The Oscar J. Cooper, M.D. 5th District Medical Newsletter

COVID-19 Information Guide

"Everything you need to know"
by

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My thought was to bring back this newsletter and begin discussing health related issues concerning Omega men in the 5th District and African American men abroad. That quickly turned as the COVID-19 pandemic dramatically changed our way of life and our families were threatened. This Corona virus is so new, the knowledge gap was like "a chasm vast and deep and wide". What you heard on the radio was sometimes different from what you heard in state and federal press conferences from what was being said on social media. Because of that, I felt it was my duty as an Omega medical doctor to research, study and then teach on COVID-19. Through the Supreme Basileus's guidance, we can use our 4 cardinal principles of Manhood, Scholarship, Perseverance and Uplift to help each other and our communities.

1. History of Coronavirus

Coronavirus is a virus that looks like a spiky ball of genetic material coated in fatty chemicals called lipids, and measures 80 billionths of a meter in diameter. A. Schalk and MC. Hawn first discovered coronavirus causing bronchitis in chickens in 1931 in North Dakota. In 1937, Coronavirus was successfully isolated and cultivated by F. Beaudette and C. Hudson. Human Coronavirus was discovered in the 1960's. Human Coronoavirus before 2002 had been known to cause the common cold, bronchitis, acute pharyngitis and viral pneumonia.

2. Let's Speak Corona Correctly

Looking at the nomenclature, there has been a second "***2***" *Severe Acute Respiratory Syndrome* "***Sars"*** caused by *Coronavirus* "***CoV***" (***Sars-CoV-2***). This virus is causing "***CO"*** stands for "*corona*", "***VI***" for "*virus*", *and* "***D***" for "*disease*", starting in "*2019*" therefore"***-19***" (***COVID-19***). So putting it all together for a better understanding, **Sars-CoV-2** is the virus that has caused the pandemic **COVID-19**. Formerly, this disease was referred to as "2019 novel coronavirus" or "2019-nCoV".

Does the viral nomenclature, Sars-CoV-2 look familiar? Yes, it's because Coronavirus caused the "SARS" or Severe Acute Respiratory Syndrome pandemic in 2003. That virus was Sars-CoV-1. Coronavirus has also caused "MERS-CoV" or Middle Eastern Respiratory Syndrome that has had outbreaks in 2012, 2015, and 2018.

3. Source of Sars-CoV-2

A. Popular Theory (Most Likely)

Sars-CoV-2 mostly lived in the Horseshoe Bat along with other diseases. Bats have long developed an incredible immune system that allows them to live with many infectious diseases. Sars-CoV-2 was though to transmit from animal to animal. The virus somehow mutated and transmitted from animal to animal, then animal to human, then human to human. The intermediate source between bat and human appears to be the animal the Pangolin. The pangolin is a shy, skinny scaly animal with no teeth that lives off of insects. It's called the "asian ant eater". Even though it is illegal, the pangolin is one of the most trafficked mammal as the meat is considered a delicacy. Unfortunately, this appears to be the case of the possibility of the pangolin being sold at the Wuhan Huanan Seafood Wholesale Market. Thus Wuhan, China became the epicenter and place of origin of the COVID-19 pandemic.

B. Conspiracy Theory

Newsflash!!! Coronavirus came from an evil scientific lab headed by a diabolical Harvard scientist that was pocketing millions of dollars. Well, just part of that is true. 3 scientists were recently arrested by the United States Justice Department in Boston, MA. This first arrest was of Dr. Charles Lieber, a Harvard University nanoscientist, who was arrested for lying about being paid hundreds of thousands to millions of dollars by China for participating in their Thousand Talents Plan. He created a lab at Wuhan University of Technology in Wuhan, China. The second person arrested was Yanqing Ye. She was studying robotics and computer science research at Boston University's Physics, Chemistry, and Biomedical Engineering department. She was arrested for lying on her J-1 visa, as she is a lieutenant in the People's Liberation Army of the Chinese Communist Party and her ongoing military service at the National University of Defense Technology (NUDT), a top military academy. The third scientist arrested was Zaosong Zheng, a cancer cell researcher from China on a J-1 visa at Beth Israel Deaconess Medical Center. He was arrested trying to smuggle 21 vials of biomedical research in his luggage that he stole from his American lab back to China. Some people believe these 3 people are connected to a larger covert plan by the Chinese government to create weapons for biological warfare. The thought is this virus was being tested in Wuhan, China and got accidentally released.

4. Spread

Sars-CoV-2 is spread via respiratory droplets. There is a high viral load in the respiratory tract of someone carrying the virus. So it can be transmitted by a person coughing, sneezing or even speaking within 6 feet of the next person and the droplets hit any mucous membrane (mouth, lips, throat, nose or eyes). If it doesn't enter your body via nose, mouth or eyes directly, it can be transmitted via a fomite. A fomite is an inanimate object transferring infectious diseases.

That being said Sars-CoV-2 can live in the air for 3 hours, on copper for 4 hours, on cardboard for 24 hours, and plastic and stainless steel for 48-72 hours. It can be spread via community or hospital settings.

One reason why Sars-CoV-2 is spreading faster and farther than Sars-CoV-1 is 25% of people carrying the virus are asymptomatic. Also it is milder in the beginning stages of the disease, so a person may just have a runny nose or slight cough as seen in mild colds and allergies. This person is then going around other people not thinking they have something serious.

So politics aside, the first case of Sars-CoV-2 was in Wuhan, China and reported about December 2019. By December 15, 2019, there were 27 cases associated with a "wet market". However, there seems to be evidence that the first case was really on November 17, 2019, in a 55 yo individual from the Hubei providence of China, where Wuhan is the capital.

A pneumonia of unknown cause was first reported to the World Health Organization (WHO) Country Office in China on December 31, 2019. The WHO declared the outbreak a Public Health Emergency of International Concern on January 30, 2020. The WHO asked the international community and countries for $675 million to help protect states with weaker medical and public health systems in its Strategic and Preparedness and Response Plan. On February 11, 2020, the WHO announced a name of the new coronavirus disease:COVID-19. It was called a pandemic by the World Health Organization (WHO) on March 11, 2020.

The first person to person case of Sars-CoV-2 in the U.S. was in January 2020 in Illinois. Patient #1 was a woman in her 60's who returned from Wuhan, China in mid-January, 2020. One week later she was hospitalized with pneumonia and tested positive for Sars-CoV-2. Her husband, Patient #2, did not travel but had frequent close contact with his wife. He was admitted to the hospital 8 days later.

5. Period of Infectivity

The period of being contagious is not currently known. However, studies show there is a higher viral load soon after symptom onset vs later in the illness. This means that transmission most likely occurs at the earlier stage of infection. This is unlike the SARS (Sars-CoV-1) pandemic of 2003, where people had severe symptoms quicker. So people with then increased viral loads were isolated sooner. Also, it has been shown 25% of patients with Sars-CoV-2 are asymptomatic (no symptoms at all). What does all that mean? That means Sars-CoV-2 is most likely being transmitted from person to person from patients with no symptoms or slight symptoms that can be misinterpreted as a cold or allergies. The duration of viral shedding (how long contagious) appears to vary on how bad the disease. There have been negative Sars-CoV-2 swabs in positive patients as early as 10 days to as late as 37 days from onset of being confirmed positive. But average days in a few studies appears about 20 days. In one of the first studies in the United States, the symptomatic secondary attack rate (getting another person sick) was 0.45 percent, or roughly half, among 445 close contacts of 10 confirmed patients. Lastly, some patients that have tested positive for Sars-CoV-2, then improved and tested negative, have gotten sick again and tested positive again.

6. Severity

The spectrum of symptomatic infection ranges from mild to critical; most infections are not severe. Specifically, in a report from the Chinese Center for Disease Control and Prevention that included approximately 44,500 confirmed infections with an estimation of disease severity :

A. Mild (no or mild pneumonia) was reported in 81 percent. In one study, a positive chest X-ray was all they noted on physical exam and diagnostic testing in positive patients. In another study, it showed 50% of asymptomatic patients had either positive CT or CXR findings.

B. Severe disease (trouble breathing and needing oxygen or >50 percent lung involvement on chest X-ray within 24 to 48 hours) was reported in 14 percent.

C. Critical disease (ARDS, respiratory failure, cardiac arrhythmia, shock, or multi-organ dysfunction) was reported in 5 percent. However in the world pandemic, this appears to vary on country and location.

The overall mortality rate in China was 2.3%. However, I don't believe that. I think China under reported their deaths. Especially, currently in the world during the pandemic, the morality rate is about 0.69 or 6.9% (death in approximately 7 out of every 100 people that test positive for Sars-CoV-2). As of this week, here in America, the mortality rate is 5.6%. Kentucky's rate is 5.3%. Here in Tennessee, the mortally rate is lower at 2.1%. These states verses Maryland at 4.3%, D.C. 4.3%, VA 3.5%, NY 5.6%, NJ 5.5% CA 4.0% and TX 2.6%. So it appears the more populated states with larger metropolitans have higher rates than the rural states. This could be secondary to people being in closer proximity to each other. I'm not sure. Lastly, let's compare Sars-CoV-2 mortality rates to Influenza for this past winter (2019-2020). COVID-19 mortality rate is 0.53 vs Flu mortality rate is 0.00060. That is during this season with COVID-19, 5 out of 100 people die. With the Flu, 6 out of 10,000 people die. The numbers don't lie and that's a powerful difference. Sars-CoV-2 is a deadly virus.

7. Symptoms

Pneumonia appears to be the most frequent serious manifestation of Sars-CoV-2 infection, characterized primarily by fever, cough, dyspnea (shortness of breath), and bilateral infiltrates (patches of infection) on chest imaging. There are no specific clinical features that can yet reliably distinguish COVID-19 from other viral respiratory infections.

In one study describing 138 patients with Sars-CoV-2 pneumonia in Wuhan, the most common clinical features at the onset of illness were:

- Fever in 99 percent
- Fatigue in 70 percent
- Dry cough in 59 percent
- Decreased appetite in 40 percent
- Muscle Soreness in 35 percent

● Trouble breathing in 31 percent
● Coughing up phlegm in 27 percent

Headache, sore throat, runny nose, GI symptoms (like nausea and diarrhea) have also been reported. Anosmia (no sense of smell) is not a statically significant consistently reported symptom

Of patients being admitted here in the United States, >80% had these top three symptoms
a. Cough
b. Chills/Fever
c. Shortness of Breath

8. Risk Factors/Demographics for Severe Disease

The United States Center for Disease Control (CDC) studied the demographics of COVID-19 patients in 99 counties from 14 states from March 1-30, 2020.The hospitalization rate was 4.6 needing to be hospitalized per 100,000 people. Rates of hospitalization increased with age (74% being greater than 50 yo), with highest rates being > 65 years old. However, patients as young as 1 month of age have been hospitalized. Even though children and young adults have died from Sars-CoV-2, it appears older age had increased mortality.

A. Hospitalization Factors

90% of patients with positive Sars-CoV-2 that had to be hospitalized had 1 or more underlying conditions. (co-morbidities)

a. Underlying conditions in order of presentation in hospitalized patients were

i. Hypertension (High Blood Pressure)
ii. Obesity (Elevated BMI greater than 30)
iii. Chronic Lung Disease (Asthma, COPD)
iv. Diabetes Mellitus (Elevated Blood Sugar)
v. Cardiovascular Disease (Coronary Artery Disease and Congestive Heart Failure

B. Other Risk Factors

Other risk factors for severe disease appears to be the male sex and also being African American. The difference between male and female infection rates aren't that significant, but mortality rates in New York City in males were nearly double that of females. The increase risk with being African American appears to be seen more in the larger metropolitan cities than in rural smaller areas.

C. Kids and COVID-19

On April 10, 2020, the CDC released the largest study involving kids (<18 yo) and COVID-19. The study was from all 50 states in the America and included Washington, D.C. and 4 U.S.

territories. Data was from 149,760 laboratory confirmed COVID-19 cases occurring during February 12 – April 2, 2020. Among 149,082 (99.6%) reported cases for which age was known, 2,572 (1.7%) were among children aged <18 years. By comparison, kids (<18yo) make up 22% of the U.S. population. That means that the number of kids testing positive is extremely low. This goes in line with what was reported out of China.

The median age for children testing positive was 11 years old. Of the 2,572 children that tested positive, 147 were hospitalized (5.7%), 5 sent to the ICU (0.2%) and 3 died (0.11% mortality rate). Infants had a much higher hospitalization rate than any other child age group. Of the 95 positive infants, 59 (62%) were hospitalized. The hospitalization rate for children 1-17 was 14%.

Among the children for whom complete information was available, only 73% developed fever, cough, or shortness of breath, 56% fever, 54% cough and 23% muscle soreness. Sars-CoV-2 positive adults (18-64) reported in the same time frame, 93%, 71%, 80% and 61% respectively.

The study admits 4 main limitations to the study. Missing data, different Sars-CoV-2 testing practices across the country, most data collected a few days before publication and lastly the 18 - 64 yo age group could be skewed as the older age population gets more severe disease than the younger population. For instances, the under 30 yo group may mimic kids. Regardless, it appears what we have known that kids are testing positive less than the older generation and if they do, they are less likely to get severe disease. This is a great mystery that will be studied for years to come. As a pediatrician and parent, it is somewhat comforting to know.

9. Testing

Tests are never 100% accurate. However, testing for Sars-CoV-2 is vital for the combat of COVID-19. It is vital to see if a person has the Sars-CoV-2 virus. It is vital to know where and when that person can move about the community. It is vital to the individuals who are in contact with a person who has the virus. It is also vital to know the epidemiology of COVID-19. It will help to manage and distribute resources, like money, health equipment and manpower.

There are 3 ways to test for Sars-CoV-2.

1. Reverse Transcription Polymerase Chain Reaction (RT-PCR)
2. Isothermal Nucleic Acid Amplification (IT-NAA)
3. Serology Testing

RT-PCR and IT-NAA are very excellent tests for Sars-CoV-2. They both work by taking the smallest amount of viral material and amplifying whatever viral material is present to determine the identification of that organism. These tests have a very good sensitivity probability. Meaning, how accurate is the test at finding the organism in a patient with the disease and they subsequently test positive. (More True Positives and less False Negatives) And the tests also has a very good specificity probability. Meaning, how accurate is a test in making sure someone who doesn't have the disease has a negative test.(More True Negatives and less False Positives)

We rely on three variables with these two tests. The first variable is the sample kit itself. Then the most important variable is the actual sample. In other words, did we get enough sample material to test in the first place? It is based on the patient, the medical personal, his/her training, the swab, the collection process and the agent the swab is going into. Then it is based on the handling of the test to the lab. Unfortunately, all of these steps are very subjective to error. Once the sample swab is brought to the lab, the last variable is the machine that runs the test of the sample.

Serological Testing is a way to test someones blood or mucous to see if they have antibodies that fight off a certain organism. An "IgM positive" test would show a current infection. An "IgG positive" test would show a previous infection. We have serological testing for many diseases like mononucleosis, strep throat, hepatitis, chickenpox and even allergies. However, the sensitivity and specificity of each test varies with each disease. For example, serology testing for hepatitis and mono are very accurate. However, serology testing for strep throat is not.

Serology can be used both for diagnosis and population surveillance. Antibody tests show how many people have had the disease, including those whose symptoms were minor or who were asymptomatic. An accurate mortality rate of the disease and the level of herd immunity (protection of people who haven't had the disease because everyone around them has had it) in the population can be determined from the results of this test. However, we can't rely on herd immunity alone. Look at the anti-vaxxers. They rely on herd immunity to protect their children from diseases prevented by vaccines. There have now been several scientifically proven outbreaks of measles secondary to herd immunity not protecting unimmunized children.

So with the rush to help combat COVID-19, we needed testing kits for a virus we have never seen. LabCorp Company announced on March 5, 2020 that health care providers could start to order its test. Quest Diagnostics Company announced the same day that the company will also offer commercial tests as soon as March 9 pending U.S. Food and Drug Administration reviews. Participation of those two commercial laboratories greatly expanded testing capacity in the United States. By March 11, 2020, 81 state and local public health laboratories in 50 states and Washington, D.C., had successfully verified accurate COVID-19 diagnostic tests and began offering testing. Unfortunately, some of those states only had a single kit, containing enough material to test just 700 people.

During the week of March 30, 2020 the CDC and public health partners began the first stage of serological testing for SARS-CoV-2. The initial studies use serum samples collected in the state of Washington and New York City. Currently, the CDC is evaluating commercially manufactured serologic tests in collaboration with the Biomedical Research and Development Authority, the Food and Drug Administration, the National Institutes of Health, the Department of Defense, and the White House Office of Science and Technology Policy. This evaluation is expected to be completed in late April.

Serologic test results have limitations that make them less than ideal tools for diagnosing people who are sick. It typically takes one to two weeks after someone becomes sick with COVID-19 for their body to make antibodies; some people may take longer to develop antibodies. Depending on when someone was infected and the timing of the test, the test may not find

antibodies in someone with a current COVID-19 infection. Serological testing for Sars-CoV-2 are being pushed by some politicians to show when someone can go back to work and when the person is "safe". That statement is not completely accurate. Remember, herd immunity isn't 100% protective. Experts say we can't reach herd immunity with COVID-19 until 60% of the population get the disease. The US in a haste to make these antibody tests available, loosened up its regulations and are relying on the manufactures effectiveness numbers. There are now more than 95 antibody tests available, but only three have received official "emergency" authorization from the FDA. Even of those 3, the accuracy of their tests have still not been verified by the FDA. England has shown what can go wrong with Sars-CoV-2 antibody tests. Prime Minister Boris Johnson called them a "game changer" and the government ordered millions from China, only for them to later be deemed unfit for widespread use. Think about these inaccurate tests. You will have more False Positives and less True Negatives, and more False Negatives and less True Positives. To be blunt, I can think I have a positive antibody test and go around some COVID-19 patients and get the disease and literally die. Serological testing has its place but we are not close to developing a truly scientifically proven test that can stand on its own and can repeat the same accurate numbers in FDA and peer review laboratories.

Who gets tested?

Before with the limited amount of tests, the testing was reserved for clinicians to base their decisions on who should be tested for Sars-CoV-2 on 1. Signs and symptoms, 2. Local epidemiology, 3. If the patient has had close contact with a confirmed COVID-19 patient (relatives or front line workers) or a history of travel from an area with sustained transmission within 14 days of symptom onset. Clinicians were and still are encouraged to test for other causes of respiratory illness in addition to COVID-19.

Currently since we have an abundance of tests available, the rules have been dramatically loosened as who gets tested. But since there is a cost associated with each test, it is highly unlikely that every single person in America will be tested.

10. Treatment

A. Mitigation

By definition, mitigation means the action of reducing the severity, seriousness, or painfulness of something. Interestingly, the Federal Emergency Management Agency (FEMA) has a sub organization called Federal Insurance and Mitigation Administration (FIMA) that has been in place years before COVID-19. This was used mostly for flooding but on its website it says the agency "is used to implement a variety of programs authorized by Congress to reduce losses that may result from natural disasters." Surprisingly, the natural disaster is COVID-19. Right on the CDC's website, this agency's "goals for using mitigation strategies in communities with local COVID-19 transmission are to slow the transmission of disease and in particular to protect: 1. Individuals at increased risk for severe illness, including older adults and persons of any age with underlying health conditions. 2.The healthcare and critical infrastructure workforces." So in the case of COVID-19, mitigation calls for closing of multiple public venues and social distancing. This is not to be confused with social isolation.

B. Home Care

Home management is appropriate for patients with mild infection who can be adequately isolated as an outpatient. Management of such patients should focus on prevention of transmission to others and monitoring for clinical deterioration. If the clinic symptoms worsen then prompt hospitalization is recommended.
Persons of Interest with no or mild symptoms of COVID-19 should stay at home and try to separate themselves from other people and animals in the household. Disinfection of frequently touched surfaces is also important. The optimal duration of home isolation is unknown. The CDC recommends two strategies to discontinue home isolation, a. test-based and b. non-test-based. The choice of strategy depends on the patients, the availability of testing supplies, and access to testing.

When a **test-based** strategy is used, patients may discontinue home isolation when there is:

a. Resolution of fever without the use of fever-reducing medications **AND**
b. Improvement in respiratory symptoms (eg, cough, shortness of breath) **AND**
c. Negative results for Sars-CoV-2 from at least two consecutive nasopharyngeal swab specimens collected ≥24 hours apart (total of two negative specimens)

When a **non-test-based** strategy is used, patients may discontinue home isolation when the following criteria are met:

a. At least seven days have passed since symptoms first appeared **AND**
b. At least three days (72 hours) have passed since recovery of symptoms without the use of fever-reducing medications **and** improvement in respiratory symptoms.

In some cases, patients may have had laboratory-confirmed COVID-19, but they did not have any symptoms when they were tested. In such patients, home isolation may be discontinued when at least 14 days have passed since the date of their first positive Sars-CoV-2 test so long as there was no evidence of subsequent illness.

The World Health Organization suggests that home isolation in patients with documented COVID-19 should continue for at least two weeks after symptom resolution.

For health care workers with lab confirmed or suspected COVID-19, who have not had any symptoms should be excluded from work until 10 days have passed since the date of their first positive Sars-CoV-2 diagnostic test assuming they have not subsequently developed symptoms since their positive test. Masks should be worn at all times with N95 masks used in high risk areas. N95 masks with exhaust valves are not recommended for those individual health care workers.

C. Hospital Care

The basis of hospital care is to treat the symptoms of the viral infection as the body heals itself. This may cause minor issues like fever and cough or may be severe issues that come up like cardiac, respiratory, or kidney failure. With severe disease, there appears to be an "overreaction" by the body to the disease. This is where the ventilator issue came up in New

York City. With several patients going into respiratory failure with ARDS (Acute Respiratory Distress Syndrome), ventilators were needed to "breathe" for the patient.

D. Steroids

The WHO and CDC do not recommend steroids in patients with Sars-CoV-2 pneumonia unless there are other pressing indications. Steroids have been associated with an increased risk for mortality in patients with the flu and delayed viral clearance in patients with MERS-CoV infection. Although they were widely used in management of SARS, there was no good evidence for benefit.

E. Non-steroidal Anti-Inflammatory Drugs (NSAIDS)

Some clinicians have suggested the use of NSAIDs (Ibuprofen, Naproxen, Celebrex, Toradol) early in the course of disease may have a negative impact on disease outcome. These concerns are based on reports of a few young patients who received NSAIDs early in the course of infection and experienced severe disease. Because of this, in the lay press you may hear suggestions of using tylenol/acetaminophen instead of NSAIDs for reduction of fever. However, there have been **no clinical or population-based data** that directly address the risk of NSAIDs with COVID-19.

F. Investigational Drugs

A number of investigational agents are being explored for antiviral treatment of COVID-19. But first let me address the elephant in the room. ANTIBIOTICS fight BACTERIA. ANTI-VIRALS fight VIRUSES. Sars-CoV-2 is a VIRUS. So the anti-bacterial drug Azithromycin (Z-pack or Zithromax) can't in any way kill or decrease the replication of a virus.

There is a registry of the international clinical trials on the WHO website and at clinicaltrials.gov. Certain investigational agents have been described in observational series or are being used anecdotally based on in vitro or extrapolated evidence. For clarification, In vitro means the experiment was proven or taken place (or it worked) in lab equipment outside a living organism. In vivo means it took place (or it worked) in a living organism. It is important to acknowledge that there are **no controlled data supporting the use of any of these agents**, and their efficacy for COVID-19 is unknown.

1. Remdesivir - Remdesivir is an anti-viral drug first developed to combat Ebola Virus and Marburg Virus diseases. Several randomized trials are underway to evaluate the efficacy of remdesivir for moderate or severe COVID-19. Remdesivir has activity against Sars-CoV-2 in vitro and related coronaviruses Sars-CoV-1 and Mers-CoV both in vitro and in vivo in animal studies. Remdisivir was used on one of the first patients with COVID-19 in the United States. Any clinical impact of remdesivir on COVID-19 remains unknown.

2. Lopinavir/Ritonavir - Lopinavir-ritonavir is an combination anti-viral drug which has primarily been used for HIV infections. It appears to have little to no role in the

treatment of Sars-CoV-2 infection. The drug has in vitro activity against the Sars-CoV-1 and appears to have some activity against Mers-CoV in animal studies in vivo. However, there was a study done in a hospital in Wuhan, China on 199 patients and there was no difference in time to clinical improvement or mortality at 28 days in patients with severe COVID-19 given lopinavir-ritonavir for 14 days in addition to regular hospital care vs those who received regular hospital care and no drug.

3. Chloroquine/Hydroxychloroquine - Chloroquine and Hydroxychloroquine are drugs used to treat malaria, as well as Lupus (SLE) and Rheumatoid Arthritis (RA). Malaria is a disease caused by a parasite from the family Plasmodium. It is really unknown how it helps with SLE and RA. Both drugs have been reported to inhibit Sars-CoV-2 in vitro, although hydroxychloroquine appears to have more potent antiviral activity. Use of chloroquine in China was reportedly associated with reduced progression of disease and decreased duration of symptoms. However, primary data supporting these claims have not been published. Lastly, in one study of 36 patients with COVID-19, use of hydroxychloroquine was associated with a higher rate of undetectable Sars-CoV-2 RNA via nasal swab at day 6 compared with no specific treatment. In this study, the use of azithromycin in combination with hydroxychloroquine appeared to have additional benefit, but there were concerns about the scientific methodology, and the biologic basis for using azithromycin vs a virus in this setting is very unclear.

Despite the limited clinical data, given the safety of using hydroxychloroquine for short term use and the lack of known effective interventions, some doctors have started to use hydroxychloroquine (or chloroquine) in hospitalized patients with severe or risk for severe infection. The possibility of drug toxicity (including cardiac toxicity with QTc prolongation and retinal toxicity) should be considered prior to using hydroxychloroquine, particularly in individuals who may be more susceptible to these major side effects. One man died and his wife was hospitalized when they self medicated with chloroquine phosphate.

4. Tocilizumab - Tocilizumab is a immunosuppressive drug used to treat Rheumatoid Arthritis and Juvenile Idiopathic Rheumatoid Arthritis. It is an antibody that is given via infusion monthly to decrease the body's immune response. Remember, COVID-19 is thought to cause damage to your body with an over reactive immune response to the body. There is a 43 year old ER doctor in Seattle, Washington that says Tocilizumab saved his life. He had kidney, heart and lung failure and was placed on a special machine known as an ECMO (extracorporeal membrane oxygenation) that replaces the functions of both the heart and the lungs. He was also given the tocilizumab to treat the out-of-control inflammation in his body caused by an overreaction of his immune system known as a "cytokine storm." His condition went from deteriorating to improvement to where he is home now. There also was a cardiology fellow in NYC who got worse on azithromycin and hydroxychloroquine. He started getting infused with tocilizumab and improved within 12 hours.

5. Losartan - Losartan (Cozaar) is a drug in the angiotensin converting enzyme (ACE) inhibitor family that is used for high blood pressure. There is a theory that using this

drug may help with the aggressiveness and mortality associated with Sars-CoV-2. This idea is based on observations that the angiotensin−converting enzyme 2 (ACE2) likely serves as the binding site for SARS−CoV−2. If you can block the binding site for the virus, you can stop the virus from replicating in an infected patient. Currently there are several labs worldwide working on this premise. However, there is not clinical data to validate this theory.

G. Sars-CoV-2 Vaccine

With the Sars and Ebola epidemics, manufactures and pharmaceutical companies have been working on a vaccine to prevent or lessen the symptoms of these diseases. Since the Sars and COVID-19 viruses are similar, companies already have a structural basis they have been working on. There are now at least a half-dozen vaccines, including live viruses, recombinant protein subunits, and nucleic acids that may offer promise as preventive vaccines against COVID-19. However, each of these vaccines will require additional manufacturing steps and formal toxicology testing before then submitting a package to national regulatory agencies like the FDA. Then only after this manufactures would be able to commence the clinical development, first with phase 1 clinical trials for safety and immunogenicity, and later, phase 2 and phase 3 trials for both safety and efficacy. Therefore a vaccine is no where near to be available in the foreseeable future.

H. Passive Immunity

Passive immunity is immunity that develops after a person receives immune system components, most commonly antibodies, from another person. Passive immunity can occur naturally, like when an infant receives a mother's antibodies through breast milk or the placenta. Or it can occur artificially such as when a person receives antibodies in the form of an injection or intravenously. This can be done through convalescent plasma (CP) in a person recovered from an illness/disease. Passive immunity provides immediate protection against an antigen (the actual bacteria or virus), but does not provide long lasting protection.

From H1N1 influenza to Ebola to Sars-CoV-1, medical practitioners have repeatedly turned to this basic form of passive immune therapy and in several cases, reported back promising reductions in mortality and viral load.

There was a study out of China published on March 23, 2020. In this study, 10 severe patients with confirmed COVID-19 were transfused with one dose of 200 ml convalescent plasma derived from recently recovered donors whose antibody titers were high. After transfusion, the patient's antibody levels to Sars-CoV-2 went up and the clinical symptoms improved within 3 days. CT and Chest X-ray results showed varying degrees of absorption of lung lesions within 7 days. The viral load was undetectable after transfusion with the convalescent plasma in 7 out of the 10 patients. No severe side effects were observed. This study showed CP therapy was well tolerated and could potentially improve the clinical outcomes through neutralizing viremia in severe COVID-19 cases. The optimal dose, timing, as well as, the clinical benefit of CP therapy, needs further investigation in larger well controlled trials.

11. Summary

In summary, I have started from the very root and basics of COVID-19 and taken you through the disease, treatment, statistics and included prevention. Sars-CoV-2 is a menace never seen before. It is new (novel) and so we will need time to fight against this invisible beast. Several questions will continue to come up and present a grim future. For example, will it come back next winter?Will it mutate again and current therapies not be effective. If I get it COVID-19, can I get it again? Will it go to other animals and then back to humans? I believe in the medical community and the advancement of science. With this and the human spirit, this pandemic will prayerfully end, and we will be better equipped to handle it again. My reasoning for researching and putting together this medical information is to dispel the myths, politics, and hysteria associated with COVID-19 and present all the facts in understandable terms. If you get these facts, you can make your own judgement to protect yourself, your family, your chapter brothers, and your community. So "Don't give up, whate'er you do; Eyes front, head high to the finish" and let's "See it through!!!"

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4/24/20