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A REVIEW ON: COVID -19 PANDEMIC DISEASE

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ABSTRACT

One of the new public health crises threatening the world with the emergence and spread as pandemic 2019 novel coronavirus (2019-nCoV) or the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2),a member of the coronavirus family. The virus originated in bats and was transmitted to humans through yet unknown intermediary animals in Wuhan, Hubei province, China in December 2019. There have been so many people reported cases of coronavirus disease 2019 (COVID-2019) and with a high rate of mortality in world wide. For preventing this COVID-19 pandemic and most of the countries implementing social distancing owing to the lack of alternatives, there has been a push to develop a vaccine to eliminate the need for social distancing. But the future course of this virus disease and spreading is unknown. This article only gives a bird's eye view about this new virus and disease. Since knowledge about this virus is rapidly evolving, readers are urged to update themselves regularly.

KEYWORDS: *Covid 2019, Pandemic disease,corona virus.*

INTRODUCTION

In late 2019, emerged an acute respiratory disease, known as novel coronavirus disease 2019 (COVID-19). The pathogenic organism responsible for COVID-19 is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2, also referred to as the COVID-19 virus), a member of the coronavirus family. These Corona viruses are enveloped with a positive sense RNA viruses ranging from about 60 nm to 140 nm in diameter with spike like projections on its surface that giving it to a crown like appearance under the electron microscope; hence the name coronavirus. Four corona viruses namely HKU1, NL63, 229E and OC43 have been in circulation in humans, and generally they cause mild respiratory diseases.[1] The rapid spread of COVID-19 is related to SARS-CoV-2 carriers being highly infectious while asymptomatic and the high capability of the virus to survive in different environmental conditions and various surfaces.[2,3] The current pandemic condition has highlighted the need for an effective preventive solutions to reduce the current burden and spread of this pandemic disease.

SARS Entry

The virus have the trimeric, transmembrane spike (S) glycoprotein of, SARS-2-S, includes two main functional subunits: S1 and S2. The S1, mainly, consists of the four core domains, S1A, S1B, S1C, and S1D, that contribute to the attachment to the surface receptor of target cells. Latter it coordinates the fusion of viral and cellular membranes. Because of thisr eceptor binding, it activates proteases that can carry out proteolytic cleavage of the S protein. In corona viruses, cleavage mainly occurs at two sites: the S1/S2 junction and at the S2′, a region close to the viral fusion peptide. Proteolytic cleavage of the S protein causes a conformational change, so that they cannot revert to the original structure and profound enough to prime the S2 subunit for the fusion of viral and cellular membranes.[4]

Epidemiology and Pathogenesis

All ages are susceptible to this infection. Through large droplets generated during coughing and sneezing by symptomatic patients infection mainly transmitted, but can also occur from asymptomatic people and before onset of symptoms.[5] Studies have shown higher viral loads present in the nasal cavity area as compared to the throat with no difference in viral burden between symptomatic and asymptomatic people.[6] These infected droplets can spread 1–2 m and deposit on different surfaces and in air. The virus can easily remain viable on various surfaces for so many days in favourable atmospheric conditions but are destroyed in less than a minute by common disinfectants like sodium hypochlorite, hydrogen peroxide etc.[7] Infection is acquired either by inhalation of these droplets or touching surfaces contaminated by them and then touching the nose, mouth and eyes areas. The virus is also present in the stool and contamination of the water

supply and subsequent transmission via aerosolization/ feco oral route is also hypothesized.[8]

Therapeutic Approaches

From meta-analysis studies have shown that there is a reduced risk of mortality in patients with SARS-CoV and influenza receiving convalescent plasma.[9]

Serum from convalescent SARS patients can neutralize SARS-CoV2 very efficiently. Antiserum that contains antibodies against human ACE2 could prevent the entry of both SARS-S and SARS-2-S pseudotypes while not affected the entry of VSV-G and MERS-S pseudotypes. From this it is clear that SARS-S and SARS-2- S utilize the same primary entry receptor, i.e., ACE2, which is different from the primary receptors VSV-G and MERS-S engage for cell entry that is LDLR and DPP4, respectively. Sera from three convalescent SARS patients reduced the SARS-S entry and, to a lesser degree, the SARS-2-S entry. The patient serum effect was in a dose-dependent manner.[10]

Intravenous immunoglobulins IVIG has shown promising results in case of severe (such as sepsis, Parvovirus B19 infection, West Nile virus encephalitis, HIV, Clostridium diffiffiffificile infections, Mycobacterium avium, Mycobacterium tuberculosis, and A. Saghazadeh and N. Rezaei *International Immunopharmacology 84 (2020) 106560* 3Nocardia infections) and recurrent infections in primary antibodies Deficiencies.[11]

In a study, ten patients with COVID-19 who demonstrated worsening symptoms, e.g., decreased lymphocyte count and decreased PaO2/FIO2 ratio and oxygen saturation level, following treatment with a short-term moderate-dose corticosteroid (methylprednisolone 80 mg/d) plus immunoglobulin (10 g/d). After switching to the double dose of 1600 mg/d methylprednisolone plus 20 g/d immunoglobulin, all of the patients improved in the clinical, laboratory, and paraclinical outcomes.

Passive immunization is effective against this disease, and so it should be administered as early as possible when the patient is diagnosed with covid 19. Studies shows that the viral RNA of 2019-nCoV reaches its maximum paek during the first week and then it gradually decreases and that IgG and IgM begin to rise from the 10th day so that most patients have anti-viral antibodies by the 14th day.[12]

A mAb against the binding domain of this virus can inhibit SARS-CoV2 infection. Hybridoma supernatants containing antibody repertoires from immunized transgenic mice that express the human immunoglobulin heavy and light chains and rat origin immunoglobulin constant regions were used to detect antibodies that can cross neutralize SARS-S and SARS-2-S.[13]

In the study, 21 patients with COVID-19 whose condition was severe or critical received one or two doses of Tocilizumab plus standard therapy. Patients who had a mean IL6 level of greater than 100 pg/ ml before tocilizumab treatment showed improvement in clinical symptoms and peripheral oxygen saturation level and normalization for lymphocyte proportion and CRP levels. Also, lung lesion opacity was absorbed in 90% of patients. Neither serious adverse effffects nor deaths occurred with tocilizumab treatment.[14]

Effect of Heat in Therapy and Prevention

Southern China has been the birthplace of various epidemics of 'flflu' in the past. This is explained by the fact that its people, pigs and domestic fowl, which all harbour inflfluenza viruses, live close together, thus increasing the likelihood that strains of virus may recombine genetically to become a new variant that is pathogenic to humans. We need to be prepared to deal with the occurrence of another epidemic in the future.

Current control measures for SARS including early case detection and isolation, tracing and follow up of contacts, and quarantine are effective but intensive both in time and cost as well as being socially disruptive. Few countries can sustain such efforts over time. One of the most important questions for the future is whether COVID 19 can be eliminated. Three possible ways of interrupting transmission include the availability of an effective vaccine; an accurate, sensitive and specific test for early diagnosis; and the absence of an animal reservoir.

Airborne transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) via airconditioning systems poses a signifificant threat for the continued escalation of the current coronavirus disease (COVID-19) pandemic. Considering that SARS-CoV-2 cannot tolerate temperatures above 70° C. In a designed and fabricated effificient fifilters based on heated nickel (Ni) foam to catch and kill SARSCoV-2. Virus test results revealed that 99.8% of the aerosolized SARS-CoV-2 was caught and killed by a single pass through a novel Ni-foame based fifilter when heated up to 200° C. In addition, the same filter was also used to catch and kill 99.9% of Bacillus anthracis, an airborne spore. It paves the way for reventing transmission of SARS-CoV-2 and other highly infectious airborne agents in closed Environments.[15]

The dried virus on smooth surfaces retained its viability for over 5 days at temperatures of 22-25°C and relative humidity of 40-50%, that is, typical air-conditioned environments. The Covid -19 virus symptoms drastically decreased after the administration of steam. No further transmission was observed in patients taking steam inhalation. steam can be permitted as an adjunct to social distancing, sanitizers and masks and PPE for an effective treatment for precaution as well as cure for covid-19 infection.[16]

CONCLUSION

The novel coronavirus, SARS-CoV2, can cause a potentially harmful disease, COVID-19, in humans.This new virus outbreak has challenged the economic, medical and public health infrastructure of China and to some extent, of other countries especially, its neighbours. Time alone will tell how the virus will affect our lives here in India. The infection of human cells by SARSCoV2 includes two sequential steps: attachment of the virus to the surface receptor of target cells and the fusion of viral and host cell membranes.Lack of specifific treatments for COVID-19 and also it is very time-consuming process of vaccine development lead us to trust traditional notions of immunization using passive transfer of humoral immunity.Now a days passive immunization can be done using plasma therapy and IVIG therapy. Plasma from COVID-19 recovered patients, that contains antibodies against SARS-CoV2 has shown effective promising results in patients with severe COVID-19. However, they do not dictate precise actions and might cause suppression of anti-viral immune responses. Viruses and pathogens of zoonotic origin may likely to continue. Therefore, apart from curbing this outbreak, efforts should be made to devise comprehensive measures to prevent future outbreaks of zoonotic origin of diseases. Hand hygiene in non−health care settings is one of the most important and effective measures that can be used to prevent COVID-19 infection. In homes, schools and crowded public spaces − such as markets, places of worship, and train or bus stations − regular hand washing should occur before preparing food, before and after eating, after using the toilet or changing a child's diaper and after touching animals. No one can predict how much time it may takes to reach a new level of perfection, and that the development of vaccines for active immunization is a long process.

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