

WOLFF-PARKINSON-WHITE SYNDROME

What is Wolff-Parkinson-White (WPW) Syndrome?

WPW syndrome is a condition in which episodes of fast heart rates (tachycardia) occur because of an abnormal extra electrical pathway in the heart.

Symptoms:

- Palpitations
- Dizziness
- Lightheadedness
- Fainting
- Some patients have no symptoms

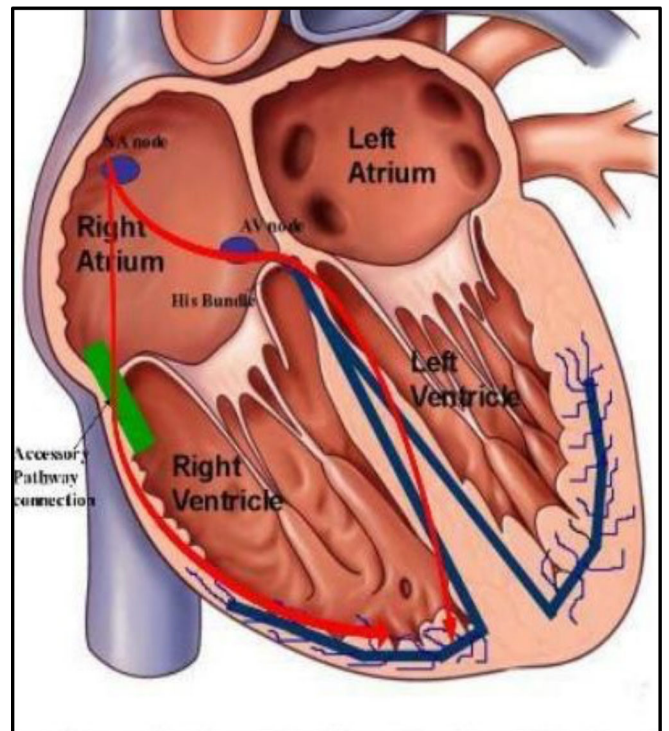
Normal cardiac conduction:

A normal heartbeat is started by an electrical signal that comes from the heart's natural pacemaker, the sinoatrial (SA) node, located at the top of the right atrium. The electrical signal travels through the atria and reaches the atrioventricular (AV) node. After crossing the AV node, the electrical signal passes through the bundle of His. This bundle then divides into branches that extend into the right and left ventricles. The electrical signal travels down the left and right bundle branches and eventually reach the muscle cells of the ventricles, causing them to contract and pump blood to the body.

Conduction in WPW

Normally the only connection between the atrial and ventricles is at the AV node. Patients with WPW syndrome have an extra electrical pathway between the atrial and ventricles known as an accessory pathway. This abnormal pathway directly connects the atria and ventricles at a site other than the AV node, allowing the electrical signal to travel from the atrial to the ventricles more quickly than normal bypassing the AV node where the electrical signal travels more slowly. This allows the impulse travelling through the accessory pathway to reach the ventricles earlier causing what is termed "preexcitation."

Patients who have recurring tachycardia because of this abnormal pathway are said to have WPW syndrome. Some patients have the WPW pathway but no tachycardia. These patients do not have WPW syndrome, but may develop it at some point. These patients are said to have WPW pattern which can be detected on a routine electrocardiogram (ECG).



Diagnosis

Electrocardiogram (ECG): The WPW pattern can be detected by an ECG, even while the patient is in a normal rhythm. Conduction through the accessory pathway produces a characteristic ECG pattern. A classic finding is a short PR interval (the time for conduction between atria and ventricles) and a delta wave, which reflects early conduction to the ventricles through the accessory pathway. Diagnosis is based upon ECG evidence of the accessory pathway and the presence of a related tachycardia (fast heart rate).

Electrophysiology Study: In some patients, a procedure called an Electrophysiology Study may be done. This can:

- Determine the reason for tachycardia
- Identify the location of an accessory pathway
- Determine if the accessory pathway has dangerous properties

Causes of tachycardia

Atrioventricular reentrant tachycardia (AVRT): This is the most common mechanism in WPW. In AVRT, an electrical impulse travels down one pathway, either through the AV node or the accessory pathway, and then back up the other, creating a repeating loop. This circular or “reentrant” electrical activity sends impulses to the ventricles at an abnormally high rate, causing the heart to beat from 140 to 250 beats per minute (bpm).

Atrial fibrillation: Less commonly, patients with WPW can develop an abnormal rhythm called atrial fibrillation, in which the atria beat in an uncoordinated manner at a rate of 350 to 600 bpm. The AV node usually blocks most of these impulses, so the ventricular rate is less than 170 bpm. However, with WPW conduction from the atria to ventricles can be rapid. The ventricles may beat at a rate of 200 bpm or more, and there is a risk that the heart can beat up to 300 bpm. This rapid heart rhythm can result in cardiac arrest and sudden death. It is because of this risk patients with symptomatic WPW are urged to undergo catheter ablation.

Treatment

Many patients with the WPW pattern on ECG do not experience tachycardia and do not develop any symptoms. These patients do not need treatment and in some young patients, conduction via the accessory pathway disappears as they grow older.

Patients with WPW syndrome require treatment if/when they have an episode of tachycardia. Treatment focuses on:

- **Stopping the tachycardia:** Coughing or bearing down, medications, electrical cardioversion
- **Prevention of recurrence:** Catheter ablation of the accessory pathway is treatment of choice for patients with WPW syndrome with symptomatic tachycardia