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Any Symptom of Epilepsy in Child Age Must Be Treated Immediately

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Abstract

Epilepsy has always carried a negative stigma so it is extremely important for a child with epilepsy to overcome the fear of repetition of convulsions and continue living like their peers. After the first cerebral attack, parents have a huge fear of repeating the same, so it is extremely important to contact a doctor immediately. Complete treatment should be performed during hospitalization, especially in cases of head trauma or prolonged loss of consciousness. The treatment consists of electroencephalography, hematological-biochemical tests, additional specific treatment according to the anamnesis and psychological treatment. After two or more unprovoked seizures with a pathological finding of electroencephalography, a diagnosis of epilepsy is made and then it is necessary to educate parents and the child about living with this disease.

Keywords: Epilepsy, Seizures, Child, Treatment

Introduction

Neurological symptoms may be associated with objective abnormality demonstrable on examination [1]. But the objective signs may be disproportionate, that is, they may be less than the symptoms would lead you to expect so that wilful or subconscious exaggeration is suspected. Or the signs may seem unrelated to the symptom, for example, a complaint of paralysis when the signs indicate sensory loss. Or finally the neurological symptoms may have no corresponding sign or abnormality on examination. A lack of objective support for the organic basis of a complaint is relatively common in neurology. It occurs, for example, in many pain syndromes, especially those where the pain is associated with damage to peripheral nerve, the spinal cord or central nervous system. Migraine, epilepsy, irritability and personality change are all common post-traumatic phenomena where there is usually no associated objective abnormality. Compensation gives a motive to perpetuate symptoms previously experienced or to claim symptoms that have either recovered or never been sufficiently severe to cause disability.

Symptoms [2]

- Epilepsy: 2 or more seizures
- Generalized seizures:

→ Generalized tonic-clonic (GTC):

- Loss of consciousness (LOC)
- Stiffening
- Then entire body may jerk

→ Atonic: quick loss of body tone

→ Typical absence:

- Usually 3–10 sec
- LOC
- Staring
- Possibly eye fluttering
- Ends abruptly

→ Atypical absence:

- Usually 5–30 sec
- Pt often delayed
- Variable LOC
- Staring
- May involve eye fluttering

→Myoclonus: shocklike jerks

- Simple partial seizures (no LOC):

→Motor: focal twitching

→ Sensory: abnormal sensations

→ Autonomic: rare

→ Psychic phenomena

- Complex partial seizures:

→ Often < 2 min

→ Stare

→ Decreased responsiveness

→ Automatisms

→ Drowsy afterward

- Common seizure syndromes:
- → Benign rolandic epilepsy (BRE):

- Onset age 4–10
- Nocturnal GTC seizures & morning facial twitching w/ speech arrest
- EEG: centrotemporal spikes

→ Childhood absence epilepsy (CAE):
- Family Hx often significant
- Onset age 4–8
- Several dozen absence seizures/day
- Rare GTC seizures
- Normal intellect
- EEG: 3-Hz generalized spike waves

→ Juvenile myoclonic epilepsy (JME):
- Often positive family Hx
- Peak onset age 12–18
- Myoclonic & GTC seizures
- 1/3 have absence seizures
- Seizures often in a.m.
- Triggers: lights, alcohol, sleep deprivation

→ Lennox-Gastaut (LGS):
- Childhood onset
- Delayed development
- Multiple seizure types
- EEG: refractory, slow spike wave

→ West:
- Mental retardation
- Infantile spasms
- EEG: hypsarrhythmia

• Status epilepticus: any seizure lasting >30 min or 2 seizures with no recovery between

Diagnosis [2]

• Syncope or syncopal convulsion:

→ Preceded by dizziness or visual graying

→ Postictal state: tired but not confused

• Breath-holding spells

• Pseudoseizures

• Staring spells:

→ Daydreaming

→ Depression

→ ADHD

• Myoclonus:

→ Non-epileptiform myoclonus

→ Tics

→ Chorea

Pathophysiology

Seizures result from an abnormal, uncontrolled electrical discharge from the neurons of the cerebral cortex in response to a stimulus [3]. If the activity is localized in one portion of the brain, the individual will have a partial seizure, but when it is widespread and diffuse, a generalized seizure occurs. Symptoms vary widely, depending on the involved area of the cerebral cortex. Seizures are generally manifested as an alteration in sensation, behavior, movement, perception, or consciousness lasting from seconds to several minutes. A seizure can be an isolated incident that may not recur once the underlying cause is corrected. Epilepsy or seizure disorder are the terms used for recurrent, unprovoked seizures.

Seizure threshold refers to the amount of stimulation needed to cause neural activity. Although anyone can have a seizure if the stimulus is sufficient, the seizure threshold is lowered in some individuals, and this may result in spontaneous seizures. Potential causes for lowered seizure threshold include congenital defects; craniocerebral trauma, particularly that from a penetrating wound; subarachnoid hemorrhage; stroke; intracranial tumors; infections, such as meningitis or encephalitis; exposure to toxins, such as lead; hypoxia; and metabolic and endocrine disorders, such as hypoglycemia, hypocalcemia, uremia, hypoparathyroidism, excessive hydration, and fever.

Seizures

Seizure may be the consequence of numerous pathophysiologic events, most commonly metabolic and neurochemical [4]. Management of seizure or status epilepticus resulting from poisoning varies significantly from management of epilepsy or trauma-associated seizure. The initial management of toxin-induced seizures should include rapid bedside assessment of blood glucose and assessment for hypoxia.

Management of toxin-induced seizures differs from epileptic or traumatic seizures in that phenytoin use is contraindicated. Specifically, phenytoin results in increases in severe seizure activity and increased incidence of cardiac dysrhythmia and death. Although the sodium channel blocking activity of phenytoin is effective in decreasing activity of epileptogenic foci or focal activity of traumatized brain, toxin-induced seizure activity is the culmination of diffuse and global cerebral dysfunction, for which sodium channel blockade both is unhelpful and may worsen seizure activity. It is ill-advised to treat toxin-induced seizure with phenytoin, as doing so is expected to be ineffective and, more important, to increase morbidity and mortality.

Benign childhood epilepsy occurs in children between 3 and 15 yr of age and is characterized by generalized motor seizures occurring predominately during sleep [5]. Partial seizures often begin with sensory symptoms involving one side of the face or tongue, progress to anarthria, drooling, and clonic motor activity of the facial and lingual muscles. The partial seizure can occasionally spread to become a generalized tonic-clonic seizure. Children with benign childhood epilepsy are otherwise healthy and have a normal neurologic examination. Absence seizures occur typically in healthy school-aged children and are characterized by frequent "absences" of short duration. The seizures occur without warning and are periods of loss of consciousness of a few seconds. Occasionally the episodes may be prolonged and accompanied by automatism, such as eyelid blinking or clonic jerking of the limbs. Juvenile myoclonic epilepsy is characterized by the occurrence of bilaterally synchronous single jerks or clusters of myoclonic jerks. These typically occur upon falling asleep or as the child is waking up. The jerks predominately involve the arms, often causing the child to drop or throw objects. The seizures begin during adolescence and teen years and most patients experience at least one generalized tonic-clonic episode. Complex partial epilepsy affects all ages and is the most common form of idiopathic epilepsy. It is characterized by impairment of sensorium associated with psychic, autonomic, olfactory, and occasionally gustatory symptoms. Automatisms occur in patterns of semi-purposeful activity such as

lip smacking, sucking movements, fumbling of the hands, moaning, or verbal perseveration. Following the seizure, there is often a period of confusion or nondirected aggressive behavior.

Status Epilepticus

Status epilepticus is defined as either a single seizure lasting longer than 15 minutes or a series of seizures without a return to baseline mental status between each episode [6]. If the seizure started at home and has not stopped before arrival in the ED, the patient is most likely in status. The term status epilepticus refers only to the duration of the seizure and does not imply anything about the cause, prognosis, or type of seizure activity. Generalized tonic–clonic status, partial complex status, and febrile status are the most frequent types of status epilepticus.

The most common cause of status is low antiepileptic drug levels in a child with known epilepsy. Breakthrough seizures may also be triggered by fever, vomiting, and/or intercurrent infections. Less commonly, status is secondary to an acute encephalopathic process such as CNS infection (meningoencephalitis), metabolic disturbance (hypoxia, hypoglycemia, hyponatremia, hypocalcemia, hyperammonemia), intoxication or poisoning (cocaine, theophylline, tricyclic antidepressants, amphetamines, camphor), mass lesion (tumor, abscess, hemorrhage), or head trauma.

Children generally tolerate status epilepticus well, although there may be hypoxia and hypercarbia with metabolic and respiratory acidosis significant enough to require intubation and mechanical ventilation. Increased cerebral oxygen consumption and cerebral blood flow occur and may cause intracranial hypertension. This can lead to exacerbation of cerebral injury if the seizure is due to trauma or spontaneous intracranial hemorrhage. Physical injury and vomiting with aspiration are additional hazards. Therefore, treat status epilepticus as quickly as possible and prepare to provide advanced respiratory support to manage the respiratory depression and altered mental status which may occur with aggressive medical therapy.

Electroencephalography

Electroencephalography (EEG) is a noninvasive method for recording neuronal electrical activity in the brain [7]. The background patterns of the EEG vary by both age (infant, toddler, or adolescent) and clinical state (awake, drowsy, or asleep). Intermittent activity, such as slowing of the background, often reflects disordered central nervous system (CNS) function. The EEG has its greatest clinical applicability in the evaluation of seizure disorders. An EEG may demonstrate "epileptiform activity," that is, patterns that can indicate risk for seizures and epilepsy. At times, however, the findings on an EEG can be diagnostic, as in the hypsarrhythmia pattern seen in infantile spasms (West syndrome) or generalized 3-Hz spike-wave activity seen in childhood absence epilepsy. Synchronized video recording with EEG has increased the utility of EEG in assessing episodic disorders that may or may not represent seizures. EEG also can be very useful in the evaluation of altered mental status and in some encephalopathies.

The EEG is rarely diagnostic in isolation, but is rather only one part of the child's clinical picture. Routine EEG, obtained in the outpatient setting, is usually brief (< 30 minutes). Therefore, events of interest are usually not recorded. If the child is unable to cooperate, it may be impossible to obtain a study, or the study may be uninterruptable due to artifact from movement, crying, etc. Medications used for sedation of an uncooperative child, especially barbiturates and benzodiazepines, may produce artifact or iatrogenic changes in the EEG, which can confuse interpretation and may decrease the likelihood of recording abnormalities such as epileptiform discharges. In addition, children without a history of epilepsy may, in fact, have an abnormal EEG. EEG findings such as those occasionally seen in migraine, learning disabilities, or behavior disorders are often nonspecific and do not reflect structural brain damage or dysfunction. When questions arise regarding the clinical significance of EEG findings, consultation with a pediatric neurologist is appropriate.

Due to more prolonged duration, ambulatory EEG obtained over 24-72 hours can be useful in capturing and assessing events to ascertain if they are due to epileptic seizures. Likewise, recording the EEG during nocturnal polysomnograms can help differentiate between nonepileptic sleep-related events from nocturnal epileptic seizures.

Prolonged or continuous inpatient EEG recordings are useful in the assessment of patients with altered mental status, suspected nonconvulsive status epilepticus, and druginduced coma, as well as infants with hypoxic ischemic encephalopathy. The EEG is less commonly helpful in determining electrocerebral silence (brain death).

Living

Children living with epilepsy, particularly with untreated or poorly controlled seizures, can develop reduced cognition and memory [7]. Clearly, epileptic encephalopathy (i.e., epileptic activity or frequent seizures are contributing to worse neurocognitive function) does occur, particularly in young children with epilepsies such as infantile spasms (West syndrome), Dravet syndrome, and Lennox-Gastaut syndrome. The impact of persistent partial seizures on development is less clear, although persistent temporal lobe seizures in adults are associated with cognitive dysfunction. It is not likely that interictal epileptiform activity contributes to cognitive impairment in older children, although increased epileptiform burden has been demonstrated to cause mild cognitive problems in some disorders previously thought to be benign, such as benign epilepsy with central temporal spikes (BECTS). Continuous epileptiform activity in sleep is associated with Landau-Kleffner syndrome (acquired epileptic aphasia) and the syndrome of electroencephalographic status epilepticus in sleep (ESES), both of which are associated with cognitive decline.

Injuries

Children with epilepsy are at far greater risk of injuries than the general pediatric population [7]. Physical injuries, especially lacerations of the forehead and chin, are frequent in atonic (previously called astatic) seizures (so-called drop attacks), necessitating protective headgear. In all other seizure disorders in childhood, injuries as a direct result of a seizure are not as common, although drowning, injuries related to working in kitchens, and falls from heights remain potential risks for all children with active epilepsy. It is therefore extremely important to stress "seizure precautions," in particular water safety. Showers are recommended over bathing as they decrease the likelihood of drowning. Ultimately, patients

with epilepsy should not participate in activities that could result in serious injury in the case of sudden loss of consciousness, without taking precautions to address that possibility. However, for most activities simple accommodations allow individuals with epilepsy to lead very normal lives.

The greatest fear of a parent of a child with new-onset of epilepsy is the possibility of death or brain injury. There is an increased risk of premature death in children with epilepsy, especially those who have not achieved seizure control. Most of the mortality in children with epilepsy is related to the underlying neurologic disorder, not the seizures. Sudden unexpected death with epilepsy (SUDEP) is a rare event in children. Although children with epilepsy have an increased risk of death, SUDEP occurs in only 1–2:10,000 patient-years. The greatest risk for SUDEP is in children with medically uncontrolled epilepsy. The etiology of SUDEP is not yet known and there is no current proven strategy to prevent SUDEP other than seizure control. Identifying life-threatening disorders (eg, identifying patients with cardiac arrhythmias, especially prolonged QT syndrome) as the cause of misdiagnosed epilepsy is clearly of utmost importance. While SUDEP is rare, increased mortality in children with epilepsy should be mentioned when counseling families.

Treatment

If the child has returned to normal, he or she can go home and follow up with an outpatient EEG and MRI [8]. A neurological consultation should also be scheduled. If the patient does not return to baseline, in addition to standard lab testing (i.e., bedside glucose, CBC, electrolytes, liver function tests [LFTs], ammonia, or urine toxicology), an imaging study (CT or MRI) should be performed emergently. If a clinical indication, an LP should be performed. Occasionally, an acute EEG should also be performed to rule out subclinical status.

Treatment of seizures with anti-epileptics balances the risk of recurrence with the risks of the medication. The risk of having a second afebrile seizure after a first is slightly below 50%. Therefore, unless there are other factors, it is customary not to start an antiepileptic medication until after the second seizure. Things that confer additional risk such as dramatically abnormal EEG, very strong family history, or abnormal neurological examination may impact the decision of whether or not to start medication. This decision should be made with a pediatric neurologist.

Conclusion

The instructions and rules largely depend on a number of factors and there will be no identical rules for all epilepsy sufferers. The age of the child, the control of epileptic seizures, the mental status and the possible existence of another disease are extremely important in determining activities and schooling. It is important to establish good communication and trust between the doctor and the family and to ensure that both the child and the parents strictly follow the instructions on living with epilepsy. The appearance of an epileptic seizure in childhood does not necessarily mean that the child is suffering from epilepsy. Seizures can be epileptic or non-epileptic. Non-epileptic seizures can occur in a variety of medical conditions (e.g., low blood sugar) and they stop when the cause is removed. When such an attack occurs, parents should be told how the child experienced the epileptic seizure, but that this does not mean that the child is suffering from epilepsy. The diagnosis is made after a series of tests performed.

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