



Iberoamerican Journal of Medicine

ISSN: 2695-5075

ISSN-L: 2695-5075

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Hospital San Pedro

España

Kumar, Vijay; Priyadarshinee, Siprali; Naik, Sujata
Coronavirus (COVID-19): A new pandemic
Iberoamerican Journal of Medicine, vol. 2, núm. 2, 2020, pp. 30-31
Hospital San Pedro
España

DOI: <https://doi.org/10.5281/zenodo.3739130>

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**IBEROAMERICAN
JOURNAL OF
MEDICINE**

iberoamericanjm

Journal homepage: www.iberoamericanjm.tk

Editorial

Coronavirus (COVID-19): A new pandemic

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ARTICLE INFO

Article history:

Received 1 April 2020

Received in revised form 2 April 2020

Accepted 5 April 2020

Keywords:

Coronavirus

COVID-19

Pandemic

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Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) [1]. Coronavirus disease (COVID-19) is a new strain that was discovered in 2019 and has not been previously identified in humans. Coronaviruses are zoonotic, meaning they are transmitted between animals and people. Detailed investigations found that Severe acute respiratory syndrome-related coronavirus (SARS-CoV) was transmitted from civet cats to humans and Middle East respiratory syndrome coronavirus (MERS-CoV) from dromedary camels to humans. Several known coronaviruses are circulating in animals that have not yet infected humans [2].

The COVID-19 virus affects different people in different ways. Common signs of infection include respiratory symptoms, fever, cough, shortness of breath and breathing difficulties. People may be sick with the virus for 1 to 14 days before developing symptoms [3]. The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Most people (about 80%) recover from the disease without needing special treatment. More rarely, the disease can be serious and even fatal. Older people, and people

with other medical conditions (such as asthma, diabetes, or heart disease), may be more vulnerable to becoming severely ill [4].

To prevent infection and to slow transmission of CoVID-19, do the following:

- Wash your hands regularly with soap and water, or clean them with alcohol-based hand rub.
- Maintain at least 1 metre distance between you and people coughing or sneezing.
- Avoid touching your face.
- Cover your mouth and nose when coughing or sneezing.
- Stay home if you feel unwell.
- Refrain from smoking and other activities that weaken the lungs.
- Practice physical distancing by avoiding unnecessary travel and staying away from large groups of people [5].

There are currently 861,113 confirmed cases and 42,385 deaths from the coronavirus COVID-19 outbreak as of March 31, 2020 [6].

There is no specific medicine to prevent or treat COVID-19. People may need supportive care to help them breathe. Proper rest and sleep, keep warm, drink plenty of liquids,

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<http://doi.org/10.5281/zenodo.3739130>

use a room humidifier or take a hot shower to help ease a sore throat and cough

There are no US Food and Drug Administration (FDA)-approved drugs specifically for the treatment of patients with COVID-19. Hydroxychloroquine and chloroquine are oral prescription drugs that have been used for treatment of malaria and certain inflammatory conditions. Chloroquine has been used for malaria treatment and chemoprophylaxis, and hydroxychloroquine is used for treatment of rheumatoid arthritis, systemic lupus erythematosus and porphyria cutanea tarda. Both drugs have in-vitro activity against SARS-CoV, SARS-CoV-2, and other coronaviruses, with hydroxychloroquine having relatively higher potency against SARS-CoV-2 [7].

A study in China reported that chloroquine treatment of COVID-19 patients had clinical and virologic benefit versus a comparison group, and chloroquine was added as a recommended antiviral for treatment of COVID-19 in China. Based upon limited in-vitro and anecdotal data, chloroquine or hydroxychloroquine are currently recommended for treatment of hospitalized COVID-19 patients in several countries. Both chloroquine and hydroxychloroquine have known safety profiles with the main concerns being cardiotoxicity (prolonged QT syndrome) with prolonged use in patients with hepatic or renal dysfunction and immunosuppression but have been reportedly well-tolerated in COVID-19 patients [8].

Due to higher in-vitro activity against SARS-CoV-2 and its wider availability in the United States compared with chloroquine, hydroxychloroquine has been administered to hospitalized COVID-19 patients on an uncontrolled basis in multiple countries, including in the United States. One small study reported that hydroxychloroquine alone or in combination with azithromycin reduced detection of SARS-CoV-2 RNA in upper respiratory tract specimens compared with a non-randomized control group but did not assess clinical benefit [7]. Hydroxychloroquine and azithromycin are associated with QT prolongation and caution is advised when considering these drugs in patients with chronic medical conditions (e.g. renal failure, hepatic disease) or who are receiving medications that might interact to cause arrhythmias [8].

Hydroxychloroquine is currently under investigation in clinical trials for pre-exposure or post-exposure prophylaxis of SARS-CoV-2 infection, and treatment of patients with mild, moderate, and severe COVID-19.

First developed in the 1940s, chloroquine earned FDA approval as a malaria treatment in 1949 and long stood as the go-to treatment for the disease [6].

A report published in 2005 tells the first possibility that chloroquine and its derivative hydroxychloroquine might be effective at treating COVID-19. The study revealed that chloroquine could prevent the spread of the SARS-CoV virus, which caused severe acute respiratory syndrome nearly 20 years ago, in primate cells grown in culture. Chloroquine interferes with the virus's ability to replicate in

two ways. First, the drug enters compartments called endosomes within the cell membrane. Endosomes tend to be slightly acidic, but the chemical structure of the drug boosts their pH, making the compartments more basic. Many viruses, including SARS-CoV, acidify endosomes in order to breach the cell membrane, release their genetic material and begin replication; chloroquine blocks this critical step [7].

The drug also prevents SARS-CoV from plugging into a receptor called angiotensin-converting enzyme 2, or ACE2, on primate cells, according to the 2005 report. When the virus inserts its spike protein into the ACE2 receptor, it sets off a chemical process that alters the structure of the receptor and allows the virus to infect. An adequate dose of chloroquine appears to undermine this process, and in turn, viral replication in general, the authors noted. "It was thought that whatever pertained to SAR-CoV-1 might apply to SARS-CoV-2" [9].

Severe acute respiratory syndrome-related coronavirus (SARS) and CoVID-19 virus infect humans when protein spikes on its surface bind to special receptors on the surface of human cells. Chloroquine worked against SARS by interfering with those receptors, thereby reducing the virus's ability to bind to cells. Researchers believe there is a chance Chloroquine can do the same against COVID-19.

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