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Review Article

Transmission and Pathogenesis of Coronavirus Disease (COVID-19) Outbreak

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ABSTRACT

The current pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has presented unmatched challenges to the healthcare systems in almost every country around the world. Currently, there are no established effective vaccines or therapeutic agents against the virus. Present clinical management includes infection prevention and control process and supportive care including supplemental oxygen and mechanical ventilator support. It is proposed this is likely the zoonotic beginning of COVID-19. Individual to-individual transmission of COVID-19 contamination prompted the separation of patients that were accordingly managed an assortment of medicines.

Keywords: COVID-19, SARS-CoV-2, supplemental oxygen, ventilator support

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PROPERTIES OF SARS-CoV-2

Coronaviruses are enveloped viruses with a notable experience unmarried-stranded RNA genome (26 to 32 kb)¹. Coronaviruses are members of the subfamily Coronavirinae from the own family Coronaviridae and the order Nidovirales. based totally on phylogenetic relationships and genomic systems, the subfamily Coronavirinae is break up into four genera - Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus. Alphacoronaviruses and beta coronaviruses only infect mammals. Gammacoronaviruses and deltacoronaviruses infect birds and on occasion even infect mammals along with rodents and bats. Gammacoronaviruses and Betacoronaviruses are diagnosed to purpose respiratory ailments in human beings

and gastroenteritis in animals². A coronavirus particle consists of four structural proteins: the nucleocapsid, envelope, membrane, and spike (three). The Spike (S) protein office work club-fashioned protrusions that stick out all over the virion, similar to a crown or the solar's corona, for that reason, the call. These protrusions bind to receptors on host cells thus decide the mobile kinds and the form of species that the virus can infect this structure may prompt mistakes, cause fast transformation³. A portion of these changes can give the infection new properties, for example, the capacity to contaminate new cell types or even new species that can create genuine lung disease⁴ the spike protein assume significant function for the objective of immunization, remedial and determination.

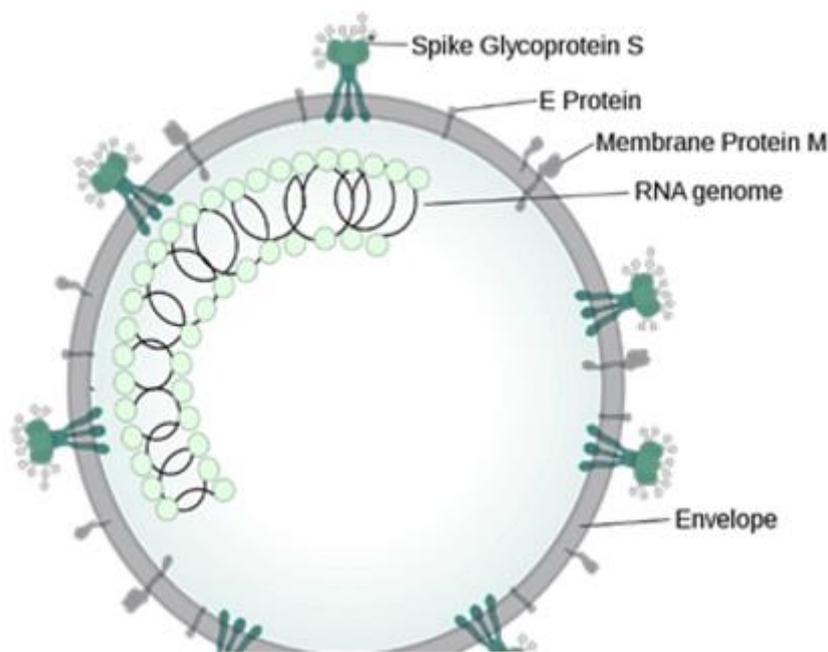


Figure1: Diagrammatic representation of the structure of novel corona virus

APPROACH OF TRANSMISSION

COVID-19 has the potential to spread thru respiration droplets at some point of near touch due to its predominance within the upper respiratory tract. It's far possible to gather COVID-19 while in close proximity to an inflamed character who coughs, sneezes, or maybe talks. Following the initial publicity, it could take in to fourteen days earlier than a man or woman develops signs and symptoms. The median time from publicity to symptom onset has been reported to be four to five days (CDC, 2020). Additionally, over 80% of inflamed people are asymptomatic or have moderate signs (Wu et al., 2020).⁵

The fundamental courses of individual to-individual transmission of respiratory infections are the accompanying:

- a) The immediate or circuitous contact with a contaminated subject;
- b) The enormous beads produced by hacking/sniffing that can arrive at a uninfected subject.
- c) The inward breath of little airborne particles staying in the air ⁶.

According to the last mentioned, ⁷ have unequivocally proposed that the SARS-CoV-2 has been spreading through the air in this equivalent line.

Consistent with cutting-edge evidence, the COVID-19 virus is typically transmitted between human beings through respiration droplets and call routes ⁸. The droplets can unfold as much as 7-8 meters beneath beneficial environmental situations, which include humidity and temperature, the gasoline cloud and its payload of pathogen ⁹. Transmission may additionally arise through fomites within the immediately surroundings across the infected person ¹⁰. Therefore, the transmission of the COVID-19 virus can arise by way of direct contact with inflamed people and indirect touch with surfaces in the immediate environment or with objects used on the infected man or woman.

Asymptomatic and pre-indicative people are able to do accidentally dispersion the infection, despite the fact that the danger of spread is the most extreme in suggestive patients

because of viral movement (CDC, 2020). As most of gentle or indicative cases regularly go unreported, it is hard for networks to contain high danger territories. Running rules have suggested intermittent hand washing, evasion of direct contact, just as stay-at-home and physical separating requests to help moderate the spread of the infection.

PATHOGENESIS OF COVID-19

Patients with COVID-19 show clinical manifestations including fever, nonproductive cough, dyspnea, myalgia, fatigue, normal or decreased leukocyte counts, and radiographic evidence of pneumonia ¹¹ Hence, although the pathogenesis of COVID-19 is poorly understood, the similar mechanisms of SARSCoV and MERS-CoV still can give us a lot of information on the pathogenesis of SARS-CoV-2 infection to facilitate our recognition of COVID-19.

Considerate the mechanism of pathogenesis of SARS-CoV-2 permits researchers to become aware of goals for novel therapeutic dealers to prevent or treat the disorder. SARS-CoV-2 is an unmarried stranded RNA-enveloped virus ¹². Mechanisms dependent on a spike -s-protein contact with host cellular equation is s-protein priming interact with host cellular receptor in to be had of host cellular proteases fundamental target is human lung epithelial cells ¹³ he accurate mechanism of lung involvement is unsure: assumed mechanisms include sepsis leading to cytokine hurricane syndrome or direct cellular harm because of the virus.

Cytokine storm associated with COVID-19 pneumonia has been accompanied by way of stronger serum stages of interleukin-1 β (IL-1 β), IL-2, IL- 7, IL-8, IL-nine, IL-5, interferon- γ , tumor necrosis thing alpha (TNF- α), G-CSF (granulocyte colonystimulating factor) and GM-CSF (granulocytemacrophage colony-stimulating thing) that resulted in an inflammatory response and finally tissue damages along with pulmonary edema ¹⁴. Therefore, AKI at this situation can be a end result of frame infection, extended vascular permeability, extent depletion and cardiomyopathy which could lead to cardio-renal reaction ¹⁵. additionally, these mediators might exert dangerous effect on renal tissue thru induction of surprise, rhabdomyolysis following tissue hypoxia, and an accelerated stage of CPK in sufferers

admitted to ICU ^{16, 17, 18} This syndrome consists of systemic endothelial damage which makes pleural effusion, edema, intra-abdominal hypertension, third area fluid loss, intravascular fluid depletion and hypotension

CONCLUSIONS

The modern COVID-19 pandemic is absolutely a global public health problem. COVID-19 is a brand new disorder resulting from the new pressure of coronavirus, SARS-CoV-2. There is no evidence to endorse any specific antiCOVID-19 treatment there are no antiviral drugs proven to be powerful now. Ongoing research continues to analyze the protection and efficacy of repurposed pills, at the same time as SARS-CoV-2 vaccine trials are rapidly underway.

Conflict of interests: No conflict of interests is declared.

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