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Diagnosis, Prevention and Treatment of COVID-19 Disease

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ABSTRACT

Coronavirus diseases called as COVID-19, an infective disease cause due to novel discovered coronaviruses. Coronavirus (CoV) are broad family of the envelop, zoonotic, single-strand RNAs virus. Four CoV circulated oftenly between human: HKU1, HCoV2-229E, -NL63 and -OC43. Much of the people are infected by COVID-19 virus that suffer mildly to moderately respiratory diseases and recovered without specifically treatment that is being required. Older people and the health conditions like cardiovascular disease, chronic respiratory diseases, diabetes and the cancer are mostly experienced serious illness. This coronavirus disease have reported the causes for the respiratory diseases by the outbreak starting in the December 2019 in the Hubei Province, Wuhan, Chi. The outbreak spreaded to the 19 countries along with 11,791 confirm cases, that includes 213 death till 31st January 2020. This declared publically health emergency to the international significance from World's Health Organizations (WHO). The present study focuses on diagnosing, prevention and control to coronavirus infections among people.

Keywords: Bronchitis, Coronavirus diseases, Cardiovascular disease, Infectious diseases, Respiratory disease

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INTRODUCTION

Coronaviruses constitute wide family for single-stranded, enveloped, zonotic RNAs virus that belongs to Coronaviridae family, Nidovirales order [Figure 1]. It can affect number of animal (includes humans, pets and bird) where it causes significant respiratory, cardiovascular, entric and neurological diseases. CoVs often causes respiratory and gastrointestinal symptom in humans that ranges by common cold or more illnesses that includes pneumonia, bronchitis, and extreme acute respiratory distress's syndromes (ARDS), multiple-organ failures, coagulopathy and deaths [1]. Human coronavirus (HCoV) linked by the chronical obstructive pulmonary diseases, the cystic fibrosis and the asthma exacerbations. It includes α-coronavirus, β-coronavirus, mid-east respiratory syndromes-related coronaviruses (MERS-CoV), and severed acute respiratory's syndromes-related coronaviruses (SARS-CoV) [2].

The patient sufferings by the COVID-19 are major infection sources. These asymptomatic cases have significant roles in transmission process from the infected person to a healthy person, in which the respiratory droplet and contacts with each other is major transfer route [3]. The closed contacts along with the symptomatic and asymptomatic case by the silent infections are major route of transfer of COVID-19 infections among the people, especially children. New cells and the molecular biology techniques contributed greater understanding for intracellular replications and viral cell bio, and emergence to reverse genetics approach to study of coronaviruses over the past five years becomes possibly start identifying determinant of the viral replications, trans species adaptations and the human diseases [4].

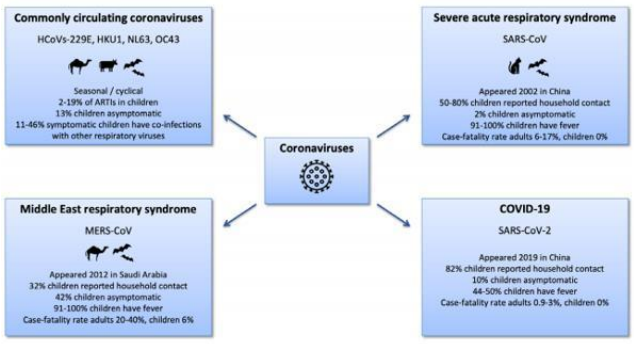

Figure 1. Summary of corona virus diseases. COVID-19 indicates coronavirus disease 2019.

Coronavirus life's cycle

The best model to coronavirus replications and pathogenesis was grouped 2 mouse hepatitis virus, murine's coronavirus, and known about stage of coronavirus life cycles was determine by using this virus in the animals and within community.

The virion coronavirus is enveloped particles containing protein spikes (S), membranes (M), and envelopes (E). Additionally, certain coronavirus type, not SCoVs, releases hemagglutinin proteins (HE) which are also included in virion. The coronavirus genomes, a linear, single-strand, positive (mRNA) polarity RNA molecules with lengths by 28kb-32 kb. These genomes encapsidated within the virion from several copy to nucleo capsid proteins (N) and conformation of helical configuration of RNAs/nucleocapsids. The S proteins is the subject for pathogenesis study with mice, because appear to essential determinants of the cells tropism, the species specific, the host selections, the cell's tropism and diseases. Virus replication is initiated at the host cell surface from binding S proteins for specific receptor. The main receptor to the MHV was Carcino-Embryonic Antigen-Cell Adhesioned Molecules (CEACAM), and receptor is amino peptidase N to human's coronavirus, HCoV-229E and another group 1 coronavirus.

Epidemiology

Most children who are infected by mild clinical are manifestation. It doesn't contain a clear prognosis for fever or pneumonia symptoms. Most recovered in between 1 to 2 week of the illness. Some could progress towards lowering respiratory infection. No new born deliver by the mothers infects with 2019-nCoV were found positive and no new born case been identified. Additionally, after intensive use of pathogen analysis, to number for confirmed infective case that will increase. Adult data show that serious cases frequently experience dyspnea within a week of the onset of disease. Several cases will progress fastly to the acute respiratories distress syndromes (ARDS), septic's shock, refractory metabolically acidosis and impaired coagulations.

SARS-CoV and MERS-CoV

SARS-CoVs is new group of 2b Beta coronavirus that first appeared in the Guangdong provinces, southern China in the year 2002, and then spreads rapidly to the Hong Kong and several other countries. This induced serious lower respiratory tract's infections by significant morbidities and high case-fatalities rate (approximately fifty per cent in the people around 60 yrs. of the age, 10 per cent by overall) [5].

Viral replication complex formation and function

The promising polyproteins replica and the intermediating precursor likely to mediating development for the viral replication complex within cytoplasm of the host cells. Ironically, replication of the coronavirus involves regular translations and processing of replicase gene over the life cycle to sustain a successful infection. MHV replication complexes are associated with double-membrane vesicles, and all the MHV replica protein tested shown for collocate the replication complex to earliest detection timing, possibly for both through membrane's integration and through protein to proteins and protein to RNA interaction. In addition, replicase proteins are thought for mediating formation of the double-membrane vesicles, possibly by activation of the cellular autophagy's pathway. Coronavirus replications complex is site to the translation of replicase genes and the production of polyproteins and also for the synthesis of viral RNA.

The coronavirus replica poly protein and the mature replica protein represents largest and the most complex repertoires for any positive-strand RNA virus family's distinct enzymatic functions, recognized and predicted. Until recently, RNA helicase, proteinase and RNAs-dependent polymer activity for more than 15 matured replica protein were predicted or experimentally confirmed. Since advent for the SARS, broader bioinformatics analyse culminated in the prediction for many additional RNA processing function, including methyltransferase and exonuclease activities. Also with the addition of distant predicted relationships, no predicted or confirmed roles remain for up to eight of the replicase proteins have been found.

DIAGNOSIS

(RT-PCR) on the upper/lower respiratory secretion is main basis for the diagnosis of HCoV infection. For the MERS-CoV, SARS-CoV and SARS-CoV2, the high viral load were observed inside lower respiratory tracts sample as opposed to the upper respiratory tract [6]. Serology used for diagnosing MERS-CoV and SARS-CoV infections and not effective within acute infection process. This study has observed the cross-reactivity among antibody to the SARS-CoV and specific CoV.

PREVENTION and CONTROL

Strategy for the prevention and the control of COVID-19 identified to three levels–National levelled, population levelled that is associated by the case, and general population levels. At national level, the People Republic to China's Nation Health Commissions releases its "No.1 Announcements" on the 20th Jan in the year 2020, which includes COVID-19 in management of the Class B's legal infection disease and are allowed for preventing and control measure to Class A infection disease. Medical institute implement isolations therapy and observation protocol under this policy for preventing and monitoring COVID-19 spreading. National plans were also drawn up by the target steps to the rural area that was issue on 28th Jan 2020 and elderly that was issuing on the 31st Jan 2020. A huge number of publically health measure introduced which prevent/slow COVID-19 transfer; it includes cases isolation, contact's identifications and monitor, environment disinfections and use of the personal and protecting equipment [7].

Airborne measures and another protection was discussing and suggest for the protections. There are some preventive measures against the infection such as use of face mask, use of tissues while coughing or sneezing and after using them disposing off in the dustbin, regular washing of hands with soap or disinfectant including sanitizer containing minimum 60% alcohol content in it, maintaining the social distancing, etc.

TREATMENT

Supporting treatments including adequate intake of fluids and calories, and the extra oxygen supplementations that should use for treating HCoV infected in children. The objective for preventing ARDSs, organ's failures and nosocomial secondary infection. When the bacterial infections suspected of involving the broad's spectrum antibiotic, like cephalosporins of the second/third generations [8].

SARS-CoV

Interferon's-alpha or combined to the ribavirin hasn't reliably improved outcome in the adults. There are certain evidences which intra venous cortico's steroid in SARS-CoV-infected individuals have contributed to clinical and radiological improvement. However, a systematic analysis has shown the evidences for the inconclusive, and corticosteroid that is harmful.

MERS-CoV

There were no reports in children onto clinical results to MERS-CoV. It has not been shown that interferons/ ribavirin's alone and its combinations have significant advantage to adults for the SARS-CoVs [9]. However, animal tests have shown the drugs lead for worse outcome in the lungs and extra pulmonary tissue by the higher viral loads.

Monoclonal antibodies

Given their variability, CoVs share a lot of proteins between different species, which is useful in developing novel drug. The surface structured spiked glycoproteins, that becomes responsible to the interaction of viral-cells [10]. However, it has been studied so far only in animal studies.

CONCLUSION

This study gives a detailed description of the latest work in respond to COVID-19 out breaking. In this early phase, numerous researches published investigating epidemiology, its causes, the clinical presentation and the diagnosis and the novel coronavirus preventions and controls. Many studies have so far focus to epidemiology and its possible cause. The studies investigating prevention and its controlling mechanisms nevertheless started to increase slowly. Governmental agencies quickly have integrated latest scientific finding in the neighbouring state, and national public policies for slowing down for preventing further COVID-19 spreading.

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