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A CHALLENGING CASE OF REFRACTORY NEONATAL SUPRAVENTRICULAR TACHYCARDIA

Paediatrics

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ABSTRACT

Supraventricular tachycardia is one of the most common arrhythmias in neonates requiring emergency cardiac care. Female neonate of 22-day presented with severe respiratory distress and tachycardia of 300/min was diagnosed with supraventricular tachycardia (SVT), resistant to first line treatment. The patient required multiple interventions, including adenosine, amiodarone, metoprolol and synchronized cardioversion. The case highlights the challenges of managing neonatal SVT and the importance of a stepwise escalation in treatment.

KEYWORDS

Neonate, supraventricular tachycardia, SVT, syncrhonised cardiversion, beta blockers, amiodarone.

INTRODUCTION:

Supraventricular tachycardia is characterized by abnormally fast rhythm that originates above the ventricle due to abnormal pathways, re-entry pathways including AV node or increased excitability.[1]In most of neonates clinical features are non-specific which includes irritability, poor feeding, pallor, mottled skin, increased precordial activity or even heart failure if left untreated.[2] Incidence is between 1 in 250 to 1 in 1000 infants.[3] Diagnosis is confirmed by electrocardiography (ECG). Management includes supportive care along with placement of ice pack on the face, adenosine administration, or synchronised cardioversion in unstable cases. Long term management includes beta blocker and amiodarone is considered In non-responsive cases.[4]

Case Report:

A 22-day-old female child was admitted to the hospital with complaints of cold for 3 days. On admission infant was active with severe respiratory distress. Vitals at presentation showed tachycardia (180/min) with bounding pulses, Tachypnea, normal blood pressure and capillary refill time, absent signs of shock with SpO2 86% on room air. Respiratory system examination revealed grunting, intercostal and subcostal retractions for which infant was intubated. Cardiovascular system examination was unremarkable except for tachycardia. ABG revealed severe high anion gap metabolic acidosis with inadequate respiratory compensation. Initial management including Intravenous fluids, sodium bicarbonate and intravenous antibiotics were started. Baseline investigations revealed moderate anemia, following which 1 unit of packed cell volume was transfused. Ultrasonography cranium revealed subependymal cyst (5 mm maximum dimension) in left caudothalamic groove. Tachycardia increased to 320/min, hence 2D-echocardiography was done which showed no apparent structural heart defect. 12-lead ECG was done which showed rapid wide complex tachyarrhythmia (rate = 320/min). Differential diagnoses were supraventricular tachycardia and ventricular tachycardia. Ice pack application on face was tried, but the arrhythmia persisted. No improvement was noted despite rapid flush of adenosine (0.1 mg/kg, 0.2 mg/kg and 0.3 mg/kg respectively).

A loading dose of amiodarone 5 mg/kg was given over one hour, followed by 10 mcg/kg/min infusion. Tachycardia settled within 5 hours of starting amiodarone. Repeat ECG revealed sinus rhythm with delta waves. After around 7 hours, there was relapse of supraventricular tachycardia with heart rate of more than 300 beats per minute. Intravenous metoprolol was started at 2 mcg/kg/min. Dose was increased to 3 mcg/kg/min when there was no improvement after initiating metoprolol. DC cardioversion (1.5 J/kg) was given as the Supraventricular tachycardia was refractory to metoprolol. First shock didn't result in sinus rhythm. DC cardioversion was repeated at 3 J/kg. Sinus rhythm was achieved. Injection Amiodarone was gradually tapered and switched to oral form by 9th day of therapy, and tapered over next two weeks. Injectable metoprolol was replaced with tablet propranolol 2.5 mg/kg q6h after 48 hours. Child was discharged with stable vitals and sinus rhythm, on tablet Propranolol 2.5 mg/dose four times a day and tablet Amiodarone 4 mg/kg/dose once a day.

Figures:

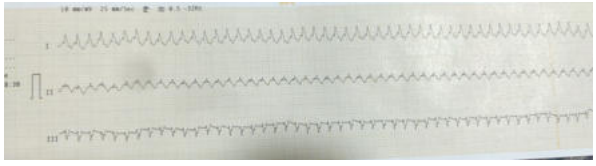

Figure 1: ECG shows wide QRS complex tachycardia with heart rate of around 330/min , regular rhythm and absent p wave.

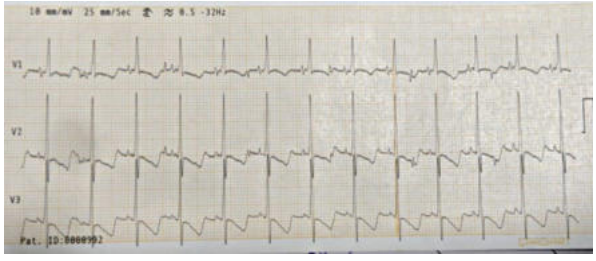

Figure 2: Post Cardioversion ECG shows heart rate of around 115/min, regular rhythm and normal QRS complex.

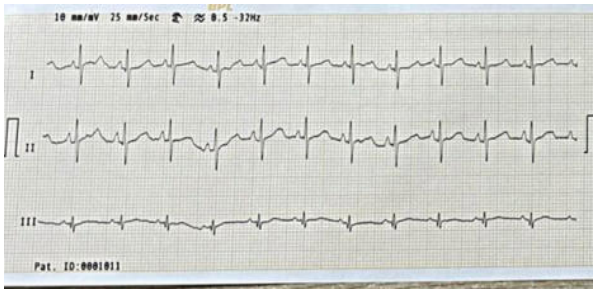

Figure 3: Before discharge ECG shows heart rate of around 124/min,regular rhythm and normal QRS complex.

DISCUSSION:

In otherwise healthy children, supraventricular tachycardia is fairly common (1 in 250-1000 children.[3] Among other symptoms like poor feeding, irritability and cough, infants may present with respiratory distress as was the case in our patient. Supraventricular Tachycardia may also present as congestive heart failure. In hemodynamically stable patients, management includes vagal manuovers, pharmacological measures and electrical cardioversion.[5] Vagal manuovers are frequently tried as the first line measure in hemodynamically stable patients, and in infants, this is done by stimulating the diving reflex (placing a bag of ice over the face).[2] The

first line pharmacological treatment is adenosine, administered in progressively increasing doses of 0.1 mg/kg, 0.2 mg/kg and 0.3 mg/kg respectively. Adenosine is preferred because of its short half life and rapid metabolism.[6] For patients who do not respond to adenosine, a Cardiology consultation is recommended, and the same was done in our case.[7] Long term therapy for management of SVT is digoxin, propranolol and amiodarone.[7] Oral propranolol is the first line oral mono therapy for long term maintenance in infants with SVT, due to its favourable safety profile and effectiveness in WPW syndrome.[8]

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