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Short Communication

A Respiratory Review on Covid-19: Pathophysiology, Diagnosis, Treatment, and Prevention

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Abstract:
Coronavirus Disease-2019 (Covid-19), a global threat, is a viral-born disease affecting the respiratory tract and causing breathing problems. Due to its high spread nature, it spread through the world in a short period and is a declared global threat. The reported cases are slowing down now but the fight against covid-19 is still ongoing. Most people with covid-19 experience uncomplicated symptoms although it has created fatal fear in the world population. Still, most people from developing countries lack information and are in psychological distress. This review has explained the symptom, disease process, diagnostic measures, treatment schedule, and preventive measures of covid-19.
Keywords: Coronavirus, Covid-19, respiratory disease, global threat

Introduction

For the last three-year, the world population is under the fear a disease called Covid-19. Coronaviruses, which causes disease in human and animals, are a large family of viruses first recognized in Wuhan, China, in December 2019. 229E, NL63, OC43, and HKU1 are the four important human coronaviruses among the seven-group causing infection[1,2]. The pathogen is closely related to the SARS virus and genetic information suggested that it is a group of beta coronavirus. Globally, as of 15 July 2022, there have been 557 million confirmed cases, including 6 million deaths. They affect primarily the respiratory tract and cause infectious diseases [3]. The sing and symptoms of Covid-19 are classified as:

Table 1: Symptom of Covid-19[4]

Covid-19 symptom	
Anorexia (40–84%)	Fever (83–99%)
Myalgia (11–35%)	Cough (59–82%)
Rhinorrhea, sore throat, diarrhea	Fatigue (44–70%)
Anosmia (loss of smell)	Shortness of breath (31–40%)
Ageusia (loss of taste)	

Pathophysiology of Covid-19

In early infection, SARC CoV-2 targets the nasal, bronchial epithelial cell, and pneumocytes through the viral spike(S) protein. They kill the T lymphocytes and reduce the immune capacity of the body. Coronaviruses cause endothelial damage to the pulmonary vasculature which further damages the alveolar and interstitial inflammation. These intensive damages again result in the microvascular thrombosis with hemorrhage and ultimately cause covid-19 vasculopathy. Pulmonary intravascular coagulation, and hypercoagulability is a crucial pathophysiological condition of covid-19. The coagulation cascade may have been activated by refractory and secondary ARDS with ventilation-perfusion unbalance and hypoxemia[5,6].

Disease Progression on Covid-19

It is observed that the patient condition among the infected people as:

- Mild: 80%
- Severe: 15%
- Critically ill: 5%

Disease progression on Covid-19 patient symptom wise on daily basis was shown as;

- Day 1: Fever, fatigue, muscle pain, with dry cough are the common symptom on the very first day of infection. Some of them may experience diarrhea and weakness.
- Day 5: Elderly and pre-existing medically ill patients may experience breathing problems.
- Day 7: on increasing the symptom progression the patient may have to be hospitalized.
- Day 8: 15% of patients develop acute respiratory distress syndrome (ARDS) on day 8. It is a fatal condition in the severe case where the lung is filled with water.
- Day 10: Due to the worse condition the patient is shifted to ICU (Intensive Care Unit). Some of them may experience abdominal pain and loss of appetite.
- Day 17: Patients are discharged after 2 to 3 weeks.

Usually, the symptoms are not seen initially and after 5 to 6 days of infection, only the symptoms are seen in most of the cases. So, it is difficult to diagnose initially by symptom[7,8].

Diagnosis of Covid-19

Assigning the symptom is the first way to diagnose the disease. It gives us the benefit of doubt. Rapid covid-19 test kits and serological tests become most popular during pandemics. The differential determination comprises a wide range of upper/lower aviation route viral irresistible specialists, like adenovirus, rhinovirus, influenza, parainfluenza, respiratory syncytial infection (RSV), human metapneumovirus, other Covid-19, and other notable viral respiratory contaminations, abnormal microorganisms (chlamydia, mycoplasma) what's more, bacterial microorganisms. Coronavirus sickness is distinguished because of the epidemiological history and clinical signs, alongside checked SARS-CoV-2 contamination through one of the resulting strategies: ongoing opposite transcriptase-polymerase chain response (RT-PCR) measure, high-throughput genome sequencing, and serological assessment of against viral immunoglobulin M (IgM) and G (IgG) antibodies. Another way of diagnosis of Covid-19 should be so-called microbiological confirmation. In other words, identify the insect that causes Covid-19[9,10].

Confirmation of Covid-19 Diagnosis

Affirmation of Coronavirus conclusion associated patients who have anyone with the following measures:

- Aviation route or on the other hand blood tests tried positive for SARS-CoV-2 utilizing RT-PCR;
- Hereditary sequencing of aviation routes or blood tests is amazingly homologous with the distinguished SARS-CoV-2 genome[11].

Treatment

Supportive Therapy

According to the patient’s health condition, age group, and medical severity, the arrangement

should be made to keep the patient away from public relation. The best way to stop the spread is to maintain the isolation. So, a chain of transmission is broken. The regular techniques include bed rest and palliative treatment, providing sufficient calorie and water utilization, supporting water-electrolyte equilibrium and homeostasis, investigating crucial signs and oxygen immersion, keeping up aviation route unhampered, and flexible maintaining oxygen when required[12].

Symptomatic Therapy

The first step for symptomatic treatment is to distinguish the severity of the disease and carry out the treatment accordingly. The gentle infection ought to be overseen at home by exhorting about risky signs. The standard methodology is proceeding with hydration, sustenance, and overseeing fever and hack. On the off chance that a patient has a high temperature surpassing 38.5°C with perceptible trouble, substantial cooling, (for example, tepid water shower, antipyretic patches) or antipyretic medication treatment would be given.

In the hypoxic case, oxygen treatment by nasal route, face veil, high stream nasal cannula, or non-intrusive ventilation might be required. Mechanical ventilation and oxygen demand ventilation treatment may be viewed as vital. Kids who go through non-obtrusive mechanical ventilation for two hours with no advancement, or can't endure non-invasive ventilation, with expanded aviation route emissions, serious hacks, or then again hemodynamic unusualness, ought to quickly go through mechanical ventilation. Whenever required, inclined position ventilation, and pneumonic enrolment can be used. Renal substitution treatment might be needed in specific cases[13,14].

Drug Therapy

FDA-approved drugs are used in the treatment. An antimalarial drug such as Chloroquine and Hydroxychloroquine, antiviral drugs such as ivermectin, Remdesivir, lopinavir, and ritonavir, and antibiotics such as Azithromycin are mostly used during pandemic. Corticosteroids are also been used in the treatment[15,16]. Mostly a combination of these drugs has been used like lopinavir and ritonavir with oseltamivir, hydro chloroquine with azithromycin, and lopinavir with chloroquine drugs used for the treatment[17,18]. In some cases, plasma therapy and monoclonal antibodies therapy[19] is also in used[19]..

Vaccine

Currently, vaccines are developed based upon three main approaches: a whole virus or bacterium, the parts of the germ that activate the immune system, or the genetic material that gives the instructions for making specific proteins, not the whole virus. The whole microbe approach has five types: inactivated, live attenuated, viral vector, subunit, and genetic approaches. Various vaccines are approved by different agencies and are available for preventive therapy. The efficacy and reliability of vaccines are different from each other. But most the vaccine are supportive for betterment [20,21].

Prevention

During a pandemic all the world population strictly followed the following preventive measure:

- Maintain social distancing
- Wearing mask, Personal Protection (PP) kit
- Washing hands with soap or use of antiseptic
- Isolation
- Home isolation
- Vaccination
- Public awareness

These are the best prevention measures for Covid-19 transmission[22].

Conclusion

The Covid-19 affect the global health system in the last three years and the fear of it people is still there. It can be preventable and curable if we break the chain of contact by maintaining social distance. The development of effective vaccine decreases the threat of covid-19.

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