Risk of Sudden Death in Wolff-Parkinson-White Syndrome
How High Is the Risk?

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In 1930, Dr Louis Wolff, Sir John Parkinson, and Paul Dudley White described a case series of 11 patients with a syndrome that now bears their name. The first patient with a short PR interval, ventricular preexcitation, and supraventricular tachycardia was described by Cohn and Fraser in 1913. Wood et al postulated the accessory pathway (AP) as its anatomic substrate in 1942, and a large population series reported the prevalence of preexcitation to be 0.15% in 1962. Reports in 1971 and 1979 described sudden cardiac death (SCD) in patients with Wolff-Parkinson-White (WPW) syndrome related to atrial fibrillation (AF) that was conducted rapidly over the AP with a short refractory period that deteriorated into ventricular fibrillation (VF). The first operative ablation of an AP was performed by Sealy in 1967, whereas Weber and Schmitz described the first endocardial catheter ablation of an AP in 1983.

The evolution of curative catheter ablation has clearly become the treatment of choice in the patient with substantive symptoms. A continuing controversy has been the use of this therapy in the asymptomatic or less symptomatic individual, and the central looming theme is the incidence of SCD as part of the natural history of this entity and our ability to predict it. The incidence of SCD in symptomatic patients with WPW syndrome was initially reported in the late 1960s and is estimated to be in the range of 0.25% per year, or 3% to 4% over a lifetime.

A number of risk factors for development of SCD have emerged, including (1) shortest preexcited RR interval (SPRRI) during AF and its surrogate, the antegrade ERP of 250 ms, collectively termed malignant arrhythmia. The majority of WPW syndrome patients remained asymptomatic or had only a “benign” recurrence of arrhythmia over a 5-year period (92%), with the majority no longer taking antiarrhythmic medications (98%). Four patients (1.1%) experienced hemodynamic collapse (preexcited AF in 3 and VF in 1) that required cardiopulmonary resuscitation and/or defibrillation (the circumstances and precipitating factors before hemodynamic collapse are not reported). An additional 25 patients experienced presyncope or syncpe during follow-up. Multivariate analysis demonstrated that the antegrade ERP of the AP and AVRT that degenerated to preexcited AF during electrophysiological studies predicted the occurrence of the primary end point. Although the specificity and PPV of AF that resulted from AVRT for predicting the primary end point can be calculated to be 99% and 82%, respectively, this was only observed in 31% (sensitivity) of patients. Other studies have demonstrated sustained AF to have a PPV of...
only 18% and an NPV of 100% (with use of more rigorous end points). The inductibility of AVRT has been reported to have PPVs that vary widely between 0%12 and 70%,13 with NPVs >95%12–14 for prediction of subsequent AVRT. To be clear, of the 29 patients in the present study with the end point, 3 had rapid AF and 1 developed VF. Although the latter were not specifically identified, all but 3 of the total group of 29 patients had an AP ERP ≤250 ms (2 with 270 ms, 1 with 260 ms). If analyzed with the 4 cases of hemodynamic collapse alone (given that SCD is exceptionally rare, and the surrogate end point in this study is a collective that includes presyncope and syncope), the PPV of a short ERP from this study is at best 15%, and NPV is 100%.

The merits of including presyncope or syncope as an end point need to be considered. The association of supraventricular tachycardia with high vagal tone has been reported to provide both high sensitivity and high PPV.7 The association of supraventricular tachycardia with high vagal tone has been reported to provide both high sensitivity and high PPV.7 The point need to be considered. The association of supraventricular tachycardia with high vagal tone has been reported to provide both high sensitivity and high PPV.7 The association of supraventricular tachycardia with high vagal tone has been reported to provide both high sensitivity and high PPV.7 The association of supraventricular tachycardia with high vagal tone has been reported to provide both high sensitivity and high PPV.7 The association of supraventricular tachycardia with high vagal tone has been reported to provide both high sensitivity and high PPV.7 The association of supraventricular tachycardia with high vagal tone has been reported to provide both high sensitivity and high PPV.7

In the final analysis, the major limitation of the present study by Pappone et al10 and other studies purporting to predict risk in the WPW syndrome is the very low event rate, especially in those with no minimal symptoms. The selection of the primary end point is germane to this. At one extreme, the only indisputable end point in our context is SCD or VF. If one sticks to this end point, it is not possible to demonstrate any meaningful risk stratification that provides both high sensitivity and high PPV. One can circumvent this problem by adding other parameters to achieve more end points. Unfortunately, other end points added, such as pre-syncope, syncope, or any nonsustained arrhythmia, are of more debatable clinical significance.

What can be taken from the present study? It is certainly a large and well-executed study and is likely the closest that will be achievable to a “natural history” study of the patient presenting with symptoms in the modern era. It verifies the very low mortality in general in the WPW syndrome, even in patients with a short ERP. It supports the contention that both medical therapy and no therapy are reasonable options, even in the symptomatic patient who is clearly told of the therapeutic options, along with the pros and cons of ablation, and who elects not to have ablation. It verifies that the group “at risk” is that with a measure of short AP refractoriness. The study does not circumvent the inherent major limitation of attempting accurate risk stratification with so few meaningful end points. Management will always be based on the preference of a well-informed patient who balances a very small immediate ablation risk with a very small longer-term risk without ablation.

Disclosures

None.

References

2. Hiss RG, Lamb LE. Electrocardiographic findings in 122,043 individuals. 
6. Wellens HJ. Should catheter ablation be performed in asymptomatic patients with Wolff-Parkinson-White syndrome? When to perform catheter ablation in asymptomatic patients with a Wolff-Parkinson-White electrocardiogram. 
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