

Current Literature

In Clinical Science



Can Status Epilepticus Sometimes Just Be a Long Seizure?

Unprovoked Status Epilepticus: The Prognosis for Otherwise Normal Children With Focal Epilepsy.

Camfield P, Camfield C. *Pediatrics* 2012;130:e501. Originally published online August 20, 2012, doi: 10.1542/peds.2012-0838.

OBJECTIVE: To document the effect of unprovoked status epilepticus (SE) on the prognosis for otherwise normal children with focal epilepsy. **METHODS:** From the Nova Scotia Childhood Epilepsy Study (population based), we identified patients with focal epilepsy, normal intelligence, and neurologic examination and follow-up ≥ 10 years. We compared those with and without unprovoked SE. **RESULTS:** One hundred eighty-eight cases had a mean follow-up of 27 ± 5 years with no deaths from SE. Thirty-nine (20%) had SE, 19 of whom experienced their first seizure. The number of episodes of SE was 1 in 27 patients (69%) and 2 to 10 in 12 patients. At onset, 9 of 39 (23%) SE patients and 35 of 149 (23%) no-SE patients had specific learning disorders. At follow-up, 11 (28%) SE and 49 (33%) no-SE patients had learning disorders ($P =$ not statistically different [ns]). Grades repeated, high school graduation, and advanced education did not differ. The number of antiepileptic drug (AED) used throughout the clinical course was the same: 22/39 (56%). SE patients used ≤ 2 AEDs versus 99 of 149 (64%) no-SE patients ($P = .2$). The distribution of patients using 3 to 11 AEDs was similar. The remission rate (seizure-free without AEDs at the end of follow-up) for SE patients was 24 of 39 (61%) versus 99 of 149 (66%) in no-SE ($P = .5$). Intractable epilepsy occurred in 15% SE and 11% of no-SE cases. **CONCLUSIONS:** SE often recurs but apparently has little influence on long-term intellectual and seizure outcome in normally intelligent children with focal epilepsy.

Commentary

Status epilepticus (SE) is a grave, life-threatening neurological emergency requiring rapid administration of definitive therapy to avoid irreversible brain injury (1), but it seems paradoxical that many children who experience it do surprisingly well. For instance, children who experience SE are no more likely to go on to develop chronic epilepsy than those who experience an ordinary, self-limited first seizure (2). Although prolonged seizures may be associated with subsequent development of hippocampal sclerosis (3), and a history of SE predicts a lower chance of seizure freedom after temporal lobectomy (4), nonetheless, children with SE and epilepsy were found to have only a modestly lower chance of achieving seizure remission than others with epilepsy in one prospective population-based study (5). While it is not surprising that individual patients experience cognitive deterioration after SE (6), this has not been proven for larger samples of patients. How often does SE, a potentially malignant phenomenon, have an apparently benign outcome?

This question is addressed by this study from the Camfields using the Nova Scotia Childhood Epilepsy population-based cohort. That province has a central EEG reading facility. Based on the assumption that children will receive an EEG for new

onset of an unexplained seizure, these EEG records were used to identify all children with newly diagnosed epilepsy between 1977 and 1985. Contact had been maintained with these patients and their families, most recently in 2009–2011, to collect the information for analysis. This study looked at children with focal epilepsy (two or more unprovoked seizures) who had convulsive SE (> 30 minutes of unconsciousness with continuous or repeated seizures) at any time in their lives. In addition to requiring adequate follow-up, the study criteria required normal intelligence ($IQ > 70$) and no neurological deficits interfering with daily activities. Because of the era of diagnosis, MRI data was not included, but CT was available in 86%; approximately 60% of patients had no identifiable cause for epilepsy. The selection conditions, therefore, must eliminate some cases of remote symptomatic epilepsy, a subgroup with a higher risk of SE (5). It would not be surprising if patients with baseline cognitive impairment and other neurological disability would have different SE outcomes than those of neurologically normal patients in the current study.

This study looked at the consequences of SE, particularly evidence for brain injury or worsening of subsequent seizure control. The measure of brain injury addressed was cognitive function. Although many of these patients had follow-up neuropsychological testing, this information was not analyzed other than to note the presence of a learning disorder because this testing was not standardized or complete. However, it can be argued that neuropsychological testing is merely a surrogate for the ability to perform and succeed in life activities;

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in this regard, SE and non-SE patients were no different, with equal educational achievements and earned income. Since all SE was convulsive, it is not surprising that generalized tonic-clonic seizures were more common in the SE patients, in all other respects, however, the course of subsequent epilepsy was similar in the two groups. This similarity included the percentage of focal seizures with altered consciousness, antiepileptic drug regimens, and average longest seizure-free period. Most importantly, the chance of achieving a sustained seizure-free remission off antiepileptic drugs at the end of the study was the same for SE and non-SE patients. So, unprovoked SE did not lead to cognitive deterioration or an increased chance of medically refractory epilepsy in this patient cohort.

Other studies provide additional perspectives. The occurrence of one episode of SE increases the risk of subsequent occurrences (7), and 31% of patients in the current Canadian study had multiple SE events. SE is more likely in remote symptomatic epilepsy, in focal epilepsy, and with epilepsy onset earlier in life (5, 7). The most relevant prior investigation, however, comes from another prospective population-based study, done in Finland (5): This was a group of 150 patients with childhood-onset epilepsy followed for more than 3 decades, of whom 27% had one or more SE episodes. Overall, SE did not affect long-term prognosis. It was most common at epilepsy onset and did not alter mortality rates. Even combining all patients, including those with neurological and cognitive deficits, there was only a modest decrease in the probability of attaining seizure remission. In subjects with no other neurological handicap, social and educational outcomes were similar in those with and without SE. Therefore, this Finnish and the current Canadian studies demonstrate a similarly favorable outcome for neurologically normal patients with SE in childhood-onset epilepsy.

This work shows that neurologically normal patients with childhood-onset epilepsy and SE have prognoses for life function and seizure control the same as those of similar patients without SE. In this situation SE can be regarded as “just a long seizure.” It cannot be assumed that this holds for other patient subgroups—such as those with acute provoked SE, with SE

in the setting of baseline cognitive and neurological deficits, or with generalized or adult-onset epilepsies. It also does not mean that SE is not a dangerous event (8). These favorable outcomes reflect the timely interventions delivered by the excellent healthcare system of a Canadian province, and modern SE treatment with benzodiazepines and parenteral antiepileptic drugs (9). The results do mean that neurologically normal patients with childhood-onset epilepsy, and their families, can be counseled that the occurrence of unprovoked, well-treated SE usually does not change the prognosis.

by John W. Miller, MD, PhD

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