

Transmission, protection, and potential treatment options for COVID-19

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ABSTRACT

Global challenges continue to be posed by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)-driven novel coronavirus disease (COVID-19) pandemic. Researchers have been unable to find an effective vaccination or practical therapy choices despite extensive global research efforts. Therefore, the best strategy for limiting illness spread is infection prevention, early virus detection, and creation of effective treatment procedures. Current COVID-19 treatment options, prevention strategies, and routes of transmission are covered in this review. Although it had been predicted by early March 2019 that new

coronavirus infections will arise, likely coming from Chinese bats, no worldwide preventive action was done. In early 2020, further information concerning the outbreak was finally made public by the National Health Commission of China after many cases of pneumonia with an unknown origin were noted at the end of 2019. The World Health Organization (WHO) initially referred to the disease-causing virus as "novel coronavirus 2019" (2019-nCoV), but the international committee of the Coronavirus Study Group (CSG) later renamed it "severe acute respiratory syndrome coronavirus 2" (SARS-CoV-2) and WHO referred to it as "coronavirus disease 2019" (COVID-19). The outbreak is believed to have started at the Hunan seafood market in Wuhan, China.

INTRODUCTION

Further research found that some patients had not visited the seafood market, despite the possibility that the COVID-19 patient in China in China may have consumed infected animals as food or visited the market. Therefore, it was accepted that this virus might spread from person to person via coughing, sneezing, and the release of respiratory droplets or aerosols. Additionally, virtually every nation and continent in the world documented illness transmission brought on by aerosol penetration into the upper respiratory system and lungs through inhalation. The number of instances increased quickly after then, all around the world. A mathematical model looked at whether isolating afflicted patients and monitoring their contacts with others would help restrict the spread of the SARS-CoV-2 virus. This model came to the conclusion that because there would be too much time between the start of symptoms and isolation, separating people and examining their contacts would not be enough to manage the COVID-19 pandemic within three months. So it would be crucial to follow preventive measures, including isolation and lockdown. SARS-CoV-2 is extremely contagious, and there is currently no approved vaccine or effective treatment. The best way to contain the pandemic will therefore be to simultaneously employ preventative measures, sensitive diagnostic techniques, and the use of already accessible

medications, while also creating novel therapies. The most recent data on COVID-19 transmission, prevention, and potential treatment approaches are presented in this article. A 29.9 kb positive-sense, single-stranded, enveloped beta-coronavirus, SARS-CoV-2 has an envelope. The SARS-CoV-2 genome was found to be 96.2% identical to another bat CoV, RaTG13, and to have a resemblance of 88% to the bat-SL-CoVZC45 and bat-SL-CoVZXC21 genomes. Recent research, however, points to pangolins as the virus's direct source rather than a bat, along with other potential intermediary hosts like turtles or snakes that may have been trafficked from Malaysia to China. Furthermore, SARS-protein-coding CoV-2's genes share sequence similarities with SARS-CoV and MERS-CoV of 79.5% and 51%, respectively. Similar to SARS-CoV, the SARS-CoV-2 virus enters cells through the Angiotensin-Converting Enzyme 2 receptor. There is a chance that SARS-CoV-2 can be treated the same way as SARS-CoV and MERS-CoV were previously manage date.

DISCUSSION

Fever, a dry cough, tachypnea, and shortness of breath are the primary symptoms. Though around 20% to 25% of patients with MERS-CoV or SARS-CoV infection had diarrhea, COVID-19 patients rarely have digestive symptoms. Another investigation identified the COVID-19 symptoms of disorientation, chest discomfort, nausea, and vomiting.

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Other signs and symptoms include a sore throat, runny nose, coughing up mucus, dyspepsia, anosmia, rash on the skin, discolored fingers or toes, and viral conjunctivitis. Several laboratory experiments have demonstrated that COVID-19 suffers from cytokine storm, sepsis, and RNAemia.

Lactate Dehydrogenase (LDH), Aspartate Aminotransferase (AST), Alanine Transaminase (ALT), C-Reactive Protein (CRP), Creatine Kinase (CK), Erythrocyte Sedimentation Rate (ESR), White Blood Cell (WBC) count, D-dimer level, procalcitonin, urea, and creatinine levels have all increased, according to clinical chemistry studies. Patients with COVID-19 have been shown to have decreased hemoglobin, lymphocyte count, eosinophil count, and serum albumin. The most frequent radiographic finding in COVID-19 patients was lung ground-glass opacity. SARS-CoV-2 can also harm the gastrointestinal tract, the cardiovascular system, and lead to severe renal failure. Additionally, analysis of 148 COVID-19 patients' hepatic symptoms revealed that more than one-third of those admitted to the hospital had abnormal liver function, and these patients stayed in the hospital for a longer amount of time. It is important to note that a significant fraction of asymptomatic people could be viral carriers. The variety of clinical manifestations and outcomes emphasize the value of following sanitary and preventative principles as well as discovering and creating new delicate diagnostic and treatment modalities. Children with COVID-19 exhibit milder symptoms and better clinical outcomes than adults do; among COVID-19 patients under the age of 18, infants under one year old appear to be more at risk of developing the severe form of the illness. Early research indicated that children with COVID-19 were less likely than other age groups to experience severe symptoms, but a recent study revealed that children are just as likely to experience COVID-19 as adults. Therefore, prevention and finding the right treatment are equally vital for children and adults. In one study, 171 of the 1391 children with a median age of 6.7 years who participated in the survey had a COVID-19 diagnosis. Only three kids, who had underlying problems, required an Intensive Care Unit (ICU) and mechanical ventilation. By March 8th, 2020, 149 cases had been discharged, 21 children were still in the ward in a stable condition, and one intussusception patient had passed away. It should be noted that recent reports from researchers and doctors indicate that young infants who were diagnosed with COVID-19 also had classic Kawasaki Disease (KD) or a disease that is similar to KD. This suggests that additional research into the clinical signs and symptoms of pediatric COVID-19 and its potential relationship with KD is required. SARS-CoV-2 can spread directly (through droplets and human-to-human transmission) as well as indirectly (through touch) (contaminated objects and airborne contagion). Personal Protection Equipment (PPE) may also contribute to the spread of airborne diseases. As previously stated, SARS-CoV-2 is thought to transmit mostly by respiratory droplets produced when a patient coughs, sneezes, talks, or even sings. Typically, droplets can only travel a distance of six feet (nearly two m) and hang in the air for a brief period of time. However, SARS-CoV-2 can float in the air for up to three hours in droplets that are smaller than five microns in diameter and still remain intact and infectious. SARS-CoV-2 can spread directly (through droplets and human-to-human transmission) as well as indirectly (through touch) (contaminated objects and airborne contagion). Personal Protective Equipment (PPE) may also contribute to the spread of airborne diseases. As previously stated, SARS-CoV-2 is thought to transmit mostly by respiratory droplets produced when a patient coughs, sneezes, talks, or even sings. Typically, droplets can only travel a distance of six feet (nearly two m) and hang in the air for a brief period of time. However, SARS-CoV-2 can float in the air for up to 3 h while still being intact and contagious in droplets (less than five microns in diameter). Therefore, airborne isolation, proper room

ventilation, and disinfectant application (particularly in bathrooms) may all help to limit the virus's ability to spread by aerosol. If a person encounters a SARS-CoV-2-contaminated surface and then directly touches mucous membranes like the eyes, nose, or mouth, COVID-19 may result. Consequently, it is advised to wash your hands thoroughly with soap and water or hand sanitizer. By location and the effectiveness of infection control measures, different reported contagion rates from a patient with symptoms of infection are observed. According to a joint WHO-China report, among tens of thousands of confirmed cases in China, the rate of secondary COVID-19 infection varied from one to 5%. It has also been observed that SARS-CoV-2 can spread from asymptomatic people (or people who are still in the incubation period) without producing any radiological results. Therefore, there is a need for advancements in quick and accurate diagnostic techniques to identify infected people. Even though each patient in a trial on four infected hospital staff members had at least two negative tests, the RT-PCR remained positive from 5 days to 13 days after discharge. Additionally, with a mean of 11.2 days after the respiratory tract test was negative, viral shedding in the stool is likely to continue for up to five weeks (the maximum length of shedding was 37 days and in died patients until the moment of death). In one study, the average rate of rise of new COVID-19 patients was compared to the mean daily average temperature. Iran, Italy, Germany, Spain, and the United States were among the five countries analyzed. Different regions in each nation were analyzed individually to reduce the impact of confounding factors like the implementation of government actions or cultural variations between these countries. According to the study's findings, there was a strong correlation between the average daily air temperature of two regions and the average cumulative daily rate of new patients in those two regions in each of the analyzed areas. The ideal temperature and humidity for the survival of SARS-CoV-2 in vitro were determined to be 4°C and 20% to 80%, respectively. In addition, it was discovered that the average temperature and humidity of infected cities were 5°C-11°C and 47%-79%, respectively. Additionally, the contaminated cities never had an average temperature below 0°C. Furthermore, the virus spread in the latitude range of 30°N to 50°N (South Korea, Japan, Iran, and North Italy). In addition, southern China has not yet experienced a rapid SARS-CoV-2 outbreak. Although the aforementioned reports suggest a connection between temperature and the virus's distribution, a comparison of the maps of COVID-19 distribution and the world's climate led to the conclusion that there was no conclusive connection between temperature or humidity and the virus's distribution. Shielding is the practice of avoiding direct contact with any healthy (perhaps asymptomatic patients) or diseased person while remaining at home (home quarantine); avoiding unnecessary travel; adhering to the two-meter rule for social distance in crowded areas, especially if someone is sneezing or coughing; refraining from shaking hands while introducing yourself to others; Washing hands frequently for at least 20 seconds with soap and water or using a hand sanitizer containing at least 60% alcohol is advised, especially after touching communal areas, using the restroom, or shaking hands. You should also avoid touching your eyes, nose, or mouth with unwashed hands and disinfect surfaces with household sprays or wipes.

CONCLUSION

In conclusion, COVID-19 disease currently lacks a particular treatment due to the new and extremely contagious nature of SARS-CoV-2. It must be considered that occasional social alienation will probably persist until 2022 if no effective action is taken and if medications, vaccinations, and patient tracking tools are not extensively used or successful. By then, COVID-19 may have killed over 40 million people and affected 90% of the world's population. Therefore, it is advisable to keep up preventive strategies and public health initiatives until a suitable vaccination and potent medications are found.

Eventually, COVID-19 will be successfully treated with combination therapy that includes some of the aforementioned medications or dietary supplements along with an appropriate immunomodulatory diet, appropriate emotional support, and adherence to standards.