Review Article

Covid Complications: An Overview

Kumaraswamy M[1], Meghana M N*[2], Shreeharsha P B[2], Samraksha M[2]

1. Associate Professor, Department of Pharmacy Practice, Sri Adichunchanagiri College of Pharmacy, B G Nagar, 571448, India.
2. Pharm D Intern, Sri Adichunchanagiri College of Pharmacy, B G Nagar, 571448, India.

***Corresponding author's E-mail:** mnmeghana77@gmail.com

Received: 03-04-2022; **Revised:** 17-06-2022; **Accepted:** 26-06-2022; **Published on:** 15-07-2022.

ABSTRACT

Coronavirus disease 19 (COVID-19) is taken into consideration as a multisystemic disease. Several studies have reported persistent symptoms or late-onset complications after acute COVID-19, including Pulmonary, Immunological conditions, Hepatic and hematological disorders. Many people in India encountered financial hardship as a result of the COVID 19 pandemic, thus the government waived cost-sharing for COVID 19 testing and treatment. Patients are still in danger for lung disease, cardiovascular disease, and psychological state problems even after they have recovered. Diabetes is a common comorbidity with Corona virus infection, and it plays a significant impact in the severity of Covid 19 infection. Various Adverse events that developed over the course of COVID-19 and Patients are facing many long-term consequences due to its treatment. Patients with lower incomes, those that are uninsured or underinsured, are likely to face significant medical, psychological, and financial problems as results of these issues patients are enduring delayed morbidity and impairment.

Keywords: Covid-19, SARS-CoV-2, ARDS, Diabetes, PTSD, VTE.

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DOI: 10.47583/ijpsrr.2022.v75i01.030

DOI link: http://dx.doi.org/10.47583/ijpsrr.2022.v75i01.030

INTRODUCTION

The World Health Organization (WHO) received a report in December 2019 about a pneumonia case cluster with unknown cause in Wuhan, China. Shortly after the pathogen responsible was identified as a novel corona virus. The virus, now known as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), has rapidly spread throughout the world, prompting the WHO to declare a global pandemic due to corona virus disease-2019 (COVID-19) on March 11, 2020.[1] The mean incubation period of this virus is 5.2 days[2] which was previously thought to be a lung-related condition but has now been shown to have a wide range of negative health effects.

The disease manifestations are quite diverse. The vast majority of cases are mild and self-limiting. Some people may be asymptomatic despite having corona virus infection. A small percentage of patients develop disease complications quickly, progressing to acute respiratory distress syndrome (ARDS), multi-organ failure, and death. This places a significant strain on hospital and intensive care units.[3] People with comorbidities are more likely than others to develop severe COVID 19 symptoms. Diabetes and hypertension were the most commonly reported co-morbidities.

There was a significant correlation (p-value 0.05) between the presence of underlying pre-morbidities and disease severity, as well as oxygen requirement, invasive ventilation requirement, and mortality.[3] The presence of pre-existing comorbidities in patients and their impact on disease outcomes during COVID-19 illness has stimulated researchers' interest.[3]

Many common pre-morbidities have been identified, as well as those that predispose patients to severe disease and poor outcomes. Diabetes, hypertension, obesity, cardiovascular diseases, chronic respiratory and neurological illnesses are all common in COVID-19 cases, according to Chinese research.[4-8]

According to the findings of the study conducted by Kaleem Ullah Toori and others, the presence of premorbid conditions such as diabetes, hypertension, cardiovascular disease, CKD, CLD, chronic respiratory disease, and chronic neurological illnesses in COVID -19 patients is associated with greater disease severity, including the need for invasive ventilation and a higher risk of death. Patients with underlying risk factors may require tailored interventions. Knowledge of these risk factors may assist clinicians in better managing populations at high risk of severe COVID-19.[3]

The most common clinical manifestations in COVID 19 infected patients are fever (83 percent –98 percent), dry cough (76 percent –82 percent), fatigue, and dyspnea. Patients may also exhibit symptoms from multiple systems, such as headache, confusion, hemoptysis, sputum production, rhinorrhea, sore throat, dyspnea, diarrhea, chest pain, nausea, vomiting, myalgia, and conjunctival injection.[9,10] According to some published

reports, in severe cases, patients develop acute kidney injury, arrhythmia due to cardiac dysfunction, shock, hepatic dysfunction, and hematological abnormalities such as lymphocytopenia.[11,12]

COVID COMPLICATIONS

There are numerous complications accounted by covid 19 among them that the major body system affected are Pulmonary and Immunological:

Lungs

A small percentage of patients develop disease complications quickly, leading to acute respiratory distress syndrome (ARDS), multi-organ failure, and death.[3]

Luo et al.[13] reported the presence of hemorrhagic necrosis preferentially in the outer edge of the lower lobe of the right lung, suggesting it as one of the initial sites of origin of main lesions in COVID-19 and could be the result of a CD4 and CD8 T cell-induced cytokine storm, which progresses to severe and, in some cases, fatal respiratory dysfunction in critically ill patients.[13]

Bujaet al.[14] described empyema and atelectasis in one of their cases. Congestion, punctuate hemorrhages, and hemorrhagic necrosis are also distinct parenchymal changes, especially at the pulmonary lobe's periphery.[7] Menter et al.[15] found severe mucous tracheitis tracheobronchitis in one-third of the patients and described extensive supportive broncho pneumonic infiltrates in addition to consolidation. Pericardial and pleural effusions with mild to moderate serosanguinous fluid have also been reported.[16,17] In autopsy cases of SARS CoV infection, the gross features include firm, edematous, heavy lungs with congestion and hemorrhages, as well as hilar and abdominal lymphadenopathy and a small spleen.[17]

Histopathological features consistent with exudative, proliferative, and fibrotic phases were evaluated, as well as other associated findings such as alveolar multinucleated giant cells and interstitial and alveolar inflammation. The most consistent finding is bilateral DAD during the exudative and proliferative phases.[15-17]

The most common complication was COVID-19–associated pneumonia (37.8 percent).[18]

Three complementary strategies for reducing the chances of developing lung fibrosis may be suggested in this regard: (a) more intense and prolonged viral replication inhibition; (b) long-term inhibition of the inflammatory response; and (c) administration of anti-fibrotic drugs.[19]

Thrombosis

Admission to the ICU was linked to a significant rate of COVID-19–related complications such as pneumonia (96.5%), ARDS (78.8%), sepsis (57.1%), and hypotension (57.1%). Major arterial or venous thromboembolic events, major adverse cardiovascular events, and symptomatic VTE occurred in 35.3 percent, 45.9%, and 27.0 percent of COVID-19 patients in the ICU cohort, respectively, 30 days after diagnosis. [17]

The majority of symptomatic Deep Vein Thrombosis was caused by catheter or device-related thrombosis (76.9 percent). Only three ICU patients with COVID-19 had symptomatic Pulmonary Embolism, although two of them had hemodynamically unstable (high-risk) Pulmonary Embolism. Arterial thrombosis caused by a catheter or device occurred in 6.5 percent of ICU patients. Myocardial infraction was diagnosed in 7.7% of ICU patients and was solely non–ST-segment elevation. 23.5 percent of COVID-19 patients in the ICU cohort died after 30 days, with 97.5 percent dying in the hospital and 92.5 percent dying from sepsis. Patients with COVID-19 in the ICU cohort who received prophylactic anticoagulation had a higher rate of major arterial or VTE events (15.9% vs. 0.7 percent; p 0.0001), major adverse cardiovascular events (20.2 percent vs. 1.1 percent; p 0.0001), and symptomatic VTE (11.5 percent vs. 0.1 percent; p 0.0001).[17]

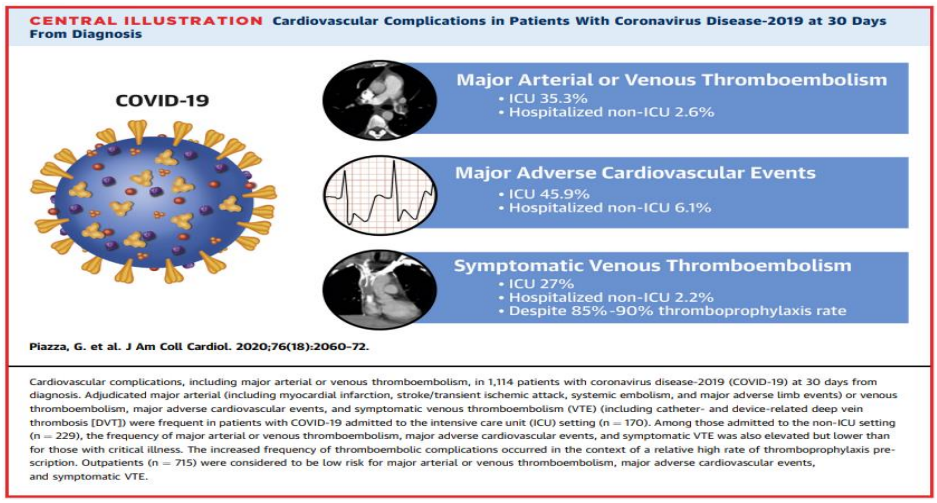

Figure 1: Piazza, G.; Campia, U.; Hurwitz, S.; Snyder, J.E.; Rizzo, S.M.; Pfeferman, M.B.; Morrison, R.B.; Leiva, O.; Fanikos, J.; Nauffal, V.; et al. Registry of arterial and venous thromboembolic complications in patients with Covid-19. J. Am. Coll. Cardiol. 2020, 76, 2060–2072. [CrossRef].[17]

Immunological complications

A Rheumatoid arthritis patient has admitted to a hospital due to multiple osteoporotic fractures and developed a pulmonary embolism, even after taking prophylactic heparin. A woman diagnosed with SLE secondary to Evans syndrome and COPD, which was treated with chronic supplementary oxygen, developed a secondary Pseudomonas Aeruginosa infection. Both the patients had a history of COVID 19 infection. This data shows that there is an increased chance of unusual immunological effects on a person'shealth after COVID 19 infection.[19]

Mental health-related complications

COVID-19, a novel coronavirus illness, has spread fast over the world. With the increasing number of infected cases and deaths, many patients experienced both physical suffering and great psychological distress.[20]

COVID-19 patients in China must be treated in segregated hospitals, according to Chinese treatment recommendations. Patients with COVID-19 may experience loneliness, anger, anxiety, depression, insomnia, and posttraumatic stress symptoms as a result of social isolation, perceived danger, ambiguity, physical discomfort, medication side effects, fear of virus transmission to others, and negative news on social media[22], which may negatively affect individuals' social and occupational functioning, as well as their quality of life.[23]

A study conducted by Bo H-X et al, examined the pattern of posttraumatic stress symptoms in clinically stable COVID-19 patients. They explored patients' attitude toward crisis mental health services during the COVID-19 outbreak.[21]

Prior to discharge, the majority of COVID-19 patients had significant posttraumatic stress symptoms related with the disease, which can contribute to unfavorable consequences such as reduced quality of life and impaired work performance. Following the outbreak of severe acute respiratory syndrome (SARS) in 2003, the prevalence of Post Traumatic Stress Disorder in SARS survivors was 9.79% in their early recovery phase[24] and 25.6% at 30-month post-SARS assessment.[25]

Liver

A meta-analysis of the impact of COVID-19 on liver dysfunction found a significant connection between liver dysfunction and mortality of COVID-19 patients

COVID-19 patients' mortality and severity are significantly linked to liver impairment. The serum AST levels of non-survivors and severe COVID-19 patients are higher than those of survivors and non-severe COVID-19 patients. The results of this study a meta-analysis of the impact of COVID-19 on liver dysfunction form a basis for better clinical liver management of patients with COVID-19.[18]

Covid 19 and Diabetes mellitus

Recent studies shows that patients with type 2 diabetes mellitus has more mortality rate with covid 19 infection when compared to non diabetic patients with covid 19 infections the exact mechanism linking diabetes and severe COVID 19 are unclear, several potential Mechanisms of interaction have been identified.

Hyperglycemia and insulin resistance affect metabolic abnormalities and immune function of the cellular components of the innate immune system by releasing cortisol, catecholamine's, cytokines, glucagon, and growth hormone[26]. Hyperglycemia impairs the innate immune system, which contributes to other serious diseases and mortality.

Metabolic abnormalities can reduce the function of macrophages and lymphocytes, leading to altered cytokine profiles and impaired immune function.[27] For instance, it has reported that diabetic COVID 19 patients had a more activated inflammatory response and suppressed immunity compared to nondiabetic COVID 19 patients.[28] A cytokine storm has often been observed in COVID 19 deaths and is considered a major factor promoting disease progression. These data show that COVID 19 patients with diabetes are more vulnerable to excessive inflammation and unbalanced immunological responses, which could be contributing to the patients' accelerated deterioration.

Hyperglycemia and insulin resistance also impair the vascular endothelium and promote thrombus formation through oxidative stress, endothelial dysfunction, Platelet hypersensitivity, and inflation[29] further, COVID 19 reportedly predispose an individual to thrombotic diseases ranging from microvascular thrombosis to venous or arterial thrombosis.[30] Thus the risk of thrombotic complications and death may be significantly increased in COVID 19 patients with diabetes.

There is an evidence that there is Covid 19 related diabetes development[31] reported that about half of the SARS-COV2 infected patient had elevated blood glucose levels (2021). In addition Pancreatic damage has been reported to occur in patients with severe COVID 19, suggesting that SARS-CO 2 may bind to AVE2 in the Pancreas and directly damage the islets, worsening glycemic control in COVID 19 patients.[32] Koufakiset al[33] reported that sodium glucose co transporters (SGLT) 1 upregulation could result in increased intestinal glucose absorption and subsequently promote the development of hyperglycemia in COVID 19.[33] According to the findings of a recent clinical trial, glucocorticoid medication is useful in situations of severe COVID-19 infection.[33]

CONCLUSIONS

COVID-19 is a multisystem disease. The lungs are the main organ affected by this infection, but it also affects other regions of the body. The people with comorbidities are more prone to develop serious health related condition when compared to healthy subjects. After ICU admission, many patients diagnosed with major arterial or venous thromboembolic events, major adverse cardiovascular events, and symptomatic VTE. This condition led not only physical health problem but also mental health

disturbances like covid related anxiety, depression due to lockdown, by this we can say that there are so many complications from covid 19 infection, which is still increasing day by day. These consequences are expected to increase medical, psychological, and financial difficulties for all patients, with the uninsured and underinsured, as well as those experiencing homelessness, being the most vulnerable. As a result, a comprehensive plan for avoiding and managing postCOVID-19 problems is required to mitigate their clinical, economic, and public health consequences, as well as to provide support to patients who have experienced delayed morbidity and disability as a result.

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Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.