Paroxysmal Supra Ventricular Tachycardia Masquerading as Seizures in a Child

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Introduction

Autonomic changes are common during seizures, which are seen in both generalized and partial seizures. Complex partial seizures of temporal lobe can produce autonomic changes. Occipital lobe seizures in children (Panayiotopoulos syndrome) are characteristically associated with autonomic changes of the skin along with tachyarrhythmias and bradyarrhythmias. There are rare seizures culminate in ictal asystole, which can possibly lead to the SUDEP (sudden unexpected death in epilepsy patients). Loss of consciousness due to neurocardiogenic syncope at times can be confused with seizures and leads to majority of the referrals to neurologists for vasovagal syncope. Long QT syndrome is one of the important conditions which can mimic convulsive seizures, often associated with torsade de pointes.

Long term EEG monitoring and event loop recording led to the increased awareness and enabled detection of cardio vascular abnormalities associated with ictal phenomena in children and adults. The ictal discharges can spread in such a way that associated autonomic areas- both sympathetic and parasympathetic - are stimulated or inhibited. Cardiovascular effects are, not the only manifestation of the activation or stimulation of the network.

Case report:

A thirty six months old boy with global developmental delay and hypotonia secondary to a chromosomal anomaly was referred to our center for evaluation.

He was found to have episodes in which when he woke up, he was found to be groggy and pale on few occasions and was unresponsive to stimulation. This was first noticed during a day time nap. He seemed as if having some difficulty in breathing as well. He needed to be stimulated to return to his baseline activity, which took about 20 minutes. There was no fever, cough, rashes, vomiting or diarrhea noted.

As he was a nonverbal child at his baseline, initially these events went unnoticed. He was admitted to hospital for a lower respiratory tract infection, and during this, he was found to have a heart rate of 180-190 bpm. This was thought to be secondary to inhaled beta agonist and Glycopyrrolate (prescribed for drooling) and he was discharged without any subsequent work up. Glycopyrrolate was discontinued by the neurologist.

Subsequently he was evaluated in the pediatric neurological clinic. A routine EEG was performed. The study was normal with no evidence of epileptiform discharges. The ECG rhythm strip showed tachycardia. However this was attributed to the child’s agitation while restrained in bed for the study.

He continued to have the events without any change in frequency or severity. No anti-seizure medication was initiated. On a follow up visit, patient had an event at the clinic observed by the child neurologist during which child’s heart rate was found to be very high. The examination of heart revealed normal heart sounds, absence of any murmurs or adventitious sounds.
As the events became frequent, child was admitted to hospital for long term video EEG monitoring. Multiple episodes were captured, which showed paroxysmal supraventricular tachycardia and associated behavior arrest and lethargy. No ictal epileptiform discharges were noticed (Figure 1).

This event prompted a cardiology referral for 24 hour ECG recording. This detected SVT, with rate of 290 bpm. (Figure 2.)

A transthoracic echocardiogram revealed normal anatomy and no further follow up was suggested by cardiologist. He was started on Atenolol. He was seen at an ENT surgery center for placement of tympanostomy tubes, during the procedure, SVT was noted and procedure was cancelled.

As the events persisted with Atenolol, he was sent to cardiac electrophysiologist. Patient underwent catheter ablation for AVNRT. There was no recurrence of events.

Discussion

Autonomic disturbances especially involving cardiovascular system can be a common accompaniment of seizures. Moreover, stimulation of limbic areas during ictus can invoke flight and fright response and surge of catecholamines. In most of the seizures, raised heart rate is very common finding. About 50-100% of seizures are associated with arrhythmias. Ictal bradycardia is rarer than tachycardias, but has been seen in association with fatal asystole, contributing to SUDEP 1,2. Most often the heart rates are between 100-120 bpm; however this can go up to 170 bpm in certain cases. It is interesting to note that tachycardia is commonly seen in the early ictal phase and bradycardias are seen during late ictal or post-ictal phase of the seizure. Supraventricular tachycardias are the commonest rhythm disturbances in children. Most children however, have a structurally normal heart. Tachycardias in younger children often fails to be...
detected if the events are short lived and not associated with features of hemodynamic compromise and cyanosis.

The manifestation of tachyarhythmias can be variable in different age groups. This can range from isolated chest discomfort, lethargy, palpitations in an older child, to behavior arrest to congestive cardiac failure and collapse. Concomitant illnesses like febrile illness, anemia, and hyperthyroid states along with drug administration can be common causes of tachycardias. Medications commonly used include beta agonists, anti cholinergics like ipratropium and glycopyrrolate can lead to increased heart rate. These various confounding factors can lead to under-detection of the problems, unless pursued with strong suspicion of PSVT.

Figure 2. ECG

References