SignaVitae

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Managing coma in critically ill patients: clinical neurophysiology

Humans are not entirely different from animals in their experience to be self-aware; nevertheless, they are unique in being aware of our awareness. Conscious awareness is distantly facing medical electro-physiologic testing of the central and peripheral nervous system, which provides a functional and measurable view of the human brain, spinal cord, and nerves. While imaging techniques have superseded electro-physiologic testing for diagnosing structural brain lesions during disorders of consciousness, neurophysiology takes profit from studying brain function when the clinical evaluation is limited or difficult, particularly during sedation/altered self-awareness. Neurophysiology provides a real-time and continuous assessment of brain function not otherwise attainable. The change of these brain signals weight responses to therapeutic interventions, and it is pinned to the recovery of brain function or the progression of brain injury, the hallmark of prognostic tests. After the advances and standardization of critical care and neurosurgical techniques, survivors have better functional outcomes and fewer adverse outcomes, which must be predicted. For this prognostication, electro-physiologic testings are best applied as a complement to other methods in multimodal evaluations. While, on one side, patients with acute brain injury need a daily follow-up and treatment, on the other, the clinical practices, the social representations, and evidence-based recommendations are changings in an evolving field, and we need measurements of uncertainty and value in evidence. National and international societies that represent neuro-critical care produce guidelines, practice statements, and organized training with board certification, and the arena is now undergoing a fast scientific transformation. At this crossroads, particularly in clinical neurophysiology, an increasing number of research groups focus on better understanding, diagnosing, and prognostic tests of consciousness in acutely brain-injured patients, and in the evolutions of these disorders. This work has become of top clinical and ethical significance in revealing the underlying coma's mechanisms and showing more accurate prognosticators and treatments with a ground of insights gained from studying not only coma but anaesthesia, sleep, and evolution of disorders of consciousness such as vegetative and minimally conscious states. We are only now starting to understand the dynamic and complex interactions between brain regions required for the conscious state.

The prediction of the recovery, the duration of coma, or long term disability remain a matter of probability. The chances of recovery from coma mainly obviously depend on the severity and time of the brain injury. While the limitations of electrophysiological tests are that they still remain a relatively subjective measure of brain activity susceptible to artifacts, labor-intensive, and needing expertise, clear improvements are made in recent years. This volume intends to summarize and investigate these approaches.

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