

# Arrhythmias

Intrinsic conduction system of the heart

## What is an arrhythmia?

An heart or

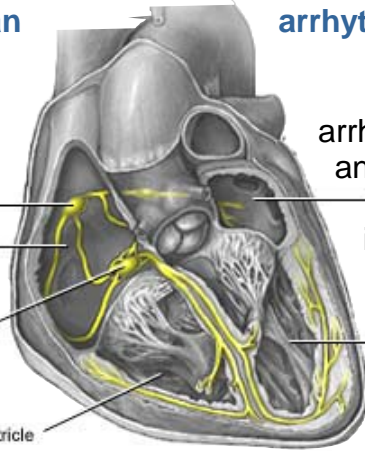
Sinoatrial node

Right atrium

Atrioventricular node

built in

Right ventricle



arrhythmia is a change in the regular beat of the an abnormal heart rhythm. The heart may seem to skip a beat or beat irregularly or very fast or very slowly.

Left ventricle

The heart has its own natural or pacemaker called the sinoatrial node (also called the SA node or sinus node). In a normal person the SA node sends out impulses to the right and left upper chambers (atria) of the heart telling them it's time to beat. The signal then travels through the AV node, then into the ventricles (bottom chambers) via the "His bundle" telling them to beat. This causes the atria to beat first and a split second later, the ventricles beat. This is the most efficient and effective way for your heart to pump blood to the body. In a normal person, the AV node is the only way for heartbeat signals to travel between the top and bottom chambers of the heart.

## What happens in the heart during an arrhythmia?

Describing how the heart beats normally helps to explain what happens during an arrhythmia. The heart is a muscular pump divided into four chambers; two atria located on the top and two ventricles located on the bottom. Normally each heartbeat starts in the right atrium. Here, a special group of cells called the sinus node, or natural pacemaker, sends an electrical signal. The signal spreads throughout the atria to the area called the atrioventricular (AV) node. The AV node connects to a group of special pathways that conduct the signal to the ventricles below. As the signal travels through the heart, the heart contracts. First the atria contract, pumping blood into the ventricles a fraction of a second later, the ventricles contract, sending blood throughout the body. Usually the whole heart contracts between 60 and 100 times per minute. Each contraction equals one heartbeat.

## Causes

Many times, there is no recognizable cause of an arrhythmia. Heart disease may cause arrhythmias, but having an arrhythmia does not mean that you have heart disease. An arrhythmia may occur for one of several reasons:

- Instead of beginning in the sinus node, the heartbeat begins in another part of the heart.
- The sinus node develops an abnormal rate or rhythm.
- A patient has a heart block.
- Use of caffeine, tobacco, alcohol, diet pills, and cough and cold medicines
- Stress

### How common and serious are arrhythmias?

Arrhythmias occur commonly in middle-age adults. As people get older, they are more likely to experience an arrhythmia.

The majority of people with arrhythmias do not need extensive exams or special treatments for their condition. For some, arrhythmias are associated with heart disease, in which case, heart disease, not the arrhythmias, poses the greatest threat to the patient. In a very small number of people with serious symptoms, arrhythmias themselves are dangerous. These arrhythmias require medical treatment to keep the heartbeat regular. Some people have a very slow heartbeat, causing them to feel lightheaded or faint. If left untreated, the heart may stop beating and these people could die. For most people, however, these symptoms are completely harmless.

### Symptoms

- very fast heart beat or skipped heartbeat
- feeling dizzy, faint or lightheaded

- shortness of breath
- fatigue
- palpitations
- chest pain
- passing out

### **What is heart block?**

Heart block is a condition in which the electrical signal cannot travel normally down the special pathways to the ventricles. For example, the signal from the atria to the ventricles may be delayed, but each one conducted:

- delayed with only some getting through
- completely interrupted
- if there is no conduction, the beat generally originates from the ventricles and is very slow

### **How are arrhythmias detected?**

Sometimes an arrhythmia can be detected by listening to the heart with a stethoscope. However, the electrocardiogram is the most precise method for diagnosing the arrhythmia. An arrhythmia may not occur at the time of the exam even though the symptoms are present at other times. In such cases, tests will be done if necessary to find out whether an arrhythmia is causing the symptoms.

### **How are arrhythmias treated?**

Many arrhythmias require no treatment whatsoever. Serious arrhythmias are treated in several ways depending on what is causing the arrhythmia. Sometimes the heart disease is treated to control the arrhythmia. Or, the arrhythmia itself may be treated using one or more of the following treatments:

- Drugs

There are several kinds of drugs used to treat arrhythmias and one or more may be used in combination. Drugs are carefully chosen because they can cause arrhythmias or make arrhythmias worse. For this reason, the benefits of the drug are carefully weighed against any risks associated with taking it.

- Cardioversion

To quickly restore a heart to its normal rhythm, the doctor may apply an electrical shock to the chest wall. This treatment is called cardioversion and is most often used in emergency situations. After cardioversion, drugs are usually used to prevent the arrhythmia from recurring.

- Automatic implantable defibrillators

These devices are used to correct serious ventricular arrhythmias that can lead to sudden death. The defibrillator is surgically placed inside the patient's chest. There, it monitors the heart's rhythm and quickly identifies serious arrhythmias. With an electrical shock, it immediately disrupts a life threatening arrhythmia.

- Artificial pacemaker

This device can take charge of sending electrical signals to make the heart beat if the heart's natural pacemaker is not working properly or its electrical pathway is blocked. This electrical device is placed under the skin in a minor operation and a lead is extended from the device to the right side of the heart, where it is permanently attached.

- Surgery

When an arrhythmia cannot be controlled by other treatments, doctors may decide to perform surgery. After locating the heart tissue that is causing the arrhythmia, the tissue is altered or removed so that it will not produce the arrhythmia.

## Types of Arrhythmias

There are many types of arrhythmias. Arrhythmias are identified by the location where they occur in the heart (atria or ventricles) and by what happens to the heart's rhythm when they occur. Arrhythmias arising in the atria are called atrial or supraventricular (above the ventricles) arrhythmias. Ventricular arrhythmias begin in the ventricles. In general, ventricular arrhythmias caused by heart disease are the most serious.

### **Bradycardia**

This is characterized by the heart beating too slow. There may be a problem in your SA node, AV node or His bundle that doesn't allow the heart beat to travel through your heart in a normal fashion. Tachycardia This condition is characterized by the heart beating at an abnormally rapid rate and interfering with the pumping of oxygenated blood throughout the body.

### **Supraventricular tachycardia**

When this occurs, there are abnormal fast rhythms from the top chambers of the heart. There are many causes including heart disease, aging, metabolic imbalances and other medical problems. Some people are born with the problem even though it may not be evident until later in life.

### **Ventricular tachycardia**

This is abnormal fast rhythm from the bottom chambers of the heart and is a serious and potentially life threatening heart rhythm problem. The heart is beating too fast to effectively pump blood to the body.

### **Ventricular fibrillation**

This is a rhythm problem during which the heart goes so fast that is essentially not pumping any blood. Defibrillation must be performed within seconds to save the patient's life. Long-term treatment includes medications or implanted defibrillators.

With proper attention and treatment, persons who have suffered from arrhythmia's can still lead a long and healthy life.

