

## P044-P059 NEUROPHYSIOLOGY AND FUNCTIONAL IMAGING

normal cyclic wake-sleep pattern in 12 subjects. Clinical Outcomes were: 3 deaths; 5 VS patients; 7 minimally conscious state patients (MCS).

**Conclusion.** Our study describes the polysomnographic EEG patterns in an heterogeneous group of VS patients. We found how it is difficult to consider common scoring criteria both due to clinical situation and environmental conditions. Despite this we could perform conventional scoring in 40% of the patients. Remaining observations revealed different patterns as "dissociated patterns" with the presence of phasic rhythms. We observed that 5 Patients with REMs evolved to a MCS.

## P056

**Functional involvement of cerebral cortex in patients with sleep-wake disturbances after traumatic brain Injury: a TMS study**

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**Objective:** Sleep-wake disturbances (SWD) are common after traumatic brain Injury (TBI); in particular, chronic excessive daytime sleepiness (EDS) is a major, disabling symptom for many patients with TBI. The pathophysiological mechanisms remain unclear. Transcranial magnetic stimulation (TMS) represents a useful complementary approach in the study of sleep pathophysiology. We aimed to determine in this study whether post-traumatic SWD are associated with changes in excitability of the cerebral cortex.

**Participants, Materials/Methods:** TMS was performed 3 months after mild to moderate TBI, in 11 patients with subjective excessive daytime sleepiness (defined by the Epworth Sleepiness Scale  $\geq 10$ ), 12 patients with objective EDS (as defined by mean sleep latency  $< 5$  on multiple sleep latency test), 11 patients with fatigue (defined by daytime tiredness without signs of subjective or objective EDS), 10 patients with post-traumatic hypersomnia "sensu strictu" (increased sleep need of  $> 2$  h per 24 h compared to pre-TBI), and 14 control subjects. Measures of cortical excitability included central motor conduction time, resting motor threshold (RMT), short latency intracortical inhibition (SICI) and intracortical facilitation to paired-TMS.

**Results:** In the patients with objective EDS and hypersomnia, RMT was higher and SICI was more pronounced than in control subjects. In the other patients all TMS parameters did not differ significantly from the controls.

**Conclusions:** Similar to that reported in patients with narcolepsy, the cortical hypoexcitability may reflect the deficiency of the excitatory hypocretin/orexin-neurotransmitter system. A better understanding of the pathophysiology of post-traumatic SWD may also lead to better therapeutic strategies in these patients.

## P057

**The role of functional MRI in diagnosing severe chronic disorders of consciousness**

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**Objective:** Accurate diagnosis of severe chronic disorders of consciousness (DOC) after TBI is essential for clinical and rehabilitative care and decision-making. Neurobehavioral tests, which rely on the patients' intellectual and motor ability to communicate, are the most widely used diagnostic tools, since their advantage over clinical assessment has been validated. However, with the emergence of modern neuroimaging methods, especially functional MRI, objective physiological markers for assessing the state of consciousness are available in specialized clinics. They are, however not fully integrated in clinical routine, because their benefit has yet to be determined.

**Participants, Materials/Methods:** 15 patients in apallic syndrome (AS) and 5 patients in minimally conscious state (MCS) after TBI and other etiologies were examined with somatosensory, auditory and event related paradigms in fMRI and evoked potentials (EP). The findings were compared to the neurobehavioral diagnosis and it was analyzed, if the additional information from fMRI and EP confirmed or questioned the diagnosis.

**Results:** 3 out of 15 patients in AS showed fMRI activation in event related paradigms, suggesting that patients are in MCS or even better.

**Conclusion:** Uncertainty in diagnosis still exists even with well-established diagnostic assessment scales. As long as internationally accepted guidelines for assessing patients with chronic DOC do not exist, every single diagnostic modality available in each clinical setting should be performed, to minimize diagnostic error and to find ways, in terms of perceptive channels, to approach the patients. fMRI has the potential to bring diagnostics in chronic DOC forward to the next level.

## P058

**The "Extended Locked-In syndrome"**

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**Objectives:** Locked-in syndrome is one of the most devastating neurological conditions. However, despite thorough description of the condition and its clinical appearance, the classic Locked-in syndrome, which is defined as quadriplegia, only vertical eye movement and blinking possible with preserved cognitive abilities, seems to be infrequently present. This syndrome is also referred to as bilateral ventral pontine syndrome, which in respect neuroanatomically explains the symptomatology. Since MRI verified isolated damage to the pons poses the finding in this certain case, the question arises, how the symptomatology increases, if additional lesions are found in cranial brain areas. The aim of the study is to describe in detail different clinical syndromes and to relate them to different patterns of structural damage in 3T MRI.

**Participants, Materials/Methods:** Five patients with brainstem infarction and different patterns of structural injury and clinically in a state of unresponsive wakefulness are investigated with structural 3T MRI.

**Results:** Clinical and MRI results are presented in great detail and it is discussed how clinical appearance and imaging results relate to each other. The question will be approached if it is useful to differentiate several types of Locked-in syndrome and how akinetic mutism and parasomniac syndromes connect in addition.

**Conclusion:** Especially since special academic emphasis is placed



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