Operational classification of seizure types by the ILAE: Position Paper of the ILAE Commission for Classification and Terminology

Historically, in 1981, seizure types had been characterized as partial vs. generalized in onset, and simple vs. complex, based on several behavioral and vEEG-based recordings of seizures. In 2010, proposed revisions to this original classification scheme were made, specifically for the purpose of clarifying a patient's likely seizure and epilepsy type, if a specific epilepsy syndrome was not present: a clearer classification scheme could help group patients more appropriately (according to seizure type) in future clinical trials, thereby allowing for cleaner data with respect to etiologic, prognostic, and therapeutic interventions for different types of epilepsy.[1] Based on these proposed revisions made in 2010, a Seizure Type Classification Task Force was established in 2015 to further elucidate seizure types. The operational classification for seizure types set forth by this task force were summarized in this review.

Motivation for Change: The authors highlight that the first step in a patient's evaluation is to determine if a transient episode of abnormal signs/symptoms is even suggestive of a seizure; if so, identifying the seizure type is the next step. As such, the authors highlight that having a more standardized method for identifying the seizure type, can 1) make physician-physician communication easier, 2) better group patients for specific therapies, 3) potentially help identify new syndromes or etiologies (i.e., as in IS and Tuberous Sclerosis), 4) focus on mechanisms of different seizure types, and 5) provide the patient with terminology to describe their seizure.

Results:

a) Classification of Seizure Types: The basic classification charts are shown in Fig.1 and Fig.2. The first step in seizure classification begins with understanding whether the seizure is generalized (engaging bilateral networks simultaneously) or focal (engaging a unilateral network) **in onset**; if not previously witnessed, unknown onset can be used until more data is obtained. If focal in onset, the level of awareness[2] during the seizure should then be characterized, to arrive at either a focal aware (i.e., simple partial) or a focal impaired awareness seizure (i.e., complex partial). Sub-modifiers are encouraged, to identify whether there are predominantly motor or non-motor features, and then further by the first prominent sign in the seizure (see Fig.2); an example would be a focal impaired awareness automatism seizure. The new term "focal to bilateral tonic-clonic" was also added here, to replace the original term of "partial onset with secondary generalization", and to distinguish a focal-onset seizure that later propagates diffusely from a generalized-onset seizure. The authors note that using as many descriptors as possible is helpful for focal seizures, though one should aim to at least identify a seizure as focal vs. generalized in onset. Finally, for generalized-onset seizures, there is almost always loss of awareness (given diffuse network involvement), so primary sub-divisions include motor vs. non-motor features.

b) Reasons for Classification Changes: In terms of the focal vs. partial terminology, the term focal is more intuitive with respect to anatomic terminology. Regarding focal vs. generalized-onset, identifying features of a focal-onset seizure may help localize the seizure to a suspected network or brain region.

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[1] As emerging data surrounding the mechansims of epilepsy have suggested that epilepsy as a network-based disease, rather than pathology restricted to a local brain region

[2] Retained awareness suggests that a person was aware of themselves and their environment during the seizure, even if immobile. If any lost awareness at any point in the seizure, the seizure should be named as w/impaired awareness

With respect to the term 'awareness', we know that the level of consciousness during a seizure has significant implications for a patient (i.e., driving), and the term 'awareness', specifically, helps to simplify the experience for the patient; they are presumed to have retained awareness if they can recall the experience/were aware of their environment during the seizure.[3] Finally, though not shown in Figs 1 or 2, the etiology of a seizure (post-traumatic, structural brain lesion) should be described, if known. Further, supporting information (EEG, neuroimaging, videos, genetic testing, etc) is always helpful, beyond history, for seizure classification.

Conclusions: Overall, the modifications to the original 1981 classification scheme suggested here are outlined in Table 1. Aside from some of the major changes noted above, additional features in this newer classification scheme that were highlighted by the authors included the addition of more terms to describe focal-onset seizures (i.e., emotional, cognitive, hyperkinetic) and the acceptance that some seizure types previously defined as generalized could actually be focal in onset (and vice versa). Ultimately, the authors again highlight that this updated method for seizure classification may lead to a more standardized approach for diagnosing different types of epilepsy, to eventually achieve more targeted and effective therapies.

Summary created by Elaine Sinclair, D.O.

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[3] Awareness was used over responsiveness, as a patient's responsiveness is not often tested during a seizure