



Systematic Investigation of Vital Signs, Cardiovascular Problems and Level of Consciousness in Patients with Infectious and Non-Infectious Diseases

Alireza Rahat Dahmardeh¹, Zohreh Soleimanydarinsoo², Khatoon Zندهbodi³, Nahid Mirzaei Tirabadi⁴, Farnoush Azizi^{5*}

Abstract

This study systematically investigated vital signs, cardiovascular problems and level of consciousness in patients with infectious and non-infectious diseases. Respiratory viruses are a serious threat to the health security of people internationally and can lead to global epidemics with high mortality and financial burden for treatment. An example of these viruses that have always brought many challenges are coronaviruses. There are several reasons for this. Heart cells have angiotensin-converting-2 (ACE-2) receptors at the point where the coronavirus attaches to cells. Heart damage can also be caused by too much inflammation in the body. As the immune system fights the virus, the inflammatory process can damage some healthy tissues, including the heart. The coronavirus also affects the inner surfaces of blood vessels, which can cause inflammation of blood vessels, damage to very small vessels, and blood clots. All of these can compromise blood flow to the heart or other parts of the body. Severe covid-19 is a disease that affects endothelial cells, which form the inner lining of blood vessels. Many symptoms have been reported in the post-Covid-19 period and there are several reasons for these symptoms. Severe fatigue after infection with the corona virus is common like other serious diseases. Many people experience shortness of breath, chest pain or palpitations. Any of these problems can be related to the heart. But it can also be due to other factors, including the consequences of a long-term illness, prolonged inactivity, and weeks of bed rest for recovery. People who recover from the coronavirus sometimes show symptoms of a condition known as standing orthostatic tachycardia syndrome. Researchers are discovering whether or not there is a connection between this disease and the corona virus. Standing orthostatic tachycardia syndrome is not a heart problem per se, but a neurological problem that affects the part of the nervous system that regulates heart rate and blood flow. This syndrome can cause a rapid heartbeat when standing which can lead to fatigue, palpitations, lightheadedness and other symptoms.

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Key Words: COVID, Heart Problems, Infectious and Non-Infectious Diseases, Taki Syndrome, Heartbeat.

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Introduction

Research to find treatment solutions for this virus was still ongoing until December 31, 2019, when a severe respiratory infection was reported in Wuhan,

Hubei Province, China. At first, this virus was temporarily named as nCoV-2019, until sometime later, after more information was obtained, it was called COVID-19.

Corresponding author: Farnoush Azizi

Address: ¹Department of Anesthesiology and Critical Care, School of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran, ²Postgraduate student of Intensive Care and Anesthesia, Department of cardiac surgery ICU, Asklopios st. Georg, Hamburg, Germany, ³Graduated from Bushehr University of Medical Sciences, Head of Internal ICU, Salman Farsi Hospital, Bushehr, Iran, ⁴ Department of Infectious Disease, Shahid Motahari Burns Hospital, Iran University of Medical Sciences, Tehran, Iran, ⁵ Department of Nursing, School of Nursing and Midwifery, Shiraz university of Medical Science, Shiraz, Iran
E-mail: Dr.dahmardeh@gmail.com¹, zdarinsoo@gmail.com², kh.zd400@gmail.com³, Mirzaeitirabadi.n@iums.ac.ir⁴, farnush.7265@gmail.com⁵



The first death report about it was reported [1-3] in China on January 11, 2020, and gradually the positive cases of people suffering from this disease were reported from other countries such as Thailand, Japan, South Korea, Iran, America and Taiwan and today it has become an epidemic and even more than that, it has become a pandemic and a great global challenge [4-6].

The result of this great epidemic was the filling of hospital beds, excessive fatigue of treatment teams, severe lack of personal protective equipment, infection of hospital staff, lack of manpower and the spread of disease and concern in various cities of China and some countries of the world.

This new disease is considered a disease that can be transmitted from animals to humans, but the ways of transmission, animal origin, prevention methods and its exact clinical manifestations have not yet been determined and it needs more studies [7-9]. Also, the vaccines prepared for treatment do not

provide adequate immunity against 2019-nCoV, and therefore, asking about the history of travel and contact from patients with fever and patients with respiratory symptoms plays a very important role in the prevention and control program of this disease. The main clinical symptoms caused by this virus include: fever, cough and difficulty in breathing. The fatality rate of the coronavirus shows different values, but it is very low compared to the death rate of the MERS virus with a fatality rate of 35%. However, the major concern about this virus is its high transmission rate compared to other viruses. The deaths related to this new virus were mainly related to elderly people with underlying diseases such as liver cirrhosis, high blood pressure, diabetes and Parkinson's disease [10]. The results of the research of a group of researchers regarding nCoV-2019 are shown in table 1.

Table 1. Recent research and their results regarding the new coronavirus or nCoV-2019

Research fellow	Research title	Results	Source
Lu et al	Genomic and epidemiological characteristics of nCoV-2019	The results of this research show that 70% of the genome of nCoV-2019 is similar to SARS-COVID.	12
Zhou et al	An outbreak of novel coronavirus pneumonia of possible bat origin	The results of this research show that the external domains of the 2019-nCoV receptors match with the SARS-causing virus and in addition, it shows the 96% power of this virus in transmitting infection from one person to another.	13
Zhou et al	Novel coronavirus pneumonia from pneumonia patients from China	The results of this group indicate that the binding domains of nCoV-2019 receptors match with ACE2 receptors in human cells.	14
Xu et al	Outbreak of novel coronavirus from Wuhan and S protein modeling to investigate the risk of transmission to humans	The results of this research showed that the second binding receptor or RBD of the second nCoV-2019 has a very strong interaction with the S protein of human ACE2 molecules. These findings show that ACE2 plays a very important role in entering the cell.	15
Hao Xu et al	High expression of ACE2 receptors from nCoV-2019 in oral mucosal epithelial cells	The results of this research show the very high expression of ACE2 on the mucosa of the oral cavity and the enrichment of epithelial cells of the tongue with this receptor which indicates the potential ability of the oral cavity to enter the cells of nCoV-2019.	16

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Considering the ability of 2019-nCoV to infect the oral mucosa, Hao Xu and his colleagues investigated the expression of ACE2 in the oral cavity in order to investigate the possible routes of 2019-nCoV infection in the oral mucosa [11-13]. The results of

this study showed that ACE2, in addition to being expressed in the oral cavity, is also very rich in the epithelial cells of the oral cavity which provides the conditions for more infection with nCoV-2019 (Figure 1).



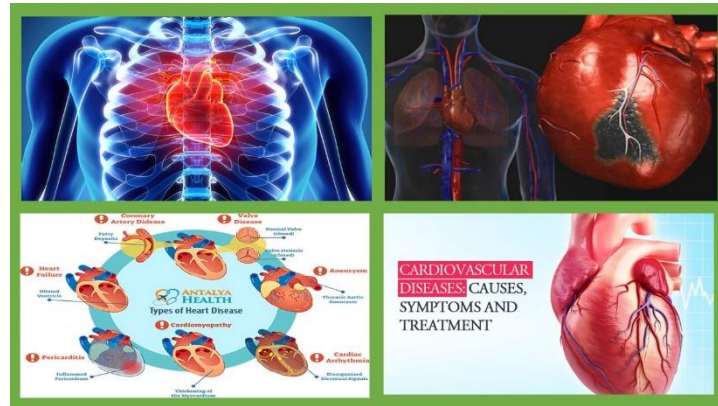


Figure 1. Cardiovascular Disease and Type 2 Diabetes

In addition, the expression level of ACE2 in different oral sites shows that its expression is much higher in tongue cells than in gums. These results indicate the high potential of the oral cavity and especially the tongue for infection and entry of nCoV-2019. Also, the level of ACE2 expression in different cells of different organs of the body is different. Table 2 shows the expression level of ACE2 in different body cells. The importance of ACE2 expression is currently related to the possibility of entry of COVID-19 through its specific receptors [14].

What is cardiac arrest? Causes, symptoms, complications, diagnosis and treatment

Sudden cardiac arrest occurs when the electrical function of the heartbeat, breathing, and consciousness of a person has a problem and is lost. The cause of sudden cardiac arrest is the electrical disturbance of the heart which causes disruption in blood pumping and stopping blood flow to other parts of the body. Cardiac arrest prevents blood flow to other organs and can be fatal if not treated immediately. In the following, we examine what happens during a sudden cardiac arrest including signs and symptoms and subsequent actions. We also discuss treatment, survival rates, and risk factors. If someone shows signs of cardiac arrest, such as loss of consciousness or a detectable pulse, they should call 911 immediately [15].

What is cardiac arrest?

Cardiac arrest is different from heart attack. A heart

attack occurs when blood flow to part of the heart is blocked. Of course, a heart attack may cause an electrical disturbance which causes a sudden stop. Cardiac arrest, if not treated quickly, will cause sudden death. In fact, cardiac arrest is the sudden stopping of the heart which is accompanied by a decrease in the level of consciousness. Cardiac arrest is the result of an electrical current that interrupts the flow of blood to the organs of the body. Cardiac arrest is a completely emergency situation and it is necessary to contact the emergency room immediately if you see a person who has suffered a cardiac arrest, so that the patient can return to life with cardiac resuscitation and pressure on the chest or electric shock [16].

What happens when the heart stops?

The heart receives electrical signals that control how often and at what rhythm it pumps. Each heartbeat pushes through a complex network of blood vessels to organs and cells throughout the body. Disturbances in these electrical signals cause irregular beats known as arrhythmias. There are different types of arrhythmias (Figure 2). Some of them cause no symptoms, while others can cause cardiac arrest. Cardiac arrest causes the heart to suddenly stop beating which prevents blood from flowing to other parts of the body. Cardiac arrest is different from a heart attack, which occurs when a blocked blood vessel prevents blood from reaching the heart and damages its tissues [17].

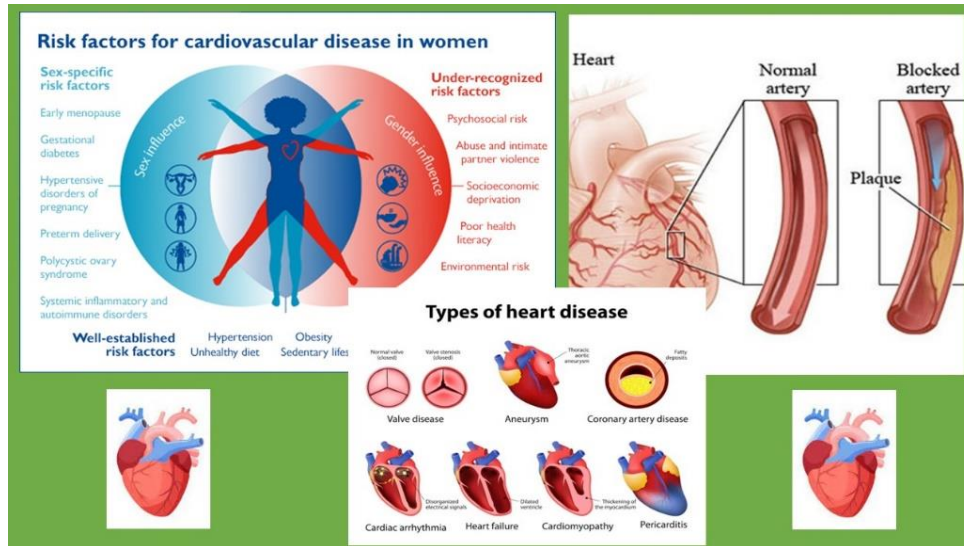


Figure 2. Congestive Heart Failure Vector Illustration Labeled Medical Compare Scheme Stock Illustration

Causes of cardiac arrest

One of the most important causes of cardiac arrest is chronic heart disease.

The reason for the stop is generally due to arrhythmia or disturbance in the heart rhythm which will cause a problem in the electrical system of the heart.

Among the reasons that can be mentioned are:

Coronary artery disease: coronary artery disease, the arteries are blocked by cholesterol and deposits and reduce blood flow. This will cause the heart to become hard to perform electrical MJ [18].

Heart attack: Heart attack can also cause sudden ventricular fibrillation due to severe coronary artery disease. A heart attack can be located in the remaining areas of scar tissue and an electrical short circuit around the scar tissue can lead to heart rhythm disturbances.

Cardiomyopathy: An enlarged heart or cardiomyopathy occurs when the walls of your heart muscles become stretched, enlarged or thickened. Either way, your heart muscle is abnormal and causes damage to heart and cardiac tissue [19].

Heart disease of the heart valves: leaking or narrowing of the heart valves can cause stretching or thickening of the heart muscle or both. When the heart becomes enlarged and weakened due to stress caused by valve dysfunction or sudden pressure, the risk of arrhythmia increases.

Congenital heart disease: Cardiac arrest in children or adolescents may be due to congenital heart disease [20].

Stop signs and symptoms

The first sign of cardiac arrest is usually loss of consciousness or fainting. A person experiencing a standstill has no heartbeat or pulse.

Before losing consciousness, some people have 1503 other symptoms such as:

Dizziness and sudden fall

Fast heartbeat

Chest pain

Shortness of breath

Fever

Nausea, with or without vomiting.

Unlike a heart attack, an arrest often occurs without warning and suddenly.

Although the two issues are different, people who have had one or more heart attacks are more likely to have sudden cardiac arrest [21].

The most common symptoms of sudden and severe cardiac arrest

Sudden fall

Cessation of heartbeat

Stop breathing

Loss of consciousness

Treatment of cardiac arrest

After receiving emergency measures, a person who has experienced cardiac arrest needs to be treated in a hospital. In the hospital, doctors closely monitor symptoms and may use medications to reduce the risk of another cardiac arrest [22]. They then run tests to determine the cause of the stoppage. Test results help doctors develop a long-term treatment



plan. For example, a person with heart disease may need surgery to restore blood flow to the heart. Doctors may also recommend an implantable cardioverter-defibrillator (ICD). ICDs are small devices that deliver electrical shocks to the heart to control arrhythmias. This makes the heart pump at a normal rate. A cardiologist places this device under the skin of the chest or abdomen. During the hospital stay, the person needs rest to allow the body to heal. Doctors may recommend that the person follow a diet and lifestyle that supports heart health. They may also recommend cardiac rehabilitation a short program that provides information and support [23].

Survival rate after cardiac arrest

People can survive sudden cardiac arrest. Chances of survival usually depend on how quickly and effectively you receive CPR or defibrillation. A study looked at survival rates among people who received CPR for cardiac arrest. The researchers found that circulation returned in about 30% of those who received the intervention, while 22% lived long enough to reach the hospital and 9% survived to hospital discharge. Other factors, such as age and general health, also affect the likelihood of surviving cardiac arrest [24-26].

Causes and risk factors of cardiac arrest

Most cardiac arrests are caused by ventricular fibrillation, a type of arrhythmia. Ventricular fibrillation causes the lower chambers of the heart to beat abnormally, preventing the heart from pumping blood to the rest of the body [27].

Certain health conditions also increase the risk of an electrical problem that can cause the heart to stop. These include:

Ischemic heart disease which occurs when plaque builds up in the arteries and restricts or blocks blood flow [28].

Family history of coronary artery disease and various heart diseases such as rhythm disorder, congenital disorder, heart failure, etc.

Being a man, the probability of cardiac arrest in men is 2 to 3 times that of women.

High blood pressure.

High blood cholesterol.

Obesity.

Diabetes.

Abnormal levels of potassium or magnesium.

Severe blood loss or lack of oxygen.

Vigorous exercise, which can cause cardiac arrest in

people with existing heart disease.

Structural problems, such as an enlarged heart.

Hereditary heart diseases, such as long QT syndrome.

Use of stimulant drugs, such as amphetamines.

Unhealthy lifestyle and diet, nutritional imbalances, such as low potassium or magnesium levels [29].

Other risk factors for cardiac arrest include older age, being male, and drug and alcohol use.

Side effects of cardiac arrest

During cardiac arrest, the brain is the first part to be damaged, because the brain does not have a supply of oxygen-rich blood and needs blood without a moment's pause. Decreased blood flow to the brain causes irregularity and if your heart rhythm does not return to a normal rhythm quickly, brain damage and death occur [30].

If the stop lasts more than 8 minutes, the chance of survival will be greatly reduced and the survivors may suffer brain damage. Anyone can reduce the risk of cardiac arrest by adopting a lifestyle that supports heart health [31]. This includes eating a healthy diet, exercising regularly, and not smoking. Having a normal weight is also important. People who are more at risk of stroke such as people with heart disease may need medications to prevent or reduce heart risk. A doctor may prescribe blood pressure medications or statins to lower cholesterol. People who have previously experienced cardiac arrest can reduce their risk of another cardiac arrest by implanting an ICD and following their treatment plan closely [32].

Heart Failure

Heart failure, which is known as congestive heart failure, means that the heart muscle is weaker than normal and gets tired easily. Heart failure can cause various symptoms and make it difficult to perform normal daily activities. The walls of the heart are made of muscle. If the heart muscle is weakened due to disease, it cannot pump blood properly and provide enough blood to the body organs. If the heart cannot meet the body's need for blood (oxygen and food), it is said that the person has heart failure [33]. After heart failure occurs, changes occur in the heart to help the weakened heart pump blood throughout the body:

At first, the heart becomes bigger so that more blood enters the ventricular cavity, and this causes more blood to leave the heart in each contraction (heart beat). At this stage, the patient may not have any



symptoms of the disease. Over time, the heart muscle gets tired and these changes are not enough to meet the needs of the body, especially during physical activities and sports. It is at this stage that a person may notice symptoms of heart failure. Of course, the heart continues to pump, but with less power and efficiency. Then the heart beats faster to pump more blood out of the heart per minute [34].

Symptoms of heart failure

At first, depending on how weak the heart is and how well the heart failure is controlled, the patient may have no symptoms or have mild or severe symptoms. These symptoms are caused by the weak pumping of the heart. The heart cannot pump blood effectively for a long time, and as a result, the patient initially feels:

Confusion and weakness (especially when standing up quickly): which is caused by insufficient blood reaching the brain.

Fatigue: which occurs especially during activity due to less blood reaching important organs and muscles. The person is less able to do physical activity and climbing the stairs or walking tires him and causes weakness and shortness of breath [35].

Sensation of heartbeat: which is caused by the heart beating faster to deliver enough blood to the body. The patient's heart beats faster or more irregularly.

Shortness of breath: Due to the rejection of fluid from the capillaries to the lungs (lungs), accumulation of fluid in the lungs (congestion or pulmonary edema) is created and the disturbance in the transfer of oxygen from the lungs to the blood leads to shortness of breath. Shortness of breath occurs even at rest or when the patient is lying down (orthopnea) and the patient may need 2 or 3 pillows to breathe comfortably at night [36].

Swelling (edema or fluid accumulation) on the legs, abdomen and rapid and unexplained weight gain:

which is caused by not enough blood reaching the kidneys and causes water and salt retention, as well as heart congestion itself leading to liver congestion and eventually organ swelling. It leads to the abdomen.

Accumulation of fluid in the abdomen causes loss of appetite, swelling and enlargement of the abdomen (ascites). The abdomen also becomes sensitive or painful and the patient may have some nausea. Remember, for one liter of fluid accumulation in the body, 1 kilogram is added to the patient's body weight [37].

All these signs may exist together. However, it is very important to know that many of these symptoms can occur in other conditions and for other reasons and it is not always due to heart failure. Therefore, the diagnosis of heart failure should always be made by a doctor [38].

Infectious diseases are disorders caused by organisms such as bacteria, viruses, fungi or parasites. Many organisms live in and on our bodies. They are usually harmless or even helpful. But some of them may cause disease under certain conditions [39]. Some infectious diseases may be transmitted from person to person. Some of them are transmitted by insects or other animals and others are transmitted by consuming contaminated food or water or exposure to environmental organisms. Signs and symptoms vary depending on the organism causing the infection, but often include fever and fatigue. Mild infections may respond to rest and home remedies while some fatal infections may require hospitalization and referral to an infectious disease specialist. Many infectious diseases such as measles and chicken pox can be prevented with vaccines. Frequent and thorough washing of hands also helps in protection against infectious diseases [40].



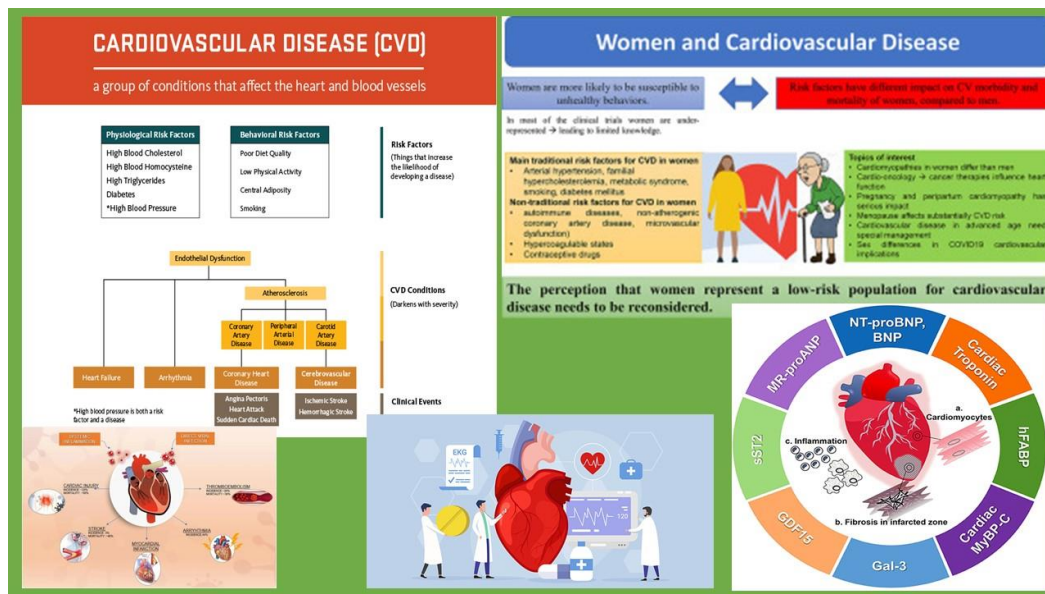


Figure 3. Nanotechnology applications for cardiovascular disease treatment

Statistical Society

The current study is a systematic review that was used to find relevant articles from SID, PubMed, Web Science, EMBASE, Scopus, Science direct and Google Scholar databases, JAMA internet database and WHO and CDC website. In order to search, only English articles with the keywords Covid-19, treatment, Remdesivir, Hydroxychloroquine, ritonavir, lopinavir, Tocilizumab and all possible combinations of these words were used during the years 2019 and 2020 [41].

Among the 150 articles obtained, 14 articles had initial conditions, and finally 8 clinical trial articles related to the treatment of Covid-19 were reviewed. Also, we found 50 studies with 1456 participants to evaluate the accuracy of diagnosis, cardiovascular problems and level of consciousness in patients with infectious and non-infectious diseases in the investigation of people suspected of having COVID-19. 45 studies evaluated one imaging method each

and seven studies each evaluated two imaging methods. All 50 studies used RT-PCR alone or in combination with other criteria (e.g., clinical signs and symptoms, or positive exposure) as the 1506 reference standard for the diagnosis of COVID-19, cardiovascular complications, and level of consciousness in patients with comorbidities [42]. Search strategy and selection of articles Search in Scopus, Google scholar, PubMed databases and by searching with keywords such as "Covid-19" and "Coronavirus 2019" and "Covid-19 and drugs" to obtain articles related to the selected keywords [43]. Case report articles, editorials, and articles that were not published or only an introduction of them were available, as well as summaries of congresses and meetings that were in languages other than English, were ignored. Only the original research articles that evaluated the effectiveness of different drugs in the treatment of COVID-19 using standard methods were studied (figure 4).



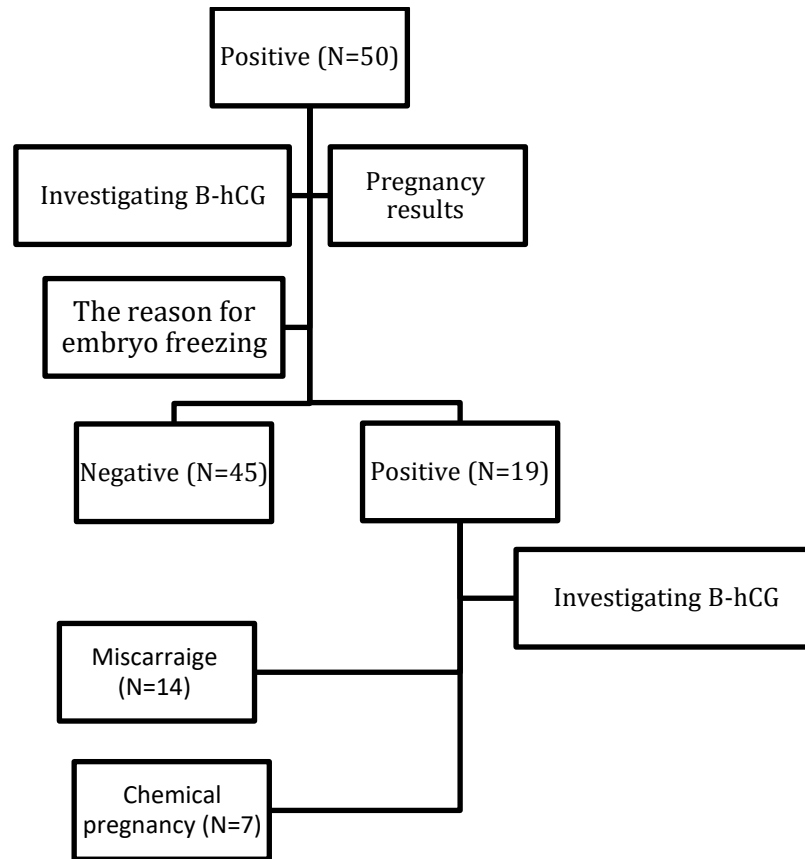


Figure 4. Flow chart of included subjects

Rehabilitation in patients after heart attack or heart surgery

The initial activities should be done under supervision. At first, it is recommended to start with a small amount of activity such as sitting on a chair for a few hours a day, and then light activity such as daily walking at a slow speed and a short distance, and gradually during Increase to 10 minutes of continuous walking every day for two weeks. During this period, walking should be done along with non-resistance exercises and movements (stretching and softening) of hands, legs and trunk. If the activity is stopped for a few days, it should be resumed with less intensity and gradually increased. In the interval of 2 to 6 weeks after the heart attack, if the patient's condition is stable, a series of tests, including an exercise test, will be performed for the patient and an exercise program will be implemented to prepare the patient which includes large muscle exercises for at least 20 to 30 minutes. It should be done in every session and 3 to 4 times a

week [44].

There should be no problem during the activity, the patient should stop his activity and consult his doctor if he experiences chest pain or discomfort, heart palpitations, nausea, fainting and shortness of breath. In low-risk patients (Figure 5), the intensity of the activity can be increased. When the intensity of the exercise activity is harmless for the patient, 5 minutes can be added to the activity time every week [45]. The patient is gradually able to perform a certain activity with the ability and less increase in heart rate. Then the intensity of the activity can be increased to the extent of strength exercises such as lifting appropriate weights. Patients who have to use stairs at home should practice there before being discharged from the hospital (Figure 6). That is, they can go down one floor of stairs one day and come back with the elevator and the next day they can go up one floor of stairs and come down. This helps the patient and his family to be less anxious at home.



Raw	Study	Year					Proportion Wight 98%	Weight %
1	Sami et al.	2022					0.95 [0.39 – 0.72]	5.02
2	Aho et al.	2022					0.93 [0.42 – 2.01]	4.92
3	Hoaa et al	2021					0.84 [0.55 – 2.02]	3.65
4	Akbarian et al	2021					0.811 [0.48 – 0.98]	2.03
Heterogeneity $t^2=0.00, I^2= 0.00, H^2=0.9$							0.88 [0.20 – 0.58]	
Test of $\Theta= \Theta, Q (4) =3.45, P= 0.77$								
1	Karim ben Hassan et al.	2022					0.78 [0.52 – 1.06]	8.55
2	Elyas et al.	2020					0.84 [0.31 – 1.68]	5.44
3	Saeed et al	2022					0.88 [0.03 – 0.12]	5.45
4	Frank et al	2020					0.80 [0.09 – 0.02]	4.03
Heterogeneity $t^2=0.03, I^2= 0.00, H^2=0.98$							0.78 [0.20 – 0.36]	
Test of $\Theta= \Theta, Q (4) =4.44, P= 0.71$								

Figure 5. Forest plot showed Heart rate

1	Chen et al.	2019					0.84 [0.27 – 1.08]	6.08
2	Yuan et al.	2019					0.76 [0.12 – 0.22]	5.82
3	Cheng et al.	2019					0.69 [0.14 – 0.19]	5.85
4	Hafeez et al.	2020					0.82 [0.02 – 0.99]	6.09
Heterogeneity $t^2=0.01, I^2= 0.00, H^2=0.99$							0.0.95 [0.09 – 1.00]	
Test of $\Theta= \Theta, Q (4) =5.55, P= 0.84$								

Figure 6. Forest plot showed Body temperature

Discuss

Coronaviruses are the source of common infections of the upper respiratory tract, gastrointestinal tract, and central nervous system in humans and other mammals. In the last two decades, two beta-coronaviruses named SARS and MERS caused continuous public panic and became the most important public health events [46]. At the end of the last decade, on December 31, 2019, a new coronavirus called nCoV-2019 from the same beta coronavirus family caused a large pneumonia outbreak in Wuhan, China, with a high number of patients. The intensity of transmission of this virus was so high that it became a major global challenge in just 3 months. So far, the routes of infection and the exact mechanism of infection of the respiratory tract by COVID-19 are not known. In this study, we collected the information obtained from the researches about COVID-19 and it was found that the expression level of ACE2, which is the receptor of nCoV-2019, in AT2 cells of the lung, upper

epithelial cells and esophagus, absorptive enterocytes. It has increased greatly from the ileum and large intestine and the cells of the oral cavity and especially the tongue and this increase in expression has caused an increase in the level of contamination and as a result, a high percentage of infectivity of this virus. The high level of ACE2 expression in the cells of different organs indicates that not only the respiratory system but also the digestive system is part of the possible route of infection and disruption by this virus [47].

In addition, enteric symptoms of 2019-nCoV may appear following high expression of ACE2 in enterocytes. Having said that, since there is still no definitive treatment for infections caused by coronaviruses. It seems that the best way to deal with the severe infection of COVID-19 is to control the source of infection, early diagnosis, supportive treatments and timely dissemination of correct information, far from creating panic, to deal with the epidemic [48].

Although researchers around the world are



developing more than 165 vaccines against the corona virus and 27 vaccines have reached the human testing phase. Normally, the vaccine needs several years of research and testing before reaching the clinical phase, but scientists should produce a safe and effective vaccine for this virus due to the emergency situation of the new coronavirus pandemic. The effort to produce a corona virus vaccine began in February 1998 with the decoding of the SARS-CoV-2 genome. The first safe human trial of the vaccine took place in March, but the way forward is uncertain. Some tests will fail and other tests will end without a clear result. But a number of experiments in stimulating the immune system to produce effective antibodies against the virus may prove to be successful. Hopefully, with more research by biologists, we will see a cure for this deadly disease. Infectious diseases are one of the most important and widespread human diseases that, depending on the situation, involve one or more organs of the body [49].

The causative agent of infectious diseases often enters the body from outside the human body. Of course, sometimes this factor is already latent and inactive, and rarely naturally and normal flora are present in the human body which become active and pathogenic under special conditions, especially the occurrence of generalized or local immunity weakness. The important causative agents of infectious diseases include: viruses, bacteria, fungi, single-celled parasites and worms. Some living organisms also act as carriers of some infectious diseases, for example, insects (Anopheles mosquito that transmits malaria, ground mosquito The agent of transmission is (seeker, etc.) lice, ticks, etc. Infectious diseases have different symptoms and manifestations, the most famous and most common symptom of infectious diseases is fever [50].

Of course, the absence of fever and possibly its non-permanence does not rule out the presence of infectious diseases. In principle, some infections may never be accompanied by fever during the disease, or they may have a transient and unimportant fever from the point of view of the patient and those around him. Other symptoms of infectious diseases are directly related to the organ or organs involved in the disease. Headache, dizziness, impaired consciousness, convulsions, nausea, vomiting, skin rashes, red sores, pain in the skin, vision and hearing disorders, anemia, jaundice, abnormal secretions from the skin or from natural body holes, sore throat, abnormal swelling in the neck and armpits and... hoarseness, cough,

expectoration, bloody sputum, shortness of breath, chest pain, abdominal pain, diarrhea, swelling in the abdomen, presence of blood in stool, joint pain and swelling, back pain, general weakness, fatigue, weight loss, etc. are all among the signs and symptoms that a patient with an infection may have one or several of these symptoms depending on which organ or organs were involved.

People who have general or localized weakness in the immune system for any reason are more susceptible to infections and life-threatening diseases in the field of these diseases. Among these patients can be: Elderly people - especially premature infants - pregnant women - diabetic patients - dialysis patients - cancer patients - chemotherapy patients - transplant patients - patients treated with drugs for immunodeficiency - patients with chronic diseases of the heart, lungs, liver, kidneys, etc. ... named. Heart attack has many forms. A type 1 heart attack, caused by a blood clot blocking one of the heart's vessels, is rare during or after a coronavirus infection. Type 2 heart attacks are more common in Covid-19. This heart attack can be caused by increased stress in the heart. Such as a fast heart rate, low blood oxygen levels, or anemia because the heart muscle is not getting enough oxygen from the blood to do the extra work. This case has been observed in people with acute corona virus disease. But it is less common in those who have recovered from this disease. Blood tests have shown that during covid-19, some people have small amounts of a substance called troponin in their blood. Along with changes in heart rate and chest pain. An increase in troponin level is a sign of heart tissue damage [51].

Sometimes this is caused by a heart attack. This is less common after recovery from covid-19. During acute covid-19, elevated troponin levels with abnormal ECG are associated with higher mortality but not in patients with normal ECG. Research shows there is still much to learn about the lasting effects on the heart in people who have had the coronavirus. In some cases, symptoms of complications and heart damage are observed in patients with corona, which may require continued monitoring. In the evaluation of athletes who had corona disease, whether with severe or mild symptoms, MRI of the heart showed that these athletes have a normal ECG and a normal level of a substance called troponin, which, if elevated, can indicate heart problems. Four of them had inflammation of the heart muscle (myocarditis) and two of them had inflammation of the pericardium



(pericarditis). The results of this evaluation should be carefully examined because the sample size is small and the heart health of the participants before contracting the corona virus was not known [52]. These test results have led to debate about appropriate testing and return-to-sport guidelines for adult athletes in competitive sports. We need to know more about the potential risks associated with post-Covid-19 syndrome, which is mostly asymptomatic.

Conclusion

The body is exposed to a large number of viruses, bacteria, fungi and microscopic organisms, many of them are pathogenic for the body. The corona virus was common in human societies for the past fifty years and had only very mild symptoms such as a cold, but since 2003, with the appearance of the first corona virus transmitted from an animal (bat) to humans, the severe SARS disease and then the severe MERS disease have been transmitted. From camel to human and finally the new corona virus of 2019 was identified. The symptoms of the new corona virus, like most upper respiratory viral diseases, are non-specific and may cause flu-like or cold-like symptoms in patients. In about 82% of cases, the corona virus causes mild symptoms and in the rest of the cases it leads to illness. Scientists have identified some sources of 150 to 200 types of viruses that cause colds, some of which cause upper respiratory infections. In previous years, we knew the corona virus as the cold virus of the winter season when the doors and windows are closed, the corona virus appears in closed air. Rhinovirus mostly causes colds in the fall, the spread of influenza is with the cold season, and in the past century there were many deaths due to the outbreak of influenza. The spread of the Spanish flu in the last century killed millions of people in the world which was prevented by wearing a mask. There are similar symptoms in the corona virus and influenza. Cold virus syndrome causes these two diseases. The obvious differences between these two diseases are that in influenza, we have a sudden onset of fever, body aches and headaches. Currently, we are facing three diseases, cold, flu and corona. The symptoms of Corona are similar to influenza with fever and sudden body pain, the patient has headache and cough. The spread of these two diseases is one of the main problems this winter.

In the cold season, there is an outbreak of various viral diseases, corona disease is also a type of cold.

Usually, colds and non-coronaviruses start with an acute condition, and the patient has a fever above 40 degrees, severe body pain and bruises. With each cough, five thousand infectious drops and with each sneeze, six thousand infectious drops are suspended in the air, and eight it can infect another person 10 meters away. It is necessary for people not to talk to each other for more than five minutes at a distance of one meter, avoid coughing into the other person's mouth. According to the provided statistics, regular hand washing, social distancing and people's attention to health standards are necessary to prevent respiratory infections and corona virus.

References

- Abbasi, M. Nakhostin, A. Namdar, F. Chiniforush, N. Hasani Tabatabaei, M. The Rate of Demineralization in the Teeth Prepared by Bur and Er:YAG Laser, *J Lasers Med Sci.* 9(2):82-86. (2018)
- Abbasi, M. Nakhostin, A. Namdar F. Chiniforush, N. Hasani Tabatabaei, M. The Rate of Demineralization in the Teeth Prepared by Bur and Er:YAG Laser, *J Lasers Med Sci.* 9(2):82-86. (2018)
- Ahamed S, Samad M. Information mining for covid-19 research from a large volume of scientific literature. *arXiv preprint arXiv:200402085.* 2020.
- Al-Tawfiq JA, Al-Homoud AH, Memish ZA. Remdesivir as a possible therapeutic option for the COVID-19. *Travel medicine and infectious disease.* 2020.
- Beachboard, D.C., J.M. Anderson-Daniels, and M.R. Denison, Mutations across murine hepatitis virus nsp4 alter virus fitness and membrane modifications. *J Virol.* 2015. 89(4): p. 9-2080.
- Khosraviani, F. Saberi-Demneh, A. Asadollahifar, R. Nakhostin, A. Khazaei P. Post-operative pain management with meloxicam: a systematic literature review in the field of dentistry, *Oral Surgery,*
- Borba MGS, Val FFA, Sampaio VS, Alexandre MAA, Melo GC, Brito M, et al. Effect of high vs low doses of chloroquine diphosphate as adjunctive therapy for patients hospitalized with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection: a randomized clinical trial. *JAMA network open.* 2020;3(4):e208857-e.
- Cai Q, Yang M, Liu D, Chen J, Shu D, Xia J, et al. Experimental treatment with favipiravir for COVID-19: an open-label control study. *Engineering.* 2020.
- Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. Features, evaluation and treatment coronavirus (COVID-19). *Statpearls [internet]: StatPearls Publishing;* 2020.
- Samiei, N. Ghane, HK. Khaled, Y. COVID-19 and Periodontal Disease: The Potential Role of Interleukin-6, *SVOA Dentistry,* 2(6), 254-257, (2021)
- Chiusano ML. The modelling of COVID19 pathways sheds light on mechanisms, opportunities and on controversial interpretations of medical treatments. v2. *arXiv preprint arXiv:200311614.* 2020.
- Cottam, E.M., M.C. Whelband, and T. Wileman, Coronavirus NSP6 restricts auto-phagosome expansion. *Autophagy,* 2014. 10(8): p. 1426-41.
- Crisan D, Carr J. Angiotensin I-converting enzyme: genotype and



- disease associations. *J of Mol Diagn.* 2000; 2(3): 105.
- Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *The Lancet infectious diseases.* 2020;20(5):533-4.
- Furuta Y, Gowen BB, Takahashi K, Shiraki K, Smee DF, Barnard DL. Favipiravir (T-705), a novel viral RNA polymerase inhibitor. *Antiviral research.* 2013;100(2):446-54.
- Gadlage, M.J., et al., Murine hepatitis virus nonstructural protein 4 regulates virus-induced membrane modifications and replication complex function. *J Virol,* 2010. 84(1): p. 280-90.
- Gao J, Tian Z, Yang X. Breakthrough: Chloroquine phosphate has shown apparent efficacy in treatment of COVID-19 associated pneumonia in clinical studies. *Bioscience trends.* 2020.
- Graham, R.L., et al., The nsp2 replicas' proteins of murine hepatitis virus and severe acute respiratory syndrome coronavirus are dispensable for viral replication. *J Virol,* 2005. 79(21): p. 13399-411.
- Hao Xu. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. *International Journal of Oral Science* (2020) 12:8; <https://doi.org/10.1038/s41368-020-0074-x>.
- Helmy YA, Fawzy M, Elasad A, Sobieh A, Kenney SP, Shehata AA. The COVID-19 pandemic: a comprehensive review of taxonomy, genetics, epidemiology, diagnosis, treatment, and control. *Journal of Clinical Medicine.* 2020;9(4):1225.
- Hosseini Khalili AR, Thompson J, Kehoe A, Hopkinson NS, et al. Angiotensin-converting enzyme genotype and late respiratory complications of mustard gas exposure. *BMC Pulm Med.* 2008;8(1):15.
- Huang L, Zhang X, Zhang X, Wei Z, Zhang L, Xu J, et al. Rapid asymptomatic transmission of COVID-19 during the incubation period demonstrating strong infectivity in a cluster of youngsters aged 16-23 years outside Wuhan and characteristics of young patients with COVID-19: a prospective contact-tracing study. *Journal of Infection.* 2020.
- Huang, C., et al., SARS coronavirus nsp1 protein induces template-dependent endonucleolytic cleavage of mRNAs: viral mRNAs are resistant to nsp1-induced RNA cleavage. *PLoS Pathog,* 2011. 7(12): p. e1002433.
- Ibrahim IM, Abdelmalek DH, Elshahat ME, Elfiky AA. COVID-19 spike-host cell receptor GRP78 binding site prediction. *Journal of Infection.* 2020.
- Jiahua He Huanyu Tao, Yumeng Yan, Sheng-You Huang*, Yi Xiao. Molecular mechanism of evolution and human infection with the novel coronavirus (2019-nCoV). *bioRxiv preprint* doi: <https://doi.org/10.1101/2020.02.17.952903>.
- Kalantari H, Tabrizi AHH, Foroohi F. Determination of COVID-19 prevalence with regards to age range of patients referring to the hospitals located in western Tehran, Iran. *Gene reports.* 2020;21: 100910.
- Karampela I, Dalamaga M. Could Respiratory Fluoroquinolones, Levofloxacin and Moxifloxacin, Prove to be Beneficial as an Adjunct Treatment in COVID-19? *Archives of medical research.* 2020;51(7):741-2.
- Khosraviani, F. Saberi-Demneh, A. Asadollahifar, R. Nakhostin, A. Khazaei P. Post-operative pain management with meloxicam: a systematic literature review in the field of dentistry, *Oral Surgery,*
- Kirchdoerfer, R.N. and A.B. Ward, Structure of the SARS-CoV nsp12 polymerase bound to nsp7 and nsp8 co-factors. *Nat Common,* 2019. 10(1): p. 2342.
- Lei, J., Y. Kusov, and R. Hilgenfeld, Nsp3 of coronaviruses: Structures and functions of a large multi-domain protein. *Antiviral Res,* 2018. 149: p. 58-74.
- Lim J, Jeon S, Shin H-Y, Kim MJ, Seong YM, Lee WJ, et al. Case of the index patient who caused tertiary transmission of COVID-19 infection in Korea: the application of lopinavir/ritonavir for the treatment of COVID-19 infected pneumonia monitored by quantitative RT-PCR. *Journal of Korean medical science.* 2020;35(6).
- Liu W, Morse JS, Lalonde T, Xu S. Learning from the past: possible urgent prevention and treatment options for severe acute respiratory infections caused by 2019-nCoV. *ChemBiochem.* 2020.
- Lu, R. et al. Genomic characterization and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *Lancet.* [https://doi.org/10.1016/S0140-6736\(20\)30251-8](https://doi.org/10.1016/S0140-6736(20)30251-8) (2020).
- Madelain V, Oestereich L, Graw F, Nguyen THT, De Lamballerie X, Mentré F, et al. Ebola virus dynamics in mice treated with favipiravir. *Antiviral research.* 2015;123:70-7.
- Montani JP, Vliet VB. General physiology and pathophysiology of the renin-angiotensin system. *Angiotensin Vol. I: Springer;* 2004: 3-29.
- Monteil V, Dyczynski M, Lauschke VM, Kwon H, Wirnsberger G, Youhanna S, et al. Human soluble ACE2 improves the effect of remdesivir in SARS-CoV-2 infection. *EMBO molecular medicine.* 2020:e13426.
- Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of autoimmunity.* 2020:102433.
- Samiei, N. Ghane, HK. Khaled, Y. COVID-19 and Periodontal Disease: The Potential Role of Interleukin-6, *SVOA Dentistry,* 2(6), 254-257, (2021)
- Serrano, P., et al., Nuclear magnetic resonance structure of the nucleic acid-binding domain of severe acute respiratory syndrome coronavirus nonstructural protein 3. *J Virol,* 2009. 83(24): p. 12998-3008.
- Singh AK, Singh A, Shaikh A, Singh R, Misra A. Chloroquine and hydroxychloroquine in the treatment of COVID-19 with or without diabetes: A systematic search and a narrative review with a special reference to India and other developing countries. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews.* 2020.
- Smieszek SP, Przychodzen BP, Polymeropoulos MH. Amantadine disrupts lysosomal gene expression; a hypothesis for COVID19 treatment. *International Journal of Antimicrobial Agents.* 2020:106004.
- Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery.* 2020.
- Spinner CD, Gottlieb RL, Criner GJ, López JRA, Cattelan AM, Viladomiu AS, et al. Effect of remdesivir vs standard care on clinical status at 11 days in patients with moderate COVID-19: a randomized clinical trial. *Jama.* 2020;324(11):1048-57.
- Stobart, C.C., et al., Chimeric exchange of coronavirus nsp5 proteases (3CLpro) identifies common and divergent regulatory determinants of protease activity. *J Virol,* 2013. 87(23): p. 12611-28.
- Stoessel AJ, Bhatia KP, Merello M. Movement Disorders in the World of COVID-19. *Movement Disorders Clinical Practice.* 2020;7(4):355-6.



- Tanaka, T., et al., severe acute respiratory syndrome coronavirus nsp1 facilitates efficient propagation in cells through a specific translational shutoff of host mRNA. *J Virol*, 2012. 86(20): p. 11128-37.
- Tchesnokov EP, Gordon CJ, Woolner E, Kocinkova D, Perry JK, Feng JY, et al. Template-dependent inhibition of coronavirus RNA-dependent RNA polymerase by remdesivir reveals a second mechanism of action. *Journal of Biological Chemistry*. 2020;295(47):16156-65.
- Uzunova K, Filipova E, Pavlova V, Vekov T. Insights into antiviral mechanisms of remdesivir, lopinavir/ritonavir and chloroquine/hydroxychloroquine affecting the new SARS-CoV-2. *Biomedicine & Pharmacotherapy*. 2020:110668.
- Velavan TP, Meyer CG. The COVID-19 epidemic. *Tropical medicine & international health*. 2020;25(3):278.
- Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *Jama*. 2020;323(11):1061-9.
- Wang M, Cao R, Zhang L, Yang X, Liu J, Xu M, et al. Remdesivir and chloroquine effectively inhibit the recently emerged novel coronavirus (2019-nCoV) in vitro. *Cell research*. 2020;30(3):269-71.
- Warren T, Jordan R, Lo M, Soloveva V, Ray A, Bannister R, et al, editors. Nucleotide prodrug GS-5734 is a broad-spectrum filovirus inhibitor that provides complete therapeutic protection against the development of Ebola virus disease (EVD) in infected non-human primates. *Open Forum Infectious Diseases*; 2015: Infectious Diseases Society of America.