A case of Supraventricular Tachycardia Associated with Wolff–Parkinson–White Syndrome in Young Infant

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ABSTRACT

WPW syndrome is a disorder characterized by the presence of an accessory conduction pathway, which predisposes patients for tachyarrhythmias and sudden death. Characteristic ECG appearances include shortened PR intervals and slurred upstrokes of the QRS complexes.

Keywords: WPW Syndrome, SVT, tachycardia

INTRODUCTION

Wolff–Parkinson–White syndrome (WPW) is a macro reentrant arrhythmia first described over 80 years ago in healthy young people with shortened PR intervals and bundle branch block on electrocardiography (ECG). These patients were prone to tachycardia episodes. Pre-excitation usually refers to early depolarization of the ventricles by an abnormal pathway from atria. The most common form of pre-excitation is due to the presence of an accessory pathway (bundle of Kent) that connects one of the atria with one of the ventricles. This abnormal connection allows electrical impulses to bypass the atrioventricular (AV) node and depolarizes area of ventricles where the bypass tract ends. The ability to conduct impulses along the bypass tract can be quite variable and intermittent or rate dependent. This predisposes patients to supraventricular tachycardia (SVT), atrial fibrillation and, in worst cases, ventricular fibrillation (VF) leading to cardiac arrest. Characteristic ECG appearances include shortened PR intervals and slurred upstrokes of the QRS complexes.

CASE REPORT

A 2½ month male infant was brought to the pediatric intensive care unit, at Kamla Raja Hospital Gwalior, with complaints of respiratory difficulty and irritability for 13 days. He was irritable with excessive crying, had respiratory distress with heart rate – 132/min, respiratory rate – 64/min, saturation of oxygen 2-91% and just palpable liver. After ECG monitor was attached it revealed narrow QRS complex tachyarrhythmia, which suggested SVT (Figure 1). Intravenous adenosine was given at 0.2 mg/kg under continuous ECG monitoring. Heart rate immediately returned to sinus rhythm with a rate of 120/min.

The next day child was accepting breastfeeds well, his irritability had reduced and respiratory distress had subsided. Repeat ECG showed delta waves in sinus rhythm with heart rates of 120, which were suggestive of WPW syndrome. The patient was put on a maintenance dose of oral propranolol 0.5 mg/kg/dose 12 h. The patient's complete blood count, C-reactive protein, cerebro spinal fluid routine microscopy and culture sensitivity, electrolytes were within normal limits. His chest X-rays and echocardiography were also normal with no evidence of cardiomegaly or congenital heart defects.

**DISCUSSION**

This case highlights the importance of follow-up of arrhythmia patients and interpreting ECG of the patient after the acute management of arrhythmia/SVT.

The SVT occurring in earlier life is commonly accessory pathway mediated. AV reentrant tachycardia (AVRT) represents 85% of the arrhythmias in fetal life and 82% of the arrhythmias occurring during infancy. The incidence decreases to 65% in the 1-5 age group, 56% in the 6-10 age group and 68% in the above 10 years age group.4 The population prevalence of ventricular pre-excitation is around 1.5 per 1000 in the adolescent age group and probably lowers during the early childhood. WPW syndrome is a typical example of AVRT in children. WPW syndrome is a disorder characterized by the presence of an accessory conduction pathway, which predisposes patients for tachyarrhythmias and sudden death. The diagnosis of WPW syndrome is reserved for patients who have both pre-excitation and tachyarrhythmias.5 The anomaly in WPW syndrome is accessory connections between the atrium and ventricle. This accessory connection also called bypass tract may be atriofascicular, fasciculoventricular, intranodal, or nodoventricular, the most common being AV pathway otherwise known as a Kent bundle.5 Most patients with the WPW syndrome have otherwise normal hearts, but some have concomitant congenital heart disease. A significant proportion of patients do not reveal pre-excitation in the ECG at the time of presentation. Nearly 50% with remain asymptomatic at diagnosis with 30% having symptoms due to arrhythmias at a later time.6

The initial onset of this arrhythmia may occur in utero, within the first few weeks of life, or may first occur in adolescence; although, infants and children are more often affected. Most patients with bypass tracts will experience orthodromic tachycardia or atrial fibrillation and rarely antidromic tachycardias can occur. Ventricular tachycardia or VF can be precipitated by rapid ventricular rates during any of the above tachycardias and could result in sudden death.7 The incidence of sudden cardiac death (SCD) in patients with the WPW syndrome has been estimated to range from 0.15% to 0.39% over 3-10-year follow-up. It is unusual for cardiac arrest to be the first symptomatic manifestation of WPW syndrome.5

This case is a typical presentation of SVT, managed successfully with intravenous adenosine. Following the successful management of arrhythmia, we detected delta wave on ECG suggestive of pre-excitation in WPWS. The management options for symptomatic WPWS are prolonged drug therapy and catheter ablation. The 2003 ESC/ACC/AHA guidelines recommend routine electrophysiological study (EPS) with liberal indications for catheter ablation in asymptomatic patients. However, management of asymptomatic subjects with incidentally found pre-excitation patterns remains controversial. Prognosis is usually good, but there is a lifetime risk of malignant arrhythmias and SCD, and the latter can be the first presentation of the disease.2 Radiofrequency (RF) ablation is a curative procedure for WPW syndrome. The procedure-related mortality reported for catheter ablation of accessory pathways ranges from 0% to 0.2%.8 RF ablation is technically demanding and potentially hazardous in infancy. The small diameter of femoral vessels imposes severe limitations on catheter choices. Apart from vascular complications, there are concerns of damage to the fragile intra-cardiac structures at such a tender age.9 There have been no controlled trials of drug prophylaxis involving patients with AVRT. The drugs available to treat AVRT include any drug that alters either conduction through the AV node (e.g., calcium-channel blockers, beta-blockers, digoxin) or a drug that alters conduction through the atrium, ventricle, or accessory pathway (e.g., Class Ia, Ic, or III antiarrhythmic agents). Despite the absence of data from clinical trials,
chronic oral beta-blocker therapy may be used for treatment of patients with WPW syndrome, particularly if their accessory pathway has been demonstrated during electrophysiological testing to be incapable of rapid anterograde conduction. \textsuperscript{5,10} We put the patient on propranolol prophylaxis. EPS was not done in our case as the cardiologist refused for catheter ablation due to younger age group.

**CONCLUSION**

This case highlights the importance of follow-up of arrhythmia patients and interpreting follow up ECG of the patient after the acute management of arrhythmia. management of arrhythmia/SVT.

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**PEER REVIEW**

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**CONFLICTS OF INTEREST**

Nil

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**REFERENCES**