Heart arrhythmia

Symptoms and causes

By Mayo Clinic Staff

Symptoms

Arrhythmias may not cause any signs or symptoms. In fact, your doctor might find you have an arrhythmia before you do, during a routine examination. Noticeable signs and symptoms don't necessarily mean you have a serious problem, however.

Noticeable arrhythmia symptoms may include:

- A fluttering in your chest
- A racing heartbeat (tachycardia)
- A slow heartbeat (bradycardia)
- Chest pain
- Shortness of breath
- Lightheadedness or dizziness
- Sweating
- Fainting (syncope) or near fainting

When to see a doctor

Arrhythmias may cause you to feel premature or extra heartbeats, or you may feel that your heart is racing or beating too slowly. Other signs and symptoms may be related to your heart not pumping effectively due to the fast or slow heartbeat. These include shortness of breath, weakness, dizziness, lightheadedness, fainting or near fainting, and chest pain or discomfort.

Seek urgent medical care if you suddenly or frequently experience any of these signs and symptoms at a time when you wouldn't expect to feel them.

Ventricular fibrillation is one type of arrhythmia that can be deadly. It occurs when the heart beats with rapid, erratic electrical impulses. This causes pumping chambers in your heart (the

ventricles) to quiver uselessly instead of pumping blood. Without an effective heartbeat, blood pressure plummets, cutting off blood supply to your vital organs.

A person with ventricular fibrillation will collapse within seconds and soon won't be breathing or have a pulse. If this occurs, follow these steps:

- Call 911 or the emergency number in your area.
- If there's no one nearby trained in cardiopulmonary resuscitation (CPR), provide hands-only CPR. That means uninterrupted chest compressions at a rate of 100 to 120 a minute until paramedics arrive. To do chest compressions, push hard and fast in the center of the chest. You don't need to do rescue breathing.
- If you or someone nearby knows CPR, begin providing it if it's needed. CPR can help maintain blood flow to the organs until an electrical shock (defibrillation) can be given.
- Find out if an automated external defibrillator (AED) is available nearby. These portable defibrillators, which can deliver an electric shock that may restart heartbeats, are available in an increasing number of places, such as in airplanes, police cars and shopping malls. They can even be purchased for your home.

  No training is required. The AED will tell you what to do. It's programmed to allow a shock only when appropriate.

Causes

Many things can lead to, or cause, an arrhythmia, including:

- A heart attack that's occurring right now
- Scarring of heart tissue from a prior heart attack
- Changes to your heart's structure, such as from cardiomyopathy
- Blocked arteries in your heart (coronary artery disease)
- High blood pressure
- Overactive thyroid gland (hyperthyroidism)
- Underactive thyroid gland (hypothyroidism)
- Smoking
- Drinking too much alcohol or caffeine
- Drug abuse
- Stress
- Certain medications and supplements, including over-the-counter cold and allergy drugs and nutritional supplements
- Diabetes

- Sleep apnea
- Genetics

What's a normal heartbeat?

Your heart is made up of four chambers — two upper chambers (atria) and two lower chambers (ventricles). The rhythm of your heart is normally controlled by a natural pacemaker (the sinus node) located in the right atrium. The sinus node produces electrical impulses that normally start each heartbeat.

From the sinus node, electrical impulses travel across the atria, causing the atria muscles to contract and pump blood into the ventricles.

The electrical impulses then arrive at a cluster of cells called the atrioventricular node (AV node) — usually the only pathway for signals to travel from the atria to the ventricles.

The AV node slows down the electrical signal before sending it to the ventricles. This slight delay allows the ventricles to fill with blood. When electrical impulses reach the muscles of the ventricles, they contract, causing them to pump blood either to the lungs or to the rest of the body.

In a healthy heart, this process usually goes smoothly, resulting in a normal resting heart rate of 60 to 100 beats a minute.

Types of arrhythmias

Doctors classify arrhythmias not only by where they originate (atria or ventricles) but also by the speed of heart rate they cause:

- **Tachycardia (tak-ih-KAHR-dee-uh).** This refers to a fast heartbeat — a resting heart rate greater than 100 beats a minute.
- **Bradycardia (brad-e-KAHR-dee-uh).** This refers to a slow heartbeat — a resting heart rate less than 60 beats a minute.

Not all tachycardias or bradycardias mean you have heart disease. For example, during exercise it's normal to develop a fast heartbeat as the heart speeds up to provide your tissues with more oxygen-rich blood. During sleep or times of deep relaxation, it's not unusual for the heartbeat to be slower.

Tachycardias in the atria

Tachycardias originating in the atria include:

- **Atrial fibrillation.** Atrial fibrillation is a rapid heart rate caused by chaotic electrical impulses in the atria. These signals result in rapid, uncoordinated, weak contractions of the atria.

  The chaotic electrical signals bombard the AV node, usually resulting in an irregular, rapid

rhythm of the ventricles. Atrial fibrillation may be temporary, but some episodes won't end unless treated.

Atrial fibrillation may lead to serious complications such as stroke.

- **Atrial flutter.** Atrial flutter is similar to atrial fibrillation. The heartbeats in atrial flutter are more-organized and more-rhythmic electrical impulses than in atrial fibrillation. Atrial flutter may also lead to serious complications such as stroke.
- **Supraventricular tachycardia.** Supraventricular tachycardia is a broad term that includes many forms of arrhythmia originating above the ventricles (supraventricular) in the atria or AV node.
- **Wolff-Parkinson-White syndrome.** In Wolff-Parkinson-White syndrome, a type of supraventricular tachycardia, there is an extra electrical pathway between the atria and the ventricles, which is present at birth. However, you may not experience symptoms until you're an adult. This pathway may allow electrical signals to pass between the atria and the ventricles without passing through the AV node, leading to short circuits and rapid heartbeats.

Tachycardias in the ventricles

Tachycardias occurring in the ventricles include:

- **Ventricular tachycardia.** Ventricular tachycardia is a rapid, regular heart rate that originates with abnormal electrical signals in the ventricles. The rapid heart rate doesn't allow the ventricles to fill and contract efficiently to pump enough blood to the body. Ventricular tachycardia can often be a medical emergency. Without prompt medical treatment, ventricular tachycardia may worsen into ventricular fibrillation.
- **Ventricular fibrillation.** Ventricular fibrillation occurs when rapid, chaotic electrical impulses cause the ventricles to quiver ineffectively instead of pumping necessary blood to the body. This serious problem is fatal if the heart isn't restored to a normal rhythm within minutes.

  Most people who experience ventricular fibrillation have an underlying heart disease or have experienced serious trauma, such as being struck by lightning.

- **Long QT syndrome.** Long QT syndrome is a heart disorder that carries an increased risk of fast, chaotic heartbeats. The rapid heartbeats, caused by changes in the electrical system of your heart, may lead to fainting, and can be life-threatening. In some cases, your heart's rhythm may be so erratic that it can cause sudden death.

  You can be born with a genetic mutation that puts you at risk of long QT syndrome. In addition, several medications may cause long QT syndrome. Some medical conditions, such as congenital heart defects, may also cause long QT syndrome.

Bradycardia — A slow heartbeat

Although a heart rate below 60 beats a minute while at rest is considered bradycardia, a low resting heart rate doesn't always signal a problem. If you're physically fit, you may have an efficient heart capable of pumping an adequate supply of blood with fewer than 60 beats a minute at rest.

In addition, certain medications used to treat other conditions, such as high blood pressure, may lower your heart rate. However, if you have a slow heart rate and your heart isn't pumping enough blood, you may have one of several bradycardias, including:

- **Sick sinus syndrome.** If your sinus node, which is responsible for setting the pace of your heart, isn't sending impulses properly, your heart rate may be too slow (bradycardia), or it may speed up (tachycardia) and slow down intermittently. Sick sinus syndrome can also be caused by scarring near the sinus node that's slowing, disrupting or blocking the travel of impulses.
- **Conduction block.** A block of your heart's electrical pathways can occur in or near the AV node, which lies on the pathway between your atria and your ventricles. A block can also occur along other pathways to each ventricle.

  Depending on the location and type of block, the impulses between the upper and lower halves of your heart may be slowed or blocked. If the signal is completely blocked, certain cells in the AV node or ventricles can make a steady, although usually slower, heartbeat.

  Some blocks may cause no signs or symptoms, and others may cause skipped beats or bradycardia.

Premature heartbeats

Although it often feels like a skipped heartbeat, a premature heartbeat is actually an extra beat. Even though you may feel an occasional premature beat, it seldom means you have a more serious problem. Still, a premature beat can trigger a longer lasting arrhythmia — especially in people with heart disease.

Premature heartbeats are commonly caused by stress, strenuous exercise or stimulants, such as caffeine or nicotine.

Risk factors

Certain factors may increase your risk of developing an arrhythmia. These include:

- **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 increases your risk of developing coronary artery disease. It may also cause the walls of your left ventricle to become stiff and thick, which can change how electrical impulses travel through your heart.

- **Congenital heart disease.** Being born with a heart abnormality may affect your heart's rhythm.
- **Thyroid problems.** Having an overactive or underactive thyroid gland can raise your risk of arrhythmias.
- **Drugs and supplements.** Certain over-the-counter cough and cold medicines and certain prescription drugs may contribute to arrhythmia development.
- **Diabetes.** Your risk of developing coronary artery disease and high blood pressure greatly increases with uncontrolled diabetes.
- **Obstructive sleep apnea.** This disorder, in which your breathing is interrupted during sleep, can increase your risk of bradycardia, atrial fibrillation and other arrhythmias.
- **Electrolyte imbalance.** Substances in your blood called electrolytes — such as potassium, sodium, calcium and magnesium — help trigger and conduct the electrical impulses in your heart. Electrolyte levels that are too high or too low can affect your heart's electrical impulses and contribute to arrhythmia development.
- **Drinking too much alcohol.** Drinking too much alcohol can affect the electrical impulses in your heart and can increase the chance of developing atrial fibrillation.
- **Caffeine or nicotine use.** Caffeine, nicotine and other stimulants can cause your heart to beat faster and may contribute to the development of more-serious arrhythmias. Illegal drugs, such as amphetamines and cocaine, may profoundly affect the heart and lead to many types of arrhythmias or to sudden death due to ventricular fibrillation.

Complications

Certain arrhythmias may increase your risk of developing conditions such as:

- **Stroke.** When your heart quivers, it's unable to pump blood effectively, which can cause blood to pool. This can cause blood clots to form. If a clot breaks loose, it can travel from your heart to your brain. There it might block blood flow, causing a stroke.

  Certain medications, such as blood thinners, can greatly lower your risk of stroke or damage to other organs caused by blood clots. Your doctor will determine if a blood-thinning medication is appropriate for you, depending on your type of arrhythmia and your risk of blood clots.

- **Heart failure.** Heart failure can result if your heart is pumping ineffectively for a prolonged period due to a bradycardia or tachycardia, such as atrial fibrillation. Sometimes controlling the rate of an arrhythmia that's causing heart failure can improve your heart's function.