Case Report

Refractory paroxysmal supraventricular tachycardia in a neonate with WPW syndrome: A case report

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ABSTRACT

Supraventricular tachycardia (SVT) is the most common tachyarrhythmia requiring emergency cardiac care in newborns. Neonatal paroxysmal SVT sustained by an atrioventricular node or accessory pathway reentry mechanism, if refractory can lead to congestive cardiac failure, cardiogenic shock, NEC, and death. We report the case of a 14-day-old male full-term neonate diagnosed with Wolff-Parkinson-White syndrome after evaluation for refractory SVT. This case report emphasizes the importance of evaluating cases of neonatal SVT that require multiple doses of adenosine for reversal, with serial electrocardiography and electrocardiographic studies to identify the underlying cause.

Key words: Neonate, Supraventricular tachycardia, tachycardia, Wolff-Parkinson-White syndrome

Wolff-Parkinson-White (WPW) is a congenital defect of the cardiac conduction system, with proliferation of extra embryologic conduction pathways and rapid conduction of electrical impulses. The estimated neonatal incidence of 0.1% to 0.2% may be misrepresented secondary to missed or misdiagnosis. Undiagnosed WPW can result in sudden cardiac death [3]. Supraventricular tachycardia (SVT) is the most common tachyarrhythmia requiring emergency cardiac care in newborns. Neonatal paroxysmal SVT (PSVT) sustained by an atrioventricular node or accessory pathway reentry mechanism, if refractory can lead to congestive cardiac failure, cardiogenic shock, NEC, and death [1,2]. Although SVT is common tachyarrhythmia in the neonatal period and can be triggered by varied causes ranging from fever, congenital heart disease, and Gram-negative sepsis, electrophysiological studies are mostly not done on a routine basis for SVT cases. We report this case to underline the importance of serial electrocardiography (ECG) recordings and electrophysiological studies in cases of neonatal SVT especially those requiring multiple doses of Adenosine for reversal.

CASE REPORT

A term, 2.9 kg male baby born to a 23-year-old primi mother with uneventful antenatal, natal, and early postnatal history was brought to our hospital on day 14 of life with c/o poor feeding, lethargy and was admitted with a provisional diagnosis of Late-onset sepsis and was started on first-line intravenous (IV) antibiotic as per unit policy after drawing blood for sepsis screen and cultures. 12 h into admission, the baby developed extreme tachycardia with HR-290/min with normal hemodynamic status. ECG showed narrow QRS tachycardia (Fig. 1), diagnosed as SVT and the baby received three doses of Adenosine at 0.1 mg/kg, 0.2 mg/kg, and 0.2 mg/kg serially to no avail of tachycardia reversion. The baby was then started on Amiodarone infusion, following which the rhythm was reverted to sinus. The investigation panel was significant with a positive sepsis screen and cultures yielded growth of Resistant *Escherichia coli* and antibiotics were upgraded as per the sensitivity panel. Serum electrolytes and thyroid function tests were normal. Chest X-ray and repeat ECG were normal. As per the pediatric cardiology expert opinion, amiodarone was slowly weaned off and started on propanolol orally.

After a day of stopping amiodarone, the baby again developed recurrent episodes of SVT, managed with vagal maneuvers, intermittent adenosine boluses, and restarting amiodarone. At this time, ECG showed a pre-excitation pattern with delta wave and hence shifted to a higher cardiac center for electrophysiological studies. On follow-up, electrophysiological studies were found to have revealed WPW syndrome, and the baby was discharged on propranolol, flecainide, and digoxin with the definitive plan being radiofrequency ablation of the tract after 6 months of age.

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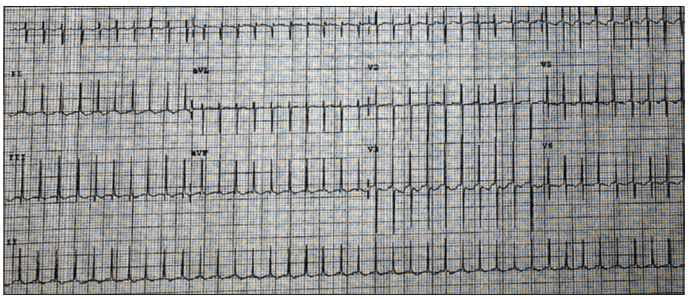

Figure 1: Electrocardiography showing Supraventricular Tachycardia with narrow QRS complexes

DISCUSSION

WPW syndrome is an abnormal condition associated with abnormal heartbeat and it is a result of a pathological pathway between the atria and the ventricles that surrounds the electrical conduction pathway of the atrioventricular node. Patients with WPW are frequently susceptible to PSVT [4].

To validate the WPW syndrome, an electrocardiogram (EKG) with specific parameters (short P–R interval, Δ wave, and wide QRS) needs to be conducted [5], but often these findings may not be present during the crisis time ECG recordings and hence the need for serial ECGs in all cases of neonatal tachyarrhythmias.

WPW syndrome may present with PSVT or there can be situations where there would not be any traceable arrhythmia as well. The acute care treatment for PSVT's is vagal maneuvers like applying an ice bag on the child's face for 10 which was tried for our patient but with no therapeutic outcome.

In the situation where vagal maneuvers are not effective, the treatment of choice is IV or intraosseous administration of adenosine (starting with a 0.1 mg/kg of body weight dose [6 mg at most]), followed by a saline solution in a rapid flush technique with 3 way stopcock. If the initial dose does not have the desired outcome, a subsequent administration of 0.2–0.3 mg/kg of body weight (maximum 12 mg) is recommended [6,7].

Other antiarrhythmic drugs that can be used in this setting are propranolol (in patients with WPW syndrome), digoxin, or amiodarone, the efficiency and safety of which was observed in nurslings and may be administrated if adenosine proves to be ineffective [8]. Nevertheless, in our case, even amiodarone could provide only temporary relief.

It is to be mentioned that our patient was hemodynamically stable throughout. However, in situations where the patient is hemodynamically unstable in cardiogenic shock or congestive heart failure, the baby might be subjected to direct cardioversion from 0.5 J/kg of body weight to up to 2 J/kg of body weight [6].

Electrophysiological studies are to be recommended for all cases of refractory PSVT. Most cases of WPW symptoms subside by the age of 12 months. However, the management is individualized and in patients like ours with medically refractory, persistent arrhythmias, the effective therapy of choice is ablation. Newer modalities like Transesophageal overdrive pacing are also promising.

CONCLUSION

Although a rare entity, any fetal or neonatal SVT requires further evaluation with serial EKG and the involvement of an experienced cardiologist and electrophysiological studies for diagnosis of WPW syndrome, as recurring episodes of PSVT may result in irreversible damage and WPW syndrome can cause sudden cardiac death also.

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