

Coronaviruse (Covid-19) : Emergence, Phylogenetics and Review of Pandemic Disease

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Abstract

The emergence of new COVID-19 the severe acute respiratory syndrome corona virus 2 (SARS-CoV2) create great public health crises in the world. Coronaviruses are a family of viruses that can cause illnesses such as the common cold, severe acute respiratory syndrome (SARS). The discovery of the coronavirus disease 2019 (COVID-19) during a pneumonia outbreak in Wuhan city in China has raised a global public health concern. Respiratory symptoms such as cough and shortness of breath (or tachypnea in children) are present without signs of severe pneumonia. The risk factors for severe presentations are concentrated in patients with chronic kidney disease, Human immune responses to a novel pathogen with both innate and adaptive arms. CoVs are positive-stranded RNA viruses with a crown-like appearance. The COVID-19 outbreak is an unprecedented global public health challenge. In March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic.

Keywords: Coronavirus, SARS, RNA, COVID-19, immune responses, Respiratory symptoms.

I. INTRODUCTION

Novel coronavirus disease 2019 (COVID-19) is a highly infectious, rapidly spreading viral disease with an alarming case fatality rate up to 5%. The risk factors for severe presentations are concentrated in patients with chronic kidney disease, particularly patients with end-stage renal disease (ESRD) who are dialysis dependent. Ferrey A J and et al reported the first US case of a 56-year-old nondiabetic male with ESRD secondary to IgA nephropathy undergoing thrice-weekly maintenance hemodialysis for 3 years, who developed COVID-19 infection. He has hypertension controlled with angiotensin receptor

blocker losartan 100 mg/day and coronary artery disease status-post stent placement^[1]. The first reports of a novel pneumonia (COVID-19) in Wuhan city, Hubei province, China occurred in late December 2019, although retrospective analyses have identified a patient with symptom onset as early as December 1st. Ongoing pandemic of a new human coronavirus, SARS-CoV-2, has generated enormous global concern. China was involved in the initial genome sequencing of the virus. Herein, genomic data reveals about the emergence SARS-CoV-2 and discuss the gaps in our understanding of its origins^[2]. Knowledge of virus dynamics and host response are essential for formulating strategies for antiviral treatment, vaccination, and epidemiological control of COVID-19. The profile of acute antibody response in COVID-19 patients, and provide proposals for the usage of antibody test in clinical practice. A multi-center cross-section study and a single-center follow-up studied were performed to investigate the feature of acute antibody response to SARS-CoV-2. A cohort of 52 COVID-19 suspects and close contacts were enrolled to evaluate the potentiality of the antibody test. This deadly virus caused the world to be in high alert as the death toll and the number of confirmed cases is continuously rising since the first case was reported. The Chinese government warned that the transmission ability of the virus is increasing, and international efforts are needed to overcome this outbreak^[3]. Coronavirus (CoV) infections induce respiratory tract illnesses and central nervous system (CNS) diseases. Uanyuan Li aimed to explore the cytokine expression profiles in hospitalized children with CoV-CNS and CoV-respiratory tract infections^[4].

II. EMERGENCE OF COVID-19

An acute respiratory disease, caused by a novel coronavirus (SARS-CoV-2, previously known as 2019-nCoV), the coronavirus disease 2019 (COVID-19) has spread throughout China and received worldwide attention. On 30 January 2020, World Health Organization (WHO) officially declared the COVID-19 epidemic as a public health emergency of international concern. The emergence of SARS-CoV-2, since the severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002 and Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012, marked the third introduction of a highly pathogenic and large-scale epidemic coronavirus into the human population in the twenty-first century^[5].

III. PHYLOGENETIC RELATIONSHIP OF COVID-19

CoVs are single stranded positive sense RNA viruses with a crown-like appearance under an electron microscope (coronam is the Latin term for crown) due to the presence of spike glycoprotein on the envelope. CoVs belong to the subfamily Coronavirinae in the

family of Coronaviridae of the order Nidovirales, and this subfamily includes four genera: Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus^[6]. In genetic terms, Chan et al. have proven that the genome of the new HCoV, isolated from a cluster-patient with atypical pneumonia after visiting Wuhan, had 89% nucleotide identity with bat SARS-like-CoVZXC21 and 82% with that of human SARS-CoV^[7]. Genomic analysis revealed that SARS-CoV-2 is phylogenetically related to severe acute respiratory syndrome-like (SARS-like) bat viruses, therefore bats could be the possible primary reservoir^[8]. The basic reproductive number (R_0) of 2019-nCoV is higher than R_0 of severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV). The amino acid sequence in the Angiotensin-converting enzyme 2 gene (ACE2) receptor responsible for 2019-nCoV binding in farm animals and cats has only a few exchanges compared with the human receptor, suggesting that the species barrier for virus transmission is small^[9].

IV. HOW TO TRANSFER

The virus could also be transmitted from human-to-human, and symptomatic people are the most frequent source of COVID-19 spread. As with other respiratory pathogens, including flu and rhinovirus, the transmission is believed to occur through respiratory droplets from coughing and sneezing. Analysis of data related to the spread of SARS-CoV-2 in China seems to indicate that close contact between individuals is necessary. The spread, in fact, is primarily limited to family members, healthcare professionals, and other close contacts. It can also spread if a person touches a surface with the virus on it and then touches his or her mouth and nose. It is rapidly transmitting from person to person around the world^[10].

V. SYMPTOMS AND SIGN

Signs and symptoms of COVID-19 may appear two to 14 days after exposure and can include: Respiratory symptoms such as cough and shortness of breath (or tachypnea in children) are present without signs of severe pneumonia. The risk factors for severe presentations are concentrated in patients with chronic kidney disease, Human immune responses to a novel pathogen with both innate and adaptive arms^[11]. Basic symptoms are seen in the patients like fever, malaise and dry cough and other respiratory failure, gastrointestinal symptoms, diarrhea, vomiting, fatigue. Diagnosis by RT-PCR (Reverse Transcriptase- Polymerase chain reaction) or Real time PCR. Remdesivir and Chloroquine drug with great potential to treat COVID-19^[12].

VI. EPIDEMIOLOGY

Data provided by the WHO Health Emergency Dashboard report globally, as of 11:25 am CEST, 25 July 2020, there have been 15,538,736 confirmed cases of COVID-19, including 634,325 deaths. In India, from Jan 30 to 11:25am CEST, 25 July 2020, there have been 1,336,861 confirmed cases of COVID-19 with 31,358 deaths.

VII. TREATMENT

There is no specific antiviral treatment recommended for COVID-19, and no vaccine is currently available. The treatment is symptomatic, and oxygen therapy represents the major treatment intervention for patients with severe infection. The Patient with COVID-19 and the recovery days from the date confirmation are tested for correlation using Pearson r analysis using IBM SPSS^[13]. The focus is on chloroquine and hydroxychloroquine- two oral drugs that have been available and used widely for the prevention and treatment of malaria and in the management of autoimmune diseases^[14].

VIII. DIAGNOSIS

The symptoms of the early stages of the disease are nonspecific. Differential diagnosis should include the possibility of a wide range of infectious and non-infectious such as vasculitis, dermatomyositis are common respiratory disorders.

IX. ONGOING TRIAL

Multiple studies globally are investigating the use of broad-spectrum antiviral.

X. CONCLUSION

The authors are concluded that coronaviruses are a large family of viruses that can cause a range of illnesses from common cold all the way up to more severe diseases, incidences of emerging deadly viral infections have significantly affected human health. Novel coronavirus disease 2019 (COVID-19) is a highly infectious, rapidly spreading viral disease with an alarming case fatality rate up to 5%. COVID-19 infection is a rapidly developing field, and we should expect more infected dialysis patient's case reports and analyses. COVID-19 is a challenge to the existing health systems due to its novelty, rapidity of spread, asymptomatic shedding and variable manifestations.

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