Critical Care Medicine
May 2026 • Volume 54 • Number 5 • Pages 1279–1280

LETTER TO THE EDITOR

Middle-Latency Evoked Potentials and Quantitative Electroencephalogram: Valuable Complements in the Prognostication of Disorders of Consciousness

Nathan De Lissnyder, MD[1]
Ilann Oueslati, MD[2]
Nadia Mahmoud[2]
Soufiane Habryka, MD[3]
Patrick M. Honoré, MD, PhD, FCCM[4]

To the Editor:

The recent article by Lévi-Strauss et al (1), published in a recent issue of *Critical Care Medicine*, presents important findings and the authors should be commended for the quality of their work. The following commentary aims to contribute to the discussion.

While early-latency evoked potentials may not always be the optimal tool for prognostication after cardiac arrest, the potential role of middle-latency evoked potentials warrants renewed attention. These responses, elicited by cortico-cortical projections, appear within approximately 100 ms following median nerve stimulation. They are thought to better reflect functional connectivity and therefore may offer improved prognostic value for awakening. However, because of significant technical and practical challenges, they remain far less commonly used than early-latency potentials. An Austrian study conducted prior to the therapeutic temperature management era reported a positive predictive value for awakening as high as 97% (2). Once technical limitations are resolved, middle-latency evoked potentials may prove at least as promising as long-latency potentials, particularly when refined through automated voltage topography analysis of recordings performed during acute post-cardiac arrest coma. In one study, a progression of auditory discrimination between the first and second assessments (both conducted within the first 48 hr after hospital admission) predicted good recovery in the vast majority of patients (3).

When discussing the electroencephalogram, it is important to recall that qualitative electroencephalogram interpretation is labor-intensive, requires specialized expertise, and often results in delays of minutes to hours or longer between signal acquisition and clinically actionable information. Subtle alterations may also escape detection by the unaided eye (4). Quantitative electroencephalogram (qEEG) analysis can summarize a broad array of signal features, although measures of frequency and amplitude remain the most frequently examined. With increasing computational power, advances in machine learning and statistical modeling, and growing enthusiasm for data-driven approaches, qEEG is expected to become an increasingly significant area of investigation (5). As Lévi-Strauss et al (1) also note, qEEG has been applied across various etiologies of coma, and combinations of synchronization metrics have shown predictive value for survival at ICU discharge. Furthermore, qEEG recorded during a 6–12-hour window 1 week after injury onset (including traumatic brain injury and stroke) has been shown to predict functional outcomes (5).

DOI: 10.1097/CCM.0000000000007023

In summary, prognostication in disorders of consciousness should not rely solely on long-latency evoked potentials. A growing set of tools, including middle-latency evoked potentials and qEEG, offers meaningful complementary value and merits further integration into multimodal prognostic frameworks.

1 *VUB University, Brussels, Belgium.*

2 *ULB University, Brussels, Belgium.*

3 *CHU Brugmann, ULB University, Brussels, Belgium.*

4 *CHU UCL Godinne Namur, UCLouvain Medical School, Yvoir, Belgium.*

Drs. De Lissnyder and Honoré designed the article. All authors participated in drafting and reviewing. All authors read and approved the final version of the article.

The authors have disclosed that they do not have any potential conflicts of interest.

REFERENCES

1. Lévi-Strauss J, Benghanem S, Hermann B, et al: Added value of late auditory evoked potentials in the multimodal prognostication of patients with disorders of consciousness. *Crit Care Med* 2025; 53:e1736–e1747
2. Rossetti AO: Clinical neurophysiology for neurological prognostication of comatose patients after cardiac arrest. *Clin Neurophysiol Pract* 2017; 2:76–80
3. Fischer C, Luaute J, Nemoz C, et al: Improved prediction of awakening or nonawakening from severe anoxic coma using tree-based classification analysis. *Crit Care Med* 2006; 34:1520–1524
4. Elmer J, Rittenberger JC: Quantitative EEG after cardiac arrest: New insights from an old technology. *Resuscitation* 2019; 142:184–185
5. Kustermann T, Nguepnjo Nguissi NA, Pfeiffer C, et al: Electroencephalography-based power spectra allow coma outcome prediction within 24 h of cardiac arrest. *Resuscitation* 2019; 142:162–167