An Anxious Patient: 
Reviewing Asymptomatic WPW

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Wendy’s WPW

Wendy, 30, presents with a significant history of anxiety and depression. Her ECG demonstrates a short PR interval and a Δ wave consistent with Wolff-Parkinson-White Syndrome ( WPW) (Figure 1). Holter monitoring reveals palpitations associated with sinus tachycardia and Δ waves were persistent throughout the recording.

Is Wendy symptomatic or asymptomatic? Does she require an electrophysiology study (EPS) referral?

The symptoms Wendy experienced while wearing the Holter monitor are not related to her accessory pathway (AP). If these represent her usual palpitations, she routinely would not require further investigation.

The most important risk of WPW is sudden death associated with atrial fibrillation (AF) with rapid conduction to the ventricles across the AP. Overall, the risk is very low and is especially low in patients who are asymptomatic. Symptomatic paroxysmal supraventricular tachycardia (PSVT) is much more likely to be associated with WPW. Patients in certain occupations should be considered for an EPS if it potentially jeopardizes their ability to work safely. This would include:

• pilots
• firefighters and
• truck drivers.

Symptomatic WPW patients should be considered for EPS referral.1-3 In asymptomatic patients, an EPS assessment is generally not recommended.1 Patients with WPW should be considered for an echocardiogram to rule-out underlying structural cardiac abnormalities, such as Ebstein’s anomaly.

For more on Wendy, see page 21.

Figure 1. Wendy’s ECG on presentation with Δ waves marked.
The prevalence of Wolff-Parkinson-White Syndrome (WPW) is approximately 0.1% to 0.3% of the normal population. WPW occurs as a result of abnormal conduction tissue between the atria and ventricles. This is often called a Bundle of Kent and allows the ventricle to be pre-excited electrically from the atria. Normally, the ventricles can only be activated by an impulse passing through the atrioventricular (AV) node. In WPW, the ventricle has partial early excitement via an alternate pathway. It is typically manifested by a short PR interval (<120 ms) and the presence of a ∆ wave (a slurred upstroke of the initial part of the QRS complex) reflecting premature activation of a portion of the ventricles.

Symptomatic tachyarrhythmias occur in WPW patients with a lifetime incidence of 40% to 50%, occurring at a rate of 0.7% annually.4 It is widely accepted that the symptomatic WPW patient should be evaluated for cardiac electrophysiology studies (EPS) and possible ablation.

What are the low risk features of WPW which suggest a longer refractory period over the AP? What are high risk features?

Features of lower risk include:
- a block in the accessory pathway (AP), with sudden disappearance of ∆ wave during exercise,
- intermittent pre-excitation and
- at invasive EPS, an effective refractory period > 270 ms may suggest lower risk.5

The most important high risk factors are syncope and rapid atrial fibrillation (AF) with the shortest RR intervals being < 250. Invasive EPS may also identify higher risk patients when very short AP refractory periods are measured, or when AF is induced demonstrating very rapid pre-excited ventricular rates.

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Should the asymptomatic patient be referred for EPS?

The therapeutic goal for an asymptomatic patient is to improve prognosis. A recent single center study concluded that asymptomatic patients are at increased risk of developing ventricular fibrillation (VF) and should undergo invasive EPS.6 However, it is suggested elsewhere that the true incidence of VF has been overestimated due to selection bias with studies conducted in larger tertiary care centers.7 The mortality rate of patients with WPW is currently estimated at 0.02% to 0.15% annually.8,9 Others have challenged the recommendation for routine EPS, suggesting that the risk of fatal...
arrhythmia must be weighed against risk of death and complications due to ablation. Large population-based studies appear to support a consensus strategy that EPS and ablation should, at this time, not be recommended for asymptomatic patients, with the exception of those in “higher-risk” occupations or based otherwise on individual circumstances.10

The current recommendations of the Heart Rhythm Society (HRS), American College of Cardiology, American Heart Association and Canadian Cardiovascular Society support invasive risk stratification in symptomatic patients,1,2 but only in asymptomatic patients who are considered to be at higher risk.1

What are the reported rates of serious complications from EPS and AP ablation?

Major complication rates are estimated to be 1% for EPS5 and 3% for AP ablation.5,11 Higher risks have been reported in a few series, but most experienced centers now have acceptably low risks associated with

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**More on Wendy...**

Two years later, Wendy was reassessed and was found to have increased palpitations. An event recorder was ordered, as well as an EPS referral. Her event recorder revealed rapid, wide complex tachycardia at 160 bpm associated with her palpitations on one occasion, while other palpitations were still associated with sinus rhythm. She underwent an EPS.

Supraventricular tachycardia was very easily induced which rapidly degenerated into AF. There was an extremely fast ventricular response with her AF, requiring urgent cardioversion (Figure 2). The AP was found to be on the epicardial surface of the heart and could not be ablated via an endocardial approach. Subsequently, Wendy underwent a successful and uncomplicated epicardial ablation of her AP with resolution of the Δ wave on her post-procedure EKG (Figure 3).13

Wendy did not have symptoms related to WPW at her initial assessment. Several years later she developed symptoms and more aggressive investigation was warranted. Further investigation and treatment revealed symptomatic tachycardia, with induction of rapid AF during EPS and successful ablation of an epicardial AP. Almost all APs can now be treated with catheter ablation using an endocardial approach. Rarely, an epicardial high risk pathway may require epicardial instrumentation (as in Wendy’s case) or even surgery.

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Figure 2. ECG showing rapid AF with 1:1 conduction during EP study.
Although rare, major complications could include:
- cardiac tamponade,
- heart block requiring a pacemaker,
- pulmonary embolism,
- stroke,
- infection,
- induction of atrial and ventricular tachyarrhythmias and
- death.

**Conclusion**

In most cases, asymptomatic patients with a Δ wave present on ECG do not require invasive EPS. In patients whose occupation or activities may make syncope or palpitations more concerning, more aggressive investigation and intervention may be warranted. Patients with pre-excitation (Δ wave) on the resting ECG should be counseled to report palpitations, syncope and near syncope, in which case, more aggressive investigations should be considered.

In most asymptomatic patients, invasive risk stratification is not indicated unless future evidence suggests otherwise.

**References**