Continuous EEG Patterns and Reactivity Correlate With In-hospital Mortality Among Patients With Acute Brain Injury

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Background and Purpose: Conventional EEG and continuous EEG are widely used neuromonitoring tools in neurological intensive care units. Although there are descriptions of EEG patterns for specific scenarios, such as status epilepticus, there is still a lack of evidence for general causes of acute brain injury. Methods: The objective of this study was to evaluate the correlation between different strategies of neurophysiological monitoring in patients with acute brain injury and their potential role in raising awareness of combinations of patterns for the neuroICU team to advise on mortality risk. Results: We conducted a retrospective analysis of 213 patients who were admitted to the neurocritical care unit at a university hospital. These patients received monitoring with either conventional EEG or continuous EEG. The median age of the patients was 65 years old (IQR 49-75). The median duration of EEG monitoring was 24 hours (IQR 12-24). The ICU length of stay was 10 days (IQR 5-27). The modified Rankin score at hospital discharge was 4 (IQR 2-5), and the mortality rate was 28.2%. Our analysis revealed a significant correlation between mortality and various EEG patterns. These included a categorical abnormal study (p=0.018), a slow diffuse pattern (p=0.014), suggested encephalopathy pattern (p=0.03), a theta coma pattern (p=0.006), isoelectric pattern (p=0.003), and burst/suppression pattern (p=0.005). We also found that the presence of reactivity was a good prognostic factor against mortality (p=0.005). Conclusion: These results provide more value to the importance of monitoring patients who have suffered from acute brain injury caused by different pathologies. It is particularly important to have continuous monitoring for 24 hours to increase the chances of detecting "malignant patterns" that may be indicative of scenarios other than post-cardiac arrest. Moreover, the presence of EEG reactivity is a good sign for the prognosis of neurocritical patients.

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