

MANAGEMENT OF ARRHYTHMIAS

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An arrhythmia (also called dysrhythmia) is an irregular or abnormal heartbeat.

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- **Tachycardia:** A fast heart rhythm with a rate of more than 100 beats per minute.
- **Bradycardia:** A slow heart rhythm with a rate below 60 beats per minute.
- **Supraventricular arrhythmias:** Arrhythmias that begin in the atrium (the heart's upper chambers) or the electrical bridge between the upper and lower chambers) or the electrical bridge between the upper and lower chambers of the heart, or ventricles
- **Ventricular arrhythmias:** Arrhythmias that begin in the ventricles (the heart's lower chambers)
- **Bradyarrhythmias:** Slow heart rhythms that may be caused by disease in the heart's conduction system, such as the sinoatrial (SA) node, atrioventricular (AV) node or HIS-Purkinje network (see "The Heart's Electrical System" section on the next page).

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- Valve disorder
- Electrolyte imbalances in the blood, such as sodium or potassium
- Aging
- Injury from a heart attack
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- Other medical conditions

The heart's electrical system

The atria (the heart's upper chambers) and ventricles (the heart's lower chambers) work together, alternately contracting and relaxing to pump blood through the heart. The electrical system of the heart is the power source that makes this possible.

Causes of arrhythmias

Irregular heart rhythms can also occur in normal, healthy hearts. Arrhythmias can also be caused by certain substances or medications, such as caffeine, nicotine, alcohol, cocaine, inhaled aerosols, diet pills, and cough and cold remedies. Emotional states such as shock, fright or stress can also cause irregular or fast heart rhythms.

Arrhythmias that are recurrent or related to an underlying heart condition are more concerning and should always be evaluated by a doctor.

In some cases, treating the underlying condition will take care of the arrhythmia. If not, many medications and procedures are available to eliminate or control the abnormal heart rhythm.

Types of supraventricular arrhythmias

Types of supraventricular arrhythmias include:

- **Premature atrial contractions (PACs):** Early, extra heartbeats that originate in the atria.
- **Paroxysmal supraventricular tachycardia (PSVT):** A rapid but regular heart rhythm that comes from the atria. This type of arrhythmia begins and ends suddenly.
- **Accessory pathway tachycardias (such as Wolff- Parkinson-White syndrome):** A fast heart rhythm caused by an extra, abnormal electrical pathway or connection between the atria and ventricles. The impulses travel through the extra pathways as well as the usual route. This allows the impulses to travel around the heart very quickly, causing the heart to beat unusually fast.
- **AV nodal re-entrant tachycardia (AVNRT):** A fast heart rhythm caused by the presence of more than one pathway through the atrioventricular (AV) node.

- **Atrial tachycardia:** A rapid heart rhythm that originates in the atria.
- **Atrial fibrillation:** A very common irregular heart rhythm. Many impulses begin and spread through the atria, competing for a chance to travel through the AV node. The resulting rhythm is disorganized, rapid and irregular. Because the impulses are traveling through the atria in a disorderly fashion, there is a loss of coordinated atrial contraction.
- **Atrial flutter:** An atrial arrhythmia caused by one or more rapid circuits in the atrium. Atrial flutter is usually more organized and regular than atrial fibrillation.

What is my pulse?

Your pulse indicates your heart rate or the number of times your heart beats in one minute. Pulse rates vary from person to person. Your pulse is slower when you are at rest and increases when you exercise since more oxygen-rich blood is needed by the body during exercise.

How do I take my pulse?

You can tell how fast your heart is beating by feeling your pulse. You can feel your pulse on your wrist or neck. Place the tips of your index and middle fingers on the inner wrist of your other arm, just below the base of your thumb.

Or, place the tips of your index and middle fingers on your lower neck, on either side of your windpipe. Press lightly with your fingers until you feel the blood pulsing beneath your fingers.

You may need to move your fingers around slightly up or down until you feel the pulsing.

You can count the number of beats in 10 seconds and multiply by 6 to determine your heart rate in beats per minute. A normal heart rate, at rest, is 50 to 100 beats per minute.

Your Heart Rate: Pulse in 10 seconds x 6 = _____

Types of ventricular arrhythmias

A ventricular arrhythmia begins in the heart's ventricles.

Types of ventricular arrhythmias include:

- **Premature ventricular contractions (PVCs):** Early, extra heartbeats that originate in the ventricles. Most of the time, PVCs don't cause any symptoms or require treatment. This type of arrhythmia is common and can be related to stress, too much caffeine or nicotine, or exercise. They can also be caused by heart disease or electrolyte imbalance. People who have several PVCs and/or symptoms associated with them should be evaluated by a cardiologist (heart doctor).
- **Ventricular tachycardia (V-tach):** A rapid heartbeat that originates in the ventricles. The rapid rhythm keeps the heart from adequately filling with blood, and less blood is able to pump through the body. V-tach can be serious, especially in people with heart disease, and may be associated with more symptoms than other types of arrhythmia. A cardiologist should evaluate this condition.

- **Ventricular fibrillation (V-fib):** An erratic, disorganized firing of impulses from the ventricles. The ventricles quiver and cannot generate an effective contraction, which results in a lack of blood being delivered to the body. This is a medical emergency that must be treated with cardiopulmonary resuscitation (CPR) and defibrillation (delivery of an energy shock to the heart muscle to restore a normal rhythm) as soon as possible.
- **Long QT:** The QT interval is the area on the ECG that represents the time it takes for the heart muscle to contract and then recover, or for the electrical impulse to fire and then recharge. When the QT interval is longer than normal, it increases the risk for “torsade de pointes,” a life-threatening form of ventricular tachycardia

Types of bradyarrhythmias

A bradyarrhythmia is a slow heart rhythm that is usually caused by disease in the heart’s conduction system. Types of bradyarrhythmias include:

- **Sinus node dysfunction:** Slow heart rhythms due to an abnormal SA node.
- **Heart block:** A delay or complete block of the electrical impulse as it travels from the sinus node to the ventricles. The level of the block or delay may occur in the AV node or HIS-Purkinje system. The heartbeat may be irregular and slow.

What are the symptoms of an arrhythmia?

An arrhythmia may be “silent” and not cause any symptoms. A doctor can detect an irregular heartbeat during an examination by taking your pulse, listening to your heart or by performing diagnostic tests.

If symptoms occur, they may include:

- Palpitations: A feeling of skipped heartbeats, fluttering, “flip-flops” or feeling that the heart is “running away”
- Pounding in the chest
- Dizziness or feeling lightheaded
- Shortness of breath
- Chest discomfort
- Weakness or fatigue (feeling very tired)

How is an arrhythmia diagnosed?

If you have symptoms of an arrhythmia, you should make an appointment with a cardiologist. You may want to see an electrophysiologist — a cardiologist who has additional specialized training in the diagnosis and treatment of heart rhythm disorders.

After evaluating your symptoms and performing a physical examination, the cardiologist may perform a variety of diagnostic tests to help confirm the presence of an arrhythmia and indicate its causes.

Some tests that may be done to confirm the presence of an irregular heart rhythm include:

- **Electrocardiogram (ECG or EKG):** A picture of the electrical impulses traveling through the heart muscle. An ECG is recorded on graph paper, through the use of electrodes (small, sticky patches) that are attached to your skin on the chest, arms and legs.
- **Ambulatory monitors, such as:**
 - **Holter monitor:** A small portable recorder that is attached to electrodes on your chest. It continuously records your heart's rhythm for 24 hours.
 - **Transtelephonic monitor:** A small monitor is attached to electrode leads, usually on your finger or wrist. With the help of this device, your heart's rhythm is transmitted over the phone line to your doctor's office.
 - **Transtelephonic monitor with a memory loop:** A small, portable recorder that is worn continuously for an extended period of time to record and save information about your heart's rhythm around the time you experience an arrhythmia. The recording is triggered by pushing a button (event button). The rhythm is recorded, saved and transmitted over the phone line.
- **Stress test:** A test used to record arrhythmias that start or get worse when you exercise. This test can also help detect heart disease that causes an arrhythmia.
- **Echocardiogram:** A type of ultrasound used to provide a view of the heart to determine if there is heart muscle or valve disease that may be causing an arrhythmia. This test may be performed at rest or with activity.
- **Cardiac catheterization:** Using a local anesthetic, a catheter (small, hollow, flexible tube) is inserted into a blood vessel and guided to the heart with the help of an X-ray machine. A contrast dye is injected through the catheter so X-ray movies of your coronary arteries, heart chambers and valves may be taken. This test helps your doctor determine if the cause of an arrhythmia is coronary artery disease. This test also provides information about how well your heart muscle and valves are working.
- **Electrophysiology study (EPS):** A special heart catheterization that evaluates your heart's electrical system. Catheters are inserted into your heart to record the electrical activity. The EPS is used to find the cause of the abnormal rhythm and determine the best treatment for you. During the test, the arrhythmia can be safely reproduced and terminated.
- **Tilt table test (also called a passive head-up tilt test or head upright tilt test):** Records your blood pressure and heart rate on a minute-by-minute basis while the table is tilted in a head-up position at different levels. The test results may be used to evaluate heart rhythm, blood pressure and sometimes other measurements as you change position.

What treatments are available for patients with an arrhythmia?

Treatment depends on the type and severity of your arrhythmia. Sometimes, no treatment is needed. Treatments include medications, lifestyle changes, invasive therapies, electrical devices and surgery.

Medications

Antiarrhythmic drugs are medications used to convert the arrhythmia to a normal sinus rhythm or to prevent an arrhythmia. Other medications may include heart-rate-control drugs and "blood thinners", which reduce your risk of stroke or developing blood clots.

It is important that you know the names of your medications, why they are prescribed, how often and at what times to take them, what side effects may occur, and what medications you have previously taken for your arrhythmia.

Lifestyle changes

Arrhythmias may be related to certain lifestyle factors. The following tips can help reduce your risk:

- If you smoke, stop.
- Limit your intake of alcohol.
- Limit or stop using caffeine. Some people are sensitive to caffeine and may notice more symptoms when using caffeinated products, such as tea, coffee, colas and some over-the-counter medications.
- Avoid using stimulants. Beware of stimulants used in cough and cold medications and herbal or nutritional supplements. Some of these substances contain ingredients that cause irregular heart rhythms. Read the label and ask your doctor or pharmacist which medication is best for you.
- Your family may want to be involved in your care by learning to recognize your symptoms and how to start CPR if needed, for example, in the case of a life-threatening arrhythmia.
- If your irregular heart rhythm occurs more often with certain activities, you should avoid them.

Invasive therapies

Electrical cardioversion and catheter ablation are invasive therapies used to treat or eliminate irregular heart rhythms. Your doctor will determine the best treatment for you and discuss the benefits and risks of these therapies with you.

- **Electrical cardioversion:** Patients with persistent arrhythmias, such as atrial fibrillation, may not be able to achieve a normal heart rhythm with drug therapy alone. Electrical cardioversion delivers an electrical shock to your chest wall, which synchronizes the heart and allows the normal rhythm to restart. This procedure is done after you receive short-acting anesthesia.
- **Catheter ablation:** During ablation, energy is delivered through a catheter to tiny areas of the heart muscle. This energy can either “disconnect” the pathway of the abnormal rhythm, block the abnormal pulses and promote normal conduction of impulses, or disconnect the electrical pathway between the atria and the ventricles. Ablation is most often used to treat paroxysmal supraventricular tachycardia (PSVT), atrial fibrillation, atrial flutter, AV nodal re-entrant tachycardia and ventricular tachycardia. Ablation may be combined with other procedures to achieve optimal treatment.

Electrical devices

- **Permanent pacemaker:** A device that sends small electrical impulses to the heart muscle to maintain a normal heart rate. The pacemaker has a pulse generator (which contains a battery and a tiny computer) and leads (wires) that send impulses from the pulse generator to your heart muscle and sense the heart’s electrical activity. Pacemakers are mostly used to prevent the heart from beating too slowly. Newer pacemakers have features designed to help manage arrhythmias, optimize heart rate-related functions, improve synchronization, and eliminate the need for leads.
- **Implantable cardioverter-defibrillator (ICD):** A sophisticated electronic device used primarily to treat ventricular tachycardia and ventricular fibrillation — two life-threatening abnormal heart rhythms. The ICD constantly monitors the heart rhythm. When it detects a very fast, abnormal heart rhythm, it delivers energy to the heart muscle to cause the heart to beat in a normal rhythm again.

There are several ways an ICD can restore a normal heart rhythm:

- **Antitachycardia pacing (ATP):** When the heart beats too fast, a series of small electrical impulses are delivered to the heart muscle to restore a normal heart rate and rhythm.

- **Cardioversion:** A low-energy shock is delivered at the same time as the heartbeat to restore a normal heart rhythm.
- **Defibrillation:** When the heart is beating dangerously fast or irregularly, a higher energy shock is delivered to the heart muscle to restore a normal rhythm.
- **Antibrachycardia pacing:** Many ICDs provide backup pacing to prevent heart rhythms that are too slow.

Heart surgery

Surgery may be needed to correct arrhythmias that can't be controlled with medications or nonsurgical treatment methods. Arrhythmia surgery may also be recommended if you need surgery, such as valve or bypass surgery, to correct other forms of heart disease. The Maze and modified Maze procedures are two surgeries used to treat patients with atrial fibrillation.

Your doctor will determine the best treatment for you and discuss these options with you, including more information about surgical treatment if it is an appropriate treatment option.

Regular follow-up visits

You will need to visit your doctor for regular follow-up visits to:

- Make sure your arrhythmia is controlled
- Properly adjust your medications
- Evaluate the function of any implanted devices
- Make sure you are staying healthy and not having other medical problems

Your doctor will tell you how often you should visit. Call your doctor in between visits if your symptoms become more frequent or severe.

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