

Coronavirus Disease 2019 (COVID-19): A Mini-Review on Recent Outbreak

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ABSTRACT: The outbreak of the novel coronavirus SARS-CoV-2 (COVID-19, previously 2019-nCoV) originated from the Hubei province of the People's Republic of China and has spread to all most of the countries and territories around the world and one international conveyance. As a result on 11 March, 2020 World Health Organization (WHO) declared COVID-19 as pandemic. The rapid transmission of the disease and asymptomatic transmission makes the disease as a major global health concern. Human-to-human direct contact and droplet transmission are thought to be major route of transmission the disease. The incubation period is also assumed to be 2-14 days. Various drugs and vaccines are under clinical trials for the control of pandemic disease. Some drugs are used for the relief of pneumonia associated with COVID-19. The spread of the disease can be possibly stopped by maintaining personal hygiene and social distancing like avoiding any gathering and self-quarantine. Healthcare workers (HCW) are in quite susceptible to the infection, thus care should be taken for them along with providing them personal protective equipment kit for the containment of the disease.

Keywords: Coronavirus Disease-2019, World Health Organization, Angiotensin Converting Enzyme-II, Lopinavir, Quarantine.

1. Introduction

In the recent history, the significant public health event was observed during 2002-2003, caused by severe acute respiratory syndrome coronavirus (SARS-CoV). Middle East respiratory syndrome coronavirus (MERS-CoV) also caused severe outbreak in the year 2012. These public health incidents suggested that there is a huge health threat and also having wider global distribution of the coronavirus is there. Bats have been suggested to be the major carrier of the virus but the isolation of the virus from the bat was unsuccessful. SARS-CoV and MERS-CoV were shown to use human Angiotensin Converting Enzyme II (ACE2) for its entry receptor and this provides information about the cross-species transmission of the coronavirus. The receptor binding domain (RBD) present in the terminal amino group (-NH₂) of the SARS-CoV spike (S) protein is involved in the binding to ACE2 [1].

Coronavirus can infect various animals and can cause mainly respiratory, hepatic, enteric and neurological diseases with different severity. Coronavirus have high frequency of recombination due to the unique mechanism of viral replication. Infidelity of the polymerases of RNA virus and high recombination rate allow the viruses to adapt to a new host and ecological environment. The Severe acute respiratory syndrome (SARS) occurred in 2003, caused by a novel coronavirus increased the interest of the discovery of novel coronavirus both in animals and humans and before that, only 19 (2 human, 13 mammalian and 4 avian) coronaviruses were known. After 2003 outbreak at least 10 coronaviruses were identified in Hong Kong and China, which suggested that bats play an important role in the evolution of coronavirus [2].

Bats are having the potentiality of powered flight, which allows them to migrate at a distance place as compared to other land mammals. Bats are widely distributed and reckons for about fifth of all mammalian species. Coexistence of viruses with bat is due to the powered flight of the mammal and also its migratory capability has a greater relevance with the factor of disease transmission. Bats are associated with various viruses including bat lyssavirus (Rabies virus), henipavirus (Nipah virus and Hendra virus), CoVs (SARS-CoV, MERS-CoV and SADS-CoV), and filoviruses (Marburg virus, Ebola virus, and Mengla virus). An inclusive study of mammalian host-virus relationship revealed that bats contain a remarkable higher proportion of zoonotic viruses than other mammals. Bats are now considered as major reservoir of coronaviruses. Initially civet cats were considered as primary origin of SARS-CoV, soon bats were found to be the natural reservoir host of the virus. Two bat CoVs caused outbreak in the china, thus it was of the opinion that the future outbreak may takes place in the same region only. Therefore, it was assumed that the China being the most populous nation and also the third longest country in the world might be vulnerable to be the epicenter of the later outbreak. Diverse climates and broad home lands bring great biodiversity along with the bats and bats-borne viruses. Most of the CoVs can be found in China. Majority of bats hosts of these CoVs lives near the human and potentially transfers the viruses to human and livestock. Chinese believes that fresh slaughtered animals are more healthful and this faith might have brought the viral transmission. It was believed that bat-borne CoV might re-emerge to cause next epidemic and China will be the hotspot [3].

1.1. Recent Outbreak

Emergence of the recent 2019 novel Coronavirus (2019-nCoV) infection in Wuhan, China in December 2019, the infection has rapidly spread across china and most of other countries. So far the 2019-nCoV has influenced more than 416,686 patients and 18,589 persons with confirmed death in 197 countries/regions and currently a major global health concern on 26 March, 2020(<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>). On February 11, World Health Organization (WHO) declared a new name for the pandemic disease: Coronavirus disease (COVID-19). The International Committee on Taxonomy of Virus (ICTV) has renamed virus as severe acute respiratory syndrome coronavirus-2, SARS-CoV-2. Preliminary studies reported that most of the cases of infection are due to contact between a single local fish and wild animal market, which specified animal-to-human transmission, further studies proposed that human-to-human transmission took place through droplets or direct contact. According to another study, hospital-related transmission aggregates about 41% of the cases. Based on the rapid transmission of infection and possibilities of asymptomatic carrier transmission, SARS-CoV-2 transmits successfully in humans and constitutes a higher proportion of risk for a near future pandemic. Along with the transmission efficiency and the improvement of global travel could further spread the virus to a greater extent. On January, 30 WHO declared COVID-19 as the sixth public health emergency of International concern, following H1N1 (2009), Polio (2014), Ebola in West Africa (2014), Zika (2016) and Ebola in the Democratic Republic of Congo (2019). Therefore, integrity of health workers, public cooperation and government efforts can prevent the global spread of this pandemic disease [4].

1.2. Drug of choice

China tested chloroquine or hydroxychloroquine in the treatment of COVID-19 associated pneumonia in more than 10 hospitals in wuhan, Jingzhou, Beijing, Shanghai, Chongqing, and Ningbo. The results from more than 100 patients showed that the chloroquine phosphate is useful for the control of exacerbation of pneumonia. There are no severe adverse reactions also noted in the patients receiving Chloroquine phosphate. Thus on February, 2020; experts from government, regulatory authorities and organizer of clinical trials recommended including the drug in the next version of the guidelines for the prevention, diagnosis, and treatment of pneumonia associated with COVID-19 [5].

A patient in Korea was treated with two tablets (Lopinavir 200mg/Ritonavir 50mg) per oral bid. Interestingly, it was observed that from the next day of Lopinavir/Ritonavir administration, β -coronavirus load started to decrease and no traceable coronavirus titers were observed since then [6]. Artificial intelligence identifies that drugs related to AP2-associated protein kinase 1 (AAK1) breaks these proteins and may prevent viral entry into the target cells. Baricitinib is an AAK1 and Janus kinase inhibitor is suggested for inhibition of viral replication [7]. *In vitro* and a clinical study of remdesivir, an adenosine analogue suggested that it acts as a viral protein inhibitor and improved condition in one patient [8, 9]. A humanized monoclonal antibody (CCR5 antagonist), leronlimab and galidesivir (a nucleoside RNA polymerase inhibitor), both of which shown good efficacy in treatment of deadly viruses and might be considered for the treatment against COVID-19 [10].

1.3. Preventive measures to be taken for the containment of the disease.

The World Health organization provided various guidelines for prevent the outbreak of the disease. Routine screening of the travellers are needed to be done. If any person is come in contact face-to-face within 1 meter and for 15 minutes, the person is quarantined for at least 14 days from the contact. The baggages of travellers are also protected for the containment of the disease. Older persons and those with comorbid conditions are also needed to be cared [11]. Isolation of the patients with suspected case of COVID-19 is prime necessary. Precaution should be taken to prevent droplets and contact based transmission. For this suitable respirator or mask should be provided to infected patients as well as healthcare workers (HCW). Alcohol based hand rub or soap and water should be used for maintaining hand hygiene. Social distancing might be the most effective way for containment of COVID-19 in terms of contact based transmission [12].

2. Conclusion:

Emergence of the novel coronavirus SARS-CoV-2 (COVID-19, previously 2019-nCoV) infection started from Wuhan, China in December, 2019. After that the virus spread very rapidly to all the countries and regions. The outbreak of coronaviruses is not new to the world, earlier, in 2002-2003 severe acute respiratory syndrome coronavirus (SARS-CoV) and in 2012 Middle East respiratory syndrome coronavirus (MERS-CoV) caused outbreak in various regions. Current outbreak of SARS-CoV-2 caused a wider outbreak than the earlier cases of outbreak. On 11 March, 2020 World Health Organization declared COVID-19 as pandemic. Bat has been suggested to be major reservoir of the coronavirus. Coronavirus uses Angiotensin converting Enzyme-II for its entry receptor and this provides the basis of cross-species transmission. Apart from this people of China believe that live slaughtered animals are more nutritious. Therefore, it was assumed that the china might be the epicenter for the future outbreak of coronavirus related disease. At present, human-to-human direct contact and droplets are considered as the major source of transmission of the disease. The various researchers are in the continuous effort to prepare a drug of choice but till the date most of the drugs are under clinical trials. The spread of COVID-19 is

very rapid and therefore various preventive should be taken by the people and Healthcare workers for the containment of the disease.

3. Conflict of Interest:

There is no conflict of interest.

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