



MANAGEMENT OF COVID-19 PATIENTS

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Abstract:

Background: The Coronavirus disease (COVID-19), initially documented in December 2019 in Wuhan, China, has emerged as a formidable adversary to humanity, yielding substantial repercussions on the global healthcare infrastructure. The World Health Organization officially designated it as a pandemic on March 11, 2020. Amid the ongoing battle against the prevailing COVID-19 pandemic by healthcare professionals, a new complication has arisen in the form of the post-discharge consequences faced by patients recovering from COVID-19.

Aim: This review aims at highlighting various problems faced by covid-19 patients who have been discharged from the ICU and their subsequent management.

Methodology: The analysis constitutes an exhaustive examination of PUBMED, Google Scholar, and the official WHO webpage spanning from 2009 to 2021.

Conclusion: The COVID-19 pandemic has impacted nearly every nation worldwide, emerging as one of the most severe pandemics in history. Individuals with critical pulmonary conditions or other comorbidities are in a grave state and are often moved to the Intensive Care Unit. These patients experience an extended period in critical care, leading to the development of diverse mental and physical issues following their release. Post-pandemic, a range of rehabilitation initiatives have been implemented, with a focus on the holistic well-being of the patient, encompassing physical, psychosocial, mental, and cognitive aspects. It is imperative to promote such rehabilitation schemes and ensure that patients receive ongoing monitoring following their discharge.

Keywords: COVID-19, PICS, Intensive care unit, telerehabilitation

Introduction:

The outbreak of the Coronavirus disease (COVID-19), first identified in December 2019 in Wuhan, China, has emerged as a formidable adversary to humanity, exerting significant repercussions on the global healthcare infrastructure. Its rapid transmission worldwide prompted the World Health Organisation to declare it a pandemic on March 11, 2020. Countries such as Singapore, India, Europe, and the USA witnessed a notable surge in infections within a short span, leading to a critical shortage of hospital beds, essential medications, and other healthcare provisions.[1]

The manifestations of Covid-19 primarily involve the respiratory system, encompassing symptoms such as cough, fever, dyspnea, anosmia, fatigue, myalgia, and arthralgia; additional signs have been observed in the gastrointestinal tract, such as acid reflux, diarrhea, and dysgeusia.[2] A patient exhibiting the aforementioned symptoms alongside a positive laboratory finding, regardless of disease severity, is classified as a confirmed case. Globally, the total number of documented Covid-19 cases has escalated to 142,727,374, with 3,043,703 fatalities recorded across 200 nations. The proportion of individuals progressing to severe symptoms is estimated to be approximately 14%, accompanied by a mortality rate of approximately 4.2%.[1]

While the healthcare workers are engaged in battling the current Covid-19 pandemic, a new obstacle that has emerged pertains to the consequences faced by Covid-19 patients post-discharge from a medical facility following a period of severe illness, including treatment in an intensive care unit (ICU). The enduring effects of Covid-19 on patients post-recovery have become a subject of significant concern among healthcare practitioners, prompting various research endeavors in this domain. Substantial evidence now exists regarding the persistent effects of the virus or delayed illness manifestations observed in certain individuals. This particular disease progression has been identified as Post-Intensive Care Syndrome (PICS), comprising three distinct subcategories that focus on the holistic well-being of the patient. Covid-19 patients appear to encounter similar challenges as individuals recuperating from severe illnesses, compounded by the unique nature of the virus, which introduces uncertainties regarding the trajectory of the disease.[3]

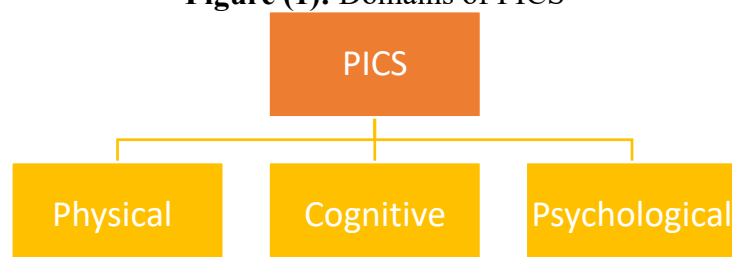
Post ICU discharge symptoms of patients

Covid 19, when manifested severely, induces pneumonia resulting in acute respiratory distress syndrome, necessitating the admission of patients to the intensive care unit (ICU) for an extended duration. During the prolonged ICU stay, individuals experience markedly diminished blood oxygen levels, non-pulmonary organ failures, and heightened indicators of inflammation. An investigation carried out by Stewart et al. focused on a cohort of young individuals under 30 years old, devoid of comorbidities, and afflicted with severe illness. Their findings revealed that prolonged ICU hospitalization led to organ reprogramming in these patients.[4] Patients who have survived the illness often experience weight loss, profound weakness, frailty, and cognitive decline. The restoration of their body mass index is delayed in different tissues due to disturbances in metabolic regulation, resulting in the onset of type 2 diabetes and an increase in adipose tissue. Many individuals suffer microscopic damage to multiple organs when inflammation is at its peak, which is not fully repaired and contributes to the development of chronic conditions in these organs, particularly chronic kidney disease and cardiovascular events following intensive care unit treatment.[5] The manifestations manifest in the individuals as a result of their compromised immune system and mild inflammation subsequent to their hospitalization in the Intensive Care Unit, rendering them susceptible to such additional infections.[5] In instances like these, the condition resulting from a sedentary lifestyle is typically mitigated through physical exercise; however, infections that are already present are not influenced by physical activity and necessitate medical treatment.[6] When individuals afflicted by severe ailments manifest chronic inflammation or thrombosis, the inhibitors targeting these mechanisms assume a critical role in ameliorating the outcomes for the survivors. The year 2017 witnessed the execution of the CANTOS trial, demonstrating that patients grappling with cardiac conditions, pulmonary malignancies, and hematological disorders exhibited signs of amelioration upon receiving treatment with Interleukin- β (IL- β). The trial revealed that discontinuation of IL- β

administration for patients recuperating in intensive care units was associated with elevated susceptibility to infections among such individuals.[7]

COVID-19 patients, in addition to experiencing the aforementioned challenges encountered by patients recuperating from a severe illness, also confront an additional issue of uncertainty regarding the trajectory of the illness, leading to ambiguity throughout the recuperation period. The Post-Intensive Care Syndrome (PICS) and its various components have played a significant role in the recuperation phase of the individual. PICS encompass three distinct subcategories focused on the holistic well-being of the patient [figure 1]. [3]

Figure (1): Domains of PICS



Once the individual is discharged from the Intensive Care Unit (ICU), a fundamental query emerges regarding the individual responsible for post-ICU care. The medical team stationed in the ICU is proficient in overseeing the patient post their critical ailment phase. Their focus lies in identifying the patient's requirements during the recuperation stage and subsequently directing them to the suitable facility based on the patient's necessities. Certain individuals necessitate an intense recuperation period entailing services from community rehabilitation centers, cardiopulmonary rehabilitation, cognitive therapy, psychological counseling, or vocational assistance. These provisions, in seamless collaboration with the hospital, strive to establish an optimal network that ensures the patient undergoes a fully optimized recuperation phase.[8]

Covid 19 Recovery Unit:

The covid recovery unit is focused on addressing the intricate consequences of the illness and facilitating a swifter recuperation in contrast to the traditional progression from ICU to surgical ward to a rehabilitation facility. The establishment of a 30-bed covid patient recovery unit at the Weill Cornell Medical Center introduced a holistic treatment approach encompassing medical rehabilitation and neuro-psychological support. The team responsible for recovery comprised specialists from diverse medical fields such as Nephrology, Pulmonary medicine, Gastrointestinal, Geriatrics, among others. The hospital defined specific eligibility criteria for admitting patients to the covid recovery unit, as outlined in Table 1.[9]

Once the establishment of the recuperation unit transpired and patients were admitted, they were instructed to adhere to a particular regimen of activities aimed at enhancing their physical and psychological well-being. Following their recuperation from Covid-19 within the Intensive Care Unit (ICU), various thoughts cross the minds of survivors, such as survivor's guilt. Facilities like patient recovery units played a crucial role in enabling patients to engage socially shortly after their ICU stay, thereby alleviating the apprehension of reintegrating into society post-ICU discharge. The hospital's utilization of a multidisciplinary approach, which integrates medical, psychological, and physical rehabilitation, has proven to be a beneficial catalyst in the recovery journey of individuals recuperating from Covid-19.[9]

Inclusion Criteria	Exclusion Criteria
The patient should be able to condone at least 30 mins of physical therapy	The patient should not be suicidal or be undergoing dementia or full-time care.

• The patient should be able to communicate well with the hospital staff and other inpatients	• Patients who are bedridden and have a low expectation about getting back to normal physical strength
• The patient should not need any peritoneal dialysis	• Patients who were on a ventilator, who still require high amounts of oxygen for survival
• Final discharge for the patient is anticipated to be in acute or subacute rehabilitation	
Table 1: Inclusion and Exclusion criteria for patients do enter the recovery unit post-Covid as per hospital guidelines	

Possible Impairments after COVID-19 ICU discharge and their management.

Impairments in the physical well-being of patients commonly manifest following critical illness and a stay in the Intensive Care Unit. Muscle wasting and weakness frequently occur as a result of an extended period of hospitalization. Individuals with severe cases of COVID-19 often necessitate prolonged ICU admission accompanied by mechanical ventilation, neuromuscular blockade, and immobility, thereby increasing their susceptibility to physical impairments. Prolonged use of a ventilator can lead to laryngeal and diaphragmatic injuries due to intubation procedures.[10] Another consequence observed in individuals following recovery from COVID-19 is a decline in cognitive functions, resulting in memory loss and delirium. This occurrence is attributed to an extended period of isolation in the Intensive Care Unit (ICU), where potent sedatives are administered, and the inability to engage with family members due to the heightened susceptibility to infection. Consequently, the diminished human interaction exacerbates the deterioration of the patient's health condition.[11] Patients who have preexisting blood sugar conditions such as diabetes mellitus experienced elevated blood sugar levels, which were accompanied by heightened inflammatory reactions attributed to the delayed activity of TH1/TH17.[12] Patients with kidney impairments exhibited a heightened mortality rate and a rise in admissions to the Intensive Care Unit.[13]

In a recent investigation carried out by Huand et al. [14], an individual was observed in the intensive care unit for a span of 12 days due to respiratory failure. Subsequently, this patient was readmitted as a consequence of respiratory reinfection stemming from a recurring bout of pneumonia, necessitating an additional 15-day stay. Following discharge, the patient underwent a rehabilitation regimen, encountering challenges such as proximal muscle weakness, musculoskeletal atrophy, tremors due to debility, diminished pulmonary function, dysphagia attributable to compromised muscle performance, psychological distress, emotional concerns, and decreased appetite. Mobility was restricted, with the patient unable to ambulate without supervision for distances exceeding 60 meters, lacking motivation for the rehabilitation process. Despite the partial resolution of respiratory complications post the second ICU admission, the patient underwent thrice-daily incentive spirometer sessions lasting 15 minutes each, with a prescribed tidal volume of > 400-600mL per breath and a breathing rate of 10-20 breaths per minute. Physical therapy initiatives encompassed activities targeting standing balance, resistance exercises, employment of resistance bands, partial squats, circuit training, and progressive ambulation, with diminishing rest periods during each session. Owing to challenges in swallowing, nasogastric tube feeding was initiated, transitioning later to dysphagia therapy, leading to enhanced swallowing capacity and eventual resumption of oral intake. Tailored home-based exercise routines focusing on physical strengthening were implemented for the patient, involving a comprehensive regime. The complete program along with the patient was supervised via phone calls, text messages, telecommunication, and video conferencing while the nationwide lockdown was still in effect. [14]

1.	Calisthenic exercises which induced strength training that exercised large muscle groups like standing, pushing, climbing stair, etc.
2.	Various range of motion exercises
3.	Exercises for limb strengthening
4.	Energy conserving exercises like pacing and prioritization of activities
5.	Breathing exercises for the diaphragm
6.	Devices for walking with assistance.

Table 2: Customised discharge program for a patient recovering from ICU post-Covid-19

Healthcare providers and their concerns after patient discharge post-COVID 19

The primary concern of healthcare professionals revolves around the potential transmission of the virus to their loved ones, a scenario grounded in the current global spread of the pandemic. In this context, experienced individuals who have previously assisted during outbreaks serve as a significant source of motivation for younger colleagues. The admission process to rehabilitation centers faced delays attributed to several COVID-19 protocols, such as the requirement of negative test results for a subsequent examination, leading to prolonged waiting periods. However, recent findings have indicated the successful elimination of the virus from the body following the initial phase of illness, thus resolving this issue.[15] Psychosocial and emotional well-being required the most extended duration for recuperation during the COVID-19 pandemic due to the various societal labels associated with the illness, particularly its contagious nature. Even subsequent to the patient's release, family members maintained a certain level of distance out of concern for potential exposure. Interventions from psychiatric professionals, which encompassed counseling and providing reassurance to both the patient and their relatives, played a pivotal role in combatting the associated stigma. The utilization of tele-rehabilitation has emerged as a valuable tool for facilitating communication and aiding in the recovery process of individuals affected by COVID-19.[16] Post-discharge guidelines are issued in written form and distributed as a physical document to individuals, subsequently overseen via a range of telephonic and messaging platforms. Diverse software programs featuring pre-recorded physical activities proved to be beneficial for individuals undergoing recuperation from bodily limitations.[16] The persistence of Covid-19 is intricately linked to the level of evidence-based treatment provided to the patient along with timely rehabilitation efforts, aimed at enhancing the holistic well-being of the individual. This approach necessitates a collaborative effort involving various disciplines such as medical, physiotherapy, psychiatric, and adequate social assistance.[17] Due to the unprecedented nature of the virus, the provision of critical care for the patient is heavily reliant on the specific conditions present, necessitating treatment that is firmly rooted in empirical evidence tailored to the individual's situation. The initiation of a comprehensive rehabilitation program involving various disciplines is advisable early in the recuperative phase, typically following the attainment of cardiorespiratory stability. Active involvement of the patient in the rehabilitation regimen fosters a sense of normality and empowerment, contributing positively to the patient's psychological well-being and sense of control over the recovery process. This active engagement enhances the patient's perception of autonomy in their own recuperation, consequently bolstering their mental state.[18]

Conclusion:

The global impact of COVID-19 has been felt by nearly all nations worldwide, marking it as one of the most severe pandemics in history. Individuals suffering from severe respiratory conditions or other underlying health issues are in critical condition and often require transfer to the Intensive Care Unit. These patients experience extended periods of critical care treatment, leading to the development of

various mental and physical health challenges following their discharge. Post-pandemic, a range of rehabilitation initiatives have been implemented to address the holistic well-being of patients, encompassing physical, psychosocial, mental, and cognitive aspects. It is imperative to promote such rehabilitation schemes and ensure continuous monitoring of patients following their release.

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