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REVIEW ON COVID -19

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ABSTRACT

A new global health crisis has emerged with the outbreak and rapid spread of the 2019 novel coronavirus (2019-nCoV), now known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus is believed to have originated in bats and likely passed to humans through an unidentified intermediate host in Wuhan, Hubei province, China, in December 2019. As of March 5, 2020, approximately 96,000 cases of COVID-19 have been reported worldwide, with around 3,300 deaths. The virus is mainly transmitted through inhalation or contact with droplets from infected individuals. The incubation period ranges between 2 to 14 days. Common symptoms include fever, cough, sore throat, shortness of breath, fatigue, and general discomfort. While most cases are mild, elderly individuals and those with underlying health conditions may develop severe complications such as pneumonia, acute respiratory distress syndrome (ARDS), and multi-organ failure. Many infected individuals remain asymptomatic. The estimated case fatality rate is between 2% and 3%. Diagnosis is confirmed through molecular tests that detect the virus in respiratory samples. Typical lab findings include normal or decreased white blood cell counts and elevated C-reactive protein (CRP) levels. Chest CT scans often reveal abnormalities, even in asymptomatic or mildly symptomatic patients. Currently, treatment is primarily supportive, as the effectiveness of antiviral drugs is still under investigation. Preventive strategies focus on isolating suspected and mildly ill individuals at home and enforcing strict infection control protocols in healthcare settings, including droplet and contact precautions. While SARS-CoV-2 spreads more rapidly than SARS-CoV and MERS-CoV, it has a lower mortality rate. The overall impact of this outbreak on global health remains uncertain.

INTRODUCTION

The human body encounters numerous infectious agents, including viruses, bacteria, fungi,

protozoa, & heminths, each of which damage tissue through distinct biological mechanism. Among these pathogens, viruses stand out due to their ability to exploit host cellular machinery for their replication. In addition, they possess a remarkable capacity to evolve rapidly, enabling them to adopt & the persist across a wide range of species.[1]

SARS –CoV -2, the virus responsible for COVID -19, primarily spreads through respiratory fluids emitted when an infected individual breaths, speaks, coughs, or sneezes. These fluid can transmit the virus via several pathways.[2,3]

The third major coronavirus outbreak, following the 2003 severe Acute Respiratory syndrome (SARS) & the 2012 middle East Respiratory syndrome (MERS), has proven to be particularly deadly. SARS affected 8,427 individual across fatality rate of approximately 9.6 %. MERS, first identified in Saudi Arabia in 2012, was even more lethal, with even more estimated at around 35%, especially among patients with underlying health conditions.[4]

HISTORY

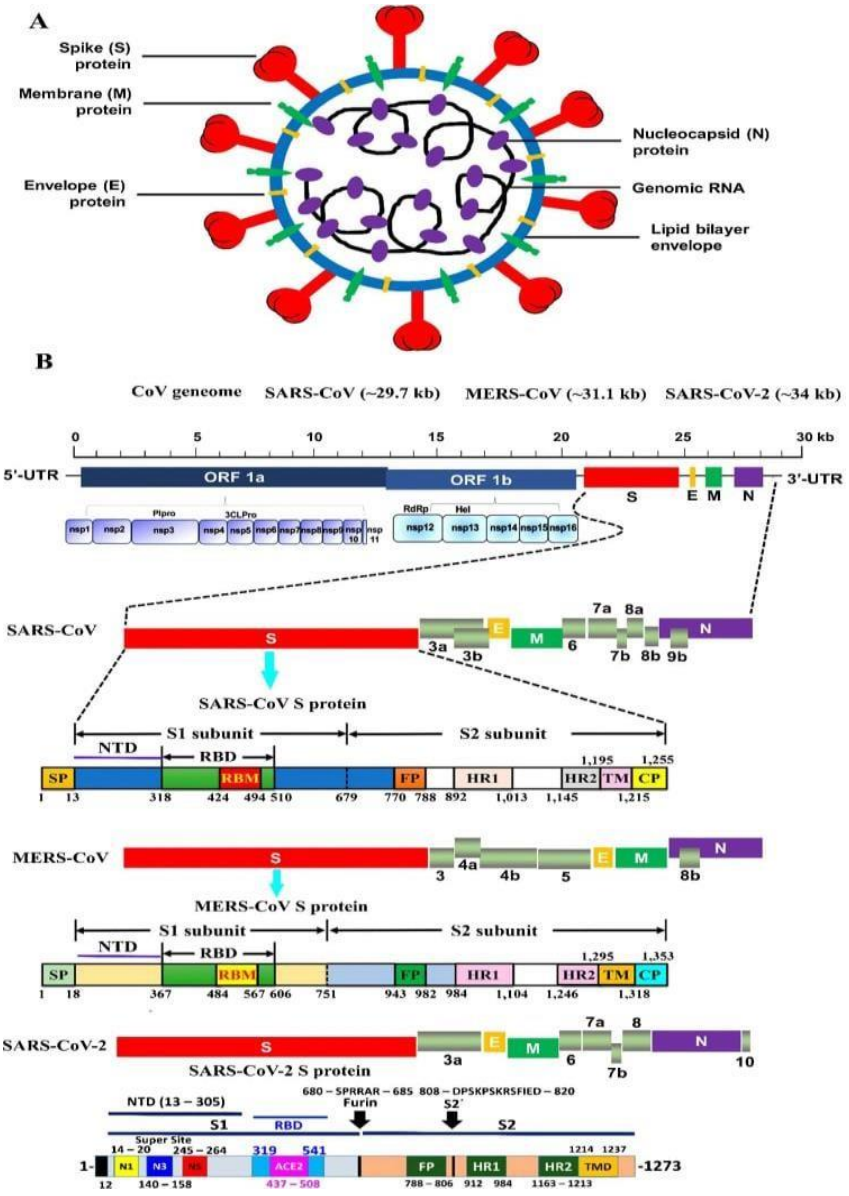
Coronaviruses are enveloped viruses with a positive sense single – stranded RNA genome. They typically measure between 60 & 140 nanometers in diameter & possess distinctive spike – like glycoprotein projections on their surfaces. These spikes gives the virus particles a crown like appearance under an electron microscope, which the origin of the name "coronavirus "derived from the latin word *corona*, meaning crown. The spike proteins are crucial for the virus ability to infect host cells, as they facilitate attachment & entry.

This structural feature is consistent across various coronaviruses, including these responsible for disease such as COVID – 19, SARS, & MERS. Electron microscopy images have been instrumental in visualizing these structural characteristics, adding researchers in understanding the virus's morphology & informing the development vaccines & treatments.[5]

What is Coronavirus ?

A: Schematic structure of Coronavirus.

B: Schematic representation of the genome organization & functional domains of S protein for SARS-COV -2.



Coronaviruses are enveloped, single stranded RNA viruses measuring about 80 to 120 nanometer in diameter. They are classified into four genera: Alpha, Beta, Gamma, & Delta. Before the emergence of COVID- 19, which belongs to the Beta- coronavirus group, became the seventh.

Among the known human – infecting coronaviruses, four types – HcoV –OC43, HcoV – NL63, HCoV- HKU1- typically causes mild respiratory illnesses. In contrast, SARS –CoV & MERS- CoV led to two severe & often deadly outbreaks. Notably, SARS – COV shares a similar genetic makeup & disease mechanism with COVID -19. Because COVID -19 adapted in bats, which have higher body temperature than humans, the virus has shown greater resistance to heart compared to SARS – COV.[6,7]

Clinical Features

The most frequently observed clinical

Symptom of COVID -19 include fever (99.87 %), cough (7.67%), & fatigue (1.38). Less commonly, patent may experience experiencediarrhea (7.3 %), & vomiting (5%), which resemble symptoms seen in other animal – derived in corona virus, Acute respiratory distress syndrome (ARDS) typically develops around nine days following the initial onset of illness. In addition to affecting the lungs, the virus also harms other organs such as the heart, kidney, liver, eyes, & the nervous system.[8]

ROUTE OF TRANSMISSION

"SARS-COV -2 can be spread through direct contact when a person touches the mucous membranes of the eyes, ears, or mouth of someone infected with COVID-19.[9] Infectious viral particle from an infected person can settle on the surfaces of inanimate objects. If another person touches these contaminated surfaces & then touches their eyes, ears, or mouth, they may become infected with SARS –COV – 2".[10]

EPIDEMELOGY & PATHOPHYSIOLOGY

During the initial investigation of COVID -19 spread in Wuhan, a significant number of early cases were associated with the Huanan wholesale seafood market. However, subsequent analysis showed that less than 10 % of the total cases had a direct links to market. The

finding supported the conclusion that the virus was primarily spreading through human to human transmission, particularly via respiratory droplets & direct contact, which contributed to the growing number of infections.[11]

DIAGNOSIS

COVID -19 diagnostic testing is used to determine if someone is currently infected with the SARS –COV-2 virus. Your healthcare provider might recommended testing if: You show symptom of COVID -19, such as a fever, cough, shortness of breath, or severe fatigue. You have chronic health condition like asthma, or heart disease & notice a sudden worsening of symptoms. You've recently been in close contact with someone who tested positive for COVID -19. You work in a healthcare setting or hospital, which puts you at higher risk. You need to be hospitalized for a medical procedure or treatment.

What are the different types of COVID-19 diagnostic tests?

There are mainly two types of laboratory tests used to detect COVID-19:

Antigen tests (Rapid tests): These are quick, cost-effective, and typically used at the point of care. Results are available within minutes, but they're more likely to miss an active infection (higher chance of false negatives) compared to molecular tests. Molecular testes (PCR tests): These tests are more accurate and reliable, as they detect the virus's genetic materials. However, they take longer to process and may require lab analysis.[12]

Factor affecting

1) Contact environment characteristic
2) Space volume 3)Ventillation 4)Crowdedness

TREATEMENT

At the onset of the pandemic, knowledge about COVID-19 and how to treat it was minimal, prompting an urgent push to explore experimental treatments and repurpose existing drugs. However, thanks to the dedicated work of clinical researchers worldwide, substantial progress has been achieved. This has not only deepened our understanding of the disease and its treatment but also led to the rapid development of new therapeutics and vaccines at a pace never seen before.[13]

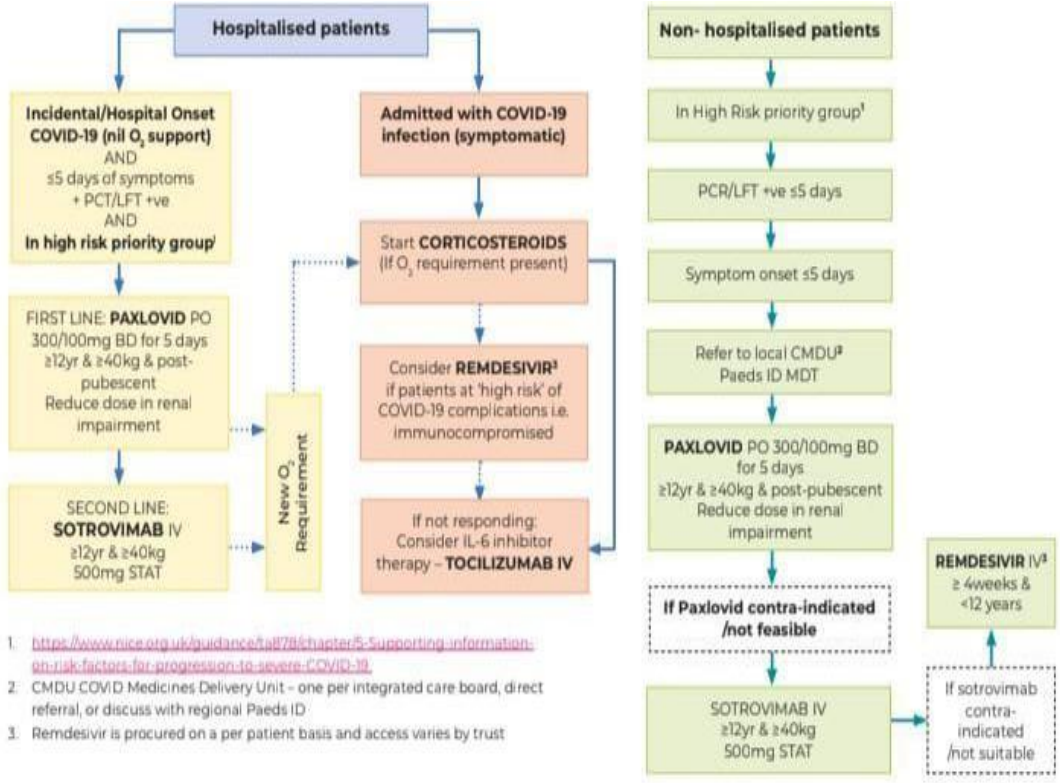


Fig: Flow chart for Management of children & young people with SARS- COV-2 positive PCR.[14]

Prevention

Currently, prevention remains the primary approach to controlling the spread of COVID-19. Early detection through screening, prompt diagnosis, patient isolation, and timely treatment are key to limiting transmission. Preventive efforts emphasize isolating infected individuals and implementing strict infection control protocols, particularly during diagnosis and patient care.[15]

Transmission

Like MERS-CoV, SARS-CoV, and the influenza virus, SARS-CoV-2 can be transmitted through both direct person-to-person contact and indirect means such as respiratory droplets or the fecal-oral route. An initial study detected SARS-CoV-2 RNA via RT-PCR in conjunctival swabs from COVID-19 patients, indicating that transmission through the eye may also be possible.[16]

Like MERS-CoV, SARS-CoV-2 shows a strong ability to stay infectious outside the human body, remaining viable for up to 60 minutes after becoming aerosolized.[17]

Certain studies indicate that SARS-CoV-2 may also spread through airborne transmission, as the virus can stay infectious in aerosol particles for several hours and persist on surfaces for multiple days.[18]

VACCINES

In response to the COVID-19 pandemic, global efforts were launched to develop effective vaccines. Over a dozen vaccine candidates were introduced, with many others still in development. Based on thorough analysis and review of the available preliminary data, the World Health Organization (WHO) has, to date, authorized five vaccines for emergency use.[19]

CONCLUSION

As it is widely known, there is still no specific cure for COVID-19, making the prevention of its spread within communities critically important.

COVID-19, an RNA virus, continues to be a significant public health threat, having already resulted in thousands of infections and fatalities. Key measures to control its transmission include maintaining proper hand hygiene, practicing social distancing, and adhering to quarantine protocols.

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