Connectivity modulation during sleep onset, reduction of movement: study via graph theory application to EEG data

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Sleep onset is characterized by specific and orchestrated patterns of frequency and topographical EEG changes. Power analyses and computational assessments of network dynamics have described an earlier synchronization of the centrofrontal areas rhythms and a spread of synchronizing signals from associative prefrontal to posterior areas. We assess how "small world" characteristics of brain networks, as reflected in EEG rhythms, are modified in the wakefulness-sleep transition comparing pre- and post-sleep onset epochs. 40 healthy subjects (20 males;age range 18–29 years) were analyzed. EEG functional connectivity was evaluated in the cortical sources' networks during the wake-to-sleep transition by graph theory application for the evaluation of small-world characteristics. Sleep onset is characterized by a less ordered brain network (as reflected by small world higher values) in sigma band for the frontal lobes indicating stronger connectivity, and a more ordered brain network in low frequency delta and theta bands indicating disconnection on the remaining brain areas.

Results depict the timing and topography of the specific mechanisms for the maintenance of functional connectivity of frontal brain regions at the sleep onset, also providing a possible explanation for the prevalence of the frontal-to-posterior information flow directionality previously observed after sleep onset.

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A telemedicine approach to carpal tunnel syndrome: is it useful? A 2 year retrospective analysis in the province of Venice

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In 2016 we started to perform electrodiagnostic studies (EDX) for suspected carpal tunnel syndrome (CTS) in our district, conducted independently by the technical staff (complete median e ulnar sensorimotor conduction study of median e ulnar nerves, with proximal stimulation and F waves), according to general practitioner request: EDX reports are performed within 7 days by neurologists through the central station in the main hospital, indicating to repeat EDX when negative. The study analyzes if CTS telemedicine approach is useful. We retrospectively collected data from 314 EDX studies carried out from March 2016, enumerate CTS positive patients, side, grading and time of onset. Data were collected from 314 patients, 81 males and 233 females, mean age 60 ± 16 years, 289 with CTS confirmed, 198 monolateral and 91 bilateral (92% positive exams). 122 patients had mild, 142 medium and 25 severe CTS. 25 patients had negative EDX: 6 had ulnar mononeuropathy, 4 had suspected radiculopathy, 1 had motor median mononeuropathy and 14 no other suspected diseases. 21 patients had coherent symptoms but negative EDX, while only 12 on 314 requests are incongruous Telemedicine provide a good alternative for diagnosing CTS.

Few and contradictory data are available regarding intraoperative seizures (IOS) during surgery for Low Grade Gliomas (LGGs). Aim of this study was to evaluate the occurrence of IOS in regard to pre-operative clinical data, tumor molecular characteristics and electrocorticographic patterns. We performed a retrospective analysis of 155 patients affected by LGGs and tumor-related epilepsy, who underwent surgery in our Department, between 2007 and 2017. Pre-operative seizures frequency was as follows: 59% monthly, 34% weekly and 11% daily. 73% of patients were operated on through awake surgery. IOS occurred in 39 patients: in 9 patients only electrographic seizures occurred while in 13 patients seizures were cognitive, sensory, autonomic or emotional, thus recognizable only by means of electrocorticography (ECoG). Nineteen seizures were induced by brain mapping. Patients with ECoG epileptiform intercritical patterns and IDH1/2 mutated tumors or oligodendrogliomas were more likely to develop IOS ($p < 0.001$). The occurrence of IOS did not affect post-operative seizure outcome, being most of the patients in Engel class I, at one-year follow up. High frequency of seizures, IDH 1/2 mutated tumor and epileptiform ECoG pattern are risk factors for IOS. ECoG is necessary to detect electrical or subtle seizures.

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Intraoperative seizures in Low Grade Gliomas surgery: From electrocorticography to molecular pattern

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Few and contradictory data are available regarding intraoperative seizures (IOS) during surgery for Low Grade Gliomas (LGGs). Aim of this study was to evaluate the occurrence of IOS in regard to pre-operative clinical data, tumor molecular characteristics and electrocorticographic patterns. We performed a retrospective analysis of 155 patients affected by LGGs and tumor-related epilepsy, who underwent surgery in our Department, between 2007 and 2017. Pre-operative seizures frequency was as follows: 59% monthly, 34% weekly and 11% daily. 73% of patients were operated on through awake surgery. IOS occurred in 39 patients: in 9 patients only electrographic seizures occurred while in 13 patients seizures were cognitive, sensory, autonomic or emotional, thus recognizable only by means of electrocorticography (ECoG). Nineteen seizures were induced by brain mapping. Patients with ECoG epileptiform intercritical patterns and IDH1/2 mutated tumors or oligodendrogliomas were more likely to develop IOS ($p < 0.001$). The occurrence of IOS did not affect post-operative seizure outcome, being most of the patients in Engel class I, at one-year follow up. High frequency of seizures, IDH 1/2 mutated tumor and epileptiform ECoG pattern are risk factors for IOS. ECoG is necessary to detect electrical or subtle seizures.

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Prognostic value of neurophysiological evaluations in severe traumatic brain injury (TBI)

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Predicting outcome in the early phase after severe TBI is a major clinical challenge, particularly identifying patients at risk for the worse cognitive outcome. This single-center prospective study aimed to explore the predictive power of neurophysiological evaluations in the early phase following sTBI, and their relationship to functional and cognitive outcome 6–12 months post-injury. Prospective case series of patients admitted to the Neuro-ICU in the coma after sTBI, monitored with EEG or- SEP, with GCS $\leqslant 8$ at admission. EEG and SEPs recordings were scored in a standardized manner and categorized. We firstly focused on a subgroup of 46 sTBI admitted to the Neuro-ICU over a 1-year period (mean age = 48.6 years SD = 28.6), who received EEG and SEPs monitoring. Twenty-one (46%) patients died, while 6 (13%) did not regain