New Definition of Status Epilepticus

Pauline Anderson | January 12, 2016

An International League Against Epilepsy (ILAE) task force has developed a proposed new definition of status epilepticus (SE) that puts into a framework what has been the practice for years.

While treatment for SE is typically started at 5 to 10 minutes, the official definition of SE had stated a time of 30 minutes before injury occurs.

"The problem has been that you had these two definitions floating around," that included 5 minutes or 30 minutes, depending on whether you were talking about when to treat or consequences, said study author Shlomo Shinnar, MD, PhD, professor, neurology, pediatrics and epidemiology and population health, and director, Comprehensive Epilepsy Management Center, Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, New York.

The proposed new definition, published in *Epilepsia*, is conceptual, with two operational dimensions. The first, time point 1 (t1), indicates the earliest time when treatment should be started. The second, time point 2 (t2), indicates when long-term consequences, such as neuronal injury, neuronal death, alteration of neuronal networks, and functional deficits, are increasingly likely.

Dr Shlomo Shinnar

For example, in the case of convulsive (tonic-clonic) SE, time point 1 is at 5 minutes and time point 2 is at 30 minutes.

Both these time points are based on animal experiments and clinical research but should be considered best estimates as the evidence is still incomplete and there is considerable variation, according to the authors.

Definition History

SE, considered the most extreme form of a seizure, was first included in the classification of seizures of the ILAE of 1970. In that classification, SE was defined as a seizure that persists for a sufficient length of time or is repeated frequently enough to produce a fixed and enduring condition. SE was divided into partial, generalized, or unilateral types.

In the revision of 1981, the definition was only minimally changed. Again, the concepts were imprecise because there was no definition of "fixed and enduring" or "sufficient length," Dr Shinnar said. The definitions also didn't include a clinical description of the type of SE.

The problem with the traditional SE definition is how it's applied to the individual patient, Dr Shinnar said. "It's not about 5 or 30 minutes; it's about what you're asking. If you're looking at what constitutes a truly prolonged seizure that may cause injury, or if you're looking to study outcomes, then 30 minutes is the correct definition. If you're looking at what point you need to not just stand there but do something, then 5 minutes is the correct definition."

SE is rather common among patients with epilepsy, according to statistics provided by Dr Shinnar. The data show that 10% to 12% of patients with a first unprovoked seizure or newly diagnosed epilepsy present with SE. As many as 40% of SE cases occur in patients with epilepsy, with head trauma, meningitis, and stroke making up much of the rest.

Because so much SE is at least initially non–epilepsy-related, it's important for nonepileptologists, such as emergency department physicians, to know how to treat it, said Dr Shinnar.

However, he pointed out that many of these initially nonepileptic patients will develop epilepsy down the road.

Other Seizure Types

While best estimates have been established for tonic-clonic seizures, data from large studies on other forms of SE are not yet available. However, on the basis of evidence from case reports and small series, the task force determined that for SE with impairment of consciousness, time point 1 is 10 minutes and time point 2 might be 30 to 60 minutes.

For absence SE, time point 1 might be 10 minutes; time point 2 is unknown. The problem with nailing down times for absence SE is that for most patients "you have no idea how long it's been going on," commented Dr Shinnar.

As knowledge and understanding increase, these time points should become clearer, said the authors. Time points can be defined according to scientific evidence and incorporated into the definition without changing the underling concepts, they said.

The task force also proposed a diagnostic classification system of SE types. This, they said, should provide a framework for clinical diagnosis, investigation, and therapeutic approaches for each patient.

The system, which reflects the 2010 ILAE revised classification, is recognition that SE can occur with seizures other than convulsive, said Dr Shinnar.

"The point is to say that, unlike the older stuff, which only talked about convulsive status, in principle, status can occur with any seizure type, and be aware that t1 and t2 won't necessarily be the same as for convulsive."

However, he added that he hasn't seen some of the types listed "in 30 years of doing this work."

This classification framework includes four axes:

1. **Semiology:** This divides forms of SE into those with prominent motor systems (eg, convulsive SE, myoclonic SE, and focal motor) and those without prominent motor systems (with and without coma). It also lists currently indeterminate conditions, such as acute confusional states (eg, delirium) with epileptiform electroencephalography (EEG) patterns.

2. **EEG correlates:** This axis adopts the latest recommendations by consensus panels to use the following descriptors for EEG: name of pattern, morphology, location, time-related features, modulation, and effect of intervention. Although in most SE cases "you will treat before you ever get EEG," if this information is available, it helps in the classification process, said Dr Shinnar.

3. **Etiology:** This section is divided into subcategories of known or symptomatic causes, such as acute (eg, stroke, intoxication, malaria, encephalitis), remote (eg, posttraumatic, postencephalitic, poststroke), progressive (eg, glioblastoma), SE in defined electroclinical syndromes, and unknown causes.

4. **Age:** This category divides SE into that occurring in the neonatal and infantile epilepsy syndromes, predominantly during childhood and adolescence, and only in adults and the elderly.

Because current knowledge about the pathophysiology and underlying neurobiology of SE is incomplete, a proposed classification can be only a compromise among conceptual, scientific, and pragmatic empirical classifications, said the paper's authors.

A classification has to facilitate communication between clinicians by providing them with a common language. It also should help to improve the treatment of patients on the basis of current understanding of pathophysiology, prognosis, etiology, and age.

As well, classification should facilitate the conduct of epidemiologic studies of consequences and prevention and guide basic research to identify natural causes.

"Therefore it is important to emphasize that the proposed classification is merely a framework and must not be treated as a doctrine, but reflect our current knowledge on status epilepticus," write the authors.

Future advances in research will likely lead to revisions of the proposed classification, they said.

The proposed guidelines "are an important addition to the literature," Amy Brooks-Kayal, MD, chief and Ponzio Family Chair in Pediatric Neurology, Children's Hospital Colorado, and professor of pediatrics, neurology and pharmaceutical sciences, University of Colorado, Aurora, told *Medscape Medical News* when asked to comment.

"They help to standardize and clarify the definitions of status epilepticus," she said. "This will be of benefit in both clinical care and research related to status epilepticus."

Dr Shinnar has disclosed no relevant financial relationships.

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