

Quantitative electroencephalography for delayed cerebral ischemia diagnosis

The association between [alpha-delta ratio](#) (ADR) on [quantitative electroencephalography](#) (EEG) and [DCI](#) has been reported in several previous studies, but their results are conflicting ¹⁾.

Focal reduction in [alpha power](#) may represent a valid, observer-independent, non-invasive and continuous marker for [vasospasm/DCI](#) in [SAH](#) patients ²⁾.

A prolonged alpha-theta/delta (AT/D) ratio decrease seems to be a reliable biomarker of [DCI](#) ³⁾.

In a study, Mueller et al. aimed to compare and analyze the ability of qEEG and [transcranial color-coded duplex ultrasonography](#) (TCD/TCCS) to early identify patients who will develop later manifest [cerebral infarction](#).

They analyzed cohorts of two previous qEEG studies. Continuous six-channel-EEG with artifact rejection and a detrending procedure was applied. Alpha power decline of $\geq 40\%$ for ≥ 5 hours compared to a 6-hour-baseline was defined as a significant EEG event. Median reduction and duration of alpha power decrease in each channel were determined. Vasospasm was diagnosed by TCD/TCCS, identifying the maximum frequency and days of vasospasm in each territory.

34 patients were included (17 male, mean age 56 ± 11 years, Hunt and Hess grade: I-V, cerebral infarction: 9). Maximum frequencies in TCD/TCCS and alpha power reduction in qEEG were correlated ($r = 0.43$; $p = 0.015$). Patients with and without infarction significantly differed in qEEG parameters (maximum alpha power decrease: 78% vs 64%, $p = 0.019$; summed hours of alpha power decline: 236 hours vs 39 hours, $p = 0.006$) but showed no significant differences in TCD/TCCS parameters.

There was a moderate correlation between TCD/TCCS frequencies and qEEG [alpha power](#) reduction but only qEEG differentiated between patients with and without [cerebral infarction](#).

Significance: qEEG represents a non-invasive, continuous tool to identify patients at risk of [cerebral infarction](#) ⁴⁾.

References

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