Diagnosis of Wolff-Parkinson-White Syndrome in a 19-Year-Old Collegiate Football Player Owing to a Routine Clinical Visit: A Case Report

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Abstract

Wolff-Parkinson-White (WPW) syndrome is a heart disorder characterized by an additional electrical pathway from the atria to ventricular chambers and episodes of tachycardia. Although the incidence of WPW is relatively low, the pre-excitation syndrome can result in sudden cardiac death, with a higher prevalence noted in younger patient populations. We present a 19-year-old male collegiate football player in whom WPW syndrome was diagnosed during a checkup at a sports-medicine clinic for a rash on his back. Radiofrequency ablation resulted in successful treatment of WPW syndrome, and the patient gradually returned to increasing levels of sports-related activity. Orthopaedic physicians should be aware of the importance in asking simple questions such as "What else can we do for you today?" to possibly reveal severe conditions that may require multidisciplinary treatment.

Introduction

Wolff-Parkinson-White (WPW) syndrome was first described by a 1930 study[1] on patients who had episodes of arrhythmia. Later research found anatomical evidence of an anomalous conducting tissue that confirmed electrocardiogram (ECG) findings of pre-excitation, including delta waves (slurred upstroke of QRS complex), short PR intervals (< 120 m/s), and abnormalities in ventricular repolarization.[2] The prevalence of ECG patterns suggestive of WPW has been estimated at 0.25% of the general population[3,4] and higher in younger patients with asymptomatic conditions.[5-7] WPW syndrome accounts for at least 1% of sudden cardiac death (SCD) in athletes, with a maximum risk of 0.45% to develop into SCD.[8,9]

Treatment options for WPW syndrome include transcatheter ablation and use of antiarrhythmic medications. Results of treatment with ablation have been about 96% successful, and 3% to 4% of patients have complications.[10] Use of flecainide and propafenone have been effective in 85% of patients who cannot undergo ablation, although side effects have been common. In patient-athletes with WPW syndrome, transcatheter ablation has been recommended for treatment because use of antiarrhythmic medications may hinder the level of athletic performance.[11]

Return to activity after treatment has depended on findings of ECG and follow-up non-invasive cardiac tests. Return to competitive sports of patients has been reported within 1 week after undergoing ablation.[11] We performed radiofrequency ablation (RFA) in a 19-year-old athlete-patient for successfully treating asymptomatic WPW syndrome. Simple questions asked during a routine visit at a sports-medicine clinic for initially evaluating a rash resulted in timely diagnosis of the disorder and subsequent multidisciplinary treatment, with a noted return to previous levels of sports-related activity.

Case Report

A 19-year-old male collegiate football player presented to our sports-medicine clinic for evaluation of a rash on his back. Pityriasis rosea was diagnosed and symptomatic treatment was administered. Before leaving, the patient was asked whether he would like to discuss anything else and revealed that he had "passed out" three times in the past year. His first syncopal episode occurred with prodrome described as "feeling hot, flushed, and dizzy" followed by quick recovery of senses. The second and third occurrences were similarly described. No symptoms of cardiac stress were noted with the episodes, which were not reported to an athletic trainer, nurse, or physician. The patient did not note any palpitations, racing heartbeat, chest pain, chest pressure, or shortness of breath.

His medical history did not include SCD, genetic heart conditions, use of pacemaker and defibrillator implants, or unexplained syncopal episodes and seizures. Vital signs and findings of physical examination were normal. An ECG was ordered from an outside facility, with laboratory

tests on complete blood count, levels of thyroid stimulating hormone and free T4, and comprehensive metabolic panel. Results of the tests were within normal range, and the ECG was not yet obtained by the patient.

The patient returned to our clinic at 1 week after initial presentation and reported another episode of syncope that day followed by quick recovery after football practice. Again, no symptoms of cardiac stress were noted and findings of physical examination were normal. He did, however, have a slight viral upper respiratory infection. Because the syncope was possibly related to exercise, physical activity was limited until the patient had a complete cardiac workup.

Findings of ECG showed delta waves, short PR intervals, and T-wave inversions (Figure 1). Electrophysiological evaluation was requested and the diagnosis of pre-excitation was confirmed. An echocardiogram (echo) showed findings negative for valvular heart disease. Results of a stress test were normal, with loss of pre-excitation before peak of exercise. Furthermore, a tilt-table test was performed and results were negative for vasovagal syncope. A new echo of the patient in resting position showed a left ventricular ejection fraction (LVEF) of 46%, with a mildly dilated left ventricle, mild global hypokinesis, and no valvular or structural heart diseases. Findings of magnetic resonance imaging (MRI) were similar to the echo, with a reduced LVEF and mildly diffused hypokinesis but no evidence of fibrosis or inflammatory factors.

It was believed that reduced LVEF could be caused by viral myocarditis owing to the viral upper respiratory infection at the time of his most recent episode, or possibly resulting from prolonged periods of intense exercise. Inflammatory and infiltrative processes were not confirmed by tests on erythrocyte sedimentation rate, C-reactive protein levels, antinuclear antibody count, iron studies, serum protein electrophoresis, and urine protein electrophoresis. Results of each test were within normal range; similarly, radiographs of the chest did not reveal hilar adenopathy that is suggestive of sarcoidosis.

After re-evaluation of the patient, treatment with electrophysiologic study or RFA were recommended, which were considered safe because the shortest pre-excited PR interval measured at 250 m/s. RFA was performed, in which the accessory pathway was identified and ablated in the right anteroseptal location, without complications, despite close proximity between the pathway and the normal conduction system. After this procedure, the ECG showed normal PR intervals without delta waves.

Almost immediately after his procedure, the patient expressed feeling better. He was considerably less fatigued than in the past year, and he had no recurrent episodes of syncope or presyncope. The most recent ECG (5 weeks after RFA) showed normal levels of PR intervals without delta waves or T-wave inversions (Figure 2). Other findings of sinus arrhythmia, J-point elevation, and sinus bradycardia were consistent with symptoms of an athletic heart. The most recent echo, obtained 3 months after his previous echo, showed improvement with LVEF from 51% to 55% with mild global hypokinesis. The patient has been gradually increasing his level of activity, with an expected return to full activity.

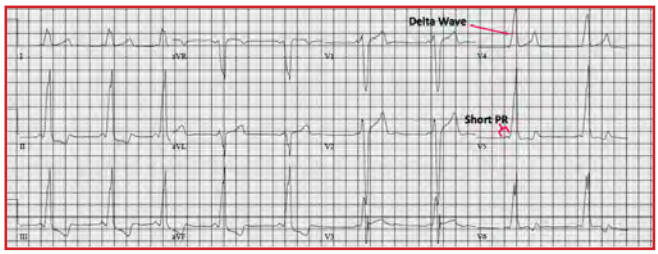

Figure 1. Electrocardiogram of the patient at 1 week after initial presentation, showing delta waves and short PR intervals, which confirmed diagnosis of Wolff-Parkinson-White syndrome.

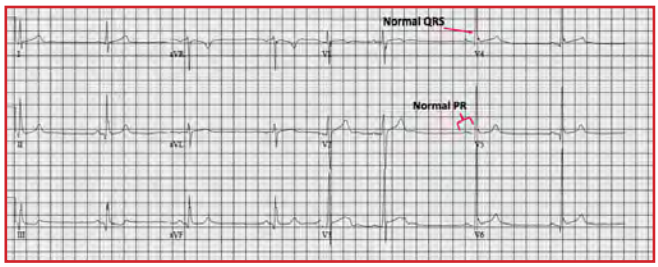

Figure 2. Electrocardiogram of the patient at 5 weeks after treatment with radiofrequency ablation, showing successful resolution of patterns suggestive of Wolff-Parkinson-White syndrome, as noted by normalized levels of PR intervals and delta waves (QRS complexes).

Discussion

The presence of pre-excitation patterns on the initial ECG should raise concerns about risk of SCD, especially in younger athletes. In the current case, diagnosis of WPW syndrome was prompted by a typical clinical checkup for evaluating an unrelated rash. Accurate diagnosis and treatment were complicated by the presence of reoccurring syncope. Notably, WPW syndrome has not typically been associated with a reduced LVEF as seen in our patient, and no case reports have described this connection. The presence of low LVEF on echo and MRI images are typically unrelated to pre-excitation patterns, but atrial fibrillation tends to occur more often in patients with reduced LVEF.

Based on possible associated symptoms and higher risk of developing atrial fibrillation in the current case, the electrophysiologic study was strongly recommended for

treatment, and findings showed a high-risk pathway. RFA was successful for treating our patient, and symptoms of cardiomyopathy showed signs of recovery. The risk of SCD was minimized to compare with normal populations, and the patient resumed his physical activities without further symptoms.

The findings of the current case emphasize the importance of asking overlooked questions such as "What else can we do for you today?" to patients seen in orthopaedic clinics. Such questions may be crucial in diagnosing potentially life-threatening conditions and allowing athlete-patients to return to previous levels of sports-related activity. Because conditions unrelated to the musculoskeletal system may be noted, the complete health of the patient should be prioritized by physicians, with multidisciplinary effort for successful treatment.

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Conflict of Interest

The authors report no conflicts of interest.

Informed Consent

The patient was informed that the data concerning the case would be submitted for publication, and he provided verbal consent.

References

1. Wolff L, Parkinson J, White PD. Bundle-branch block with short P-R interval in healthy young people prone to paroxysmal tachycardia: 1930. Ann Noninvasive Electrocardiol 2006;11(4):340-53.
2. Pick A, Katz LN. Disturbances of impulse formation and conduction in the preexcitation (WPW) syndrome; their bearing on its mechanism. Am J Med 1955;19(5):759-72.
3. Kobza R, Toggweiler S, Dillier R, et al. Prevalence of preexcitation in a young population of male Swiss conscripts. Pacing Clin Electrophysiol 2011;34(8):949-53.
4. Pediatric and Congenital Electrophysiology Society (PACES); Heart Rhythm Society (HRS); American College of Cardiology Foundation (ACCF); et al. PACES/HRS expert consensus statement on the management of the asymptomatic young patient with a Wolff-Parkinson-White (WPW, ventricular preexcitation) electrocardiographic pattern: developed in partnership between the Pediatric and Congenital Electrophysiology Society (PACES) and the Heart Rhythm Society (HRS)—Endorsed by the governing bodies of PACES, HRS, the American College of Cardiology Foundation (ACCF), the American Heart Association (AHA), the American Academy of Pediatrics (AAP), and the Canadian Heart Rhythm Society (CHRS). Heart Rhythm 2012;9(6):1006-24.
5. Kobza R, Toggweiler S, Dillier R, et al. Prevalence of preexcitation in a young population of male Swiss conscripts. Pacing Clin Electrophysiol 2011;34(8):949-53.
6. Montoya PT, Brugada P, Smeets J, et al. Ventricular fibrillation in the Wolff-Parkinson-White syndrome. Eur Heart J 1991;12(2):144-50.
7. Rao AL, Salerno JC, Asif IM, Drezner JA. Evaluation and management of wolff-Parkinson-white in athletes. Sports Health 2014;6(4):326-32.
8. Fukatani M, Tanigawa M, Mori M, et al. Prediction of a fatal atrial fibrillation in patients with asymptomatic Wolff-Parkinson-White pattern. Jpn Circ J 1990;54(10):1331-9.
9. Pappone C, Santinelli V, Rosanio S, et al. Usefulness of invasive electrophysiologic testing to stratify the risk of arrhythmic events in asymptomatic patients with Wolff-Parkinson-White pattern: results from a large prospective long-term follow-up study. J Am Coll Cardiol 2003;41(2):239-44.
10. Van Hare GF, Javitz H, Carmelli D, et al; Pediatric Electrophysiology Society. Prospective assessment after pediatric cardiac ablation: demographics, medical profiles, and initial outcomes. J Cardiovasc Electrophysiol 2004;15(7):759-70.
11. Pelliccia A, Zipes DP, Maron BJ. Bethesda Conference #36 and the European Society of Cardiology Consensus Recommendations revisited a comparison of U.S. and European criteria for eligibility and disqualification of competitive athletes with cardiovascular abnormalities. J Am Coll Cardiol 2008;52(24):1990-6.