—will be available for the huge numbers of people who will need to deal with the enormous impact of a stay in critical care[4].

Rehabilitation needs of patients with severe COVID-19

Patients with severe COVID-19 require hospitalization and oxygen support. Those whose illness may be complicated by acute respiratory distress syndrome (ARDS), sepsis and septic shock, or multi-organ failure, including kidney, liver and cardiac injury will typically require invasive mechanical ventilation in the ICU[5,6,7,8,9]. As COVID-19 is a novel disease, the short- and long-term consequences for patients who have experienced severe disease requiring admission to the ICU are anticipated based on knowledge gained from the general critical care population, in particular those with ARDS. Mechanical ventilation, coupled with sedation and/or paralysis, as well as potentially prolonged bed rest and immobilization, can have many detrimental musculoskeletal effects[10]including reduced muscle strength and physical function[11,12]. Other effects may include impairments in respiratory function, cognitive status, swallow, and communication, as well as the potential for delirium. In the long-term, the multifaceted aspects of post intensive care syndrome, which can persist for many months or years after discharge, may also manifest in reduced exercise capacity, independence with activities of daily living, and health-related quality of life[13-24]. Patients with severe COVID-19 who do not receive invasive mechanical ventilation, either because these resources are not available or where illness severity does not warrant this, may also experience some degree of impaired physical and respiratory function, as well as psychosocial challenges, as a result of the illness and hospitalization. The rehabilitation needs associated with severe COVID-19 may be amplified by underlying morbidity and senility. Isolation from support networks as a result of pandemic-related containment measures may also exacerbate many of these problems for patients as they recover from COVID-19.

Rehabilitation interventions for patients with severe COVID-19

While patients with severe COVID-19 are receiving ventilator support, rehabilitation professionals may be involved in supporting acute respiratory management[25] and the maintenance and improvement of functioning to facilitate early recovery. Specialized rehabilitation professionals can provide interventions that assist in improving oxygenation, airway secretion clearance, and ventilation weaning[26] and can also play a role in promoting nutrition[27] and preventing aspiration pneumonia, especially post-intubation and/or in patients with a tracheostomy[28]. In the early recovery period, once patients have returned to a hospital ward or step-down facility, or for patients where illness severity did not warrant admission to an intensive care unit and who have been managed in a hospital ward, rehabilitation interventions may focus on addressing ongoing impairments in mobility, respiratory function, cognition, swallow and nutrition, and communication[29, 30]. Interventions during this period further aim to promote independence with activities of daily living, and to provide psychosocial support. Rehabilitation professionals also contribute significantly to discharge preparation and planning, which can be particularly complex for older patients and those with comorbidities[31]. Long-term Following discharge, rehabilitation professionals can provide graded exercise, education on energy conservation and behavior modification, home modification, and assistive products, as well as rehabilitation for any specific individual impairment. During the long-term recovery of severe COVID-19 illness, patients may benefit from pulmonary rehabilitative interventions, which target physical and respiratory impairments, and include a combination of graded exercise, education, activity of daily living, and psychosocial support[32]. In many contexts, pandemic related constraints like physical distancing, limited human resources and limited public transport and infection risks mean that telehealth is likely to be required following discharge. This could be extended to include remote exercise (e.g. "virtual group"

education and exercise) and peer-to-peer support from COVID-19 patients who have received the appropriate training. Rehabilitation services located in people's communities are often best placed to deliver longer-term care

Need of chest physiotherapy

Most of the moderate to severe cases of COVID 19 patients present with respiratory distress as preliminary symptoms. To date, COVID-19 patients who require hospitalization are presenting with pneumonia features and bilateral patchy shadows or ground-glass opacity in the lungs. There have been no reports of COVID-19 positive patients having high secretion loads that would require postural drainage. It is important to note that some therapeutic interventions will be contraindicated for patients with COVID-19. There may be patients with existing respiratory conditions who require personalized physiotherapy treatments which may include mechanical airway clearance. In this scenario, it is important that the risk and benefit of continuing with the regime are discussed with Consultant Respiratory Clinicians/Critical Care Consultants[33].

Physiotherapy may be indicated if patients with COVID-19 present with airway secretions that they are unable to clear independently. This may be evaluated on a case- by-case basis and interventions applied based on clinical indicators, and may also be utilized in high risk individuals e.g. patients with existing comorbidities that may be associated with hypersecretion or ineffective cough[34]. Physiotherapy intervention is likely to be of limited benefit in the acute stages. Physiotherapists will have a role in the rehabilitation of COVID-19 patients who have not returned to their functional baseline once they are no longer acutely unwell[33].

When to start rehabilitation management

There is strong evidence to suggest that early mobilization with a focus on returning to functional activities helps in reducing the length of hospital stay and minimizing functional decline, thus the sooner patients start mobilizing, the sooner they can leave the ICU, and potentially have better long-term outcomes. This phase of management should incorporate a multi-disciplinary approach including measures to prevent avoidable physical and non-physical morbidity, support adequate nutrition and an individualized, structured rehabilitation program. Convalescence patients need Passive, Active Assisted, Active, or Resisted Joint Range of Motion Exercises to maintain or improve joint integrity and range of motion and muscle strength[34]. Physiotherapists can play a key role in the prevention of a range of complications including ventilator-associated pneumonias, secondary infections, contractures or pressure sores. Common modalities often used by respiratory physiotherapists may be contraindicated in the acute phase as they may further compromise the increased work of breathing.

Positioning

Positioning is a vital component of management for the mechanically ventilated COVID-19 patient, with regular turning recommended to prevent atelectasis, optimize ventilation and prevent pressure sores. Positioning can include lateral (side lying) positioning but may also include prone positioning, which is well recognized to treat hypoxemic respiratory failure. Prone ventilation is ventilation that is delivered with the patient lying in the prone position. Prone ventilation may improve lung mechanics and gas exchange, thus improving oxygenation in the majority of patients with ARDS, and could improve outcomes. Current reports suggest prone ventilation is effective in improving hypoxia associated with COVID-19[35].

The role of physical and rehabilitation medicine (PRM) in rehabilitation of patients in the immediate post-acute phase ofCOVID-19 is obvious. Following the acute phase of the pandemic there will be a surge in need for rehabilitation, including mobilization. The increased need for PRM efforts will last for months, if not years, including rehabilitation of secondary disorders, including post intensive care syndrome[36].

Conclusion: Intervention of patients with COVID 19 disease should be very specific and individualized. Critical patients have coagulopathy, atelectasis, sepsis and inflammatory cascades as

cardinal manifestations which do not need any chest physiotherapy rather carry a high risk of aerosol transmission. Patients will be particularly benefitted by physiotherapy during convalescence when breathing exercise, passive and active exercise of musculoskeletal systems will help early step down to ward from ICU thus reducing the length of hospital stay.The COVID-19 outbreak and its impact on health systems mean that health planners need to make decisions on the extent to which rehabilitation services continue to operate and how rehabilitation service continuity can be maximized. Infection risks must also be considered, along with local factors that impact the feasibility and appropriateness of alternative modes of service delivery, such as telehealth.

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