Conclusions

Our study demonstrates that taVNS induces pupil dilation under specific illuminance condition and at a specific stimulation intensity. Pupil dilation during taVNS could be used as an online and easy-to-use indicator of the effectiveness of the stimulation, in order to optimize therapeutic applications of this technique, also in neurodegenerative diseases in which the activity of the LC-noradrenergic network is supposed to play a role in the pathogenesis.

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118544

Postsynaptic neuromuscular junction defect in a patient with miller fisher syndrome

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Background and aims

Miller Fisher syndrome (MFS) is an acute immune-mediated neuropathy. To date only few studies reported a possible overlap of Myasthenia Gravis (MG) and MFS in patients with acute ophthalmoplegia. We report the case of a patient diagnosed as MFS with a coexistent neuromuscular junction defect.

Methods

A 77-year-old Chinese female, without significant previous neurological history, presented in our Emergency Department with acute ophthalmoplegia after recent fever and faringodinia. Neurological examination revealed clinical signs (areflexia, complete ophthalmoplegia and ataxia) consistent for MFS.

Results

Instrumental tests (neuroimaging, CSF, nerve conduction studies, serum antibodies tests) were performed and the patient was diagnosed with MFS. Repetitive nerve stimulation also showed coexistent significant decremental motor response suggesting an overlapping postsynaptic neuromuscular transmission defect. Patient underwent plasmapheresis with a progressive improvement until full clinical recovery.

Conclusions

Although the overlap of MG and MFS is very rare, it should be considered in the differential diagnosis in neuro-ophthalmic diseases. Our findings emphasize the importance of electrophysiologic tests for neuromuscular transmission also in MFS in order to build a spectrum of clinical, serological and electrodiagnostic characteristics and better understand the mechanisms that determine ophthalmoplegia and the treatment response. We encourage other studies to collect further related data.

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118545

Patients with unresponsive wakefulness syndrome produce high-amplitude auditory steady-state response

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Background and aims

The unresponsive wakefulness syndrome (UWS) is one of the unfavorable states that are characterized by a condition of arousal without signs of awareness. Most UWS patients are unresponsive to external stimuli. However, they often open their eyes and are capable of swallowing. In addition, most cases preserve their sleep-wake cycles. These symptoms make it difficult to understand the symptom. The author studied the electrophysiological response of UWS patients, and found a unique means to describe the syndrome.

Methods

Ten cases with UWS were studied. I examined their electroencephalogram (EEG), auditory brainstem response (ABR) and auditory steady-state responses (ASR) simultaneously. Ally ASR data set were processed by the fast Fourier transformation method, and a power spectrum around the 40 Hz-frequency band was calculated. These records were compared to the data obtained from normal volunteers.

Results

All patients exhibited low-voltage EEG less responsiveness to external stimuli. In contrast, they showed a significantly high-amplitude ASR. Waveforms and each peak's latency of their ABR records were almost normal. These findings suggested deteriorated cerebral function and preserved brainstem activity. The ASR records may indicate dysfunction of cerebral inhibition system in the neural activity of the brainstem reticular formation.

Conclusions

Findings from the electrophysiological examinations revealed cerebral hypofunction and preservation of brainstem activity. In addition, the results of the ASR examination suggested malfunction of the cortical inhibitory system against brainstem neural activity. This result is thought to be a unique feature in the UWS patients and may help to understand the pathophysiology of UWS.

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118546

Overt and covert effects of cognitive fatigue on attention networks

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Background and aims

Cognitive fatigue refers to a variation of the psychophysiological state during or after prolonged periods of mental activity that requires work efficiency, and could lead to temporary deterioration of attentional functioning, especially top-down attention and cognitive control. The present study aims to verify the effects of cognitive fatigue on attention in the context of the three attentional networks described by Posner, by using behavioral and psychophysiological measures, to detect variations in overt and covert responses respectively.

Methods

Thirty young healthy subjects were enrolled in the study, 15 in the “fatigue” and 15 in the control group. Cognitive fatigue was provoked by a continuous arithmetic task lasting 1 h, and the EEG recordings were conducted before and after the task, while subjects were performing the attention network test. The N1, N2 and P3 components were analyzed for the alerting, orienting and conflict networks, in conformity with behavioral analysis.

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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118547

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 transitorily 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-trail: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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118548

Intraoperative neurophysiological monitoring urgent symptomatic extraćtranial 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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118549

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

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