



Guest Editorial

Where Early Suspicion, Detection, and Treatment Advocacy in Nonconvulsive Status Epilepticus: A Role for the Critical Care Nurse

Anne W. Alexandrov, PhD, AGACNP-BC, ANVP-BC, NVRN-BC, CCRN, FAAN^{1,2}

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¹ Professor, University of Tennessee Health Science Center, Memphis, Tennessee USA

² Principal Partner and Professor, NET SMART, Fountain Hills, Arizona USA

Corresponding author: Anne W. Alexandrov, anne@netsmart-stroke.org

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For 31 years, my clinical practice has centered exclusively on acute stroke nursing, but prior to this, I worked in neurocritical care units managing a wide variety of neurologic diagnoses, as well as in cardiac and trauma critical care. I've been privileged to witness numerous neurologic advancements over the course of my 43 total years in practice, primarily driven by reperfusion treatments in patients with ischemic stroke. Sadly, despite ongoing research in hemorrhagic stroke, advances in the care of patients with aneurysmal subarachnoid hemorrhage (aSAH) and intracerebral hemorrhage (ICH) have moved at a much slower pace.

One of the things a good neurocritical care and stroke nurse learns early on is that when the patient looks clinically worse than their imaging, suspicion of nonconvulsive status epilepticus (NCSE) should be high. Despite this, there is often a reluctance to admit to or treat nonconvulsive seizures, and ironically, this sometimes originates from the very neurosurgeons that admitted the patient. Other times, this failure to identify seizures is driven simply by a lack of knowledge due to management by general critical care or pulmonary critical care physicians. Whether this failure to detect or respond to NCSE is due to lack of knowledge or dated practices, the result is commonly a dangerous refractory state that will worsen prognosis in an already vulnerable patient.

As Kelly and colleagues point out in their review, generalized convulsive seizures and generalized status are more than clinically obvious, and in fact are quite dramatic in

appearance, promoting rapid recognition and early treatment. However, NCSE is often clinically invisible, although in some cases subtle twitching may be identified in the patient. Interestingly, a significant number of patients presenting with generalized status will progress to NCSE even with the initiation of treatment (Alkhachroum et al, 2022), signaling the need for a very high index of suspicion and what I believe is a universal need for continuous electroencephalogram (cEEG) monitoring for at least the first 48 hours.

Use of cEEG monitoring has opened our eyes to the high prevalence of NCSE, with studies documenting as many as 30% of patients with a variety of neurologic diagnoses having NCSE treatment (Alkhachroum et al, 2022). With regard to stroke, Dennis et al., reported in 2002 that as many as 18% of aSAH patients had nonconvulsive seizures (Dennis et al, 2022), while in 2003 Vespa and colleagues found that 36% of patients with ICH had nonconvulsive seizures (Vespa et al, 2022); a long time has passed since these publications emerged, yet failure to recognize seizures lacking a clear generalized presentation remains common. But importantly, these data suggest that there is no role for “spot” 30-minute EEG in today’s neurocritical care units, favoring the use of cEEG to detect NCSE in many of the patients that we admit. Additionally, since coma is highly predictive of NCSE, certainly all comatose patients should be monitored using cEEG (Alkhachroum et al, 2022).

There are a wide variety of abnormal electrical brain discharges on EEG that remain poorly understood. Periodic epileptiform discharges (PEDS) and stimulus induced repetitive periodic or ictal discharges (SIRPIDS) may occur repetitively, yet clear guidance on how to manage these findings evades us with some treating them as seizures and others failing to identify them as clinically important. In his recent opening keynote address at the ANVC 2022 Annual Conference, Dr. Stephan Mayer suggested that “chronic burnout” with PEDS and SIRPIDS may represent agonal brain rhythms signaling that the brain is literally worn out NCSE and may be past the point of no return (Mayer, 2022). Since both delays in treatment and undertreatment of NCSE may foster emergence of these patterns on cEEG, in the words of Dr. Mayer, seizures need to be identified early and “hit hard” to optimize patient outcomes.

While continuous video EEG remains the gold standard, new artificial intelligence-supported headband cEEG technology has made rapid initiation of cEEG in high-risk patients relatively simple (Ceribell, 2022). This headband technology is something that all critical care nurses working with neurologic and neurosurgical patients should advocate for in their critical care units, taking only 6 minutes to initiate without the need for EEG technologist support. Often called, a “brain stethoscope for seizures,” headband EEG can make a significant difference in the lives of our patients, with highly reliable internal algorithms capable of reading and alerting interprofessional staff of the likelihood of seizures well before a full video cEEG can be initiated.

Uncontrolled, unrecognized seizures can be deadly, and highly damaging to the brain. It’s likely that many patients that have suffered poor



outcomes from their neurologic disorders were “missed” by us due to our lack of knowledge of NCSE and its significance to patient well-being. The contribution by Kelly and colleagues to this issue of the *International Journal of Critical Care* helps to open all our eyes to the significance of NCSE and the need for highly vigilant critical care nurses capable of advocating for the early initiation of cEEG in neurocritical care patients. Certainly, it seems reasonable to consider that when we are in doubt of whether an unusual EEG pattern represents seizures, our patients may be well served for us to err on the side of early, aggressive treatment, especially since the most common error seen in practice today remains under treatment of NCSE.

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