

Brain Monitoring - Should It Be a Vital Sign?

The Challenge of Hidden Seizures in Emergency and Acute Care Medicine Settings

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In the high-pressure environment of the emergency department and intensive care units (ICU, PICU, NICU), clinical teams face a critical challenge: the patient with altered mental status who is unresponsive or confused without an obvious cause.

A major "hidden" threat in these acute care cases is non-convulsive seizures (NCS). Because they present without overt physical convulsions, these seizures can quietly damage the brain completely unnoticed.

When treating NCS, "time is brain." The longer we wait to diagnose NCS and treat, the worse the outcome as the patient may suffer ongoing neurological damage.^{1,2} Further, the longer a patient's brain is seizing, the harder it is to control^{3,4} as first-line medications, at first-line dosing, become less effective. This means we may have to move to higher doses or second- and third-line agents, which increase potential adverse patient impacts.⁵ To stop this damage, clinicians need immediate, actionable data at the point of care.

359 Point-of-Care Recordings Prove Power of Rapid Bedside EEG: Insights from Clarity Sub-Analysis of SAFER-EEG Study (2026)

A new secondary cohort analysis of the SAFER-EEG (Seizure Assessment and Forecasting with Efficient Rapid-EEG): retrospective multicenter study,⁶ recently published in [Critical Care](#)

¹ Cheng, J. Y. (2016) *J of Neurological Sciences*. 370(15): 290-295

² Hillman, J., et al. (2013) *Int J Emerg Med*.6(1):6

³ Gutiérrez-Viedma, Á., et al. (2018) *Epilepsy Behav*. 82:11-16

⁴ Lowenstein, D.H., et al. (1993) *Neurology*, 43(3 Pt 1):483-488

⁵ Trinko, E., et al. (2022) *Continuum (Minneap Minn)*. 28(2):559-602

⁶ Kalkach-Aparicio, M., et al. (2024) *Neurology*. 103(2):e209621

[Medicine](#),⁷ provides powerful new evidence on how point-of-care brain monitoring technology may aid clinicians to track this threat.

In a collaboration between academic and Ceribell researchers, the team retrospectively analyzed 359 point-of-care (POC) EEG recordings from Yale New Haven, Massachusetts General Hospital, and the University of New Mexico.

Clarity AI Reveals Dose-Response Link: More Seizure Activity Means Higher Odds of Severe Disability or Death

The analysis found a strong "dose-response" relationship between seizure burden and patient outcomes when the Clarity® artificial intelligence (AI) algorithm was run post-hoc: the more seizure activity Clarity detected, the higher the odds of an unfavorable outcome (severe disability or death at discharge, based on a modified Rankin Scale score ≥ 4).

Patients with 90%+ Peak Seizure Burden Are 3.4 Times More Likely to Have Unfavorable Outcomes

The study used the Peak 5-Minute Seizure Burden—the maximum percentage of seizure activity captured by Clarity in any rolling 5-minute window throughout the entire recording, to estimate the impact of seizure activity on functional outcomes. Patients with a peak seizure burden of 90% or more, which equated to at least 4.5 minutes of seizure activity over the 5-minute window, were 3.4 times more likely to have an unfavorable outcome than patients without any seizure activity per Clarity (i.e., a 0% seizure burden).

Time is Brain: Every Hour of Seizure Activity Doubles Risk of Poor Patient Outcomes

The study also showed that every hour of cumulative seizure activity captured by Clarity in the EEG recording was linked to nearly double the odds of a poor functional outcome at discharge (adjusted odds ratio = 1.98). While it has been shown that prolonged exposure to epileptiform activity impacts patient outcomes, this is the first demonstration that POC EEG technology is powerful enough to track this important relationship. This association reinforces the need for POC technology that can be deployed in minutes, rather than waiting hours for traditional, cart-based EEG systems.

⁷ [Parvizi, J., et al. \(2026\) Crit Care Med. Advance online publication](#)

Ceribell AI Combination Links High Epileptiform Burden to 4.4x Higher Odds of Poor Outcomes

The study also highlighted the value of the Ceribell "Insights Bar," a tool that acts as a more sensitive algorithm, identifying patterns that might not meet the definition of seizure. The Insights Bar extracts spatial-temporal features from the multichannel raw EEG to provide clinicians with additional context when reviewing for highly epileptiform patterns, such as ictal-interictal continuum (IIC). By including Insights Bar data in the retrospective analysis, the correlation between AI findings and patient outcomes became even stronger, highlighting the algorithms' ability to provide clinicians with richer information for their clinical decision-making. When data from the two AI algorithms - Clarity and Insights Bar - was combined, those with > 90% epileptiform burden had a 4.4 times higher adjusted odds of poor functional outcome at discharge compared to those with 0% burden.

AI-Detected Seizure Burden is the New Crucial Vital Sign for Brain Health

This research shows that AI-detected seizure burden is more than just a number on a screen. It's a vital sign for brain health. By providing immediate, actionable data, point-of-care EEG allows clinicians to intervene faster, potentially changing the trajectory of a patient's recovery and their outcomes.

Read the Analysis: [Point-of-Care Artificial Intelligence Measure of Seizure Burden Associates With Clinical Outcome at Discharge](#)