

A review on novel corona virus 2019 (covid-19) pneumonia

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Abstract: The pneumonia caused by novel Coronavirus (COVID-19) SARS-CoV-2 in Wuhan, China in December 2019 is a highly contagious disease. The WHO (World Health Organization) has declared the ongoing outbreak as a global public health emergency. Currently, the research on Coronavirus is still in the primary stage. Based on the current information published evidence, we systematically summarize the latest information, drugs, diagnosis, treatment and prevention of COVID-19. This review in that we hope of helping the public effectively recognize and deal with the 2019 novel Coronavirus (SARS-CoV-2), and providing a reference for future studies.

Keywords: Coronavirus; Pneumonia; Respiratory infection; Diagnosis; Treatment.

[1] INTRODUCTION:

On December 30, 2019, a report indicating a cluster of patients with pneumonia of unknown etiology in Wuhan City, Hubei Province, China, was published on ProMED-mail. It was possibly related to contact with a local fish and wild animal market that is (Huainan Seafood Wholesale Market), where there was also sale of live animals. Most of the first reported patients visited the market about 1 month before onset. Deep sequencing analysis from lower respiratory tract samples indicated a novel Coronavirus, which was named 2019 Novel Coronavirus (2019-nCoV) by the World Health Organization (2). In mid-January 2020. **Corona viruses** are a group of related viruses that cause diseases in mammals and birds. In humans, corona viruses cause respiratory tract infections that can range from mild to lethal. Mild illnesses include some cases of the common cold (which has other possible causes, predominantly rhinoviruses), while more lethal varieties can cause SARS, MERS, and COVID-19. Symptoms in other species vary: in chickens, they cause an upper respiratory tract disease, while in cows and pigs they cause diarrhea. There are yet to be vaccines or antiviral drugs to prevent or treat human Coronavirus infections. Pneumonia is a lung infection that causes inflammation in the tiny air sacs inside your lungs. They may fill up with so much fluid and pus that it's hard to breathe. You may have severe shortness of breath, a cough, a fever, chest pain, chills, or fatigue.

2. COVID-19 PNEUMONIA:

Pneumonia is a lung infection that causes inflammation in the tiny air sacs inside your lungs. They may fill up with so much fluid and pus that it's hard to breathe. You may have severe shortness of breath, a cough, a fever, chest pain, chills, or fatigue.

• MECHANISM OF SARS-COV-2:

Antimicrobials with potential activity against SARS-CoV-2: o Chloroquine – In vitro and limited clinical data suggest potential benefit. o Hydroxychloroquine – In vitro and limited clinical data suggest potential benefit. o Lopinavir; Ritonavir - Role in the treatment of COVID-19 is unclear. Preclinical data suggested potential benefit; however, more recent data has failed to confirm. o Remdesivir – Investigational and available only through expanded access and study protocols; several large clinical trials are underway. o Favipiravir – Investigational use is being studied. • Adjunctive / supportive care: o Azithromycin – Used in some protocols based on theoretical mechanism and limited preliminary data as adjunct therapy. o Immunomodulating agents - Used in some protocols based on theoretical mechanisms and limited preliminary data as adjunct therapy. o COVID-19 convalescent plasma – Investigational use is being studied. o Corticosteroids - Not recommended for viral pneumonia; use may be considered for patients with refractory shock or acute respiratory distress syndrome. o Inhaled pulmonary vasodilators - No evidence for routine in acute respiratory failure; use may be considered in specific patients with acute respiratory distress syndrome (ARDS) as a temporizing measure. o Anticoagulation – Venous thromboembolism prophylaxis with low molecular weight heparin (LMWH) recommended for all hospitalized patients. o NSAIDS – The FDA continues to investigate the use of NSAIDs; concern for potential worsening of COVID-19 symptoms has been suggested, but confirmatory clinical data is lacking.

- **The following drugs which is used to treat COVID-19 Pneumonia.**

- Chloroquine
- Hydroxychloroquine
- Lopinavir
- Ritonavir
- Favipiravir

Mechanism of Action:

- **CHLOROQUINE**

MOA- changes the pH of endosomes and believed to prevents viral entry, transport and post-entry events.

- **HYDROXYCHLOROQUINE**

Changes the pH of endosomes and believed to prevents viral entry, transport and post-entry events

- **LOPINAVIR, RITONAVIR**

The Lopinavir and Ritonavir combination is under investigation for treatment of the COVID-19 Coronavirus disease, a deadly respiratory infection pandemic caused by the SARS-nCoV-2 virus. Most viruses have the ability to create proteins necessary for their life cycle. The Lopinavir and Ritonavir combination stops that process, in theory. For viruses to create their DNA or RNA (RNA in the case of SARS-nCov-2) the virus has to take control of some of the proteins in the host cell. The virus relies on an enzyme called protease. Imagine the virus replication process as feeding dough into a pasta maker. The protease acts as a pair of scissors at the end, snipping off lengths of pasta as they come out of the machine to make the amino acids necessary for the virus to replicate itself. What Lopinavir and Ritonavir aim to do as protease inhibitors are jam up that pair of scissors? A lot of the experience with Lopinavir and Ritonavir, as with all the drugs the medical community is trying against the Coronavirus pandemic, is drawn from the experience with the SARS outbreak in 2003. It was an option, but not clearly effective against the virus, according to trials done at the time.

- **FAVIPIRAVIR**

Inhibits viral RNA-dependent polymerase

3. COVID-19 PNEUMONIA SYMPTOMS

A fever, a dry cough, and fatigue are common early signs of COVID-19. You may also have nausea, diarrhea, muscle aches, and vomiting.

1. If your COVID-19 infection starts to cause pneumonia, you may notice things like:

- Rapid heartbeat
- Shortness of breath or breathlessness
- Rapid breathing
- Dizziness
- Heavy sweating

2. Common symptoms:

- Fever.
- Tiredness.
- Dry cough.

3. Some people may experience:

- Aches and pains.
- Nasal congestion.
- Runny nose.
- Sore throat.
- Diarrhea.

The new Coronavirus causes severe inflammation in your lungs. It damages the cells and tissue that line the air sacs in your lungs. These sacs are where the oxygen you breathe is processed and delivered to your blood. The damage causes tissue to break off and clog your lungs. The walls of the sacs can thicken, making it very hard for you to breathe.

4. TREATMENTS FOR COVID-19 PNEUMONIA

On January 28, 2020, the WHO released a document summarizing WHO guidelines and scientific evidence derived from the treatment of previous epidemics from HCoV. This document addresses measures for recognizing and sorting patients with severe acute respiratory disease; strategies for infection prevention and control; early supportive therapy and monitoring; a guideline for laboratory diagnosis; management of respiratory failure and ARDS; management of septic shock; prevention of complications; treatments; and considerations for pregnant patients. There is no specific antiviral treatment recommended for COVID-19, and no vaccine is currently available. The treatment is symptomatic, and oxygen therapy represents the major treatment intervention for patients with severe infection. Mechanical ventilation may be necessary in cases of respiratory failure refractory to oxygen therapy, whereas hemodynamic support is essential for managing septic shock.

1. Pneumonia may need treatment in a hospital with oxygen, a ventilator to help you breathe, and intravenous (IV) fluids to prevent dehydration.
2. Clinical trials are looking into whether some experimental drugs and treatments used for other conditions might treat severe COVID-19 or related pneumonia:
 - Antiviral, including remdesivir, which the FDA hasn't approved but which was developed to treat the Ebola virus
 - The malaria drugs Chloroquine and Hydroxychloroquine, sometimes along with Azithromycin, an antibiotic

5. OTHER THERAPIES

Among other therapeutic strategies, systemic corticosteroids for the treatment of viral pneumonia or acute respiratory distress syndrome (ARDS) are not recommended. Moreover, unselective or inappropriate administration of antibiotics should be avoided, although some centers recommend it. Although no antiviral treatments have been approved, several approaches have been proposed such as Lopinavir/Ritonavir (400/100 mg every 12 hours), Chloroquine (500 mg every 12 hours), and Hydroxychloroquine (200 mg every 12 hours). Alpha-interferon (e.g., 5 million units by aerosol inhalation twice per day) is also used. Preclinical studies suggested that remdesivir (GS5734) — an inhibitor of RNA polymerase with in vitro activity against multiple RNA viruses, including Ebola — could be effective for both prophylaxis and therapy of HCoV infections. This drug was positively tested in a rhesus macaque model of MERS-CoV infection. In Italy, a great investigation led by the Institute to Nazionale Tumori, Fondazione Pascale di Napoli is focused on the use of tolicizumab. It is a humanized IgG1 monoclonal antibody, directed against the IL-6 receptor and commonly used in the treatment of rheumatoid arthritis. When the disease results in complex clinical pictures of MOD, organ function support in addition to respiratory support, is mandatory. Extracorporeal membrane oxygenation (ECMO) for patients with refractory hypoxemia despite lung-protective ventilation should merit consideration after a case-by-case analysis. It can be suggested for those with poor results to prone position ventilation.

6. COVID-19 PNEUMONIA PREVENTION

1. If you're in a high-risk group for COVID-19 pneumonia, take these steps to prevent infection:
 - Wash your hands often. Scrub with soap and water for at least 20 seconds.
 - If you can't wash your hands, use a hand sanitizer gel that's at least 60% alcohol. Rub it all over your hands until they're dry.
 - Try not to touch your face, mouth, or eyes until you've washed your hands.
 - Avoid anyone who's sick. Stay home and avoid others as much as you can.
 - Regularly clean and disinfect surfaces in your home that you touch often, such as countertops and keyboards.
2. The WHO and other organizations have issued the following general recommendations:
 - Avoid close contact with subjects suffering from acute respiratory infections.
 - Wash your hands frequently, especially after contact with infected people or their environment.
 - Avoid unprotected contact with farm or wild animals.
 - People with symptoms of acute airway infection should keep their distance, cover coughs or sneezes with disposable tissues or clothes and wash their hands.
 - Strengthen, in particular, in emergency medicine departments, the application of strict hygiene measures for the prevention and control of infections.
 - Individuals that are immune compromised should avoid public gatherings.
3. The most important strategy for the populous to undertake is to frequently wash their hands and use portable hand sanitizer and avoid contact with their face and mouth after interacting with a possibly contaminated environment.

4. Healthcare workers caring for infected individuals should utilize contact and airborne precautions to include PPE such as N95 or FFP3 masks, eye protection, gowns, and gloves to prevent transmission of the pathogen.
5. China has announced the first animal tests, and researchers from the University of Queensland in Australia have also announced that, after completing the three-week in vitro study, they are moving on to animal testing. Furthermore, in the U.S., the National Institute for Allergy and Infectious Diseases (NIAID) has announced that a phase 1 trial has begun for a novel Coronavirus immunization in Washington State.

7. DIAGNOSIS:

The symptoms of the early stages of the disease are nonspecific. Differential diagnosis should include the possibility of a wide range of infectious and non-infectious (e.g., vasculitis, dermatomyositis) common respiratory disorders.

- Adenovirus
- Influenza
- Human metapneumovirus (HmPV)
- Parainfluenza
- Respiratory syncytial virus (RSV)
- Rhinovirus (common cold)

For suspected cases, rapid antigen detection, and other investigations should be adopted for evaluating common respiratory pathogens and non-infectious conditions.

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