SVT and Gram Negative Sepsis in Neonates

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ABSTRACT

Supraventricular tachycardia is the most common tachyarrhythmia seen in fetuses, neonates and infants. Sustained SVT may lead to congestive cardiac failure. Neonatal supraventricular tachycardia is more commonly associated with other cardiorespiratory and congenital problems and is uncommon in an otherwise healthy infant. Supraventricular tachycardia is also caused by neonatal sepsis but has rarely been reported. Here, we report two cases of SVT (Supraventricular tachycardia) induced by neonatal sepsis. Two neonates, one male and another female, both born to Indian mother had tachycardia with heart rate > 220 beats/minute along with poor perfusion, tachypnoea, fever and deranged coagulation profile. Both the babies had culture positive gram negative sepsis with normal echocardiography and supraventricular tachycardia on electrocardiograms which were treated with anti arrhythmic drugs and treatment of sepsis. This case report gives further insight into one more presentation and complication of neonatal sepsis.

Key words: gram negative sepsis; neonatal sepsis; supraventricular tachycardia

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INTRODUCTION

Sepsis is the commonest cause of morbidity and mortality resulting in 1.6 million deaths annually in developing countries.[1] Though neonatal sepsis can present in different ways, cardiovascular signs are the most frequent clinical features.[2] Gram negative organisms have become the major cause of neonatal sepsis in both early and late onset neonatal sepsis in India.[3] Here, we report two cases of supraventricular tachycardia induced by neonatal sepsis.

CASE REPORT 1

A male baby of 2096 grams was referred to our centre for respiratory distress. The baby was born by emergency caesarean section for gestational diabetes mellitus with oligohydramnios. The baby was managed by non-invasive high flow nasal therapy initially for respiratory distress and weaned off on second day. On third day, baby developed tachycardia with heart rate of 230 beats per minute. ECG showed narrow QRS complex tachycardia with absent p wave. In view of SVT, injection adenosine was given. Despite maximal dose, SVT didn't revert. Then, amiodarone loading and maintenance was used which controlled SVT. The baby also had poor perfusion, metabolic acidosis and positive sepsis screen. In view of coagulopathy, supportive fresh frozen plasma and platelet transfusion were given along with inotropes and injection meropenem. Cerebrospinal fluid examination was normal. Echocardiography showed mild pulmonary arterial hypertension but no structural heart disease. As the condition deteriorated, injection colistin was added. By seventh day, there was no new episode of SVT and antiarrhythmics were stopped. Blood culture report showed Klebsiella pneumoniae sensitive to meropenem and colistin. Baby slowly improved and was discharged after completion of 14 days of antibiotics.

CASE REPORT 2

A female baby weighing 3100 grams was referred to our centre for persistent fever. She was born to 22 years primigravida mother by emergency caesarean section for foetal distress. The baby had severe respiratory distress requiring mechanical ventilation along with inotropes and antibiotics. Baby was referred to our centre at 14 days of life for persistence of fever. Baby was febrile with tachycardia and tachypnoea but no distress. Other systemic examination was normal. Investigations showed high CRP, low platelet count, normal CSF and urine routine examination and culture. Blood culture grew Non-albicans Candida, so injection amphotericin B was started. Baby started to improve clinically but again developed tachycardia with heart rate of 260 per minute. ECG showed narrow complex tachycardia with absent p wave. This was aborted after two doses of injection adenosine. Septic work up was positive. CSF study was normal. Echocardiography didn't reveal any cardiac pathology. Blood culture grew Acinetobacter baumanii sensitive to colistin. Injection colistin along with Amphotericin B was continued. Baby improved and was discharged after completion of antibiotic course.

DISCUSSION

SVT is the most common tachyarrhythmia in infants with incidence of approximately one in 250 among neonates.[4] SVT can be of three types- Atrioventricular re-entry tachycardia (AVRT) (70%), AV nodal re-entry tachycardia (AVNRT) (13%) and atrial tachycardia (AT) (14%). SVT in neonates is diagnosed when ECG shows a heart rate above 230/minute with a regular and narrow QRS-complex. A wide QRS (> 0.08 sec) favours a diagnosis of ventricular tachycardia.[5] P-waves are not always visible on the surface ECG but may be either abnormal shaped or have abnormal axis and come before or after QRS complex.

Neonates may be asymptomatic or may develop symptoms of poor perfusion and congestive cardiac failure. Predisposition for SVT in neonates include congenital heart disease, concealed accessory bypass tract, Ebstein's anomaly, L-transposition of great arteries, myocarditis, septicemia, hypoglycemia, fever, hyperthyroidism and drugs.[4,6] Around 70% of infants lose SVT inducibility by one year of age, and recurrences are uncommon.[7] For management, vagal manoeuvres, facial immersion in cold water may be tried. Carotid massage is generally not recommended. Adenosine bolus is successful in about 42% to 86% of cases.[8]

Esmolol, a short acting beta blocker, may be used in cases of recurrent or sustained SVT. Procainamide, flecainide, propafenone or amiodarone are alternatives. The combination of amiodarone and propranolol is effective in 80% cases whereas combination of flecainide with sotalol is 100% effective in controlling refractory SVT.[9] Acute termination of SVT is critical by DC cardioversion if the neonate develops features of cardiovascular instability.[10] Chronic medical treatment is used who have significant SVT, or frequent SVT or pre-excitation on ECG. Rarely, radiofrequency catheter ablation is required for SVT resistant to medical therapy. We did not use chronic medical treatment as cause of SVT was sepsis with no recurrence.

CONCLUSIONS

Neonatal sepsis is the most common cause of morbidity and mortality in neonates in developing countries. Knowing the varied presentations and complications of neonatal sepsis helps in reducing neonatal deaths. Further study is needed to know the exact pathogenesis of supraventricular tachycardia due to neonatal sepsis.

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