Clinical Neurophysiology 130 (2019) 2270–2271

Contents lists available at ScienceDirect

Clinical Neurophysiology

journal homepage: www.elsevier.com/locate/clinph

Editorial

Stroke morbidity reduced by identifying acute seizure activity

See Article, pages 2282–2286

Acute stroke is a major source of morbidity in the population. An acute infarction's surrounding penumbra of marginally ischemic tissue can recover or deteriorate depending on complicating factors. One such complicating factor is seizures, which metabolically stresses marginally surviving cells. The seizures increase the metabolic rate severalfold. Such a stress can lead to cell death especially in already marginal tissue trying to recover from an acute insult. The offending seizures may be subtle but frequent. Frequent seizures, even of a non-convulsive type, excessively drive cellular energy demands (Witsch et al., 2017). This is referred to as a metabolic crisis (Vespa et al., 2003, 2016). Frequent non-convulsive seizures can be detected by continuous EEG monitoring. Once the presence of seizures is identified, treatment can begin or intensify.

Scoppettuolo and colleagues in this issue of *Clinical Neurophysiology* describe acute stroke patients treated with recanalization (Scoppettuolo et al., 2019). Recanalization substantially reduced the occurrence of seizures and epileptiform discharges. This implies that adequate circulation is another factor predisposing to seizures and epileptiform discharges. It also suggests that recanalization is effective in reducing the seizure risk. This is consistent with the premise that acute infarction's surrounding penumbra of marginally ischemic tissue can deteriorate into a metabolic crisis both because of ischemia and because of seizures. In the end, both confounding factors together would be the worst scenario, moving from metabolic crisis to cell damage and death.

The literature continues to grow demonstrating the clinical utility of continuous EEG monitoring. Clinical attention now turns from whether it is useful to when it is useful and how best to organize the service. General guidance has been written outlining the variety of clinical circumstances in which continuous EEG monitoring is useful (Herman et al., 2015a, 2015b). Further studies like the one by Scoppettuolo and colleagues (2019) add to the literature. To help coordinate the findings across centers, a unified semantic description of findings has been popularized (Hersch et al., 2013). Using that ICU EEG nomenclature, we are more clearly able to differentiate between lateralized periodic discharges (LPDs) and generalized periodic discharges (GPDs). With that nomenclature we learn that LPDs are more likely to predispose to seizures. Either LPDs or GPDs at more than 2.5 per second are associated with hypermetabolism that can lead to cell death.

Remaining technical problems pertain to how staff or physicians watch waveforms continuously or intermittently, and how the findings are reported back to the physician caring for the patient. Tracings can be monitored on-line remotely, making the clinical service more efficient and convenient. Staff can watch several patients at a time, making the service more economical. Trending allows for quick evaluation of which portions to look at first within a long recording (Nuwer, 1994). Trending also allows for quick assessment of patterns that repeat every few minutes or every few hours.

Declaration of Competing Interest

No conflict.

References

Herman S, Abend NA, Bleck TP, Chapman KE, Drislane FW, Emerson RG, et al. American clinical neurophysiology society: consensus statement on continuous EEG in critically ill adults and children, part I: indications. J. Clin. Neurophysiol. 2015a;32:87–95.

Herman S, Abend NA, Bleck TP, Chapman KE, Drislane FW, Emerson RG, et al. American clinical neurophysiology society: consensus statement on continuous EEG in critically ill adults and children, part II: personnel, technical specifications and clinical practice. J. Clin. Neurophysiol. 2015b;32:96–108.

Hirsch LJ, Laroche SM, Gaspard N, Gerard E, Svoronos A, Herman ST, et al. American clinical neurophysiology society's standardized critical care EEG terminology: 2012 version. J. Clin. Neurophysiol. 2013;30:1–27.

Marc R. Nuwer. EEG and evoked potentials: Monitoring cerebral function in the neurosurgical ICU. In: Neurosurgery Clinics of North America, 1994;5(4): 647-659, Neurosurgical Intensive Care, Neil A. Martin (ed.). W.B. Saunders, Philadelphia.

Scoppettuolo P, Gaspard N, Depondt C, Legros B, Ligot N, Naeije G. Epileptic activity in neurological deterioration after ischemic stroke, a continuous EEG study. Clin. Neurophysiol. 2019;130:2282–6.

Vespa P, O'Phelan K, Shah M, Mirabelli J, Starkman S, Kidwell C, et al. Acute seizures after intracerebral hemorrhage: a factor in progressive midline shift and outcome. Neurology 2003;60:1441–6.

Vespa P, Tubi M, Claassen J, Buitrago-Blanco M, McArthur D, Velazquez AG, et al. Metabolic crisis occurs with seizures and periodic discharges after brain trauma. Ann. Neurol. 2016;79:579–90.

Witsch J, Frey H-P, Schmidt JM, Velazquez A, Falo CM, Reznik M, et al. Electroencephalographic periodic discharges and frequency-dependent brain tissue hypoxia in acute brain injury. JAMA Neurol. 2017;74:301.

https://doi.org/10.1016/j.clinph.2019.10.003

Marc R. Nuwer *
Department of Neurology, David Geffen School of Medicine at UCLA, United States

Department of Clinical Neurophysiology, Ronald Reagan UCLA Medical Center, United States
* *Address: UCLA Dept. Neurology, Room 1190, Reed Neurological Research Center, 710 Westwood Plaza, Los Angeles, CA 90095, USA. Fax: +1-310-267-1157.*
E-mail address: MNUWER@MEDNET.UCLA.edu
Accepted 15 October 2019

Available online 4 November 2019