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## Systematic Evaluation of Medical & Nursing Care in Cardiovascular Injuries Patients with Burn and Bone Fracture Candidate Plastic Restorative

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### KEYWORDS

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### ABSTRACT:

This study has investigated and systematically evaluated cardiovascular injuries in burn and bone fracture patients who are candidates for plastic surgery with nursing and medical points. When the fracture is accompanied by the damage of a large artery, the case should be considered an emergency because the effects quickly become irreversible. In cases of severe vascular symptoms (pulsatile hematoma, severe bleeding, acute limb ischemia), emergency surgery including fracture reduction and fixation and vascular repair is required. Fractures are fixed with internal fixation or usually with external fixator. First, the vessels should be repaired and then the fracture should be stabilized, unless the fracture is unstable and its reduction requires a severe maneuver, in which case the fracture should be stabilized first to prevent damage to the vascular sutures. Open fracture with severe contamination and irreparable artery severance, ischemia time longer than 8 hours, soft tissue crush, old age and high probability of vascular repair failure. In cases of prolonged ischemia and the possibility of compartment syndrome, decompression and fasciotomy of the leg compartment are performed. The time interval between the accident and the repair of the artery is the most important factor in the prognosis. If the ischemia time is less than 8 hours, the probability of amputation is 20-25%, and if the ischemia time is longer than 8 hours, this probability reaches 50%.



## 1. Introduction

Heart disease is one of the most common diseases among people. Diagnosis and treatment of this disease is very important [1-3]. Timely tests and imaging helps to diagnose heart disease. The risk factors of heart disease in men and women cause inflammation and irritation of the inner lining of coronary arteries. Over time, cholesterol in the bloodstream can accumulate in inflamed areas and begin to form plaque, narrowing the diameter of the artery [4-6]. If the artery narrows by 40 to 50 percent, blood flow is reduced enough to cause symptoms of angina or pain in the heart and left arm. In some situations, the plaque can rupture and lead to the formation of a blood clot in the coronary artery [7]. This prevents oxygen-rich blood from reaching the heart muscle, and the part of the heart muscle that is located after the blockage begins to die [9-11]. This condition is called myocardial infarction or heart attack. If the heart attack is not diagnosed in time, the damaged part of the muscle cannot regenerate and eventually dies [12].

Coronary artery disease is one of the most common and dangerous heart diseases. Coronary artery disease occurs when the arteries that supply blood to the heart muscle become blocked with plaque. This causes hardening of the heart vessels [13-15]. What is the cause of coronary artery blockage? When the inner wall of an artery is damaged, fatty deposits (plaque) made of cholesterol and other cellular waste products tend to accumulate at the site of damage. This process is called atherosclerosis. If the surface of the plaque is broken or ruptured, blood cells called platelets gather at the site and try to repair the vessels. This mass can block an artery and lead to a heart attack or a similar condition called broken heart syndrome. Broken heart syndrome or Takatsubo cardiomyopathy is a type of heart disease in which the end and middle parts of the left ventricle are impaired in pumping blood to the aorta [16-18]. Plaque accumulation can narrow these vessels and reduce blood flow in the heart valves. Valves are responsible for controlling the blood flow in the veins. If they are damaged, the person is forced to live with an artificial heart valve.

Finally, decreased blood flow may cause chest pain (angina), shortness of breath, or other signs and symptoms of coronary artery disease.

Congenital heart defects can be mentioned among the types of heart diseases. Many congenital heart defects cause few or no signs and symptoms [19-21]. They are often not diagnosed until the child is older. Severe heart defects are found during pregnancy or immediately after birth. Symptoms of congenital heart defects include rapid and rapid breathing, cyanosis (bluish color on the skin, lips, and fingernails), fatigue, difficulty feeding, low birth weight, chest pain, delayed growth, and circulation. He pointed weakly. There are several types of congenital heart defects, including: Abnormal heart valves (valves that do not open properly or leak blood); Septal or wall defects (a hole in the wall between the lower or upper chambers of the heart), Atresia (one of the heart valves is missing); Absence of ventricles [22]; Aortic valve stenosis (AVS) (What is the cardiac aorta? The most important valve of the heart for transporting oxygenated blood is called the aorta; Atrial septal defect (ASD) [23]; Coarctation of the aorta (CoA); Complete atrioventricular canal (CAVC) defect; Displacement of great vessels; Ebstein's anomaly; Left heart hypo plastic syndrome; Patent ductus arteriosus (PDA); Pulmonary valve atresia; Pulmonary valve stenosis; Defects in a single ventricle; Tetralogy of Fallot [24]; Abnormal pulmonary vein connection (TAPVC); Tricuspid valve atresia; Ventricular septal defect (VSD) [25].

## 2. Search strategy and selection of articles

Search in Scopus, Google scholar, PubMed databases and by searching with keywords such as "Nursing Services", "Medical Services", "**Systematic Evaluation of Cardiovascular Injuries**", and "**Burn and Bone Fracture Candidate Plastic Restorative with Nursing & Medical Points**" to obtain articles related to the selected keywords [10-12]. 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 [13].

## 3. Cardiac arrhythmia

Arrhythmia refers to an irregular heartbeat. This happens when the electrical impulses that coordinate the heartbeat don't work properly. As a result, the heart may beat too fast,



too slowly, or irregularly. This disease is one of the types of heart trouble in teenagers. There are several types of arrhythmias, including: Tachycardia heart disease (rapid heartbeat); Bradycardia (slow heartbeat); Premature contractions (premature heartbeat); Atrial fibrillation heart disease (an irregular heartbeat); Heartbeat [30].

#### 4. Important symptoms of heart disease

The most important cause of cardiovascular diseases is arteriosclerosis [31]. Arteriosclerosis causes the various arteries that supply blood to different parts of the body to gradually become hard and narrow and their ability to transport oxygen and nutrients to the body's cells decreases. Some factors cause arteriosclerosis to accelerate, and if they exist, the probability of cardiovascular disease increases. To prevent the occurrence of cardiovascular diseases and the death and disability caused by them, you should know these risk factors and pay attention to medical recommendations.

#### 5. Risk factors for cardiovascular diseases

Risk factors for cardiovascular diseases include: Old age, male sex, family history of premature heart disease, high blood pressure, increased blood lipids, especially cholesterol, diabetes, smoking, obesity, inactivity (not doing physical activity). physical) and blood coagulation disorders [32-34]. Considering that diabetes is one of the risk factors of cardiovascular diseases and usually accompanies other risk factors and sometimes may be the cause of them, people with diabetes should take care of their cardiovascular health more than others. Many medical researchers have also shown that cardiovascular risk factors are more common in type 2 diabetes patients. Cardiovascular diseases can be divided into three main groups: Coronary heart diseases; Cerebral vascular events; Disease of peripheral vessels; Coronary heart diseases.

The heart is a muscular pump the size of a clenched human fist that beats an average of 60 to 100 times per minute and circulates blood throughout the body. Blood circulation causes oxygen and nutrients to reach the organs of the body and waste materials caused by the activity of cells are also removed. The heart muscle is no exception to this rule and must have proper blood supply to do its vital work properly.

Blood supply to the heart muscle is carried out by vessels called "Coronary arteries" [35]. Blood reaching the heart and the activity of the heart muscle are to some extent similar to the supply and demand situation; The more active the heart is (for example, during heavy physical activity or anxiety and tension), the more blood it will need. Coronary arteries must be able to provide this increased need; Otherwise heart muscle cells will face problems.

Arteriosclerosis and the formation of clots in the coronary arteries cause blood supply to the heart muscle cells to decrease. As a result of the lack of oxygen and nutrients and the accumulation of waste materials in the heart muscle, a pain known as "Heart pain" or "Angina" occurs. If the coronary artery is completely blocked (by a severe narrowing or blood clot), the heart cells in the area of that artery will die, and this condition is called a "Heart attack". Sometimes sudden death occurs as a result of a severe and widespread disorder in the functioning of the heart muscle [36].

#### 6. Important symptoms of heart disease

**1- Chest pain:** This pounding or pressing pain is felt in the area behind the sternum and may spread to the neck, hands, back, or abdomen. Angina pectoris often occurs during physical work or mental and emotional pressures that increase heart activity, and is usually relieved by rest or taking sublingual nitroglycerin. If the pain does not improve with rest or several minutes after taking the oral tablet, and especially if it is accompanied by shortness of breath, nausea, and severe sweating, it may be a sign of a heart attack [37].

According to the report of the Endocrine and Metabolism Research Center of Tehran University of Medical Sciences, due to peripheral nerve disorders, the severity of heart disease symptoms in diabetic people may be lower than expected (silent infarction); Therefore, you who are suffering from diabetes should be more aware of such symptoms and see a doctor on time. Of course, remember that chest pains are not only a sign of heart disease and may also appear due to digestive or lung diseases, for example.

**2- Shortness of breath:** The feeling of shortness of breath can be one of the symptoms of coronary heart disease, this state also occurs in many respiratory diseases.



**3- Heart palpitations:** In this situation, a person feels his heart beating uncomfortably. Heart palpitations may also occur in anxiety states and some other heart diseases.

**4- No or Edema:** In the more advanced stages of heart disease (heart failure) when the pump function becomes problematic, the fluid in the body tissues (especially the lower parts of the body such as the ankles) is not completely drained and under the skin it accumulates. Of course, swelling or edema may also occur as a result of varicose veins, liver disease, kidney disorders, etc [38].

### 7. Cerebrovascular accidents (stroke)

When the vessels feeding the brain are severely damaged, blood does not reach the brain cells and they will die, which is called "Cerebral infarction". A stroke occurs both as a result of the narrowing and closing of the brain vessels, and also due to the rupture and bleeding of the brain vessels. The most important risk factor for cerebrovascular accidents is high blood pressure (hypertension). The risk of stroke in people with diabetes who also have high blood pressure is twice as high as people who only have high blood pressure. This makes the importance of blood pressure control in diabetes more obvious [39].

The symptoms of cerebrovascular accidents are very different depending on which part of the brain has a blood supply disorder. Numbness or severe movement weakness (paralysis) in one half of the body and blindness or temporary blurring of vision in one eye are among the signs of cerebrovascular accidents.

### 8. Peripheral vascular disease

Peripheral vascular disease refers to diseases that affect the vessels outside the heart and brain. These diseases usually occur as a result of the narrowing of the vessels that supply blood to the legs and hands. Decreased blood supply to the legs causes two types of complications:

**1- Gangar or Yagangren:** Tissue death due to the lack of blood reaching the organs, which eventually leads to the amputation of that organ.

**2- Intermittent lameness:** Due to the hardening of the arteries that supply blood to the legs, after walking for a while, severe pain usually occurs in the muscles of the back of the

leg. In general, the probability that people with diabetes need to have a part of their legs amputated is 15 to 40 times that of the general population [40]. Therefore, it is very important to adhere to the recommendations related to the prevention of cardiovascular diseases and to follow the principles of foot care for diabetics.

### 9. Examination of fractures and damage to large vessels

Fractures partially damage the surrounding soft tissues. Specially to muscles and small blood vessels. But often, these injuries are repaired by themselves at the same time as the fractures are repaired. Sometimes an important artery is damaged by the factor causing the fracture (for example, a bullet) or by the sharp edge of the bone that is displaced during the fracture or after, this condition can have serious consequences [40]. In fact, it may cause limb loss. But fortunately, it is not common.

The most important examples of arterial damage following fractures and dislocations are:

Damage to the axillary artery shoulder dislocation.

Damage to the brachial artery in humerus fracture or elbow dislocation.

Damage to the popliteal artery as a result of knee dislocation or fracture with displacement.

### 9. Clinical signs

After every fracture in long bones, the blood supply status of the organ should be evaluated precisely and regularly. Often the first symptom that attracts attention is severe pain. Especially pain when moving toes or hands. This issue should never be ignored. Numbness or loss of sensation in the fingers may also be present.

**Treatment:** When the fracture is accompanied by the damage of a large artery, the case should be considered an emergency because the effects quickly become irreversible. If there is an arterial lesion in the initial examination of the patient, it should be thought that the artery is blocked by a direct injury and the following measures should be taken.

**The first step:** Any type of external splint or bandage that can cause pressure should be removed, and the considerable displacement of the broken parts should be corrected gently if



we are already dead, if these measures do not cause sufficient blood flow within half an hour. The next step must be taken.

**Second step:** In this step, doctors perform surgery and find the damaged artery, determine the nature of the damage and repair it.

**Vascular damage in knee fracture;** Fractures damage the surrounding soft tissue (especially muscles and blood vessels) to some extent, but these injuries often heal on their own at the same time as the fracture heals. However, sometimes an important artery may be damaged at the same time as a fracture or dislocation.

Spinal rotation due to trauma, supracondylar fractures of the femur, knee dislocations, and tibia plateau fractures, especially if they are displaced posteriorly, may cause vascular injury. Knee fractures/dislocations with vascular damage should be promptly diagnosed and treated. Otherwise, it can have serious side effects and may even lead to limb loss in some cases.

## 10. Relationship between hip replacement and heart attack risk

Total hip replacement is one of the most common non-emergency surgeries. The number of annual hip replacements is expected to increase by 2030 due to an aging population. Hip replacements are commonly used to treat conditions such as arthritis and hip fractures that cause pain and stiffness. In general, the risk of serious complications after hip replacement is low, but all surgeries carry risks. Heart attack and other serious cardiovascular complications are possible complications of joint replacement surgeries.

The risk of heart attack is higher in people with a history of cardiovascular diseases and it increases with age. Total hip replacement is one of the most successful orthopedic surgeries, with a 10-year survival rate of over 95%. Most hip replacement surgeries are performed on people between 60 and 80 years old. The biggest cause of death is adverse cardiac events (MACE), which mostly include heart attacks. Today, improvements in surgical techniques and preoperative screening have led to a significant reduction in postoperative mortality. Within thirty days after a total knee or hip replacement, the probability of a heart attack varies from 0.3 to 0.9 percent. Why does hip replacement increase the risk of

heart attack? It is not clear exactly why the risk of heart attack increases after this major surgery, but several factors are likely to play a role. Certain events during surgery may increase stress on the heart. These events include the following: Blood flow disorder; Being under general anesthesia; Surgical trauma.

Inflammation from the repair process can increase the chance of blood clots, which increases the risk of heart problems. Increased heart rate and increased blood pressure can put pressure on the coronary artery. There is also a risk of fat embolism or cement embolism in orthopedic surgery. This condition occurs when fat or cement from a joint replacement enters the bloodstream and causes a blockage or clot. This can cause serious problems for the heart and lungs. Changes in medications before surgery, such as discontinuing low-dose aspirin, may also play a role.

**How common are heart attacks after surgery?** About 3% of people who undergo major surgery experience a heart attack during the procedure. Complications increase with age and in people who have a previous history of cardiovascular disease or other risk factors for heart disease. 1 out of every 5 people over 65 or over 45 who has a history of cardiovascular disease will experience one or more heart complications within a year after non-cardiac surgery.

**How long does the risk increase?** The risk of heart attack increases immediately after surgery, especially in the first week. In a large 2016 study, researchers found that the risk of heart attack 1 month after total hip replacement was negligible. Other studies have shown that the risk of heart attack increases slightly 4 to 6 weeks after hip replacement surgery. While the risk of heart attack may decrease after a few weeks, there are still other risks to consider. For example, reduced mobility after hip surgery increases the risk of blood clots and deep vein thrombosis.

## 11. Diagnosis and treatment of heart disease

**Coronary angiography:** This method is the most reliable method used to test the anatomical structure of the arterial constriction and evaluate the function with complementary techniques. This method is used in patients whose results of other tests show narrowing of the coronary arteries, patients who are scheduled for stenting or balloon angioplasty, or in



the diagnosis and treatment of emergency heart attacks. This procedure is performed in the catheter laboratory and hospitalization is necessary. The patient does not feel any pain during the procedure, but only the heat that spreads throughout the body within seconds of the injection of an opaque radioactive substance. Under normal conditions, this procedure is short and takes only 5 to 10 minutes. When it is performed by experienced personnel in experienced centers, it has a very low mortality rate (less than 0.1%). After the procedure, the patient should be monitored in the hospital for 2 to 6 hours.

**Wrist angiography:** Angiography plays a key role in the diagnosis of cardiovascular diseases. With the help of recently developed technologies, angiography can be performed from the wrist instead of the groin area. Wrist angiography is preferred if there is constriction in the veins of the inguinal area or if the inguinal area is unsuitable due to excess weight. This method can be used in 99% of patients. Venous complications are very rare in the patient. After the operation, the patient can sit, walk and eat. The patient can return to his daily life on the same day.

## 12. Treatments

**Coronary angioplasty and stent applications:** Coronary angioplasty (balloon endarterectomy) is the stretching of local constrictions in the coronary arteries using non-surgical methods. A "Guide wire" is inserted and pushed from the inguinal aorta to the coronary veins. A deflated balloon slides through this wire to reach the constricted area. When the balloon is inflated from the outside (about 3 cm long and 3-4 cm wide), the constriction in the coronary veins is relieved. However, not every coronary artery constriction is suitable for this procedure. For some patients, bypass surgery may be necessary, while for others, heart medication can be an effective and safe form of treatment. Such decisions should only be made by relevant professionals.

**Bypass surgery:** Depending on the degree of arterial narrowing, the doctor may recommend coronary artery bypass surgery. This action corrects the blood flow that supplies the heart and thus health returns to the patient. Coronary artery bypass surgery may give your heart and life a second chance. Coronary artery bypass surgery reroutes blood to the heart by creating a different path other than the

constricted or narrowed artery. If more than one artery is narrowed, more than one bypass is needed. The artery used for a bypass, also known as a graft, is taken from the chest, arm, or leg and grafted to the coronary artery. The most common grafts are internal thoracic arteries, aorta from the arms, and veins from the legs. Since the origin areas of these veins have additional vessels, their removal does not affect the body's blood circulation.

**Small incision surgery:** Endoscopic surgery is a minimally invasive procedure in which open heart surgery is performed using special endoscopic devices through a small incision in the chest area. During the operation, all surgical tools are under the control of the surgeon. In the meantime, an endoscopic camera can be used to observe the surgical area.

Coronary artery bypass using endoscopic method can be used for valve repair, valve implantation and repair of ventricular septal defects and ablation for rhythm treatment. Compared to open surgery, there is more mobility and healing of the surgical site is much faster. After surgery, patients return to work and resume an active life much sooner. But the structure of the chest wall and heart anatomy must be suitable for this method.

**Trans catheter aortic valve implantation (TAVI):** involves implanting the aortic valve into the heart using a catheter method without open surgery. Biological heart valves are used in valve implantation surgeries worldwide and in Turkey. In the TAVI procedure, this biological valve is placed in a stent jacket, which, after unfolding, is firmly placed over the area of the valve implant. Two different techniques can be used in this method. In the first technique, similar to valve angiography, the valve is pushed into the heart from the inguinal region with the help of a catheter. Once in place, the stent mechanism opens. The second technique is used when there is constriction in the inguinal or abdominal area used to access the heart. Then a small incision of 4 to 5 cm is made in the front wall of the sternum to access the end point of the heart. The valve is inserted into the heart with the help of a catheter. In both methods, there is no need to stop the heart and perform open surgery. This procedure can be completed with local anesthesia.

Patients are transferred to their room after TAVI surgery. During this period, the patient is given anticoagulants and



under normal conditions, he is monitored for 4-5 days and discharged. After a few days of rest, the patient returns for re-examination and resumes daily life. TAVI is primarily recommended for high-risk patients who are otherwise unable to tolerate open valve implant surgery. In addition, it can be used for patients who have other obstacles to open surgery. The effectiveness of the TAVI method on such patients has been proven to increase their life expectancy and improve their clinical condition. Although TAVI is a recently developed procedure, technological advances, practical experience, and scientific results indicate that this procedure will become much more common in the future.

**TAVI in Aji Badem:** TAVI valve surgeries have been performed since 2002 in experimental environments and since 2004 on humans around the world. This procedure has been successfully performed in a number of leading centers in the US and Europe until 2010. This method was used for the first time in 2009 in Turkey. ACIBADEM Cardiovascular Surgery team had the necessary equipment to perform this new treatment method. This treatment method was successfully used on patients from that date until today, Tavi method is used in this center. The procedure is organized and performed by a team of specialists from many different disciplines, including cardiovascular surgery, anesthesia and recovery, and radiology.

### 13. Risk after hip replacement compared with other joint replacements

In a 2021 study, researchers looked at heart attack rates among 322,585 people who received spinal fusion or joint replacement. The researchers found that the overall risk of heart attack was higher in people who received spinal fusions and lower in people who received knee or hip replacements. More than 90% of hip fractures occur in people over 65 years of age. Studies have shown that the rate of major cardiac complications after joint replacement surgeries is between 0.2 and 0.8%. Heart attacks occur in about 3% of people who undergo major non-cardiac surgery. The 30-day mortality rate for people with at least one cardiovascular risk factor undergoing major surgery is 0.5 to 2 percent, with heart attack being the most common cause of death. Most complications seem to occur within 30 days of surgery, especially in the first week. How to reduce the risk of heart attack after joint

replacement? There is still limited evidence on how to reduce the risk of heart attack before surgery. It is very important to contact your doctor early to assess your risk of complications and, with your doctor's help, develop a plan to minimize your chances of developing them.

### 14. Can people with heart problems undergo hip replacement surgery?

All types of surgery, even cataract surgery or LASIK, cause stress. People about to undergo surgery may experience emotional stress regarding their health status and even regarding the result of the surgery. Many surgeries are mainly performed on the elderly, which can put physical stress on their hearts. Anesthesia and surgery itself can affect heart rate and blood pressure. In the United States, one person out of every 280,000 people has a hip or thigh fracture every year, and 90% of people who have a hip fracture are people over 65 years old. In the United States, hip fracture is the second most common cause of hospitalization in people over 65 years of age. And it is predicted that until 2040, along with the increase in the population of elderly people, the rate of hip fracture in the United States will increase by about 500%.

Hip replacement is a surgery that can give people with hip arthritis the ability to work again and quality of life. Despite the low risk and all the good benefits, hip replacement surgery may come with side effects. Unpleasant cardiovascular effects during surgery are among the problems that may plague patients after surgery. Of course, in recent years, thanks to the improvement of surgical methods and facilities, as well as anesthesia methods, many specialists consider the risk of cardiovascular problems after surgery to be very insignificant and therefore discharge the patient from the hospital in a short period of time. However, since hip joint replacement is mainly performed in elderly people, it is recommended to take care after the operation more carefully. It has been reported that a delay of at least three days in hospital discharge after surgery can help identify the risk of heart attack in these patients up to 83%.

### 15. License for surgery

Hip replacement operation is considered a major surgery during which the patient may lose some blood. Also, during surgery, a large amount of fluid may move in or out of the



surgical area. Both of these phenomena can stress the cardiovascular system. Therefore, in order to avoid any kind of problems, the surgeon usually requests a consultation or surgery permission from another doctor, usually a cardiologist. This license is more of a risk assessment, and if needed, a special test may be prescribed by the doctor to better define the patient's condition. Of course, in emergency cases where it is necessary to perform surgery in less than 24 hours, no more requests for permission or advice are given. Such consultation is usually done in cases where surgery is not mandatory. Hip or knee joint replacement surgery is usually the latter type, which is more selective, and surgery is usually the last recommended treatment.

## 16. Conclusion

Doctors usually don't recommend hip replacement unless the hip has worn down to the point where it doesn't respond to physical therapy or steroid injections. This surgery is almost always an elective surgery. This means that it is not mandatory but is done to improve performance and reduce pain. A promising and developing alternative to hip replacement for the treatment of osteoarthritis is stem cell injection. These injections contain stem cells that can turn into cartilage, muscle or bone. It is thought that they can help regenerate lost cartilage in the hip. A small 2018 study showed promising results among five people with osteoarthritis. Participants in this study experienced an average improvement of 72.4% in resting and active pain. Certain conditions, such as autoimmune arthritis and osteoporosis, that can cause hip pain are associated with an increased risk of heart attack. But research has not yet shown that the risk factor increases in this situation. Research has found a link between cardiovascular disease and inflammatory forms of arthritis such as rheumatoid arthritis, ankylosing spondylitis, and psoriatic arthritis. These conditions cause inflammation throughout the body, which may increase the risk of heart attack. A 2016 study found that heart disease is 24 percent more common in people with osteoarthritis than in the general population. Studies looking at disease prevalence in large populations have found an observational association between osteoporosis and cardiovascular disease due to shared risk factors such as advancing age. Osteoporosis and heart diseases are among the

most important public health problems, and both have common risk factors such as aging, smoking, and a sedentary lifestyle. Now, researchers at Queen Mary University in London have found that even regardless of the existence of common risk factors, there is still a connection between these two types of diseases, which is probably due to the existence of biological pathways between these two complications. As a result, by identifying these pathways, suitable targets for new drugs can be identified.

In this research, which was conducted using the data collected in the UK Biobank study, which is the largest biological information bank in the world, it was found that in both men and women, the lower the bone density, the greater the hardness of the arteries and, as a result, the health of the system. The person's cardiovascular system is weaker. It was also found that people with weak bones are more at risk of dying from ischemic heart diseases than others. These relationships cannot be justified based on common risk factors or common risk factors of cardiovascular diseases. In osteoporosis, the so-called bones become porous. The microscopic structure of bones is honeycomb. Pores and houses in cancellous bone are much larger than healthy bone. In this case, the bones gradually lose their mass and density and become very sensitive and fragile. Bones are composed of collagen fibers and minerals. From birth to early 20s, bone cells grow and thicken by absorbing nutrients and minerals. Usually, the peak of bone density is at the age of 20. The growth and development of bones continues until about 25 years of age and rarely decreases after that. After the age of 45 and with increasing age, the bone density gradually decreases and the calcium required for the body is supplied from the bones. This disease has no initial symptoms and occurs when one of the bones (usually the hip bone and wrist bone) breaks. But back pain due to fracture or destruction of vertebrae, loss of height over time, hump and bending of the spine and softening and breaking of bones are among the most important symptoms of this condition. This achievement provides valuable information for devising joint treatments for osteoporosis and heart disease. According to the World Health Organization, cardiovascular diseases are the most important cause of death worldwide.





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