CLINICAL VIGNETTE

Asymptomatic Patient with EKG showing Wolff-Parkinson-White Pattern

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Case Report

A 51-year-old male with dyslipidemia and abnormal electrocardiogram presented for pre-operative cardiac evaluation prior to knee replacement surgery. He was scheduled to have a right total knee arthroplasty for traumatic arthritis.

He denied a history of hypertension, diabetes, tobacco use or family history of premature coronary artery disease. He was taking no medications. Prior to his recent worsening knee pain, he exercised regularly, fast walking and swimming. Review of systems was negative for palpitations, chest pain and syncope.

Physical examination revealed a blood pressure of 121/77 mm Hg and a pulse of 73 bpm. Cardiac examination was negative for palpable thrills, gallops or murmur. The remainder of his examination was unremarkable except for limited mobility of his right knee, which was also accompanied by tenderness.

An electrocardiogram showed normal sinus rhythm at the rate of 82. There was a short PR interval measuring 116 msec, the QRS complex was wide measuring 122 msec with evidence of a delta wave, consistent with pre-excitation. Based on established criteria, the EKG was compatible with Type A Wolff-Parkinson-White pattern and was suggestive of a left sided bypass tract (Figure 1). Because he was free of cardiac symptoms and had recent excellent exercise capacity, the patient was assessed as low risk and advised to proceed with non-cardiac surgery without further evaluation.

Background

In 1930, Wolff, Parkinson, and White described an electrocardiographic syndrome consisting of "functional bundle branch block" and a short P-R interval occurring in otherwise healthy young people with paroxysms of tachycardia[1]. However, as seen in our case, it can be found incidentally on the EKG, in the absence of any arrhythmia.

Pathophysiology

The accessory pathways between the atria and ventricles result from anomalous myocardial tissue spanning the fibrinous bridges between the atria and ventricles[1]. These accessory pathways may result from a developmental failure to eradicate the remnants of the atrioventricular connections present during cardiogenesis. Family studies suggest that Wolff-Parkinson-White (WPW) may have a genetic component as the prevalence approaches 0.55% among first-degree relatives of affected individuals, approximately twice as high when compared to the reported prevalence in the general population[2,3]. In addition, WPW is associated with other congenital cardiac abnormalities, including Ebstein's anomaly.[4]

The Kent Bundle, the accessory pathway seen in WPW, is able to conduct in retrograde and antegrade manners, resulting in re-entrant supraventricular tachycardia (SVT)[4]. When atrial fibrillation is present, the accessory pathway may allow for rapid ventricular conduction. In turn, this may degenerate into ventricular fibrillation, leading to sudden death.

Presentation

WPW pattern may be found incidentally on EKG, in the absence of any symptoms. Symptomatic patients with WPW often present with arrhythmias, most commonly with AV re-entrant tachycardia and atrial fibrillation[5]. Sudden cardiac death due to ventricular fibrillation is a well-known but rare presentation in patients with WPW.

Diagnosis

The classic EKG pattern in a patient with WPW is a short PR interval (less than 0.12 seconds). The second characteristic is a delta wave, a widened QRS complex with a slurred upstroke. The widened QRS complex represents dual activation of ventricular myocardium via the accessory pathway as well as the AV node and His-Purkinje system. The activation via the accessory pathway occurs early with a slower conduction. On the other hand, activation via the AV-node and His-Purkinje system occurs later, with a faster conduction.

Management of the Asymptomatic Patient

Pharmacologic therapy is not recommended for asymptomatic patients with WPW, and catheter-ablation is controversial[6]. Catheter-ablation is an effective procedure with a reported success rate over 90%, and it is associated with a low complication rate. Procedural complications include infection, bleeding, valvular damage, coronary spasm, TIA/CVA, thromboembolic events, heart block, and cardiac tamponade. The reported rate of complications is under 2%. The 1995 NASPE survey reported 4 procedure-related deaths in 5427

patients[7].

Despite the low procedural complication rate, the American College of Cardiology (ACC) has discouraged routine catheter-ablation for asymptomatic individuals with WPW[6]. This is, in large part, because the overall incidence of sudden cardiac death in asymptomatic patient is low, with reported rates of 0.15 to 0.39% in three and ten year follow-up studies[8,9]. The ACC recommends discussion of elective ablation in specific patient groups, including airplane pilots and school-bus drivers.

Prognosis/Risk Stratification of the Asymptomatic Patient

Risk stratification of the asymptomatic patient with WPW may be essential when considering treatment options. Several factors have been reviewed in order to identify asymptomatic patients who may be at a higher risk for future symptomatic arrhythmia. For example, Pappone et al found a higher rate of symptomatic SVT in those patients whom atrial fibrillation could be induced via atrial and ventricular pacing[10]. In a randomized study of these "high-risk" patients, there was a substantial risk reduction among those who underwent ablation[11]. Other predictors for future symptomatic arrhythmia include patients with shortened accessory pathway refractory period (demonstrated in the electrophysiology laboratory), the expression of multiple accessory pathways, male gender, and age[9, 12-13]. Predictors of low risk include the disappearance of pre-excitation during exercise, intermittent accessory pathway conduction, and responsiveness to medication (i.e. procainamide)[14-15].

Conclusion

Pharmacotherapy and routine catheter-ablation are not currently recommended in asymptomatic patients with WPW. Risk stratification of the asymptomatic patients with WPW may become prudent when considering therapeutic options. Cardiac evaluation may be considered in asymptomatic patients with WPW in order to determine individual risk for future symptomatic arrhythmia. Further studies are needed to identify predictors for future cardiac events and to assess whether medical intervention can reduce overall risk.

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FIGURE LEGEND:

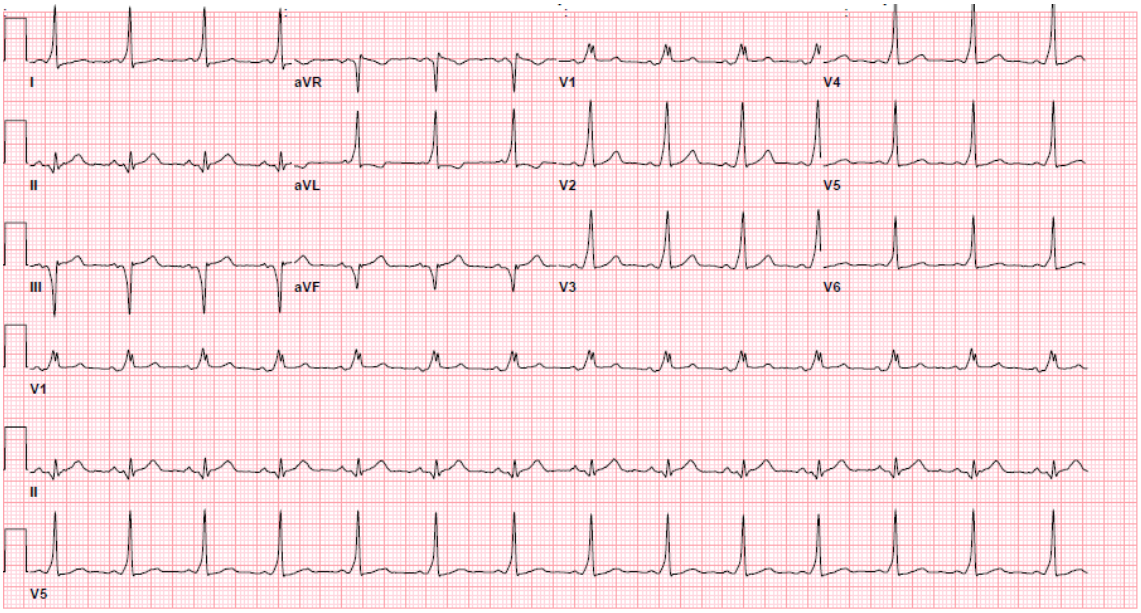

Figure 1: Electrocardiogram showing Type A Wolff-Parkinson-White Pattern