

Heart Rhythm Disorders

What Is an Arrhythmia?

An arrhythmia is a problem with the rate and or rhythm of the heartbeat. During an arrhythmia, the heart can beat too fast, too slow, or can be irregular. Arrhythmia that is too fast is called tachyarrhythmia. Arrhythmia that is too slow is called bradyarrhythmia. During irregular rate or rhythm, the heart may not be able to pump enough blood to the body. This lack of blood flow for a short period of the time also can damage the important organs and may result in significant damage to these organs and if prolonged it may result in loss of life.

Many arrhythmias are harmless, but some are not. The outlook for a person who has an arrhythmia depends on the type and severity of the arrhythmia. Even serious arrhythmias once recognised often can be successfully treated, many are cured needing no long term medications. Most people who have arrhythmias are able to live normal, healthy lives.

Arrhythmia (Tachyarrhythmia) that arise from upper chambers of the heart or junction between atrium and ventricles are called supraventricular arrhythmia and those that arise from the lower chambers (Ventricles) are called ventricular arrhythmia.

Although these are the main types of arrhythmia, some people may have premature beats either from upper or lower chamber of the heart, these are called premature beats. These are the most common type of arrhythmia. Some patients may feel this as skipped heartbeat. Most of the time, they need no treatment. Premature beats that occur in the atria (the heart's upper chambers) are called premature atrial contractions, or PACs. Premature beats that occur in the ventricles (the heart's lower chambers) are called premature ventricular contractions, or PVCs. Most of these are harmless, but rarely can lead to life threatening arrhythmias or ventricular dysfunction.

Supraventricular Arrhythmias

Supraventricular arrhythmias or tachycardia (SVT) are the heart rhythm disorders due to faster heart rates due to problems in the upper chambers or junction of the upper and lower chambers. The common types of supraventricular arrhythmias include

1. Atrial fibrillation (AF),
2. Atrial flutter,
3. Paroxysmal supraventricular tachycardia (PSVT), and
4. Wolff-Parkinson-White (WPW) syndrome.

Atrial Fibrillation

Atrial fibrillation is an irregular heart rhythm, caused by extremely rapid and chaotic electrical impulses that are generated in the heart's atria (the two upper chambers). This kind of rapid, chaotic electrical activity is called "fibrillation." When the atria begin fibrillating, three things happen.

1. First, the heart rate tends to become rapid and irregular. This leads to a fast and very irregular heart beat.

2. Second, when the atria are in atrial fibrillation, they are no longer contracting effectively. So the normal coordination between the atria and the ventricles is lost. As a result, the heart works less efficiently.

3. Third, because the atria are no longer contracting effectively, after a time (usually after about 24 hours) blood clots can begin to form in the atria. These blood clots can eventually break off and travel to the brain, producing a stroke.

While some people with atrial fibrillation have only minimal symptoms, in most cases the arrhythmia is very noticeable and quite disturbing. The most common symptoms are palpitations; easy fatigability, shortness of breath, giddiness and in patients with coronary artery disease (patients having blocks in the blood vessels supplying to heart) can have chest pain and patients who already have poor pumping function of the heart can have worsening of their heart failure symptoms.

In some patients, if the heart rate associated with atrial fibrillation is rapid enough and persists long enough (for at least several months), this arrhythmia can actually cause heart muscle weakness and heart failure. The direct consequence of atrial fibrillation, however, is the possibility of stroke.

In AF, blood can pool in the atria, causing blood clots to form. If a clot breaks off and travels to the brain, it can cause a stroke. Blood-thinning medicines that reduce the risk of stroke are an important part of treatment for people who have AF.

The most often AF is the result of other conditions that affect the health of the heart, such as high blood pressure, coronary heart disease, and rheumatic heart disease. In the developing country like ours rheumatic heart disease (sequelae still remains most common cause of atrial fibrillation. Other conditions also can lead to AF, including an overactive thyroid gland (too much thyroid hormone produced) and heavy alcohol use. The risk of AF increases with age. Sometimes AF and other supraventricular arrhythmias can occur for no obvious reason.

Atrial Flutter

Atrial flutter is similar to AF except that heart beat spreads through the atria in a fast and regular instead of irregular fashion leading to regular pulse. Atrial flutter is although less common than AF, it still has similar symptoms and complications.

Paroxysmal Supraventricular Tachycardia

PSVT is an abbreviation for “paroxysmal supraventricular tachycardia”, an intermittent heart racing or “palpitations”. It is usually related to an electrical abnormality in the heart (“wiring problem” that one is born with. There are several types of “short-circuit” in the electrical system of the heart. PSVT can be quite troublesome and even disabling but rarely life-threatening. A common electrical disorder is the Wolff-Parkinson-White (WPW) syndrome. Everybody has a normal electrical connection (AV node) that connects the upper and lower chambers of the heart. People with WPW have extra “wire” or pathway joining the upper and lower parts of the heart. This can cause heart racing by several different means. The other and perhaps most common cause of PSVT is called AV node or atrioventricular nodal re-entry. The AV node can develop a short-circuit so that the electrical signal can get “trapped” racing in a loop around the AV node.

Ventricular Arrhythmias

These arrhythmias start in the heart's lower chambers, the ventricles. This is a very dangerous and usually require medical care right away and if untreated can lead to serious consequences.. Ventricular arrhythmias include ventricular tachycardia and ventricular fibrillation (v-fib). Coronary heart disease, heart attack, a weakened heart muscle, and other problems can cause ventricular arrhythmias.

Ventricular Tachycardia

Ventricular tachycardia is a fast, regular beating of the ventricles that may last for only a few seconds or for much longer. Episodes that last for more than a few seconds can be dangerous. Ventricular tachycardia can turn into other, more serious arrhythmias, such as v-fib.

Ventricular Fibrillation

V-fib is similar to AF but it occurs in the lower chamber of the heart. The chaotic electrical signals make the ventricles fibrillate instead of pump normally. Without the ventricles pumping blood to the body, immediate cardiac arrest can result and lead to death within a few minutes. To prevent death, the condition must be treated right away with an electric shock to the heart called defibrillation. One of the most common causes of V-fib is during or after a heart attack or in patients with poor pumping function of the heart due to another disease. Torsades de pointes (torsades) is a type of v-fib that causes a unique pattern on a Electrocardiogram test. Certain medicines or imbalanced amounts of potassium, calcium, or magnesium in the bloodstream can cause this condition. People who have a disease called long QT syndrome are at increased risk for having this problem. People who have this condition need to be careful about taking certain antibiotics, heart medicines, and over-the-counter products.

Bradycardia

Having bradycardia or bradyarrhythmia means that the heart beats very slowly. For most people, a heart rate of 60 to 100 beats a minute while at rest is considered normal. If the heart beats less than 60 times a minute, it is slower than normal. A slow heart rate can be normal and healthy. Or it could be a sign of a problem with the heart's electrical system. Healthy young adults and athletes often have heart rates of less than 60 beats a minute. In other people, bradycardia is a sign of a problem with the heart's electrical system. It means that the heart's natural pacemaker is not working right or that the electrical pathways of the heart are disrupted. In severe forms of bradycardia, the heart beats so slowly that it does not pump enough blood to meet the body's needs. This can cause loss of consciousness which recovers(fainting) but can be life-threatening also.

What causes bradycardia?

Bradycardia can be caused by:

1. Changes in the heart that are the result of aging.
2. Diseases that damage the heart's electrical system. These include coronary artery disease, heart attack, and infections such as endocarditis and myocarditis.
3. Conditions that can slow electrical impulses through the heart. Examples include having a low thyroid level (hypothyroidism) or an electrolyte imbalance, such as too much potassium in the blood.
4. Some medicines for treating heart problems or high blood pressure, such as beta-blocker, and digoxin.

Risk Factors for Arrhythmia

Arrhythmias are usually more common in people who have diseases or conditions that weaken the heart, although they can occur in people with structurally normal heart also. The most common risk factors associated with arrhythmias are

- i. Coronary artery disease, commonly known as Heart attack
- ii. Heart failure (commonly due to reduction in heart's pumping function)
- iii. Diseases affecting valves of the heart in which heart chambers can be dilated
- iv. Heart tissue that is too thick or stiff that leads to dilated upper chamber
- v. Defects present at birth that affect the heart's structure or function

Other conditions that also can raise the risk for arrhythmias, such as:

- i. Hypertension (High blood pressure)
- ii. Infections that damage the heart muscle
- iii. Diabetes
- iv. Sleep apnoea, in which patients may have obstruction to airway during the sleep

Some patients may also develop post heart surgery, after ingestion of drugs like cocaine, amphetamines, and hormonal disturbances like thyroid excess or low.