REVIEW ARTICLE

Management of the first convulsive seizure

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Abstract

Objective: to observe the wide variety of reported prognosis after a first unprovoked convulsion and of risk factors that are associated with recurrence, and a uniform conduct.

Sources: systematic review of Bireme.

Summary of the findings: recurrence rates differ from a first seizure study because of different inclusion criteria. The EEG is particularly helpful to support the epileptic nature of the event in younger patients and in those with seizures of unknown origin. An abnormal EEG, particularly the ones with generalized spike-wave discharges, has been reported as a consistent predictor of recurrence. Although not a substitute for the clinical examination, the EEG is an integral part of the diagnostic process after the first afebrile seizure and should be requested. The actual decision regarding whether or not to treat patients who present an initial seizure depends heavily on the physician’s assessment of the potential morbidity of another seizure versus the potential morbidity of antiepileptic drugs (AEDs) therapy.

Conclusions: in children, side effects of AEDs are common, and the risk of injury from a seizure is usually minimal because children neither drive nor operate heavy machinery and are usually in supervised environment. Regarding adults, there is little unanimity.


Introduction

Epileptic seizures (convulsive or not) are more common than we imagine. Approximately 9% of the population will experience at least one episode throughout life.¹ A seizure is a dramatic event in the life of the child and the family.² Unprovoked seizures are those in which no triggering factor, such as fever, head trauma or metabolic disorder, can be identified. Idiopathic unprovoked seizures are those in which the clinical and electroencephalographic findings are well defined. The term idiopathic is used only in cases of genetic epilepsies.³ Seizures are classified as remote symptomatic, when the child has a history of previous neurological disorders, such as non-progressive encephalopathy since birth, cerebral vascular accident or head trauma, leading to a static lesion. Cases of unprovoked seizures for which an etiologic agent can be identified are classified as idiopathic or cryptogenic. The term idiopathic should be used in cases of seizures lacking an obvious

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cause, as it is usually employed; it must denominate partial or generalized epileptic seizures, with specific clinical and electrographic features. Seizures that are not classified as idiopathic or remote symptomatic are considered to be cryptogenic. Therefore, while idiopathic forms are characterized by a lack of causal factor, in remote symptomatic forms some etiologic factor can be identified. Some authors argue that a grading between these two forms exists, suggesting the idea of a biological continuum through the several entities, instead of a set of distinct epileptic syndromes.

After the first unprovoked seizure, a global understanding of the natural history and the risk factors for recurrence are required for a rational decision regarding the use of antiepileptic drugs (AEDs) in prophylactic treatment. Emergency procedures in cases of acute seizures and convulsive status are well established; however, there is no consensual agreement in relation to the prophylactic treatment to be followed after a first unprovoked seizure. In the literature, studies comprising both children and adults report a rate of recurrence risk between 27% and 71%, after a first unprovoked seizure. In a meta-analysis involving 16 previous studies, three methodological factors justified many of these disparities seen in the rates presented in such studies: (a) inclusion criteria, e.g., studies included only patients at the time of their first seizure or patients with previous non-convulsive seizures; (b) prospective or retrospective study; (c) follow-up time. Berg & Shinar demonstrated that, after a first seizure, etiology and electroencephalographic findings, sleep-wake cycle, Todd’s paralysis, and previous history of febrile seizure. One hundred seventy-one children (42%) presented subsequent crises. Cumulative recurrence risk was 29% for one year of follow-up; 37% for two years; 42% for five years; and 44% for eight years of follow-up. The average time for recurrence was 5.7 months; 53% of recurrences occurred within six months; 69% within one year; and 88% within two years. Only five cases of recurrence after five years were identified (3%). In the multivariate analysis, risk factors for recurrence were: remote symptomatic etiology; abnormal EEG; occurrence of seizures during sleep; previous history of febrile seizure; and Todd’s paralysis. In cryptogenic cases, risk factors included abnormal EEG and occurrence of seizures during sleep. In remote symptomatic cases, risk factors were previous history of febrile seizures and first seizure before the age of three. Risk factors for late recurrence (after two years) were etiology, abnormal EEG and previous history of febrile seizure in all groups, and abnormal EEG in the cryptogenic group. Shinnar et al. concluded that children with cryptogenic seizures who present normal EEGs and who experienced their first seizure while awake have an especially positive prognosis, with a recurrence risk of only 21% in a five years’ time.

Status epilepticus in the first seizure was not an uncommon finding in the cryptogenic group, although it was not considered a risk factor for recurrence. Another study, performed with 393 patients who had suffered unprovoked seizures (not including absence seizures), has determined the following recurrence risks within a five years’ time: a 53% recurrence risk for the general group; 45% for the cryptogenic group; 65% for the idiopathic group; and 69% for the symptomatic group.

The cryptogenic group was divided into partial, generalized and undetermined seizures; each subgroup presented a recurrence risk of 60%, 27% and 35%, respectively. When divided according to EEG findings - normal, nonspecific abnormalities and specific abnormalities - the cryptogenic group showed recurrence risks of 33%, 46% and 90%, respectively.

The recurrence rate in a cohort study involving 1,659 patients with unprovoked seizures was 61% for the whole group; 61% for the cryptogenic group; 57% for the idiopathic group; and 67% for the symptomatic group. Upon division of the cryptogenic group into partial, generalized and undetermined crises, recurrence rates reached 72%, 47% and 53%, respectively; upon division according to EEG findings, recurrence rates were 54%, 62% and 72% for normal, nonspecific abnormalities and specific abnormalities, respectively.

Should EEG be routinely requested after a first unprovoked seizure?

The literature does not present a conclusive answer to this question. Several data are made available through the EEGs of patients with epilepsy; however, there is little information about EEG findings that can support a diagnosis of epileptic episode when patients present a first event that may be interpreted as an unprovoked seizure. Clinical evidence demonstrating the specificity of the epileptiform discharges during an EEG, in a correct diagnosis of epilepsy, is mostly based on population studies, in which patients who are believed to be non-epileptic or healthy and asymptomatic volunteers are submitted to a routine EEG. This way, most studies show a 0.5% to 3.5% potential of non-epileptic subjects developing an interictal epileptiform activity in EEGs. In a classic study performed with...
10,488 individuals, the following incidences of spike-wave pattern at 3Hz were observed: 77.1% out of 463 epileptic patients with isolated absence seizure or absence in association with other types of seizures; 5.9% out of 2,162 epileptic patients without absence seizure; 3.5% out of 202 family members of epileptic patients; 0.2% out of 4,533 patients with neuropsychiatric non-epileptic disorders; and 0.2% out of 3,070 normal controls.20

EEG is a noninvasive and low-cost exam. When properly used and carefully interpreted, in the context of the patient’s clinical history, EEG becomes the most important procedure in the diagnosis and handling of epilepsy. Therefore, EEG must be requested after a first unprovoked seizure for four reasons: a) the chance of identifying children with specific epileptic syndromes; b) the chance of registering smaller seizures, such as absence and myoclonic seizures, bringing diagnostic and therapeutic implications;21 c) the possibility of establishing triggering factors, such as video games or television, allowing for a proper and early orientation; and d) the possibility of documenting electrographic findings during a stage prior to the treatment of an epileptic syndrome, since EEG can be negatively masked or changed with the use of AEDs. This is especially important in order to define a proper treatment, avoiding a misinterpretation between specific seizures and epileptic syndromes.7,10,11 Four common groups of epileptic syndromes exemplify the need for a more precise diagnosis than the term “epilepsy”. Benign partial epilepsy of childhood, symptomatic generalized epilepsies, juvenile myoclonic epilepsy, and temporal lobe epilepsy include more than 60% of all epilepsies occurring between the ages of two and 16. They are completely different in feature, etiology and genes, also presenting different investigative procedures, short-term and long-term strategies of treatment, and prognosis.2,3

Shinnar et al. demonstrated the relevance of EEG as an instrument for evaluating recurrence risks: a specific epileptiform anomaly (focal spikes, multifocal spikes, centrotemporal spikes, generalized spike-wave, and photoconvulsive response) was more associated with a higher recurrence risk than a non-epileptiform discharge, even though focal slow waves were also associated with a higher recurrence risk. Cumulative recurrence risk was 52% and 59% for two and five years, respectively, in children with an abnormal EEG, in comparison with a 28% and 32% risk for children without EEG abnormalities. Abnormal EEGs were more common in children with a remote symptomatic first seizure than among children in the cryptogenic group.7 An altered EEG has been constantly a predictive factor of recurrence, although there is no consensual agreement in respect to the nature of the abnormality predicted by the EEG. Only the generalized spike-wave pattern was associated with a high recurrence risk.11

The American Academy of Neurology, the Child Neurology Society and the American Society of Epilepsy, after some rigorous literature research, and based on evidence analysis, recommend that EEG be routinely performed as part of the diagnostic assessment of a single unprovoked seizure.22

The authors of the present article recommend not only that EEG be requested after the first unprovoked seizure, but also recommend that the physician who requests it judiciously interpret EEG findings by always combining the exam and the clinical context. Although EEG abnormalities have been associated with recurrence after a first single seizure in children,7,9,10,23,24 it is necessary to take this piece of information to the clinical context prudently, since this finding was observed only in the idiopathic group, and not among symptomatic patients. In addition, a significant number of children presenting an abnormal EEG (at least 30%) did not experience recurrent seizures.2 Therefore, an abnormal EEG was not an absolute predictive factor for recurrence.10 Moreover, 35% to 37% of children with normal EEG suffered later seizures, demonstrating that a normal EEG can, in some cases, incorrectly calm down both the family and the patient.2

**Should patients be treated with AEDs after a first unprovoked crisis?**

The decision of whether to treat a patient after the first unprovoked seizure must be individually considered. Physicians must take into consideration not only the recurrence risk and its consequences, but also the risk associated with the use of AEDs.7 The impact of a recurrence in children and teenagers is usually predominantly social, unless recurrence is associated with an extended status epilepticus.23 Several studies suggest that the consequences of recurrence are minimal if the first seizure was unprovoked, or caused by a factor other than an acute neurological insult.24-31

The treatment of the first generalized unprovoked tonic-clonic seizure does not improve the prognosis of epilepsy. The chance of remission in the long run (one or two years) in patients treated after the first and second seizure is not influenced by treatment after the first seizure. AEDs after a first seizure reduce the recurrence risk, although 50% of the untreated patients never present a second episode.32 The presence of a lesion in the neuroimaging exam is associated with a particularly high recurrence risk.33 Electroencephalographic abnormality is also a valuable reason for treating children, as well as adults.34

Criteria for beginning a treatment with AEDs vary considerably from country to country and among specialists. Some factors must be taken into consideration, such as medico-legal aspects, psychosocial impact, and the great difference seen in the recurrence rates presented in the literature. The decision of whether to treat also varies according to age, etiology and epileptic syndrome. The chance of identifying a probable cause of an unprovoked seizure increases with age. A probable etiology was identified in 77% of patients with age over 60; cerebral vascular...
accident was found to be the most common etiology in these cases. In addition to these factors, the physician must be sure that the event was in fact epileptic, and not a syncope or a pseudo-seizure.

We would like to emphasize that there is no consensual agreement in the literature, and that randomized studies recommending a uniform routine are scarce. Therefore, the need for treatment with AEDs must be evaluated individually, based on a risk/benefit evaluation. In case treatment with AEDs is chosen, some criteria must be followed: certainty of diagnosis, high risk of recurrence, probability of adherence to treatment, and patient/family or caretaker’s wish.

References