Original Article

SYSTEMATIC INVESTIGATION OF DENTAL, HEART AND LUNG DISEASES IN PATIENTS WITH COVID-19 AND HOSPITALIZED IN ICU BASED ON RADIOLOGY STEREOTYPES

Aliyeh Sehatpour[1], Mahsa Jahanbin[2], Arezousadat Fatemi[3], Nastaran Parviz[4], Seyed Masoud Sajedi[5*]

[1] Assistant Professor, Department of Oral and Maxillofacial Medicine, Faculty of Dentistry, Shahed university, Tehran, Iran.
Email: a.sehhat@shahed.ac.ir
[2] School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran.
Email: jahanbinmahsa7@gmail.com
[3] General dentist, Public Dental Clinic Practice, Stavanger, Norway.
Email: Fatemiarezoo@gmail.com
[4] Student Research Committee, Alborz University of Medical Sciences, Karaj, Iran.
Email: Nparviz78@gmail.com
[5] Assistant Professor, Department of Oral and Maxillofacial Medicine, Faculty of Dentistry, Shahed University, Tehran, Iran.
Email: s.sajedi@shahed.ac.ir
Corresponding Author: Seyed Masoud Sajedi, [5] Assistant Professor, Department of Oral and Maxillofacial Medicine, Faculty of Dentistry, Shahed University, Tehran, Iran.
Email: s.sajedi@shahed.ac.ir

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Abstract

In this study, dental, heart and lung diseases in patients with Covid-11 and hospitalized in ICU have been investigated based on radiology stereotypes. During the past months, it has been determined that the risk of this disease is greater for some people who have heart and lung diseases or suffer from complications such as high blood pressure and diabetes, and it is necessary for this group of people to be more careful. lack of contact with sick people, so that many of these people, who were under regular medical care before the corona disease, refuse to see a doctor due to the fear of being in environments infected with the corona virus, such as offices and clinics and naturally, the amount of previous care and sensitivities has been reduced, an issue that can be seen even in people without primary disease and with the onset of the first disease. During the past months, it has been abundantly observed that people with symptoms of heart attacks and heart failure have refused to go to the medical center and emergency system due to the fear of medical centers, and unfortunately, this issue causes delays in treatment and sometimes even irreversible complications. It has been compensated. People who have a history of heart disease and regularly use drugs should communicate with their doctor about the effectiveness of the drugs, their side effects and the need to change the drugs on a regular basis. Not going to the doctor does not mean disconnection from the treatment system and this can lead to many complications. People with heart disease or high blood pressure happen to be more at risk of complications from corona disease than other people, and if they are infected, their symptoms are more severe and the possibility of complications of the disease is more in them than others. Therefore, it is necessary for these people to use medical advice as soon as symptoms related to the disease appear. Denial of the disease and fear of going to the medical center can delay the diagnosis and the subsequent complications of the disease.

Keywords: Dental diseases, Heart and lung diseases, Covid-11, ICU, Radiology.

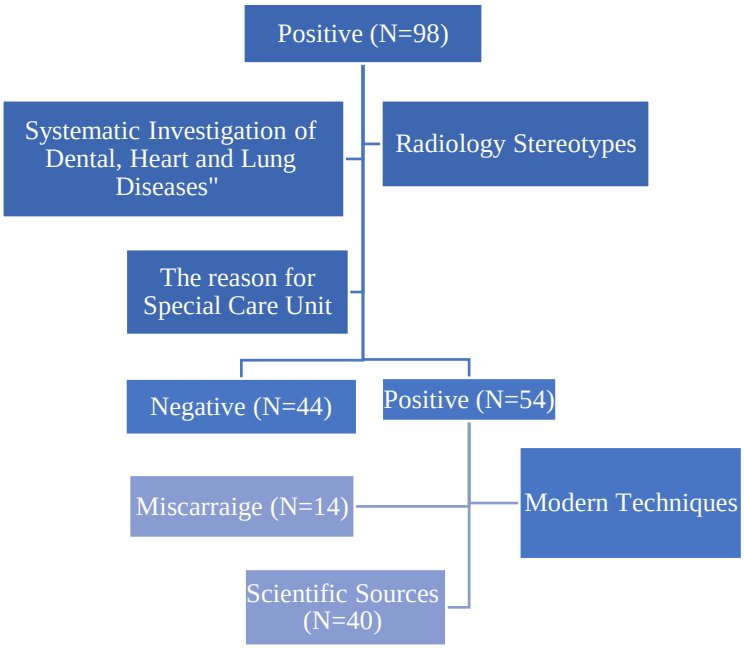
Introduction

Corona is a family of viruses that includes several members. The Corona family is not a new family and members of this family have caused various respiratory diseases in the past. including the common cold, severe acute respiratory disease, and Middle East respiratory disease, which are caused by the common cold coronavirus, SARS-COV, and MERS-COV, respectively [1-3]. The current outbreak of the coronavirus is a new member of this family that has not been seen in humans before [4-6]. This new corona virus 2019 or nCOV-2019 is called and causes the disease of Covid-19 (Covid-19). The 2019 Corona virus disease epidemic (Covid-19) that originated in the city of Wuhan, China has gradually become a major and important public health challenge that has involved not only China [7-9] but also other countries of the world. The World Health Organization announced that the outbreak of the Corona virus has created an urgent public health concern at the international level [10-13]. Based on China's experience, as well as related guidelines and research, this article provides essential knowledge about Covid-19 and nosocomial infection in dental centers and heart and lung diseases based on radiological stereotypes [14].

Search strategy and selection of articles

Search in Scopus, Google scholar, PubMed databases and by searching with keywords such as "Systematic Investigation of Dental", "Systematic Investigation of Heart", "Systematic Investigation of Lung Diseases", “Radiology Stereotypes” and “Covid-11 and Hospitalized” to obtain articles related to the selected keywords [15-17]. 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 1) [18].

Figure 1. Flow chart of included subjects



Discuss

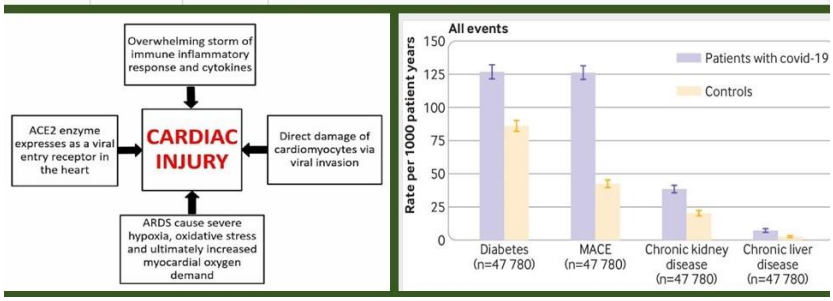
Current observations suggest that people of all ages are generally susceptible to this new infectious disease. However, those in close contact with symptomatic and asymptomatic Covid-19 patients, including medical staff and other hospitalized patients, are at higher risk for CoV-SARS-2 infection. In an analysis of 98 hospitalized patients with Covid-19 in Wuhan during the early phase of the epidemic, 41 (40%) were thought to have been infected in the hospital, including 29 (31%) medical staff and 28 (29%) who were hospitalized for other reasons (Wang et al. 2020).

Infection control in dentistry

The risk of nosocomial infection in the dental workplace, patients who cough and sneeze or receive dental treatments, including in procedures that use high-speed or ultrasonic hand pieces, spread the patient's oral secretions, saliva or blood into the air and the surrounding environment. After use, dental hand tools have the possibility of being infected with various pathogenic microorganisms or even being exposed to a contaminated environment in the clinic. Infection can also occur through piercing the skin with sharp and sharp instruments or direct contact between mucous membranes and infected hands [19-21]. Due to the unique characteristics of dental procedures with the large number of droplets and airborne particles that are created, standard routine protective measures during clinical dental treatments are not effective enough to prevent the spread of Covid-19 (Figure 2). Especially when patients are in the latent period, unaware that they are infected or they decide to hide their infection. Hand hygiene is the most important measure to reduce the risk of transmitting microorganisms to patients [22-24]. Depending on the type of surface, temperature or humidity of the environment, CoV-SARS-2 can exist on surfaces for several hours or up to several days (WHO 2020). This reinforces the need for good hand hygiene and the importance of thorough disinfection of all surfaces in the dental clinic. Use of personal protective equipment, including masks, gloves, gowns, and goggles or face shields, is recommended to protect skin and mucous membranes (potentially) from contaminated blood and secretions. Since the main route of CoV-SARS-2 transmission is respiratory droplets, N-95 masks approved by the National Institute for Occupational Safety and Health or 2FFP standard masks designated by the European Union are recommended for routine dental work [25-27].

Figure 2. Rates of multiorgan dysfunction comparing individuals with covid-19 in England discharged from hospital by 31 August 2020 with matched controls

Author	Patient's age, years	Patient's gender	Main findings
Zeng et al. [44]	63	Male	COVID-19 patients may develop severe cardiac complications (e.g., myocarditis and heart failure). The first case to report fulminant myocarditis as a complication of COVID-19
Inciardi et al. [45]	53	Female	Acute myocardial inflammation in a COVID-19 patient who recovered from the influenza-like syndrome and developed fatigue and signs and symptoms of heart failure a week after upper respiratory tract symptoms
Albarello et al. [46]	67	Male	COVID-19 infection can be complicated with bilateral pleural and pericardial effusion as noticed on subsequent chest CT scan of the patient
Yao et al.* [47]	-	-	The lung is the primary site of infection by 2019-nCoV. However, it can cause damage in other organs (heart, vessels, liver, kidneys) as demonstrated by the autopsies of three COVID-19 patients
Cui et al. [48]	55	Female	Children with COVID-19 can present with multiple organ damage. Myocardial injury is one of the complications associated with COVID-19



Necessary recommendations for dental clinics

Dentists must take strict personal protection measures and avoid or minimize operations that can produce droplets or aerosols. The use of low or high-volume saliva repellants can reduce the production of droplets and airborne particles [28-30].

Oral examination

Antimicrobial mouth rinse before treatment procedures can reduce the number of microbes in the oral cavity [31-33]. Procedures likely to induce cough should be avoided (if possible) or performed with caution (WHO 2020). Aerosol production steps, such as the use of air and water vapor, should also be minimized as much as possible. Although intraoral x-ray examination is the most common radiographic method in dental imaging. However, it can stimulate salivation and cough [34]; Therefore, extra oral radiography, such as panoramic radiography and CT, are suitable options during the outbreak of Covid-19. Dental emergencies may occur and escalate in a short period of time and therefore require immediate action. The use of a large amount of sputum and saliva can help minimize aerosols or prevent them from spreading during the treatment procedure [35-37].

In addition, face protection and goggles are essential when using a hand piece with high speed or low speed with water spray [38]. If a decayed tooth is diagnosed with symptoms of irreversible pulpitis, pulp exposure is performed after local anesthesia, caries removal is done by chemical-mechanical method using rubber and high-volume saliva remover; And finally, denervation can be done to reduce pain. The fillers can be replaced later gently without the need for anesthetic according to the manufacturer's instructions and recommendations. It should be mentioned that we met a patient who had spontaneous pain due to a cracked tooth without tooth decay and we prepared the cavity using a high-speed hand piece.

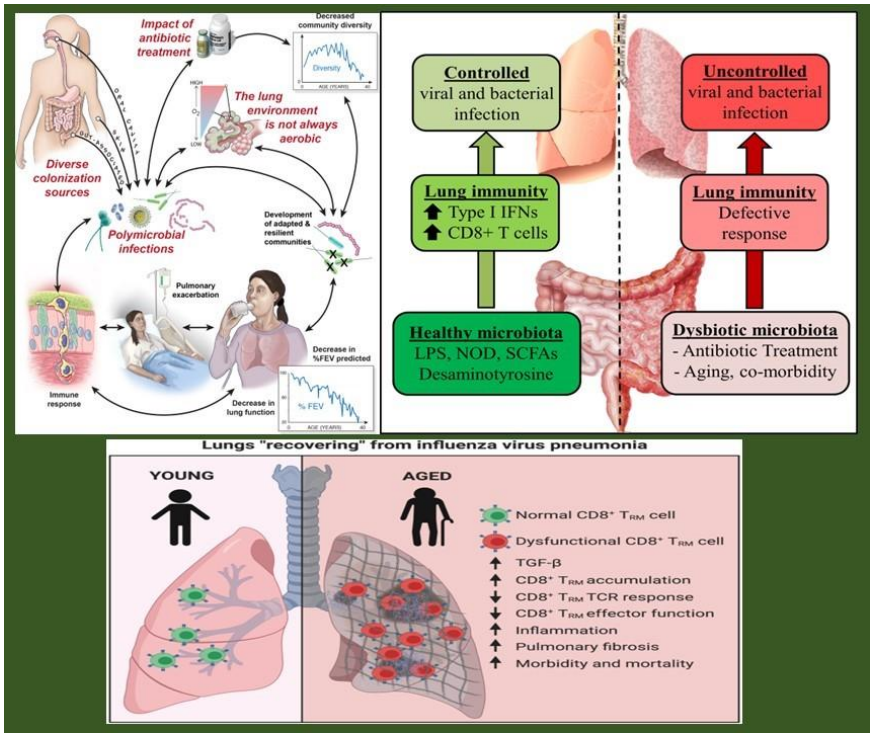
The patient requested to keep his tooth and was placed as the last patient of the day to reduce the risk of infection and spread of nosocomial infection. After the treatment, cleaning, disinfection and disinfection of the environment was done. On the other hand, in case of suspected cases of Covid-19, patients can be treated in an isolated room with proper ventilation or in rooms under negative pressure. The treatment plan for dental fractures, displacement of teeth, and complete loss of teeth from the dental socket depends on the age, severity of dental tissue damage, root development, and duration of tooth loss [39].

Lung infections

When a part of the lung tissue and airway sacs become inflamed and phlegm and secretions close the respiratory tract and a person has difficulty breathing, it is said that a lung infection has occurred. Lung infection may occur due to the presence of various organisms in the lung. These organisms can include a variety of viruses, parasites, or bacteria. Small organisms reach the lungs through the bloodstream and cause infection. But most of the time, the organisms are transferred to the lungs by the tiny water droplets in the respiratory air or the respiratory droplets that are transferred from one person to another (Figure 3). The normal body temperature of people is usually around 37 degrees Celsius, if the person has bacterial infections in the lungs, it is possible that the temperature of the person's body can rise to about 40.5 degrees Celsius, which is a very dangerous level of high fever.

What is a lung infection? When a part of the lung tissue and airway sacs become inflamed and mucus and secretions close the respiratory tract and a person has difficulty breathing, it is said that a lung infection has occurred. Lung infection may be due to the presence of various organisms in the lung.

Figure 3. Lung infections



These organisms can include a variety of viruses, parasites, or bacteria. Lung infection is a common disease that is very dangerous especially in young children and the elderly. The infection that occurs in the lung affects most of the air sacs that are present in the lung and affects the airways that transmit air to the lungs to a lesser extent. A part of the lung that has a severe infection is filled with fluid. This fluid contains white blood cells that are produced to fight infection. As mentioned, the prevalence of lung infection is very high and every year about one percent of adults are affected by this disease. Also, every year some of these people die.

Causes and origin of lung infection

As mentioned, lung infection or pneumonia is caused by small organisms such as viruses, bacteria, fungi, etc. that lead to disease. These organisms usually do not exist in the lungs of healthy people, and sometimes these small organisms reach the lungs through the bloodstream and cause an infection. But most of the time, the organisms are transferred to the lungs by the tiny water droplets in the breathing air or the respiratory droplets that are transferred from one person to another. The source of these small organisms can be people who, due to their illness, spread their respiratory droplets to others by coughing and sneezing. Sometimes these microbes originate from uncommon places. For example, the organisms that cause a particular type of lung infection called Legionella pneumonia are organisms that live in warm water [40].

Another example is psittacosis, which usually originates from private birds such as parrots. Also, staphylococci resistant to methicillin are usually found in hospitals and can cause lung infection or pneumonia in people admitted to the hospital for different reasons. In addition to organisms that can cause lung infection, other factors such as inhalation of various chemicals such as toxic vapors may cause inflammation in people's lungs. In some rare cases, lung inflammation may be caused by inhalation of allergenic substances. People who have special jobs may encounter substances that exist in the workplace or other types of environments while working, which causes inflammation in the lung tissue of these people.

For example, we can mention some farmers who may suffer from lung inflammation when breathing dust from moldy grains. People who have special jobs may encounter substances that exist in the workplace or other types

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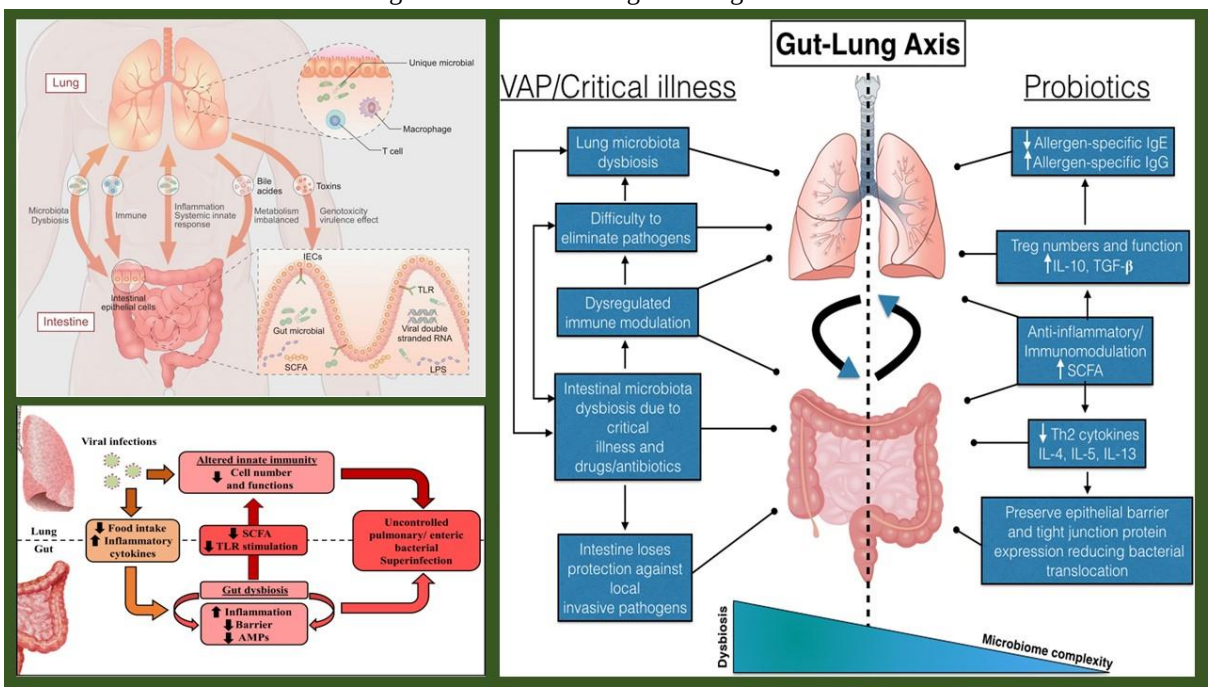
Figure 4. Causes and origin of lung infection



Symptoms of lung infection

Symptoms of lung infection usually appear suddenly. Common symptoms of lung infection include:

- Shortness of breath;
- Chest pain;
- Cough, fever, and occasional chills are mentioned;
- Coughs are dry at first, but when one or two days have passed, they may be accompanied by yellow-green sputum and blood vessels.

Symptoms of a lung infection can vary from mild to severe symptoms. The occurrence of symptoms and their severity depends on various factors, which can be the age of the person, the general health of his body, and whether the person's disease is caused by bacteria, viruses, or fungi. Symptoms may be as simple as cold and flu symptoms, but they tend to last longer in the body. The first thing that appears in a lung infection is a cough that creates a thick audience. Coughs help the body to get rid of mucus caused by inflammation of the airways and lungs. Also, sometimes these coughs may contain blood. When a person has bronchitis or pneumonia, he may have a cough that has thick mucus and its color may be between colors such as:

- Transparent;
- White;
- Green;

- And different grayish yellow;
- It should also be noted that even after the symptoms improve, coughs may remain in the body for several weeks.

The next thing is the feeling of sharp and burning pain in the chest. The pain that occurs in the chest during a lung infection is described as sharp or burning pains. Chest pain intensifies when a person coughs and takes deep breaths. Sometimes severe pains can be felt in the middle parts of the body and in the back of the person's back. Fever is one of the next symptoms seen in lung infection and we will describe it here. When a person's body uses its immune system to fight infection, a fever occurs. The normal body temperature of people is usually around 37 degrees Celsius, if the person has bacterial infections in the lungs, it is possible that the temperature of the person's body can rise to about 40.5 degrees Celsius, which is a very dangerous level of high fever. The fever may rise again [41-43]. Therefore, one must take measures to prevent fever. If a person's fever rises above 38.9 degrees Celsius, it often leads to symptoms such as:

- Chills;
- Sweating;
- Muscle pains;
- Headache;
- Weakness;
- And there is a lack of water in the body;
- Also, if the person's fever rises above 38.9 degrees Celsius or continues for more than three days, the person must see a doctor.

Body pain is also one of the other causes of symptoms that can be seen in a person's body during a lung infection. When suffering from a lung infection, a person's muscles and back may experience pain, which is also called myalgia. In some cases, inflammation may also occur in the muscles, which can lead to body pain in case of infection. A runny nose is another symptom that is often associated with a lung infection similar to bronchitis and is accompanied by a series of flu symptoms such as sneezing. Shortness of breath and wheezing are also other symptoms. Shortness of breath in this case means that a person feels that he cannot breathe or feels difficulty in his lungs when breathing. Bruising of skin color or lips may also occur due to lack of oxygen during lung infection. In this case, the person's lips or nails appear with a blue color. The sound of cracking or snoring in the lungs is also one of the symptoms that indicate the presence of a lung infection. These sounds originate from the ends of the lungs, which are also known as crackles or bibasilar crackles. A specialist doctor can hear these sounds and diagnose the disease by using tools such as stethoscopes or stethoscopes [44-46].

Causes of lung infection

There are different types of lung infection caused by viruses, bacteria and fungi.

- Bronchitis;
- Pneumonia;
- Bronchiolitis.

They are among the three most common types of lung infections. The most common microorganisms that because bronchitis are viruses such as influenza viruses or respiratory syncytial viruses. Also, bacteria such as:

- Mycoplasma pneumonia;
- Chlamydia pneumonia;

- And Bordetlapertussis.

They are also among the microorganisms that cause bronchitis [47-49].

Among the most common microorganisms that because pneumonia are bacteria such as Streptococcus pneumonia, which is the most common microorganism that causes pneumonia, as well as Haemophilus influenza and Mycoplasma pneumonia bacteria, as well as viruses such as influenza virus or (RSV) [50-52].

Types of lung infections are rarely caused by fungi such as

- Pneumocystis jirovsi;
- Histoplasma capsulatum;
- Or aspergillus is created in the person's body [53-55].

Fungal lung infections are more common in people whose immune systems are suppressed. This suppression occurs due to the occurrence of certain types of cancer, AIDS, or the use of drugs that suppress the immune system of the immune system in some people. One of the most common imaging performed is a chest X-ray. In this photo, respiratory tracts, heart and lungs, chest bones and vertebral column can be easily seen [56].

This is a poster anterior (PA) radiograph of the chest. In this photography, these organs are exposed to X-rays and images are prepared. This photography is painless and it is only necessary for the patient to be in a standing position and the X-ray will pass through his body and the person will not feel anything at this moment. In some special cases or to examine some areas, it is possible to take pictures while sitting or lying down [57].

- **Determining the condition of the lungs with chest X-ray:** This X-ray actually shows all the diseases leading to the lungs or problems such as cancer, fractures, etc. This imaging is a very accurate method that can be used to diagnose lung diseases.

- **Pulmonary and heart disorders:** Sometimes the appearance of the heart also undergoes changes that actually indicate heart failure or problems in the heart valve, pericardium, etc.

- **Blood vessels:** As you know, the main arteries and the aorta are larger than other vessels and have a larger diameter, which can be used to identify all blood vessel problems and reveal congenital heart diseases [58].

- **Calcium deposition:** The presence of calcium in blood vessels is determined by chest radiography. If there is calcium deposition in the blood vessels and it is not followed up, it causes severe damage to the heart muscle and coronary arteries. Calcium deposits are often caused by old infections that have not yet been fully treated [59-61].

The lungs, chest wall, and the appearance of the heart will be seen in this photograph. It may have the following characteristics

- Emphysema;
- Pneumonia;
- Lung cancer;
- Shortness of breath;
- Chronic coughs;
- Pain in the chest;
- Heart problems from heart failure;

- Identification of fluid and air accumulated in the lung.

Chest X-ray images

The chest area is usually examined from several different angles and views.

Posterior-anterior view (PA)

In this case, the patient is standing. The ray shines from the back to the front. The images of this view are very clear and accurate.

Anterior-posterior view (AP)

In this view, unlike the previous one, the radiation is irradiated from the front to the back and the patient is placed in a semi-sitting position. This mode is mostly used for people who are injured and cannot move much [2].

Lateral view (LAT)

In this case, the imaging of the back of the spine is carefully examined. In this type of view, the patient stands sideways and holds his hands up, and the device is also placed on the side of the body.

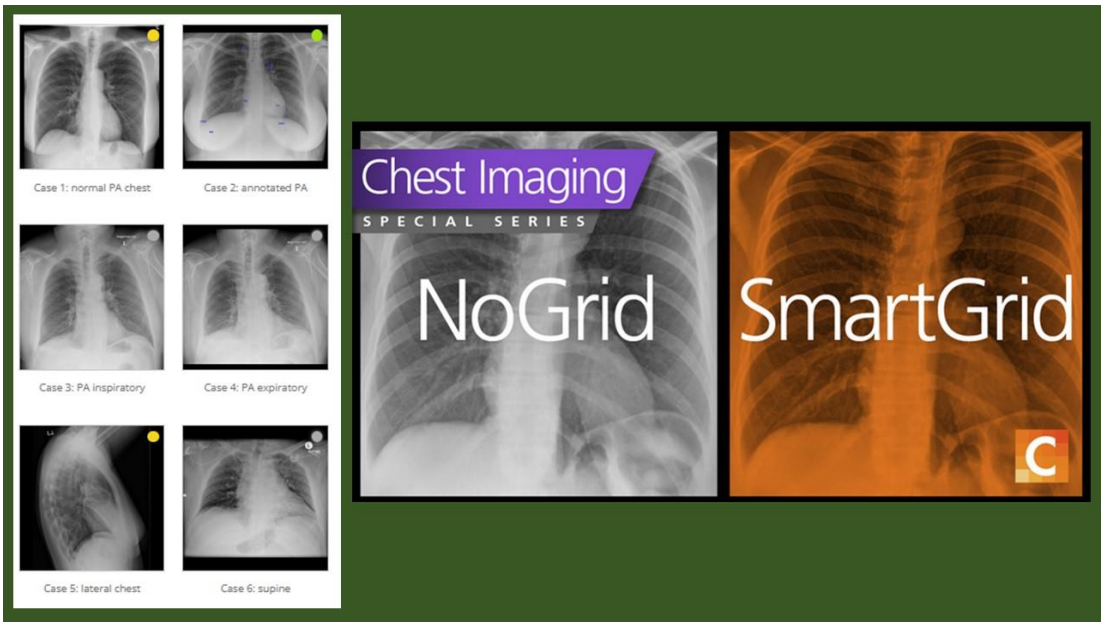
Risks of chest radiography

Many people who have to do chest radiology are worried about harming the body due to X-ray radiation, but you should know that the amount of X-ray radiation is very low and does not pose a health risk. It is better to take advantage of this method of chest imaging to pay attention to the numerous advantages of this method and not to bother our mind to do it.

Other limitations of chest radiology

Chest radiology is one of the first clinical tests, but it goes without saying that it has some limitations. For example, it is possible that a very small cancerous tumor is not visible in the images obtained from this area [6]. Blood clots in the lungs or embolism may not be identified in the lungs. Despite these limitations, no value of this diagnostic imaging method has been reduced, but they use other ways to diagnose other cases and continue to use chest radiology to diagnose internal body problems (Figure 5).

Figure 5. Chest radiology



Necessary measures before chest imaging

With the order of the medical staff, you must take off all or part of your upper body clothes and put on your clothes, which are simple clothes without any metal objects. If you have metal objects with you, they will be visible in the photos and will cause interference. If you are pregnant, you should definitely inform your doctor about this issue because X-rays must be done with a doctor's prescription for pregnant women and may be harmful to the fetus. X-rays, like many other medical procedures, should not be performed during pregnancy.

Infective endocarditis

Infective endocarditis is an infection of the inner lining of the heart cavities (endocardium) or heart valves. This complication is caused by microscopic organisms (usually bacteria and sometimes fungi and other types of microscopic organisms). These organisms enter the heart through the bloodstream and settle there. These microscopic organisms live naturally and safely in some parts of the body, such as the mouth and urinary tract, and may enter the bloodstream due to the slightest scratch or cut of the tissue. The presence of bacteria in the blood does not always lead to endocarditis, and not all bacteria can cause endocarditis. Endocarditis is a rare disease. When endocarditis occurs, microscopic organisms in the blood attach to the lining of the heart or abnormal valves. Perhaps the microscopic blood clots that have already formed at the site help them in this process. The body's response is to send immune cells and fibrin (clotting elements) to trap the organism.

A group of cellular materials containing a collection of organisms is called vegetation. Vegetation may interfere with one of the valve's functions. Vegetation’s may also be uprooted and block one of the blood vessels in a vital organ. The possibility of endocarditis increases in the presence of valvular diseases, heart surgery, congenital heart defects, damage to heart valves due to rheumatic fever in childhood, artificial heart valve or the presence of any other foreign substance in the body. Drug addicts who share or share contaminated needles are also at high risk of developing endocarditis. The symptoms of endocarditis are variable, but most of them are associated with fever. Most people report other flu-like symptoms, such as muscle aches, fatigue, night sweats, and loss of appetite. If you have chronic endocarditis or subacute endocarditis, symptoms may be less severe and last for months before diagnosis. Sometimes heart failure symptoms such as shortness of breath and confusion are the first signs of infective endocarditis. You and your doctor may notice changes in your skin and nails, including red spots on the palms of your hands and feet, painful sores on the tips of your fingers and toes, or dark lines (tiny

bleeding) under the nails that look like wood chips. Infective endocarditis may cause other complications such as anemia and blood in the urine.

Your doctor may initially suspect endocarditis based on your symptoms, especially if you have a known risk factor such as congenital heart disease, rheumatic fever, or valve disease. He will listen to your heart through a stethoscope and may notice a new murmur (sound of blood flow in the heart) or a change in the old murmur in your heart. From the blood samples that are sent to the laboratory for culture, the doctor can detect the presence of infection and the type of microbe causing the infection. Only a small number of blood cultures in people with infective endocarditis are negative (false negative). An echocardiogram confirms the doctor's diagnosis by showing vegetation's on the heart valves. An echocardiogram also shows the size of your heart and shows how the heart walls and valves are working. To treat endocarditis, you need large amounts (doses) of antibiotics for 2 to 6 weeks to kill the microscopic infectious organisms in the blood and sterilize the heart valves.

At first, it is necessary to be admitted to the hospital so that antibiotics are administered intravenously. In some people who respond well to this initial treatment, a full course of antibiotics may be completed at home. Your doctor will make sure that the drugs are working properly by performing regular blood tests. In some people, infective endocarditis may damage a heart valve (natural or artificial). Infective endocarditis may also cause heart failure. Also, the vegetation's may be separated repeatedly and spread throughout the blood. Surgery may be needed to remove infected tissue and repair or replace the valve.

Taking antibiotics to prevent endocarditis

In some cases, the doctor may recommend that you take antibiotics before performing certain dental surgeries (including scaling) or other types of surgery to prevent the occurrence of infective endocarditis. If you have a medical condition that increases your risk of endocarditis (such as an abnormal valve, previous valve surgery, an artificial heart valve, endocarditis, or certain congenital heart diseases), there is a good chance that these surgeries will allow bacteria to enter the bloodstream and colonize them on the heart valves.

Heart disease and radiological pockets

Radiology is the science of different imaging methods of the human body that are used in medical science to diagnose diseases faster and with higher accuracy. Radiology; Body imaging science.

Radiology is used for four purposes

1- Diagnostic radiology: During it, using medical equipment, it is determined whether a person has a disease or not.

2- Interventional radiology: This method helps the doctor to use a better and safer way to treat the disease.

3- Therapeutic radiology: Radiology can also be used for therapeutic aspects. For example, it targets and destroys cancer cells. This method is called radiotherapy.

4- Nuclear radiology: It includes drug therapy during which radioactive materials enter the patient's body in the form of medicine. These materials allow the doctor to see a clear picture of the function of the organ.

Advantages of radiology

- Radiology allows the doctor to get inside the patient's body with minimal complications and get information from it. Before the invention of radiology, this work was done only by opening the body with surgical methods, and many patients faced a lot of suffering and hardships in this way.

- Speeding up the diagnosis of diseases from each other: By taking only a few radiology pictures, the doctor can make a correct diagnosis of the disease in the person and start treatment immediately [2].

- Radiology, which involves radiation, is dangerous for pregnant women and can lead to fetal abnormalities. Therefore, every woman should make sure that she is not pregnant before radiology.

- Spending the least amount of time to diagnose diseases: The doctor decides in a short period of time and according to the radiology pictures and other tests of the patient, whether the person needs surgery or not. Spending this little time is completely for the patient's benefit.

- Increasing accuracy: Providing a precise image of several points of the body provides the doctor with a lot of information about the function of the body's organs and increases his decision-making power to better treat the disease.

- One of the most important benefits of radiology is the diagnosis and treatment of the two most important causes of death in the world, namely heart diseases and various cancers.

Types of radiology

1- Radiography: During this type of radiography, X-rays are irradiated to a part of the body and its bones and soft tissue are determined by the radiograph. X-rays pass through fatty tissues, but cannot pass through denser tissues such as bone and tumors. This type of imaging is usually used to diagnose heart and lung complications [3].

2- Fluoroscopy: The patient is injected with a radioactive substance or has to swallow the radioactive substance and different parts of his body are displayed on the monitor screen. This type of test is typically used to evaluate the function of the intestines, heart, blood vessels, and urinary tract. Radioactive material can also be used to detect abnormal masses in body tissues. Medical and health articles, medical recommendations, healt

3- CT scan: Using X-rays to create a three-dimensional image is another type of radiology application. It is usually used in emergencies such as blood clots, appendix rupture, or internal bleeding. Based on the images obtained from the CT scan, the doctor reaches a more accurate and faster diagnosis.

4- Ultrasound: Images of body tissues are obtained using sound waves. This method is usually used to check the health of the fetus in pregnant mothers because it has been proven that X-rays have adverse effects on the health of the fetus. It is also used to determine the gender of the fetus and identify any developmental disorders. Of course, ultrasound is also used to examine other organs such as the uterus, prostate, breast, etc.

5-MRI: Magnetic field is used to change radio waves in order to create images of the internal structures of the body. MRI is usually used to view the body at different levels (from top to bottom, from front to back, etc.). MRI provides the best images of soft tissue to the doctor and is usually used to diagnose muscle and nervous system disorders.

6- Nuclear medicine: A radioactive substance is injected into the patient to diagnose any disease related to different organs of the body. Nuclear medicine is also used to determine cancer stages, heart function and blood flow.

Risks of radiology

In general, radiological imaging is not completely safe and due to the use of rays, there will be risks for the patient. One of these risks is cancer. But in general, the benefits of radiology outweigh its risks. People with heart disease are generally at risk of complications from viral infections. For example, the flu virus can cause a heart attack, which is why it is recommended to reduce the risk of vaccination. With Covid-19, the virus can damage the respiratory system and force the heart to work faster and harder to deliver oxygen-rich blood to major organs.

Covid-19 can also cause blood clots in the arteries of your heart. It can also attack the heart muscle and weaken it. As you know, the Covid-19 virus can be very dangerous for people with heart diseases, both chronic and acute. Therefore, considering the danger lurking in the health of these people, this epidemic and dreaded disease should be identified at the same time when the first symptoms related to it appeared, and with a correct diagnosis from a specialist doctor, and the beginning of the treatment process as soon as possible.

Of course, these symptoms in these people may be similar to some symptoms of allergy and be mistaken, but in any case, patients should not take risks and take action when the first symptoms appear. Corona is considered a spectrum disease. But what is meant by spectrum disease? Corona has a wide range of symptoms, from very mild shortness of breath to severe lung infection and death. These symptoms vary from person to person. At the beginning of the epidemic, there were reports about the occurrence of problems and cardiovascular symptoms of Corona. A report from the early days of the pandemic described the extent of heart damage among 41 patients hospitalized with Covid-19 in Wuhan, China: Five, or 12 percent, showed signs of cardiovascular damage. These patients had both cardiac troponin levels (a protein released into the blood by the damaged heart muscle) and abnormalities in the electrocardiogram and ultrasound of the heart. Other reports have since confirmed that heart damage could be part of the damage caused by the coronavirus. Additionally, some reports detail clinical scenarios in which patients' initial symptoms were cardiovascular rather than respiratory in nature.

In recent years, scientists have shown that influenza, respiratory viruses and bacterial pneumonia can affect cardiovascular health and increase the severity of the disease. In fact, researchers explain that "In most influenza epidemics, more patients die from cardiovascular problems than from pneumonia-influenza causes". It seems that people with poor cardiovascular health experience more severe symptoms of Covid-19. For example, in a study of 44,672 people with Coronavirus in China, 4.2% had cardiovascular disease. However, these individuals accounted for 22.7% of all deaths. In a smaller trial involving 100 patients. Researchers found that 40% of patients had pre-existing vascular problems. You should also know that this disease also affects the severity of death. This means that these people have much more severe symptoms and the risk of death increases significantly [50-52].

The effect of corona on heart health

You probably think of corona as a respiratory disease, but it has been shown that the corona virus infects the heart and blood vessels [53-55]. Also, research shows how much it can damage these organs. Patients with Covid-19 may experience:

- Myocarditis (Heart muscle inflammation);
- Acute myocardial infarction (Heart attack);
- Heart failure [56].
- Arrhythmia (Irregular heartbeat);
- Myocardial injury (Damaged heart);
- and venous thromboembolic events (Blood clots) [57].

According to the Mayo Clinic, there are certain warning signs, some of which start with blood clots.

Heart rate and corona

If you experience heart palpitations after contracting Corona, you should contact your doctor. A temporary increase in heart rate can be caused by various factors, including dehydration. Make sure you drink enough fluids during this time, especially if you have a fever. Symptoms of a fast or irregular heartbeat can include [58-60]:

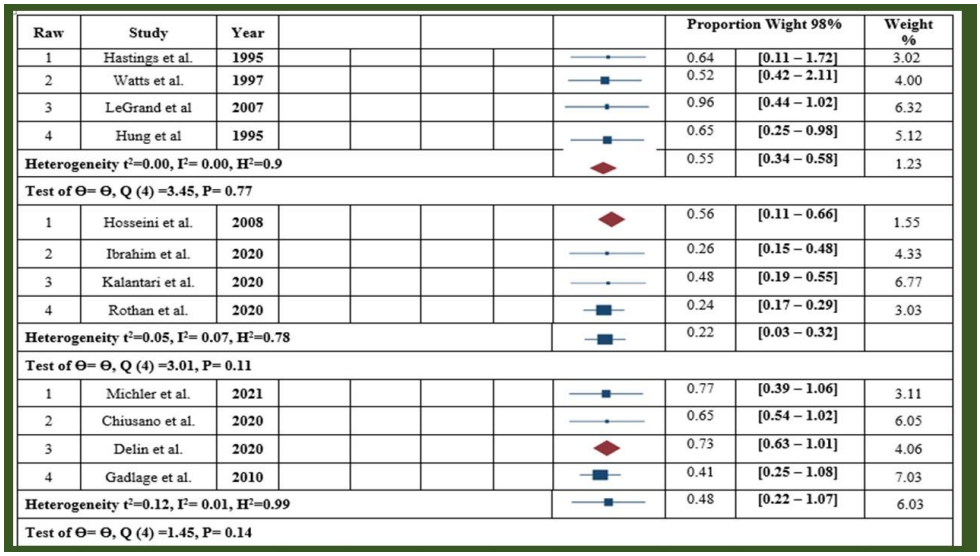
- Feeling of a fast or irregular heartbeat in the chest (Palpitations);

- Feeling light-headed or dizzy, especially when standing;
- Chest discomfort.

Is it more likely to have a heart attack after contracting Corona?

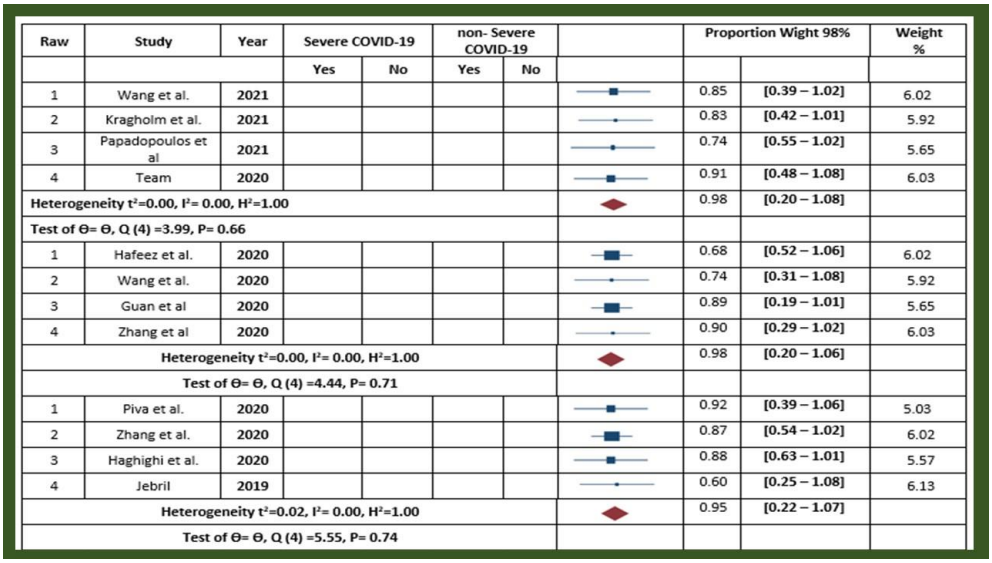
Heart attack has several different forms. A type 1 heart attack is caused by a blood clot in a vessel and blocking it. This case is rare during and after the corona virus. Type 2 heart attacks are more common with Corona. This heart attack can be caused by increased stress on the heart. such as rapid heart rate, low blood oxygen levels, or anemia (Figure 6 & 7). This has been seen in people with acute coronavirus disease. But it occurs less in people who have survived this disease [61-64].

Figure 6. Forest plot showed Systematic Investigation of Dental, Heart and Lung Diseases in Patients with Covid-11



Raw	Study	Year	Proportion Wight 98%		Weight %
1	Hastings et al.	1995	0.64	[0.11 – 1.72]	3.02
2	Watts et al.	1997	0.52	[0.42 – 2.11]	4.00
3	LeGrand et al	2007	0.96	[0.44 – 1.02]	6.32
4	Hung et al	1995	0.65	[0.25 – 0.98]	5.12
Heterogeneity t^2=0.00, I^2= 0.00, H^2=0.9			0.55	[0.34 – 0.58]	1.23
Test of Θ= Θ, Q (4) =3.45, P= 0.77					
1	Hosseini et al.	2008	0.56	[0.11 – 0.66]	1.55
2	Ibrahim et al.	2020	0.26	[0.15 – 0.48]	4.33
3	Kalantari et al.	2020	0.48	[0.19 – 0.55]	6.77
4	Rothan et al.	2020	0.24	[0.17 – 0.29]	3.03
Heterogeneity t^2=0.05, I^2= 0.07, H^2=0.78			0.22	[0.03 – 0.32]	
Test of Θ= Θ, Q (4) =3.01, P= 0.11					
1	Michler et al.	2021	0.77	[0.39 – 1.06]	3.11
2	Chiusano et al.	2020	0.65	[0.54 – 1.02]	6.05
3	Delin et al.	2020	0.73	[0.63 – 1.01]	4.06
4	Gadlage et al.	2010	0.41	[0.25 – 1.08]	7.03
Heterogeneity t^2=0.12, I^2= 0.01, H^2=0.99			0.48	[0.22 – 1.07]	6.03
Test of Θ= Θ, Q (4) =1.45, P= 0.14					

Figure 7. Forest plot showed Systematic Investigation of Dental, Heart and Lung Diseases in Patients with Hospitalized in ICU Based on Radiology Stereotypes



Raw	Study	Year	Severe COVID-19		non- Severe COVID-19		Proportion Wight 98%		Weight %
			Yes	No	Yes	No			
1	Wang et al.	2021					0.85	[0.39 – 1.02]	6.02
2	Kragholm et al.	2021					0.83	[0.42 – 1.01]	5.92
3	Papadopoulos et al	2021					0.74	[0.55 – 1.02]	5.65
4	Team	2020					0.91	[0.48 – 1.08]	6.03
Heterogeneity t^2=0.00, I^2= 0.00, H^2=1.00							0.98	[0.20 – 1.08]	
Test of Θ= Θ, Q (4) =3.99, P= 0.66									
1	Hafeez et al.	2020					0.68	[0.52 – 1.06]	6.02
2	Wang et al.	2020					0.74	[0.31 – 1.08]	5.92
3	Guan et al	2020					0.89	[0.19 – 1.01]	5.65
4	Zhang et al	2020					0.90	[0.29 – 1.02]	6.03
Heterogeneity t^2=0.00, I^2= 0.00, H^2=1.00							0.98	[0.20 – 1.06]	
Test of Θ= Θ, Q (4) =4.44, P= 0.71									
1	Piva et al.	2020					0.92	[0.39 – 1.06]	5.03
2	Zhang et al.	2020					0.87	[0.54 – 1.02]	6.02
3	Haghighi et al.	2020					0.88	[0.63 – 1.01]	5.57
4	Jebril	2019					0.60	[0.25 – 1.08]	6.13
Heterogeneity t^2=0.02, I^2= 0.00, H^2=1.00							0.95	[0.22 – 1.07]	
Test of Θ= Θ, Q (4) =5.55, P= 0.74									

Conclusion

It has not been long since the spread of corona disease and its transformation into a pandemic. From the end of December 2019 until now, studies show that cardiovascular diseases are common in patients with Covid-19, and these patients are at greater risk for complications and mortality; Although it is still unclear whether underlying cardiovascular diseases present a separate risk or whether they are involved with other factors such as age and sex. For this purpose, review and original articles using keywords such as Covid-19, Coronavirus, SARS-CoV-2, Cardiovascular diseases, Myocarditis, Acute coronary syndromes, Heart failure, Ischemic heart disease from PubMed, Scopus databases, Google Scholar, Web of Science and other valid databases were collected. The current study shows that during the corona pandemic, more attention should be paid to people suffering from cardiovascular diseases and effective treatments based on new studies should be used for them. Corona viruses are a large family of viruses that cause various diseases from the common cold to severe acute respiratory syndrome.

This disease is known as Middle East Respiratory Syndrome (MERS). Research shows that prevention of virus transmission and education to people facing danger and promotion of self-restraint behaviors have led to a reduction in the speed of disease transmission in communities and identifying the sources of disease transmission can be effective in controlling it. Corona virus is a challenging disease that can easily spread in public places. Therefore, the preparation of people to face this contagious disease and to deal with and control the severe disease caused by the corona virus in places where there are suspected or definite cases of the disease will be very valuable.

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