An Overview on COVID-19: Clinical Features, Treatment and Prevention

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Abstract: Background: The Coronavirus disease 2019 (COVID-19) is a transmissible illness produced by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It has now quickly expanded since its outbreak in Wuhan City of Hubei region of China to the other parts of the world. In accordance with the Centers for Disease Control and Prevention (CDC), the spread of COVID-19 emerges typically human-to-humans through respiratory droplets within an area of 1-2 meters.

Aims and Objective: In the present perspective, we have discussed some of the measures taken to prevent and treat the patients suffering from COVID-19, and how to restrict further spread of COVID-19 due to SARS-CoV-2.

Results: The general clinical properties are fever, cough, sore throat, headache, tiredness, myalgia and difficulty in breathing. Presently no approved treatments for COVID-19, as of now, no pharmaceutical products have been revealed to be harmless and efficient for the management of COVID-19. Various anti-viral medicines e.g. ribavirin, lopinavir, and ritonavir have been utilized supported on the familiarity with SARS and MERS. Many drugs and vaccines are currently being studied in clinical trials, jointly (Solidarity trial) co-sponsored by the WHO.

Conclusion: The use of a mask by fit people in community areas to guard against respiratory viral disease is presently recommended by WHO. Patients must be kept in individual rooms, the rooms, surfaces and equipment should go through standard sanitization, possibly with sodium hypochlorite. Consequently, apart from restricting this epidemic, efforts should be made to plan wide-ranging procedures to thwart potential outbreaks of the zoonotic sources.

Keywords: Coronaviruses, infection control, clinical features, treatment, prevention measures, COVID-19.

1. INTRODUCTION
The Coronavirus disease 2019 (COVID-19) is a transmissible illness produced by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which has now quickly expanded since its outbreak in Wuhan City of Hubei region of China to the other parts of the world [1]. Till 28 April 2020, around 3.08 million cases of COVID-19 and more than 213,000 fatalities have been reported across 210 countries and territories. Generally, the mortality rate is expected to range between 2 to 3%. [2]. The SARS-CoV-2 are well-known respiratory microorganisms related to a variety of respiratory issues including pneumonia, common cold, bronchiolitis, fatigue, and even in some cases, kidney failure [3]. SARS-CoV-2 is a single stranded RNA virus. The COVID-19 virus is about 50-400 nm in diameter and comprises of four major structural proteins; spike (S), membrane (M), envelope (E), and nucleo-capsid (N). Some of the functions of the major structural proteins are listed below:

1.1. S-Glycoproteins
The S Glycoproteins are positioned exterior to the virus and provide the characteristic form to the virus. These proteins represent homo-trimers that permit the expansion of around sun-like morphology to offer the name for Coronaviruses.

1.2. M-Glycoproteins
The M-Glycoproteins contain three transmembrane parts. These proteins are glycosylated in the golgi apparatus and play an important function in regenerating virions inside the cell.

1.3. E-Glycoproteins
The E-Glycoproteins are small proteins having about 76 to 109 amino acids. These proteins are glycosylated in the golgi apparatus and play an important function in the congregation and morphogenesis of virions inside the cell.

1.4. N-Proteins
The N-proteins are phosphoproteins that facilitate competence of linking to the helix and comprise a stretchy ar-
rangement of viral genomic RNA. They play an important function in virions structure, replication, and transcription. All covering proteins and N protein are found in every virion but Hemagglutinin Esterase (HE) is found only in a few β-coronaviruses [4-6].

According to the Centers for Disease Control and Prevention (CDC), the spread of COVID-19 emerges typically human-to-humans through respiratory droplets within an area of 1-2 meters. These viruses can also be spread if a human being contacts an exterior mucosa through touching an entity contaminated by the virus [7]. The infected individuals should be tested as soon as possible to effectively design a treatment plan. Sampling from upper respiratory tract is used to investigate the virus. The Polymerase chain reaction (PCR) is the most commonly utilized method to spot the viral RNA, in case the test is positive, the identification of COVID-19 is confirmed. While as negative cases with a substantial doubt, such as medical symptoms or revelation: loss of taste can be continually diagnosed by means of samples from additional respiratory areas [8, 9].

In the present brief study, we discuss some of the measures taken to prevent and treat the patients suffering from COVID-19, and how to restrict the further spread of COVID-19 due to SARS-CoV-2.

2. EPIDEMIOLOGY AND PATHOGENICITY

All age groups are vulnerable. The contamination is transmitting as a result of large droplets produced through sneezing and coughing by symptomatic patients, however, it can as well take place from asymptomatic persons and before the inception of signs. Increased viral loads in the nasal cavity in comparison to the throat have been reported with no disparity in viral load between symptomatic and asymptomatic persons [10-13]. Despite the clinical recovery, patients can be virulent for a while. These contaminated droplets spreading to 1-2 meters; the virus can stay doable on the surfaces for many days in encouraging distinctive environment, but is damaged within minutes by frequent disinfec-tants using the process of sanitization [14]. The disease is attained either by breathing of these droplets or by contact through touching surfaces infected by them and then touching the mouth nose and eyes.

3. CLINICAL FEATURES

The clinical characteristics of COVID-19 are diverse, ranging from asymptomatic condition to acute respiratory distress syndrome and multiple organ dysfunctions. The general clinical properties are fever, cough, sore throat, headache, tiredness, myalgia and difficulty in breathing. In a portion of persons affected, at the end of the 1st week, the infection can advance to pneumonia, respiratory collapse and death. This succession is linked with a severe increase in inflammatory cytokines. The medium period from the beginning of signs to difficulty in breathing has been reported 5 days, hospitalization 7 days and acute respiratory distress syndrome (ARDS) 8 days. The requirement for intensive care access has been about 30% of involved patients in published articles. Improvement can start in 2 or 3 weeks. The medium period of hospital stays in those who improved has been 10 days. Unfavorable results and mortalities are further frequent in the old aged patients and those with primary co-morbidity (<75% of lethal cases). Mortality percentages in the hospitalised adult patients are up to 11% [15].

4. TREATMENT

The primary move is sufficient separation to avert spread with other persons, patients and health-care personnel. Moderate sickness must be managed by staying at home by advis-ing on risky indications. The standard principles are continuous hydration, sustenance and monitoring fever and cough. Comprehensive guidelines for considerable care treatment for COVID-19 have been published by WHO [16]. Presently, there are no approved medicaments for COVID-19, as of now, no pharmaceutical products have been revealed to be harmless and efficient for the management of COVID-19. Though, a number of medicines that have been recommended as possible clinical treatments by countries where mortality is high (Table 1), other medicines that have been anticipated for treatment are Arbidol (anti-viral medicine offered in China and Russia), intravenous immunoglobulin, interferons, chloroquine and plasma of patients recovered from COVID-19.

Many other drugs and vaccines are currently being studied in clinical trials, jointly (Solidarity trial) co-sponsored by the WHO and participating nations (Table 2) [17-20].

5. PREVENTION

As discussed earlier, presently, as there is no official medication for this disease, prevention is vital. Numerous features of SARS-CoV-2 render prevention complicated, specifically, undetermined properties of the infection, the infection before the beginning of symptoms in the incubation time, spread from asymptomatic persons, lengthy incubation time, an affinity for mucosal membranes e.g., an extended period of the disease, conjunctiva and spread even following medical improvement. Separation of established or assumed cases with mild sickness at home is suggested. The ventilation system at home is important with sunshine to permit damage to the virus. Patients must be urged to put on a trouble-free surgical mask and perform cough cleanliness. Care-takers must be encouraged to put on a surgical mask while in the same area as patients and exercise hand cleanliness every 15 minutes [21]. The utmost threat in COVID-19 is spread to the healthcare personnel. In the SARS-CoV-1 occurrence in 2002, 21% of persons impacted were medical personnel [22]. The medical doctor who at the beginning of SARS-CoV-2 alerted regarding the virus, died as well.

Patients must be located in individual rooms. Low aeration rooms are not usually desirable. The rooms, area and equipment must go through standard sanitization. Health-care personnel must be equipped with healthy tested N95 masks, eyeglasses and protecting outfits. All contacts, as well as health-care personnel, must be watched for the occurrence of any symptoms of COVID-19 [17, 21, 23]. At the public level, the community must be requested to stay away from jam-packed areas and push back unnecessary tours to areas with the current spread. They must be encouraged to carry out cough hygiene by coughing in covering tissue instead of hands and follow proper hand hygiene regularly every 10-15 mins. The employment of masks by the fit
Table 1. Drugs/treatments recommended for COVID-19 in most affected countries with high fatalities.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of Drug/Treatment</th>
<th>Country</th>
<th>Approved by</th>
<th>Refs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Favilavir</td>
<td>China</td>
<td>The National Medical Products Administration of China</td>
<td>[24]</td>
</tr>
<tr>
<td>02</td>
<td>Clinical supervision together with disease prevention, management procedures &amp; adjunctive therapy</td>
<td>USA</td>
<td>US Food and Drug Administration (FDA)</td>
<td>[25]</td>
</tr>
<tr>
<td>03</td>
<td>Azithromycin, Darunavir / Cobicistat, Lopinavir / Ritonavir</td>
<td>Adults Italy</td>
<td>The Italian Medicines Agency (AIFA)</td>
<td>[26]</td>
</tr>
<tr>
<td>04</td>
<td>Tocilizumab</td>
<td>Spain</td>
<td>Spanish Agency for Medicines and Health Products (AEMPS)</td>
<td>[27]</td>
</tr>
<tr>
<td>05</td>
<td>Combination of lopinavir and ritonavir, Remdesivir (Severe Cases)</td>
<td>France</td>
<td>French High Council for Public Health</td>
<td>[28]</td>
</tr>
<tr>
<td>06</td>
<td>Under Review</td>
<td>UK</td>
<td>National Institute for Health and Care Excellence (NICE)</td>
<td>[29]</td>
</tr>
<tr>
<td>07</td>
<td>Sedatives, Muscle relaxants, Analgesics</td>
<td>Midazolam, Rocuronium, Fentanyl</td>
<td>Belgium</td>
<td>The Federal Agency for Medicines and Health Products (FAMHP)</td>
</tr>
<tr>
<td>08</td>
<td>Azithromycin, Lopinavir / ritonavir, Corticosteroids and Interferons with Ribavirin</td>
<td>Netherlands</td>
<td>The National Institute for Health and the Environment of the Netherlands</td>
<td>[31]</td>
</tr>
</tbody>
</table>

Table 2. Coronavirus drugs and vaccines in development.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of Drug/Vaccine</th>
<th>Company/Institution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Fusogenix DNA vaccine</td>
<td>Entos Pharmaceuticals</td>
<td>Fusogenix drug delivery stage is a proteo-lipid carrier to introduce genetic load straight into the cells optimized loads comprising numerous protein epitopes obtained from SARS-COV-2 proteins, which will encourage an immune retort inside the patient to thwart COVID-19 disease</td>
</tr>
<tr>
<td>02</td>
<td>ChAdOx1 nCoV-19</td>
<td>Jenner Institute, University of Oxford</td>
<td>Adenovirus vaccine vector</td>
</tr>
<tr>
<td>03</td>
<td>Gimsilumab</td>
<td>Roivant Sciences</td>
<td>The drug will aim at granulocyte-macrophage colony stimulating factor (GM-CSF) that is a proinflammatory cytokine identified in elevated levels in the serum of COVID-19 patients. Focusing on GM-CSF is estimated to lessen lung injury &amp; decrease death rate in COVID-19 patients.</td>
</tr>
<tr>
<td>04</td>
<td>AdCOVID</td>
<td>Althimmune and University of Alabama at Birmingham</td>
<td>Single dose intranasal vaccine for COVID-19</td>
</tr>
<tr>
<td>05</td>
<td>TJM2</td>
<td>I-Mab Biopharma</td>
<td>Deactivating antibody, as a management for cytokine tornado in patients afflicting from severe cases of coronavirus illness</td>
</tr>
<tr>
<td>06</td>
<td>AT-100</td>
<td>Airway Therapeutics</td>
<td>New human recombinant protein designated as AT-100</td>
</tr>
<tr>
<td>07</td>
<td>TZLS-501</td>
<td>Tiziana Life Sciences</td>
<td>Preparing the monoclonal antibody designated as TZLS-501 meant for the management of COVID-19.</td>
</tr>
<tr>
<td>08</td>
<td>OYA1</td>
<td>OyaGen</td>
<td>Robust anti-viral efficiency towards SARS-CoV-2 in labs assays</td>
</tr>
<tr>
<td>09</td>
<td>BPI-002</td>
<td>BeyondSpring</td>
<td>Smaller molecule means intended for treatment of diverse infections as well as COVID-19</td>
</tr>
<tr>
<td>10</td>
<td>INO-4800</td>
<td>Inovio Pharmaceuticals and Beijing Advaccine Biotechnology</td>
<td>As a novel coronavirus vaccine development, which is supported under Coalition for Epidemic Preparedness Innovations (CEPI) with $9M grant</td>
</tr>
<tr>
<td>11</td>
<td>Coronavirus vaccine</td>
<td>Serum Institute of India and Codagenix</td>
<td>SARS-CoV-2 with a vaccine strain equivalent to the source virulent</td>
</tr>
</tbody>
</table>
people in community areas to guard against respiratory viral infection is presently recommended by the WHO.

CONCLUSION

Out here, the SARS-CoV-2 epidemic has defied the financial, medical and public health foundation of the whole world. Solely time will let know how COVID-19 will brunt our life at this point. Moreover, future epidemics of these viruses and germs of the zoonotic source are possibly to persist. Accordingly, as of restricting this epidemic, efforts must be prepared to develop wide-ranging procedures to avoid future epidemics of zoonotic sources.

CONSENT FOR PUBLICATION

Not applicable.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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REFERENCES


