Treatment and Management of COVID-19

NUR 493C: Adult Health Alterations III Clinical

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Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an emerging viral infection that has an alarming transmission rate. Both the number of people who get infected and those who have died have increased dramatically over the course of just a few months. The purpose of this paper is to identify the various aspects which are specific to the novel coronavirus, otherwise known as COVID-19. This includes current knowledge on the disease process of COVID-19, its signs and symptoms, research of various treatment and management methods, which treatment course of action demonstrates the most desirable outcome, as well as ways to protect oneself and prevent and limit its spread onto others.

Keywords: COVID-19, pathophysiology, symptoms, treatment, prevention

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There have been many instances of emerging infectious diseases that have come up in different areas of the world. In the past, the world has experienced cases of Ebola, Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), H1N1 Influenza virus, Nipah virus, as well as many others. In more recent and current times, we face issues with a new form of virus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), also known as COVID-19. The severity of its impact along with challenges in figuring out the best possible way to approach this disease have truly left us struggling to get back on our feet. This is not just considered as a national crisis but as a worldwide pandemic.

COVID-19 first became evident in Wuhan, China around December 2019. According to Johns Hopkins Medicine, “Although health officials are still tracing the exact source of this new coronavirus, early hypotheses thought it may be linked to a seafood market in Wuhan, China. Some people who visited the market developed viral pneumonia caused by the new coronavirus. A study that came out on Jan. 25, 2020, notes that the individual with the first reported case became ill on Dec. 1, 2019, and had no link to the seafood market. Investigations are ongoing as to how this virus originated and spread” (Sauer, 2020).

Although there was initial skepticism on how COVID-19 is spread, it is now believed to have a transmission based on droplets released into the air when a person coughs or sneezes. Once these droplets enter the bodily system, it can cause severe pneumonia or other respiratory-like manifestations by negatively impacting the alveoli in the lungs and impairing proper gas exchange. Because of this, airborne and droplet precautions along with contact precautions are put into place in healthcare settings as a way to limit and contain its spread from person to person.

Recommended personal protective equipment that is required to be worn for personal safety and prevention of spread when caring for infected individuals include face masks or N95 respirator masks, gloves, gowns, as well as a face shield or goggles. These precautions also call for measures like placing patients in negative pressure rooms with the door remaining closed and wearing face masks or more specifically, N95 masks. This kind of mask provides an extra form of protection by filtering out air that has potentially been contaminated with COVID-19 droplets. It is said that the droplets, when suspended into the air, can remain "viable and infectious for a total of up to 3 hours (van Doremalen, 2020). In addition to droplets having the susceptibility to remain in the air, there is also a large risk that these droplets will be able to descend onto other surfaces like tables, floors, and any type of equipment in the patient's room. Therefore, it is also a necessary measure to wipe down any possible contaminated surfaces and equipment using disinfecting wipes or liquids.

Besides having these additional forms of physical barriers, it is important for people to understand and implement proper hand-washing measures. This is extremely important because unclean hands can promote the spread of infections through various portals of entry like by touching one's "eyes, nose, mouth, preparing and eating food with unclean hands, touching contaminated surfaces" (CDC, 2020). Effective hand-washing protocol encourages individuals to first wet their hands with water, apply soap to hands, lather the soap (on to front and back of hands, wrists, and in between fingers and nails), scrub for at least twenty seconds under warm or hot water, and then lastly to rinse and dry hands. A good technique to remember the twenty second rule is to sing the "happy birthday" song from start to end twice. Apart from proper hand-washing, both the CDC and WHO recommend maintaining a six feet distance from other people to prevent droplet transmission.

Clinical manifestations of this infectious disease do not appear consistent among those who contract it. In other words, signs and symptoms may vary between each individual as well as its severity. According to the CDC, “These symptoms may appear 2-14 days after exposure to the virus: fever, cough, shortness of breath or difficulty breathing, chills or body shakes, muscle pain, headache, sore throat, runny nose, new loss of taste or smell, and diarrhea.” Of course, not all these symptoms will occur at once and one person may experience a few symptoms while another person may experience others. It is recommended that individuals seek immediate medical attention when they experience “trouble breathing, persistent pain or pressure in the chest, new confusion or inability to arouse, bluish lips or face” (CDC, 2020).

Diagnostic criteria, first, enlists for a risk assessment that will be conducted to obtain information that will examine any recent travel history to areas like China, Iran, Europe, etc. and if there is any known exposure to someone who tested positive for the disease. Next, because coronavirus symptoms are similar to flu-like symptoms, a nose culture is used to detect SARS-CoV-2 RNA by reverse transcription polymerase chain reaction or RT-PCR. This involves using a skinny cotton swab-stick that is long enough to reach the nasopharynx. Using the cotton-tipped stick, proceed to swab a person’s nose, back of the nose, and upper portion of the throat (Johns Hopkins Medicine, 2020) and place it in a proper testing tube for analysis. It will then be sent down to testing center labs that can determine the presence of the COVID-19 virus. A retrospective research study was conducted using data collected from 95 coronavirus positive patients which observed any similarities in laboratory values. The results indicated the following: “Higher temperature, blood leukocyte count, neutrophil count, neutrophil percentage, C-reactive protein level, D-dimer level, alanine aminotransferase activity, aspartate aminotransferase activity, α - hydroxybutyrate dehydrogenase activity, lactate dehydrogenase activity and creatine

kinase activity were related to severe 2019 novel coronavirus pneumonia and composite endpoint, and so were lower lymphocyte count, lymphocyte percentage and total protein level" (Zhang, 2020). Apart from lab findings, according to the CDC, chest radiographs of patients with COVID-19 typically exhibit bilateral air-space consolidation, chest CT images from patients with COVID-19 typically demonstrate bilateral, peripheral ground glass opacities.

Once tested positive for COVID-19, there are several treatment and management options that are being implemented in order to help those regain their health during the recovery process. Majority of treatment options look to provide supportive measures for patients. Some of which include providing high flow oxygen- PEEP should not be used as it can cause even more damage to the alveoli within the lungs and endotracheal intubation will also be used as a way to maintain and preserve the airway.

Treatment courses in regard to medication is based largely on experimentation and thus, can be viewed as controversial due to unknown results or target against the coronavirus infection. There are several different kinds of medications that are being observed and tested to see action and effects against COVID-19. Some of these medications include ribavirin, neuraminidase inhibitors, protease inhibitors, immunomodulators, corticosteroids, interferons, immunoglobulins, host-directed therapies, zinc, remdesivir, and hydroxychloroquine or chloroquine (Sarma, 2020). In further analysis of some of these medications, it was found that ribavirin displays some antiviral activity against select animal COVID strains but has many side effects like hemolytic anemia, hypocalcemia, and hypomagnesemia and when in combination with corticosteroids, the risk of increased viral load after treatment (Sarma). Protease inhibitors like lopinavir and ritonavir along with interferons when used together portrayed better outcomes and are being used as a part of current guidelines, corticosteroid use "is reported to be associated

with delayed clearance of viral RNA (both in case of SERS-CoV and MERS-CoV) and other steroid-related complications such as psychosis," and "zinc is reported to have antiviral effect, [[24]] and it inhibits CoV RNA polymerase activity and thus hampers replication in cell culture experiments" (Sarma, 2020). Antimalarial drugs like hydroxychloroquine and chloroquine have recently been in the spotlight for potentially successful benefits to treat and manage COVID-19. They are typically used to treat immune-mediated responses caused by disorders like systemic lupus erythematosus. "The antimalarials hydroxychloroquine (HCQ) and chloroquine (CQ) have demonstrated antiviral activity against severe acute respiratory syndrome–coronavirus 2 (SARS–CoV-2) in vitro and in small, poorly controlled or uncontrolled clinical studies… Hydroxychloroquine can effectively treat disease manifestations, such as joint pain and rashes; reduce thrombotic events; and prolong survival" (Yazdany, 2020). Caution should be used when trying to implement these drugs as a treatment regimen due to its many adverse effects like "ventricular arrhythmias, QT prolongation, and other cardiac toxicity" as well as "withdrawal of HCQ can lead to flares of disease, including life-threatening manifestations, such as lupus nephritis" (Yazdany, 2020).

The truth of the matter is that a lot of the treatment and management methods towards COVID-19 is based on trial-and-error. Because there are still many questions about the viral infection as well as the fact that the world is still early in its research, it is quite difficult to pinpoint the most exact successful treatment outcome. This is especially apparent when it comes to medication administration and hospital management protocol. However, there are still things people can follow to try to limit and contain the spread of the infection to more vulnerable populations. These all include wearing face masks, limiting exposure to others and going outside only for necessary matters, keeping a six feet distance, proper hand hygiene, taking only

acetaminophen instead of ibuprofen or Advil for fever or pain, intake of foods containing high doses of vitamin C, ingesting more alkaline foods, etc. Although this is a very frightening time, it is necessary that we all remain calm and do whatever we can to find ways in reducing the number of people infected.

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