

Results

No difference emerged between groups in networks' efficiency scores and in N1 and P3 amplitudes related to the alerting network. As regards the orienting network, P3 amplitude was significantly reduced in the fatigue group alone ($p = 0.02$), while no differences emerged in N1 amplitude. As regards the conflict network, both N2 and P3 amplitudes were significantly reduced in the fatigue group alone and selectively for the incongruent target ($p < 0.001$; $p = 0.001$ respectively).

Conclusions

Our results suggest that, in young healthy subjects, cognitive fatigue interferes with goal-driven attention especially when the task demand is higher, sparing the bottom-up attention control mechanisms and in absence of any overt observable effect.

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Cerebellum in timing control: Evidence from contingent negative variation after cerebellar tDCS

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Background and aims

Timing control is defined as the ability to quantify time. The temporal estimation of supra-seconds range is generally seen as a conscious cognitive process, while the sub-seconds range is a more automatic cognitive process. It is accepted that cerebellum contributes to temporal processing, but its function is still debated. The aim of this research was to better explore the role of cerebellum in timing control. We transiently inhibited cerebellar activity and studied the effects on CNV components in healthy subjects.

Methods

Sixteen healthy subjects underwent a S1-S2 duration discrimination motor task, prior and after cathodal and sham cerebellar tDCS, in two separate sessions. In S1-S2 task they had to judge whether the duration of a probe interval trial was shorter (Short-ISI-trial:800 ms), longer (long-ISI-trial:1600 ms), or equal to the Target interval of 1200 ms. For each interval trial for both tDCS sessions, we measured: total and W2-CNV areas, the RTs of correct responses and the absolute number of errors prior and after tDCS.

Results

After cathodal tDCS a significant reduction in total-CNV and W2-CNV amplitudes selectively emerged for Short ($p < 0.001$; $p = 0.003$ respectively) and Target-ISI-trial (total-CNV: $p < 0.001$; W2-CNV: $p = 0.003$); similarly, a significant higher number of errors emerged for Short ($p = 0.004$) and Target-ISI-trial ($p = 0.07$) alone. No differences were detected for Longer-ISI-trials and after sham stimulation.

Conclusions

These data indicate that cerebellar inhibition selectively altered the ability to make time estimations for second and sub-second intervals. We speculate that cerebellum regulates the attentional mechanisms of automatic timing control by making predictions of interval timing.

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Intraoperative neurophysiological monitoring urgent symptomatic extracranial internal carotid artery desobliteration

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Background and aims

Background: Surgical recanalization extracranial internal carotid artery (ICA) occlusion is an off-label acute stroke therapy because of conflicting results. Common carotid artery (CCA) cross-clamp might be the main cause of intraoperative ipsilateral stroke and unacceptably high rate of poor outcome. Intraoperative median somatosensory evoked potentials (SEP) monitoring is an established tool for selective shunting and intraoperative stroke prevention. Aim: Rate of necessary interventions induced by intraoperative SEP changes during urgent ICA recanalization.

Methods

Acute ischemic stroke with extracranial ICA occlusion within 24 h from last seen normal with no contraindications for urgent recanalization therapy. Prospectively recruited 33 patients, 30 males (90.1%), average age 70.4 ± 8.9 years (52–88). Symptomatic side on left in 22 (66.7%), NIHSS median 6.0, interquartile ratio (2.0–12.0). Prestroke modified Rankin scale (mRS) 0, 1 and 2 were in 30 (91.9%), 1 and 2, respectively.

Results

Recanalization was achieved in 32 (96.7%). SEP amplitude dropped after CCA crossclamp in 6 patients (18.2%). SEP recovered after mean arterial pressure increase >100 mmHg, shunt insertion and final flow restoration in 3, 2 and 1 patient, respectively. Surgical complications were in 6 (18.2%) patients. Four haematomas were resolved after urgent surgical revision. Four ipsilateral cranial nerve lesions recovered spontaneously within 3 months. 3 month mRS-3 M 0–1, 2, 4–5 and 6 were 23 (69.7%), 5, 2 and 3, respectively. Overall permanent morbidity and mortality was 5 (15.2%).

Conclusions

Intraoperative SEP during urgent ICA desobliteration seems to be valuable because of intraoperative brain ischemia prevention and permanent morbidity and mortality reduction.

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A new, sensitive biomarker for abnormal cortical excitability: Single trial based synchronization and desynchronization with cortical myoclonus

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