Wolff-Parkinson-White Syndrome

Wolff-Parkinson-White syndrome is an arrhythmia syndrome. Some patients can display a WPW pattern but not have symptomatic WPW syndrome. Those that have WPW syndrome have ventricular pre-excitation caused by an accessory conduction pathway. It can result in various arrhythmias including supraventricular tachycardia and atrial fibrillation. On ECG, delta waves, a shortened PR interval and a widened QRS will be seen. Asymptomatic patients who have the ECG pattern but are otherwise healthy generally do not require treatment. Patients with arrhythmias, however, must be treated. Definitive treatment of Wolff-Parkinson-White requires procedural ablation of the accessory pathway.



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WPW Pattern vs. WPW Syndrome

Wolf Tracks vs. Wolf

There are two classifications of WPW. Patients with WPW pattern have ECG findings but do NOT have symptomatic arrhythmias. In contrast, patients with WPW syndrome have both classic WPW findings on ECG and symptomatic arrhythmias. Both WPW pattern and WPW syndrome occur in less than one percent of the population. However, WPW pattern is 10-100x more common.

Pathophysiology

Ventricular Pre-excitation Syndrome

Vent Pre-excited Person

WPW is a type of ventricular pre-excitation syndrome. In normal cardiac conduction, the atria and ventricles are electrically separate from one another, and electrical impulses must pass through the atrioventricular (AV) node and His-Purkinje system. Patients with WPW and other “pre-excitation” syndromes have alternative, or “accessory” pathways which allow electricity to flow directly from the atria to the ventricles, bypassing the AV node and leading to “premature” activation of the ventricles.

Accessory Conduction Pathway

Accessory Conductor Path

In WPW, an accessory conduction pathway exists which directly connects the atria and ventricles. This pathway is called the “bundle of Kent.”

Signs & Symptoms

Supraventricular Tachycardia

Super-V-Tac

Several different types of supraventricular arrhythmias can occur with WPW, the most common of which is known as AV reentrant tachycardia (AVRT). In AVRT, the electrical signal passes from the AV node to the ventricles in the normal fashion but subsequently passes back into the atria through the bundle of Kent - hence the name, “reentrant.” As with any form of SVT, patients can present with palpitations, dizziness, syncope/presyncope, and chest pain.

Atrial Fibrillation

Atria-heart Alarm-clock

Another potential complication of WPW is atrial fibrillation, which itself is another type of supraventricular tachycardia. It occurs in ~15-30% of patients. It’s characterized by a rapid atrial rate which can bypass the AV node and lead to very rapid ventricular response rates, even ventricular fibrillation. Treatment can involve antiarrhythmics or electrical cardioversion. Avoid AV node blocking agents like adenosine and beta blockers as these agents further promote conduction through the accessory pathway and increase the risk of ventricular fibrillation.

Diagnosis

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Shortened PR Interval

Short PRada Purse

Patients with WPW typically have a shortened PR interval of <0.12 seconds, reflecting faster transmission of the electrical impulse from the atria to the ventricles.

Delta Wave

Delta Wave

Diagnosis of WPW pattern usually only requires a surface ECG. The “delta wave” is a key clinical finding seen in WPW, seen on ECG as a slurred, broad upstroke of the QRS complex. It is typically first recognized as an incidental finding on an ECG obtained for another clinical indication.

Widened QRS

Wide Queen's Rocket Ship

Patients with WPW typically have a widened QRS interval of >0.12 seconds.

Treatment

No Treatment if Asymptomatic

No Treatment with Thumbs-up

As previously mentioned, WPW pattern is far more common than WPW syndrome. These patients are asymptomatic and usually not treated. However, certain asymptomatic subgroups such as pediatric patients and those with congenital heart defects or cardiomyopathies may be considered for treatment as they are at increased risk for arrhythmias in the future.

Treat Arrhythmia

Fix Broken Arrhythmia-drum

In patients presenting with symptomatic WPW (i.e. WPW syndrome), treatment is required. Treatment depends on the type of arrhythmia as well as the acute stability of the patient. In severe or persistent cases of WPW, invasive procedures may be warranted like ablation of the accessory pathway.

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