

## **Introduction**

Your heart is one of your body's most important organs. Essentially a pump, the heart is a muscle made up of four chambers separated by valves and divided into two halves. Each half contains one chamber called an atrium and one called a ventricle. The atria (plural for atrium) collect blood, and the ventricles contract to push blood out of the heart. The right half of the heart pumps oxygen-poor blood (blood that has a low amount of oxygen) to the lungs where blood cells can obtain more oxygen. Then, the newly oxygenated blood travels from the lungs into the left atrium and the left ventricle. The left ventricle pumps the newly oxygen-rich blood to the organs and tissues of the body. This oxygen provides your body with energy and is essential to keep your body healthy.

## **Overview of Cardiac Arrest**

Sudden cardiac arrest is the abrupt loss of heart function, breathing and consciousness. The condition usually results from a problem with your heart's electrical system, which disrupts your heart's pumping action and stops blood flow to your body.

Sudden cardiac arrest isn't the same as a heart attack, when blood flow to a part of the heart is blocked. However, a heart attack can sometimes trigger an electrical disturbance that leads to sudden cardiac arrest.

If not treated immediately, sudden cardiac arrest can lead to death. Survival is possible with fast, appropriate medical care. Cardiopulmonary resuscitation (CPR), using a defibrillator or even just giving compressions to the chest can improve the chances of survival until emergency workers arrive.

## **Symptoms**

Signs of sudden cardiac arrest are immediate and drastic and include:

- Sudden collapse
- No pulse
- No breathing
- Loss of consciousness

Sometimes other signs and symptoms occur before sudden cardiac arrest. These might include:

- Chest discomfort
- Shortness of breath
- Weakness
- Fast-beating, fluttering or pounding heart (palpitations)

## **Causes**

The usual cause of sudden cardiac arrest is an abnormal heart rhythm (arrhythmia), which happens when your heart's electrical system isn't working correctly.

The heart's electrical system controls the rate and rhythm of your heartbeat. If something goes wrong, your heart can beat too fast, too slowly or irregularly (arrhythmia). Often these arrhythmias are brief and harmless, but some types can lead to sudden cardiac arrest.

The most common heart rhythm at the time of cardiac arrest is an arrhythmia in a lower chamber of your heart (ventricle). Rapid, erratic electrical impulses cause your ventricles to quiver uselessly instead of pumping blood (ventricle fibrillation).

## **Risk Factors**

Because sudden cardiac arrest is so often linked with coronary artery disease, the same factors that put you at risk of coronary artery disease can also put you at risk of sudden cardiac arrest. These include:

- A family history of coronary artery disease
- Smoking
- High blood pressure
- High blood cholesterol
- Obesity
- Diabetes
- An inactive lifestyle

Other factors that might increase your risk of sudden cardiac arrest include:

- A previous episode of cardiac arrest or a family history of cardiac arrest.
- A previous heart attack.

- A personal or family history of other forms of heart disease, such as heart rhythm disorders, congenital heart defects, heart failure and cardiomyopathy
- Growing older the risk of sudden cardiac arrest increases with age
- Being male, Using illegal drugs, such as cocaine or amphetamines
- Obstructive sleep apnea
- Chronic kidney disease

## Prevention

Reduce your risk of sudden cardiac arrest by **getting regular checkups, being screened for heart disease and living a heart-healthy lifestyle.**

Here's a list of the 5 simplest ways of preventing a cardiac arrest

- Exercise. It is essential for you to keep your body going at all time.
- Eat right, eat healthy.
- Your diet is very crucial to your heart health
- Lose weight
- Quit drinking and smoking
- Reduce emotional stress

## Medical Treatment

Emergency cardiac arrest treatment includes restarting your heart and restoring a regular rhythm. Care includes using:

- **Cardiopulmonary resuscitation (CPR):** Immediate CPR is one of the most important treatments to improve cardiac arrest survival. CPR is often performed until an automatic or external defibrillator is ready. CPR uses chest compressions to replace the heart's pumping action. It moves small amounts of blood from your heart to your brain.
- **Automatic defibrillator or external defibrillator:** Once connected, this device delivers a brief electrical current (shock) to your chest. The current travels to your heart. This stops the abnormal impulses and restores the normal impulses that make it beat. It may take more than one shock for your heart to pump on its own again.

## **Overview of Cardiac Arrhythmia**

A heart arrhythmia is an irregular heartbeat. Heart rhythm problems occur when the electrical signals that coordinate the heart's beats don't work properly. The faulty signaling causes the heart to beat too fast, too slow or irregularly.

Heart arrhythmias may feel like a fluttering or racing heart and may be harmless. However, some heart arrhythmias may cause bothersome - sometimes even life-threatening - signs and symptoms.

However, sometimes it's normal for a person to have a fast or slow heart rate. For example, the heart rate may increase with exercise or slow down during sleep.

Heart arrhythmia treatment may include medications, catheter procedures, implanted devices or surgery to control or eliminate fast, slow or irregular heartbeats. A heart-healthy lifestyle can help prevent heart damage that can trigger certain heart arrhythmias.

### **Fast heartbeat (tachycardia)**

#### **Atrial fibrillation (A-fib)**

Chaotic heart signaling causes a rapid, uncoordinated heart rate. The condition may be temporary, but some A-fib episodes may not stop unless treated. A-fib is associated with serious complications such as stroke.

#### **Atrial flutter**

Atrial flutter is similar to A-fib, but heartbeats are more organized. Atrial flutter is also linked to stroke.

#### **Supraventricular tachycardia (SVT)**

Supraventricular tachycardia is a broad term that includes arrhythmias that start above the lower heart chambers (ventricles). Supraventricular tachycardia causes episodes of a pounding heartbeat (palpitations) that begin and end abruptly.

#### **Ventricular fibrillation**

This type of arrhythmia occurs when rapid, chaotic electrical signals cause the lower heart chambers (ventricles) to quiver instead of contracting in a coordinated way that pumps blood to the rest of the body. This serious problem can lead to death if a normal heart rhythm isn't restored within

minutes. Most people who have ventricular fibrillation have an underlying heart disease or have experienced serious trauma.

### **Ventricular tachycardia**

This rapid, regular heart rate starts with faulty electrical signals in the lower heart chambers (ventricles). The rapid heart rate doesn't allow the ventricles to properly fill with blood. As a result, the heart can't pump enough blood to the body. Ventricular tachycardia may not cause serious problems in people with an otherwise healthy heart. In those with heart disease, ventricular tachycardia can be a medical emergency that requires immediate medical treatment.

### **Slow heartbeat (bradycardia)**

#### **Sick sinus syndrome**

The sinus node is responsible for setting the pace of the heart. If it doesn't work properly, the heart rate may alternate between too slow (bradycardia) and too fast (tachycardia). Sick sinus syndrome can be caused by scarring near the sinus node that's slowing, disrupting or blocking the travel of impulses. Sick sinus syndrome is most common among older adults.

#### **Conduction block**

A block of the heart's electrical pathways can cause the signals that trigger the heartbeats to slow down or stop. Some blocks may cause no signs or symptoms, and others may cause skipped beats or bradycardia.

### **Risk factors**

#### **Coronary artery disease, other heart problems and previous heart surgery.**

Narrowed heart arteries, a heart attack, abnormal heart valves, prior heart surgery, heart failure, cardiomyopathy and other heart damage are risk factors for almost any kind of arrhythmia.

#### **High blood pressure**

This condition increases the risk of developing coronary artery disease. It may also cause the walls of the left lower heart chamber (left ventricle) to become stiff and thick, which can change how electrical signals travel through the heart.

## **Congenital heart disease**

Being born with a heart condition may affect the heart's rhythm.

## **Thyroid disease**

Having an overactive or underactive thyroid gland can raise the risk of irregular heartbeats.

## **Obstructive sleep apnea**

This condition causes pauses in breathing during sleep. It can lead to a slow heartbeat (bradycardia) and irregular heartbeats, including atrial fibrillation.

## **Electrolyte imbalance**

Substances in the blood called electrolytes — such as potassium, sodium, calcium and magnesium — help trigger and send electrical impulses in the heart. An imbalance in electrolytes — for example, if they are too low or too high — can interfere with heart signaling and lead to irregular heartbeats.

## **Certain drugs and supplements**

Some prescription drugs and certain cough and cold medications bought without a prescription can cause arrhythmias.

## **Excessive alcohol**

Drinking too much alcohol can affect the electrical impulses in your heart and can increase the chance of developing atrial fibrillation.

## **Caffeine, nicotine or illegal drug use**

Caffeine, nicotine and other stimulants can cause your heart to beat faster and may lead to the development of more-serious arrhythmias. Illegal drugs, such as amphetamines and cocaine, may greatly affect the heart and cause many types of arrhythmias or sudden death due to ventricular fibrillation.

## **Treatment**

- Catheter ablation
- Pacemaker
- Implantable cardioverter-defibrillator (ICD)
- Maze procedure
- Coronary bypass surgery

## Overview of Valve Disease

In heart valve disease, one or more of the valves in your heart doesn't work properly.

Your heart has four valves that keep blood flowing in the correct direction. In some cases, one or more of the valves don't open or close properly. This can cause the blood flow through your heart to your body to be disrupted.

Your heart valve disease treatment depends on the heart valve affected and the type and severity of the disease. Sometimes heart valve disease requires surgery to repair or replace the heart valve.

## Symptoms

Some people with heart valve disease might not have symptoms for many years. When signs and symptoms occur, they might include:

- Whooshing sound (heart murmur) when a doctor is listening to the heart with a stethoscope
- Chest pain
- Abdominal swelling (more common with advanced tricuspid regurgitation)
- Fatigue
- Shortness of breath, particularly when active or lying down
- Swelling of your ankles and feet
- Dizziness
- Fainting
- Irregular heartbeat

## Causes

The four heart valves, which keep blood flowing in the right direction, are the mitral, tricuspid, pulmonary and aortic valves. Each valve has flaps (leaflets) that open and close once per heartbeat. If one or more of the valves fail to open or close properly, the blood flow through your heart to your body is disrupted.

Heart valve disease may be present at birth (congenital). It can also occur in adults due to many causes and conditions, such as infections and other heart conditions.

Heart valve problems include:

- **Regurgitation.** The valve flaps don't close properly, causing blood to leak backward in your heart. This commonly occurs due to valve flaps bulging back, a condition called prolapse.
- **Stenosis.** The valve flaps become thick or stiff and possibly fuse together. This results in a narrowed valve opening and reduced blood flow through the valve.
- **Atresia.** The valve isn't formed, and a solid sheet of tissue blocks the blood flow between the heart chambers.

## **Risk Factors**

Several factors can increase your risk of heart valve disease, including:

- Older age
- History of certain infections that can affect the heart
- History of certain forms of heart disease or heart attack
- High blood pressure, high cholesterol, diabetes and other heart disease risk factors
- Heart conditions present at birth (congenital heart disease)

## **Complications**

Heart valve disease can cause many complications, including:

- Heart failure
- Stroke
- Blood clots
- Heart rhythm abnormalities
- Death

## **Prevention**

As one gets older, it becomes more important to follow a balanced diet and exercise program in order to stay healthy. Besides helping to maintain a healthy weight, and good level of cholesterol, establishing a healthy routine can also encourage heart valve disease prevention. Heart valve disease is more common in those over the age of 55. Read on to learn more about the causes of heart disease, what you can do to prevent heart valve issues, and treatments available to help care for your heart's health.



## Medical Treatment

Heart valve disease treatment depends on your symptoms, the severity of the condition, and whether your condition is worsening.

A doctor trained in heart disease (cardiologist) will provide your care. Treatment might include monitoring your condition with regular follow-up visits.

A minimally invasive procedure called transcatheter aortic valve replacement (TAVR) may be used to replace a damaged aortic valve. In this procedure, the doctor inserts a long, thin tube (catheter) into an artery in your leg or chest and guides it to the heart valve. A replacement valve is moved through this catheter to the correct position.

## Overview of Pericardial Disease

Pericardial effusion (per-e-KAHR-dee-ul uh-FU-zhun) is the buildup of too much fluid in the double-layered, saclike structure around the heart (pericardium)

The space between these layers typically contains a thin layer of fluid. But if the pericardium is diseased or injured, the resulting inflammation can lead to excess fluid. Fluid can also build up around the heart without inflammation, such as from bleeding, related to a cancer or after chest trauma

Pericardial effusion can put pressure on the heart, affecting how the heart works. If untreated, it may lead to heart failure or death in extreme cases

## Symptoms

Pericardial effusion may not cause any noticeable signs and symptoms, particularly if the fluid has increased slowly

If pericardial effusion signs and symptoms do occur, they might include:

- Shortness of breath or difficulty breathing (dyspnea)
  - Discomfort when breathing while lying down
  - Chest pain, usually behind the breastbone or on the left side of the chest
  - Chest fullness

- Lightheadedness or feeling faint
- Swelling in the abdomen or legs

## **Causes**

Pericardial effusion can result from inflammation of the pericardium (pericarditis) after an illness or injury. In some settings, large effusions may be caused by certain cancers. A blockage of pericardial fluids or a collection of blood within the pericardium also can lead to this condition.

Sometimes the cause can't be determined (idiopathic pericarditis)

Causes of pericardial effusion may include:

- Autoimmune disorders, such as rheumatoid arthritis or lupus
- Cancer of the heart or pericardium
- Spread of cancer (metastasis), particularly lung cancer, breast cancer or Hodgkin's lymphoma
- Radiation therapy for cancer if the heart was in the area of the radiation •
- Chest trauma
- Inflammation of the pericardium following a heart attack or after heart surgery or a procedure where the heart's lining is injured
- Underactive thyroid (hypothyroidism)
- Use of certain drugs or exposure to toxins
- Viral, bacterial, fungal or parasitic infections
- Waste products in the blood due to kidney failure (uremia).

## **Complications**

A potential complication of pericardial effusion is cardiac tamponade (tam-pon-AYD). In this condition, the excess fluid within the pericardium puts pressure on the heart. The strain prevents the heart chambers from filling completely with blood

Cardiac tamponade results in poor blood flow and a lack of oxygen to the body. Cardiac tamponade is life-threatening and requires emergency medical treatment.

## Tests

- **Echocardiogram.** Sound waves are used to create pictures of the heart in motion. An echocardiogram shows the heart chambers and how well the heart is pumping blood. The test can help determine the amount of fluid between the two layers of the pericardium. An echocardiogram may also show decreased heart function due to pressure on the heart (tamponade).

- **Electrocardiogram (ECG or EKG).** This quick and painless test measures the electrical activity of the heart. Sticky patches (electrodes) are placed on the chest and sometimes the arms and legs. Wires connect the electrodes to a computer, which displays the test results. Your cardiologist or another health care provider can look for signal patterns that suggest cardiac tamponade.

## Treatment

Treatment for pericardial effusion depends on:

- The amount of fluid buildup
- The cause of pericardial effusion
- The presence or risk of cardiac tamponade

## Medications

If you don't have cardiac tamponade or there's no immediate threat of cardiac tamponade, your health care provider might prescribe one of the following medications to treat inflammation of the pericardium:

- Aspirin

- Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen
- Colchicine (Colcrys, Mitigare)
- A corticosteroid, such as prednisone

## **Overview of Cardiomyopathy**

Cardiomyopathy (kahr-dee-o-my-OP-uh-thee) is a disease of the heart muscle that makes it harder for the heart to pump blood to the rest of the body. Cardiomyopathy can lead to heart failure.

The main types of cardiomyopathy include dilated, hypertrophic and restrictive cardiomyopathy. Treatment — which might include medications, surgically implanted devices, heart surgery or, in severe cases, a heart transplant — depends on the type of cardiomyopathy and how serious it is.

## **Symptoms**

There might be no signs or symptoms in the early stages of cardiomyopathy. But as the condition advances, signs and symptoms usually appear, including:

- Breathlessness with activity or even at rest
- Swelling of the legs, ankles and feet
- Bloating of the abdomen due to fluid buildup
- Cough while lying down
- Difficulty lying flat to sleep
- Fatigue
- Heartbeats that feel rapid, pounding or fluttering
- Chest discomfort or pressure
- Dizziness, lightheadedness and fainting

Signs and symptoms tend to get worse unless treated. In some people, the condition worsens quickly; in others, it might not worsen for a long time.

## Causes

Often the cause of the cardiomyopathy is unknown. In some people, however, it's the result of another condition (acquired) or passed on from a parent (inherited).

Certain health conditions or behaviors that can lead to acquired cardiomyopathy include:

- Long-term high blood pressure
- Heart tissue damage from a heart attack
- Long-term rapid heart rate
- Heart valve problems
- COVID-19 infection
- Certain infections, especially those cause inflammation of the heart
- Metabolic disorders, such as obesity, thyroid disease or diabetes
- Lack of essential vitamins or minerals in the diet, such as thiamin
- Pregnancy complications
- Iron buildup in the heart muscle (hemochromatosis)
- The growth of tiny lumps of inflammatory cells (granulomas) in any part of the body, including the heart and lungs (sarcoidosis)
- The buildup of abnormal proteins in the organs (amyloidosis)
- n Connective tissue disorders
- Drinking too much alcohol over many years
- Use of cocaine, amphetamines or anabolic steroids
- Use of some chemotherapy drugs and radiation to treat cancer

## Complications

• **Heart valve problems** Because cardiomyopathy causes the heart to enlarge, the heart valves might not close properly. This can cause blood to flow backward in the valve.

- **Cardiac arrest and sudden death** Cardiomyopathy can trigger irregular heart rhythms that cause fainting or, in some cases, sudden death if the heart stops beating effectively.

- **Heart failure.** The heart can't pump enough blood to meet the body's needs. Untreated, heart failure can be life-threatening.

- **Blood clots.** Because the heart can't pump effectively, blood clots might form in the heart. If clots enter the bloodstream, they can block the blood flow to other organs, including the heart and brain

## Prevention

In many cases, there's no prevention for cardiomyopathy. Let your health care provider know if you have a family history of the condition

You can help reduce your risk of cardiomyopathy and other types of heart disease by living a heart-healthy lifestyle, including:

- Avoiding the use of alcohol or cocaine
- Controlling high blood pressure, high cholesterol and diabetes
- Eating a healthy diet
- Getting regular exercise
- Getting enough sleep
- Reducing your stress