

## Arrhythmias

### Definition

An arrhythmia is a disorder of the heart rate (pulse) or heart rhythm, such as beating too fast (tachycardia), too slow (bradycardia), or irregularly.

### Alternative Names

Dysrhythmias; Abnormal heart rhythms; Bradycardia; Tachycardia

### Causes

Normally, your heart is able to pump blood out to your body without working any harder than is needed.

To help this happen, your heart has an electrical system that makes sure it contracts (squeezes) in an orderly way.

The electrical impulse that signals your heart to contract begins in the sinoatrial node (also called the sinus node or SA node). This is your heart's natural pacemaker.

- The signal leaves the SA node and travels through the two upper chambers (atria).
- Then the signal passes through another node (the AV node). Finally, it passes through the lower chambers (ventricles).
- Different nerve messages signal your heart to beat slower or faster.

Arrhythmias are caused by problems with the heart's electrical conduction system. Other areas of the electrical system may also send out signals. Other times, electrical signals are not able to move as easily or at all.

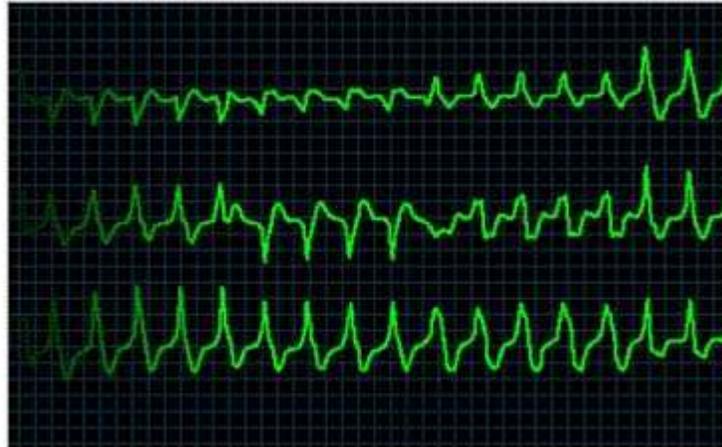
When an arrhythmia is present, your heartbeat may be:

- Too slow (bradycardia)
- Too quick (tachycardia)
- Irregular

Problems can occur anywhere along this conduction system, causing various arrhythmias. Examples include:

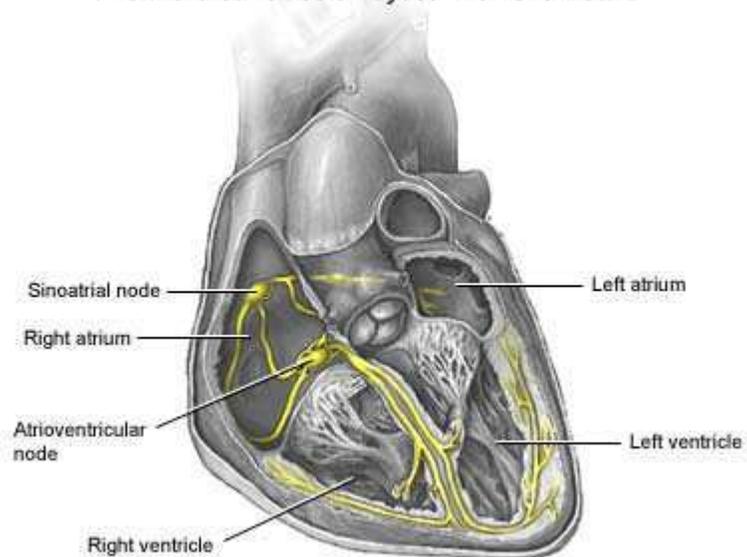
- Atrial fibrillation or flutter
- Atrioventricular nodal reentry tachycardia (AVNRT)
- Heart block or atrioventricular block
- Multifocal atrial tachycardia
- Paroxysmal supraventricular tachycardia
- Sick sinus syndrome

### Ventricular tachycardia



ADAM.

### Intrinsic conduction system of the heart



ADAM.

- Ventricular fibrillation
- Ventricular tachycardia -- a fast heart rate that originates in the lower chambers (ventricles)
- Wolff-Parkinson-White syndrome

The risk of getting a tachycardia or bradycardia varies greatly, depending on:

- Blood chemistry imbalances, such as abnormal potassium levels
- Cardiomyopathy -- a weakening of the heart muscle or a change in the heart muscle
- Heart failure
- Overactive thyroid gland
- Past heart attack

Arrhythmias may also be caused by some substances or drugs, including:

- Amphetamines
- Caffeine
- Cocaine
- Beta blockers
- Psychotropics
- Sympathomimetics

Sometimes anti-arrhythmic medications -- prescribed to treat one type of arrhythmia -- can actually cause another type of arrhythmia.

## Symptoms

An arrhythmia may be present all of the time or it may come and go. You may or may not feel symptoms when the arrhythmia is present. Or, you may only notice symptoms when you are more active.

Symptoms can be very mild when present, or they may be severe or even life-threatening.

Common symptoms include:

- Chest pain
- Fainting
- Fast or slow heartbeat (palpitations)
- Light-headedness, dizziness
- Paleness
- Shortness of breath
- Skipping beats - changes in the pattern of the pulse
- Sweating

## Exams and Tests

The doctor will listen to your heart with a stethoscope and feel your pulse. Your blood pressure may be low or normal.

The following tests may be performed to identify arrhythmias:

- Ambulatory cardiac monitoring with a Holter monitor (used for 24 hours), event monitor, or loop recorder (worn for 2 weeks or longer)
- Coronary angiography
- ECG
- Echocardiogram
- Electrophysiology study (EPS)

If an arrhythmia is detected, various tests may be done to confirm or rule out suspected causes. EPS testing may be done to find the arrhythmia and determine the best treatment, especially if a pacemaker or catheter ablation procedure is being considered.

## Treatment

When an arrhythmia is serious, you may need urgent treatment to restore a normal rhythm. This may include:

- Electrical "shock" therapy (defibrillation or cardioversion)
- Implanting a temporary pacemaker to interrupt the arrhythmia
- Medications given through a vein (intravenous)

Sometimes, getting better treatment for your angina or heart failure will decrease the chance of having an arrhythmia.

Medications may be used to prevent an arrhythmia from happening again, or to keep your heart rate from becoming too fast or too slow. These are called anti-arrhythmic drugs.

Some of these medicines can have side effects. Not all arrhythmias respond well to medications.

Cardiac ablation is a procedure used to destroy areas in your heart that may be causing your heart rhythm problems. Ablate means "to destroy."

An implantable cardiac defibrillator is placed in people who are at high risk of sudden cardiac death.

- You may need a defibrillator if you have had life-threatening bouts of ventricular tachycardia (VT) or ventricular fibrillation (VF), or if your heart is weakened, too large, and does not pump blood very well.
- As soon as arrhythmia begins, the ICD sends a shock to stop it, or a burst of pacing.

Pacemakers may be used for people who have heart problems that cause their heart to beat too slowly (bradycardia). Some pacemakers can be used to stop a heart rate that is too fast (tachycardia) or irregular.

## Outlook (Prognosis)

The outcome depends on several factors:

- The kind of arrhythmia -- whether it is supraventricular tachycardia, or a more dangerous arrhythmia such as ventricular tachycardia or ventricular fibrillation
- The overall pumping ability of the heart (ejection fraction)
- Whether you have heart disease (coronary artery disease, heart failure, valvular heart disease) and how well it can be treated

Some types of arrhythmias may be life-threatening if not promptly and properly treated.

With bradycardias treated with a permanent pacemaker, the outlook is usually good.

## Possible Complications

- Angina
- Heart attack
- Heart failure
- Stroke
- Sudden death

## When to Contact a Medical Professional

Call your health care provider if:

- You develop any of the symptoms of a possible arrhythmia
- You have been diagnosed with an arrhythmia and your symptoms worsen or do not improve with treatment

## Prevention

Taking steps to prevent coronary artery disease may reduce your chance of developing an arrhythmia. These steps include:

- Eating a well-balanced, low-fat diet
- Exercising regularly
- Not smoking

## References

Epstein AE, DiMarco JP, Ellenbogen KA, Estes NA 3rd, Freedman RA, Gettes LS, et al. ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the ACC/AHA/NASPE 2002 Guideline Update for Implantation of Cardiac Pacemakers and Antiarrhythmia Devices): developed in collaboration with the American Association for Thoracic Surgery and Society of Thoracic Surgeons. *Circulation*. 2008;117:e350-e408.

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