

Atrial Tachycardia

Atrial tachycardia is an electrical circuit originating in the upper or atrial chambers. This electrical circuit or focus takes over and generates rapid impulses across the atrial chambers. These impulses are transmitted to the ventricular chambers resulting in a rapid rate. These arrhythmias may originate from a variety of places across the atria. They may exist as an isolated problem or be related to an ongoing structural problem within the heart.

Atrial Fibrillation

Atrial fibrillation is a rapid chaotic rhythm that originates from multiple sites within both atrial chambers. Small circuits simultaneously exist throughout the atrial chambers in a dynamic changing pattern. These circuits give rise to rapid impulses that bombard the connection between the top and bottom chambers of the heart, the AV node. Only some of these impulses can get through this structure which serves as a natural bottleneck against too rapid stimulation of the bottom chambers, the ventricles. Nonetheless, the ventricles will be stimulated in a more rapid fashion than normal and the pattern will be irregular, also differing from the norm. This rapid, irregular pattern gives rise to the symptoms of atrial fibrillation, such as palpitations, rapid heart beat, chest discomfort, shortness of breath and dizziness. Contributing to the symptoms is the failure of the atria and the ventricles to have coordinated pumping action as they do in the normal situation, which can also lead to a less efficient cardiac pump. In some individuals, failure of the atrial chambers to contract properly can make them more prone to the formation of clot which can travel to distant organs where they may cause damage.

Atrial Flutter

Atrial flutter also involves rapid firing of the electrical impulse as in atrial fibrillation, but the rhythm or heart beat is more regular or organized. The rhythm is due to reentry within the atria. The electrical impulse travels in circles arriving back at the same point, usually around 300 times per minute. Signs and symptoms often experienced with atrial flutter are similar to those of atrial fibrillation, such as a pounding heart rate or pulse, shortness of breath, or dizziness.

AV Nodal Reentrant Tachycardia

AV nodal reentrant tachycardia is the most common form of paroxysmal supraventricular tachycardia or PSVT. Patients afflicted with this arrhythmia do not usually have other structural problems with their heart. The arrhythmia originates in the tissues near the AV node, the electrical structure that transmits impulses between the upper and lower chambers of the heart. Susceptible individuals will have two pathways that can channel impulses to and from the AV node. Under the right conditions, usually following a premature beat, these pathways can form an electrical circuit. An impulse will revolve around this circuit and each revolution will lead to impulse propagation to the ventricles, and thus a rapid heart beat.

Wolff-Parkinson-White Syndrome (WPW)

Many patients with WPW syndrome are otherwise healthy and often quite young when this arrhythmia is diagnosed. This type of arrhythmia involves an extra electrical pathway from the atria to the ventricles. Known as the "accessory pathway," electrical impulses may be transmitted rapidly via this pathway and the rapid rhythm sometimes can be dangerous. Other times, the pathway allows a circuit to form leading to a rapid arrhythmia. The most common symptoms people experience with WPW syndrome are palpitations, dizziness, and chest discomfort. Some people with WPW do not have arrhythmias.

Ventricular Tachycardia

Ventricular tachycardia is an arrhythmia that originates in the pumping chambers, or the ventricles. It is usually seen in patients who have damaged ventricular chambers, frequently in the aftermath of a heart attack or myocardial infarction. Scar tissue in the ventricles will alter many local electrical properties and set up conditions favorable to formation of a local electrical circuit. Under specific circumstances, the circuit can be activated leading to a rapid arrhythmia arising from a single spot within the pumping chambers. Because this is more rapid than the heart's natural electrical activity, it takes over the heart beat for the duration of the arrhythmia. Because it is so rapid, and is occurring in a damaged heart, and because the electrical sequence does not follow the normal pattern, the heart may not function properly or efficiently and low blood pressure may result.

In its most extreme form, ventricular tachycardia can lead to fatal consequences. This is a potentially dangerous arrhythmia that almost always requires therapy. In some patients, ventricular tachycardia may occur when there is no structural heart disease. This "idiopathic" form often arises from the right ventricle and less often from the left ventricle. These arrhythmias are less dangerous, but also often require therapy.