Early identification of sepsis-associated encephalopathy with EEG is not associated with short-term cognitive dysfunction

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Introduction:
Septic-associated encephalopathy (SAE) affects approximately 75% of septic patients. Recent studies showed SAE is associated with short-term mortality and long-term cognitive disability. However, diagnosis of SAE is one of exclusion and its association with short-term cognitive deficit is uncertain. The aim of this study is to evaluate the sensitivity of clinical examination in detecting SAE. The association between SAE and short-term cognitive impairment is also assessed.

Methods:
Prospective observational study enrolling adult septic patients admitted to a mixed ICU. Exclusion criteria were: encephalopathy from another cause, history of psychiatric/neurologic disease, cardiac surgery. All patients received continuous EEG monitoring and were assessed for SAE for up to 7 days after inclusion. We performed a comprehensive consciousness assessment twice daily during the ICU (GCS; Full Outline of UnResponsiveness, FOUR; Coma Recovery Scale-Revised, CRS-R; Reaction Level Scale 85, RLS85; Confusion Assessment Method for the ICU, CAM-ICU). We defined altered brain function as GCS<15, FOUR<16, CRS-R<23, RLS85>1, or positive CAM-ICU. Modified Synek scale was applied to EEG interpretation. After discharge, we assessed cognitive functions with Montreal Cognitive Assessment and Frontal Assessment Battery.

Results:
We performed 204 clinical evaluations on 38 patients (Jan 2016-Oct 2017). GCS, FOUR, CSR-R and RLS85 detected SAE in 147, 113, 140 and 139 cases respectively. CAM-ICU was positive in 57/111 cases. EEG was altered in all patients. EEG alteration correlated with clinical evaluation (GCS - r² 0.38, FOUR - r² 0.32, CRS-R - r² 0.43, RLS8 - r² 0.42 and CAM-ICU, p<.001). No correlation between cognitive function at hospital discharge and severity of EEG alteration was found.

Conclusion:
EEG was more sensitive than clinical assessment in detecting SAE. Altered EEG was not associated with short-term cognitive function.