IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Generalized Tonic-Clonic Seizures With Breakthrough Episodes In A Child With Global Developmental Delay: A Case Report

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Abstract:

A 11year-old female patient with a history of Global Developmental Delay (GDD) presented with uncontrolled Generalized tonic-clonic seizures (GTCS) despite being on anti-epileptic therapy. Breakthrough seizures were noted in the setting of recent illness and poor medication adherence.

Keywords:

GTCS, Global Developmental Delay, Breakthrough seizures, Epilepsy, Paediatric neurology.

Introduction:

The term "neurodevelopmental disorders" (NDDs) refers to a collection of conditions that affect nervous system development and usually manifest in early childhood. NDDs include conditions such as global developmental delay (GDD), attention deficit/hyperactivity disorder (ADHD), and autism spectrum disorder (ASD).(1)

Global developmental delay (GDD) is the term used to describe children under five who exhibit significant delays in two or more developmental domains: speech/language, motor skills, academic abilities, social/emotional skills, and everyday life activities. It is estimated that between 1 and 3 percent of people have GDD.(2) Age progression is associated with developmental delays. Around the age of one year, the majority of patients exhibit hypotonia. When a youngster first begins to walk, ataxia is observed; dysautonomia manifests as changes in heat or perspiration; and pyramidal symptoms vary in frequency and fluctuation. (3)Neurodevelopmental delay symptoms, such as unsteady gait, difficulty formulating sentences, and a deficiency in fine motor skills, usually do not appear until the onset of seizure activity. However, they quickly appear and worsen following the initial seizure.(4)

Seizures, which occur frequently and are characterised by unusually high levels of synchronous neuronal activity in the brain together with temporary signs or symptoms, have an incidence of 6.5 per 1000 people.(5) When a kid has widespread tonic-clonic seizures, it is important to enquire about premonitory symptoms, which may include an aura, because focal seizures can progress to bilateral convulsive activity.(6)

Generalised tonic-clonic seizures, which were once referred to as grand mal seizures, are characterised by a tonic phase and clonic contractions of the muscles. An abrupt, aura-free loss of consciousness is the first sign of generalised tonic-clonic seizures. Screaming and widespread bodily stiffness, with or without cyanosis, can initiate the tonic phase of a seizure. Clinical symptoms change from the initial tonic phase to clonic jerks, which is followed by postictal agitation, disorientation, or lethargy.(7)

A major clinical problem for children with epilepsy is breakthrough seizures. Breakthrough seizures are typically defined as spontaneous seizures in epileptic patients taking antiseizure medication (ASM) who have not experienced a seizure in at least 12 months.(8)

CASE PRESENTATION:

A 13-year-old female child was brought with complaints of recurrent involuntary movements since the previous night. Each episode lasted for about 5–10 minutes and was associated with up-rolling of eyes, drooling of saliva, and passage of urine. The episodes were not relieved with oral medication. She also had a history of high-grade fever for one day, not associated with chills or rigors. There was a past history of similar seizure episodes several months earlier, which subsided with oral antiepileptic medication. The first episode of seizures occurred at 6 months of age, for which she was evaluated at a local hospital. An electroencephalography (EEG) performed at that time was abnormal, following which she was referred to a private hospital and started on long-term antiepileptic therapy including phenytoin, sodium valproate, and levetiracetam. Four days prior to the current admission, she had symptoms of common cold and had taken medications for the same. Antenatal history revealed spontaneous conception, with the mother having received iron–folic acid supplementation and tetanus toxoid immunization. The child was born by normal vaginal delivery and did not cry immediately after birth. The parents were consanguineously married. Postnatally, the child required NICU admission due to prematurity, very low birth weight (VLBW), and meconium aspiration syndrome. Immunization was completed as per the National Immunisation Schedule up to 5 years of age. Family history was not significant. On examination at admission, the child was conscious but sick-looking. Vital signs showed a pulse rate of 118 beats per minute (regular, normal volume), respiratory rate of 33 breaths per minute, temperature of 101°F, oxygen saturation of 97% on room air, and capillary refill time of 2 seconds. Systemic examination revealed bilateral air entry with normal vesicular breath sounds. Cardiovascular and abdominal examinations were normal. Central nervous system examination showed global developmental delay, altered sensorium, and bilateral extensor plantar responses. In view of multiple seizure episodes, the child was managed with intravenous antiepileptic drugs. On day 1 of admission, she received a stat dose of intravenous phenytoin, along with intravenous ceftriaxone, levetiracetam, and sodium valproate. Paracetamol was administered for fever, and pantoprazole was given for gastric protection. Antiemetic therapy with ondansetron was provided as needed. By day 3 of hospitalization, the child showed clinical improvement, and treatment was gradually shifted to oral antiepileptic medications. She was continued on oral phenytoin, sodium valproate, and levetiracetam. Supportive measures including advice for toilet training and speech therapy were also given. During the hospital stay, the patient received intravenous phenytoin (5 mg/kg/day), ceftriaxone (100 mg/kg/day), levetiracetam (10 mg/kg/dose), sodium valproate (40 mg/kg/day), paracetamol (15 mg/kg/dose SOS), pantoprazole (1 mg/kg/dose SOS), and ondansetron (4 mg IV SOS). At the time of discharge, the child was active, comfortable, and hemodynamically stable. Vital signs revealed an oxygen saturation level of 98% on room air, a respiratory rate of 26 breaths per minute, and a pulse rate of 94 beats per minute. Systemic examination revealed normal cardiovascular and respiratory findings, a soft and non-distended abdomen, and persistent features of global developmental delay with extensor plantar responses on CNS examination. The patient was discharged on oral phenytoin (100 mg twice daily), sodium valproate (500 mg three times daily), levetiracetam (400 mg twice daily), amoxicillin–clavulanic acid (625 mg twice daily for 5 days), and pantoprazole (40 mg once daily for 5 days), with advice for regular follow-up

DISCUSSION:

This child had global developmental delay and epilepsy, which made him more prone to repeated seizures. Children like this have a more sensitive brain, so even small triggers can cause seizures. In this case, the child developed multiple generalized tonic–clonic seizures during a febrile illness. Fever is a well-known trigger and can lower the seizure threshold, leading to breakthrough seizures.

Another important factor in this child was that the antiepileptic medicines were stopped for some time due to financial problems. Because of this, the seizure control was lost, and the child presented with repeated seizure episodes. Stopping medicines suddenly can easily lead to breakthrough seizures, especially in children with developmental delay and long-standing epilepsy.(9)

The child also had several risk factors from birth, including prematurity, very low birth weight, delayed cry at birth, and NICU admission. These factors are commonly associated with both developmental delay and epilepsy. The early onset of seizures and abnormal EEG findings suggest an underlying brain problem, which may be the reason for persistent seizures and delayed development.

During admission, the seizures were controlled with intravenous antiepileptic drugs, and once stabilized, oral medicines were adjusted and restarted. After proper treatment, the child improved clinically. This highlights the importance of regular medication intake and early treatment during fever or illness.

This case shows that breakthrough seizures can happen due to fever, missed medications, and underlying brain vulnerability. Proper counselling of caregivers is very important, especially regarding regular drug intake, fever management, and early hospital visit during seizure episodes. Financial difficulties should also be addressed, as stopping medicines can have serious consequences in such children.(10)

Conclusion:

This case emphasizes the complex interplay between epilepsy, global developmental delay. Children with GDD and early-onset seizures often have structural or metabolic causes, require lifelong therapy, and have a higher risk of poor seizure control and developmental stagnation. A multidisciplinary, family-centred approach is essential to optimize neurological, developmental, and psychosocial outcomes.

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