

Overview and clinical update of COVID-19

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ABSTRACT

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections that led to the coronavirus disease-2019 (COVID-19, also known as 2019 nCoV) outbreak in Wuhan City, China, has spread quickly throughout the world. The Huanan Seafood Wholesale Market in Wuhan was epidemiologically linked to the majority of patients from the first cluster. The evidence that is now available indicates that SARS-CoV-2 can spread easily from person to person through close contact and respiratory droplets, posing a significant threat to public health. SARS-CoV-2 research is still in its early phases at the moment.

Dexa-methasone and remdesivir, however, seem to be effective medicinal treatments. There is still no clear-cut cure, and supportive therapy continues to be the cornerstone of care. Over 150 vaccinations are now being looked upon. In order to successfully manage the condition, it is vital to comprehend the nature of the virus and its clinical traits. Clinicians must keep up with the fast changing body of knowledge regarding this infection. Based on the most recent research, the present review provides a thorough summary of the epidemiology, etiology, clinical features, and therapy of COVID-19.

Key Words: *Epidemiology; Coronaviruses; Vaccines; Laboratory; Imaging; Treatment*

INTRODUCTION

In late 2019, Wuhan, Hubei, China, saw the emergence of the coronavirus disease-2019 (COVID-19) outbreak, which has since spread quickly around the globe. The organism responsible was discovered to be the 2019 new coronavirus, which the World Health Organization later dubbed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (WHO). The World Health Organization (WHO) designated COVID-19 a pandemic on March 11, 2020, and urged all nations to take immediate action as a result of the infection's rapid spread and worldwide effects. According to epidemiological evidence, the Huanan Seafood Market may have been a source of exposure for the first cases in China that were documented. SARS-CoV-2 could be communicated from person to person through intimate contact and respiratory droplets, which presents a significant risk to public health with the infection's escalating spread. Patients with COVID-19 may experience symptoms like fever, shortness of breath, cough, headache, myalgia, diarrhea, exhaustion, sore throat, anosmia, ageusia, chest discomfort, hemoptysis, sputum production, rhinorrhea, nausea, vomiting, skin rash, decreased consciousness, and seizures. The majority of cases recover on their own. According to data from China, patients with underlying conditions like hypertension, diabetes, chronic lung disease, cardiovascular disease, and cancer had considerably greater death rates than those without any such issues. The most frequent Adverse Respiratory Distress Syndrome (ARDS) consequences associated with COVID-19 are cardiac injury, Acute Kidney Injury

(AKI), and liver dysfunction. There is yet no vaccine or proven cure for viruses because the foundation for their pathogenesis and proliferation are unknown. Clinicians need to keep up with the latest information because it is continually evolving in regards to this infection. On december 12, 2019, a case of viral pneumonia was noted, and laboratory testing ruled out the presence of other CoVs, influenza, and bacterial infections. With over 95% and over 70% resemblance to bat CoV and SARS-CoV, the virus was ultimately identified as a CoV, and Chinese officials reported the isolation of a novel CoV. Many of the initial cases had a general connection to the Huanan wholesale seafood market, which was shut down on January 1. Given that the first instances were in a market with a wide variety of wild animals, it is possible that an animal contracted the infection before it reached humans. After the market was shut down, the number of new cases in Wuhan city and later abroad rose tremendously. In Wuhan, individuals with unexplained pneumonia had their lower respiratory tracts examined for the presence of the CoV, which was then isolated and identified as a novel form of CoV (SARS-CoV-2) from the genus SARS-CoV-2 transmission from one person to another has been observed in healthcare and communal settings, particularly among residents of close quarters. Infection can occur via inhaling virus-carrying droplets or from touching infected surfaces and introducing them to the eyes, mouth, and nose. The respiratory tract is the main source of transmission, which happens indirectly through fomites or droplets, and to a lesser extent by aerosols.

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Given that both MERS-CoV and SARS-CoV can infect the human gastrointestinal system, fecal-oral transmission for SARS-CoV-2 has been suggested to be a possibility. The SARS-surface CoV-2's spike protein ("S" protein) promotes a robust interaction with human ACE2 as the receptor to infect human cells, which indicates that the virus poses a serious risk to the public's health for human transmission via the S-protein-ACE2 binding pathway. Pneumocystis, nasal and bronchial epithelial cells, and ACE2 receptors are all targets of SARS-CoV-2 in the cells lining the upper airways. The upper esophagus, cholangiocytes, enterocytes of the small intestine, colon, renal proximal tubule cells, cardiac cells, and bladder are other organs that express ACE2. By cleaving ACE2 and activating the S protein, the type II Trans-Membrane Serine Protease (TMPRSS2), which is present on the surface of the host cell, facilitates viral uptake. The S protein's activation mediates the entry of SARS-CoV-2 into host cells. As a result, the main elements of viral entry are TMPRSS2 and ACE2, and activation of TMPRSS2 is necessary for S protein attachment. Additionally seen in type II alveolar epithelial cells are ACE2 and TMPRSS2. SARS CoV-2 has an incubation period of typically 3 days to 7 days (within 14 days) in exposed individuals, and the majority of patients (97.5%) show symptoms within 11.5 days of contracting the virus. There is no discernible difference in viral loads between symptomatic and asymptomatic patients, indicating the possibility of virus transmission from asymptomatic carriers. The degree of viral load rise correlates with the virus's transmissibility.

DISCUSSION

Clinical features

SARS-CoV-2 infection signs could be vague. Pyrexia (88.7%), cough (67.8%), fatigue/tiredness (38.1%), sputum production (33.4%), dyspnea (18.6%), sore throat (13.9%), and headache (13.6%) are the clinical symptoms that occur most frequently. Particularly, some individuals were proven to have asymptomatic infections or to be afebrile. There are several systems at play, including those of the respiratory (rhinorrhea, cough, sore throat, chest discomfort, shortness of breath, and hemoptysis), gastrointestinal (diarrhea, nausea, and vomiting), neurologic (confusion, headache, anosmia, and ageusia), and musculoskeletal (myalgia) systems. The majority of adult COVID-19 patients present with moderate flu-like symptoms, but 14% go on to develop a severe illness requiring oxygen assistance and hospitalization, and 5% may need to be admitted to the Intensive Care Unit (ICU). Typically, the laboratory tests are not targeted. White blood cell counts are often normal or declining in patients; lymphocyte and platelet counts were lower with longer activated thromboplastic times. The degree of lymphocytopenia correlates with the severity of the disease, and in patients with severe infection, the neutrophil count, blood urea, creatinine, and D-dimer values were much higher, and the lymphocyte levels continued to fall. An increase in procalcitonin levels can demonstrate bacterial co-infection. In order to diagnose patients with probable SARS-CoV-2 infection using the real-time RT-PCR method, samples from the upper respiratory tract (nasopharyngeal and oropharyngeal) and lower respiratory tract (expectorated sputum, endotracheal aspirate, or bronchoalveolar lavage) can be taken. Lower respiratory tract samples had higher percentages of positive results. Bilateral infiltrates are frequently seen on chest x-rays, while the results may initially be benign. Viral pneumonia is characterized by multifocal ground glass alterations on chest Computed Tomography (CT) scans, which are more sensitive and specific. On a chest CT scan, regions of consolidation can be identified that are bilateral, multilobular, and sub segmental as the infection worsens. ARDS, arrhythmia, shock, RNAemia, AKI, acute cardiac damage,

liver failure, vascular thrombosis, and secondary infections were complications with COVID-19 infections. The majority of adult COVID-19 patients have a good prognosis, but those who are younger than 60 years old or who have chronic underlying illnesses like respiratory disease, diabetes, obesity, or hypertensive heart disease are more likely to experience a severe or critical illness as a result of COVID-19. Poor clinical outcomes are closely correlated with disease severity, and older persons are more likely to experience faster disease progression. Additionally, for older patients (those over 65 years old), the time between the onset of a symptom and mortality is shorter. Newborns and the elderly population may have weak immune systems, necessitating specific attention.

Management methods

Remdesivir has lately gained recognition as a potential antiviral medication, and the Food and Drug Administration (FDA) has authorized its usage in an emergency situation. However, there are currently no COVID-19 vaccines or antiviral medications that have received FDA approval. Since even an asymptomatic infection could result in the spread of the disease, isolating patients is the first and most important step. Contacts should also be tracked down and quarantined as soon as possible. Treatment of underlying disorders, maintenance of vital signs like blood pressure and oxygen saturation, and management of consequences like secondary infections or organ failure are the key techniques. Supportive care is another important strategy. Patients must maintain proper hydration and electrolyte balance during supportive care, which may include respiratory and renal replacement assistance. It's crucial to maintain nutrition and keep fever and cough under control. Patients have been reported to have extremely high insulin needs and to require extracorporeal membrane oxygenation, severe sedation, and anticoagulation. Antibiotics and antivirals should only be used in suspected or confirmed instances and not on an ongoing, irrational basis. Systemic corticosteroid therapy is currently utilized ad hoc to reduce cytokine storms in patients with severe consequences, such as ARDS, acute cardiac injuries, acute kidney injuries, and individuals with elevated D-dimer levels. Early dexamethasone dosing in patients with established moderate-to-severe ARDS may reduce the time of mechanical breathing and overall mortality. So, depending on the severity of the dyspnea and the development of the chest imaging, it may be appropriate to explore using glucocorticoids for a brief length of time. Chloroquine can efficiently block many viruses' pH-dependent replication pathways and reduces the production and release of *TNF* and *IL-6*. It also has immune-modulating properties. As an autophagy inhibitor, it prevents the virus from replicating and infecting new cells. Nevertheless, there is not enough evidence to date to demonstrate that hydroxychloroquine and chloroquine are efficient COVID-19 therapies. The FDA recently revoked the emergency use authorization for chloroquine and hydroxychloroquine, stating that it was no longer reasonable to expect that these drugs efficiently cured COVID-19. Convalescent Plasma (CP) therapy is a traditional adaptive immunotherapy that has been used for more than a century to both prevent and cure a variety of infectious infections. In the case of SARS-CoV-2, it is anticipated that the pathogen will adhere to the transfused antibodies and cause phagocytosis, direct viral neutralization, or cytotoxicity in response. Neutralizing antibodies play a vital role in preventing viral infections, so aiding in the virus's elimination and preventing the progression of disease or acute infection during the chronic phase. In a multicenter, randomized experiment, participants who got CP randomly (51.9%) compared to those who received the conventional treatment alone did not differ in their ability to experience clinical improvement within 28 days of COVID-19 infection (n=103) (43.1%). The possible clinical benefit and risk of convalescent blood products in COVID-19, however, are still unknown. Targeting the SARS-CoV-2 with

monoclonal antibodies and CP-derived hyper immune globulin are two other approaches under investigation. In the interim, it's critical to highlight preventative measures to limit the virus's further spread. The main goals of preventive methods are to keep patients isolated and to take meticulous infection control precautions, such as using Personal Protective Equipment (PPE) in patient care environments where an illness is either suspected or proven. Even for healthy people, the Centers for Disease Control and Prevention (CDC) advises routine use of face masks or fabric face covers in addition to keeping physical distance and good cleanliness. This pandemic's trajectory has quickly changed, necessitating a switch from containment to mitigation strategies. The current context guidelines for wearing a facial mask in public still apply, but health care professionals must optimize it.

Wearing a face mask is an extra precaution to prevent infected droplets from entering the environment, but these should not be used in place of other COVID-19 prevention measures, such as frequent hand washing and social isolation, as these together allow avoiding droplets or aerosols of the viral particles. These steps, taken collectively, are sufficient to safeguard the public.

Furthermore, masks may aid in reducing the danger of transmission given the growing evidence of COVID-19's presymptomatic dissemination. One of the most effective measures for COVID-19 containment, according to the WHO, is frequent hand washing with soap and water for at least 20 seconds. Patients with COVID-19, who exhibit symptoms of an acute respiratory tract infection should keep a physical distance, cough and sneeze into disposable tissues or clothing, and wash their hands often.

CONCLUSION

The worldwide financial, clinical, sociological, and public health frameworks of many nations have been challenged by the COVID-19 epidemic. Global awareness of this infection has grown as the outbreak spreads. Many aspects of the illness, transmission, and therapy, though, are yet unknown. To successfully create clinical and public health treatments for infection prevention and treatment, more evidence is required. To stop the virus from spreading, it is essential to implement widespread testing to detect infections, contact tracking, and isolation of affected people. For the prevention and restriction of COVID-19 transmission, the creation of an effective vaccination is crucial..