P2.12
Mobile phone emissions modulate brain excitability in patients affected by focal epilepsy

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Introduction: It has been shown in healthy subjects that electromagnetic fields (EMF) emitted by mobile phones increase cortical excitability.
Objective: The aim of our study is to assess via Transcranial Magnetic Stimulation (TMS) the effects of the acute exposition to electromagnetic fields of a mobile phone operating in the Global System for Mobile Communication (GSM-EMFs) on the cortical excitability in patients affected by focal epilepsy.
Methods: Ten patients affected by focal epilepsy originating outside the primary motor area (M1) were studied using a double-blind, cross-over, counter-balanced design. Single and paired-pulse TMS were applied to the M1 of the hemisphere ipsilateral (IPSIH) to the epileptic focus and the contralateral one (CONTRAH) before and immediately after real/sham exposure to the GSM-EMFs (45 minutes). Interstimulus intervals (ISIs) of 1 and 3 ms were selected to test short-interval intracortical inhibition (SICI), ISIs of 7, 9, 11, 13 ms were used to test intracortical facilitation (ICF).
Results: The real exposure over the CONTRAH side induced an increase of brain excitability in the same exposed hemisphere paired with an excitability decrease in the other one (IPSIH). Focusing on the EMF effect across ISIs, we observed in the same condition a clear increase of ICF in the CONTRAH (exposed), and concurrently an increase of SICI in the other one. These results could be due to interhemispheric inhibition mechanisms. There were no significant changes of the brain excitability in the sham and the real IPSIH exposure conditions. No significant changes of rest motor threshold were found in all conditions.
Conclusions: Our findings suggest that in patients with focal epilepsy GSM-EMFs acute exposure of the CONTRAH but not the IPSIH significantly modulates cortical excitability.

P2.13
EEG features of patients with visually self-induced seizures

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Introduction: Patients with reflex seizures may voluntary self-provoke their attacks. Visually self-induced seizures (SIS) are the most common clinical occurrence especially in children.
Objectives: To define EEG findings of patients with SIS related to their visual sensitivity to high-contrast patterns, lights, and more complex visual stimuli (television).
Methods: We studied 204 epileptic patients (99 males, 105 females; age 2–39 years, mean age 12.7±6.8 years) with reflex seizures (69 with SIS). All patients had a prolonged video-EEG recording (21 channels; montage according to the international 10–20 system) at rest and during standardized visual stimuli by Intermittent Photic Stimulation (IPS), Pattern-Stimulation (Pt-S = checks, vertical stripes, horizontal stripes; different spatial frequencies; black/white and red/blue), and 30 minutes of watching television (TV). EEG findings of patients with SIS were compared (ANOVA, χ^2) with those of No-self-inducing patients (No-SIS).
Results: Both groups showed high occurrence of epileptic abnormalities at the rest EEG (SIS 96% *vs* No-SIS 94%; NS), with multifocal abnormalities significantly more frequent in group SIS than in No-SIS (19% vs 8 %; p 0.0474). Patients with SIS showed a significantly higher occurrence of stimulus-related paroxysmal responses compared to No-SIS for all stimuli (IPS = 84% *vs* 69%, p 0.0252; Pt-S = 100% *vs* 87%, p 0.0049; TV = 82% *vs* 67%, p 0.0213). In patients with SIS, the EEG abnormalities showed significant higher occurrence of multifocal and generalized photoparoxysmal responses to IPS (p 0.0013) and multifocal abnormalities to Pt-S (p 0.0183) and TV (p 0.0082).
Conclusions: Patients with SIS show higher sensitivity to visual stimuli compared to patients without SIS, with more frequent multifocal and generalized photoparoxysmal responses to IPS and multifocal abnormalities to high-contrast patterns.

P2.14
Mobile phone emission modulates inter-hemispheric functional coupling of electroencephalographic alpha rhythms in epileptic patients

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Introduction: It has been reported that GSM electromagnetic fields (GSM-EMFs) of mobile phones modulate – after a prolonged exposure – inter-hemispheric synchronization of temporal and frontal resting electroencephalographic (EEG) rhythms in normal young and elderly subjects (Vecchio et al., 2007, 2010).
Objectives: We tested the hypothesis that mobile phones' effect on inter-hemispheric coupling can be even more evident in epileptic patients, who typically suffer because of abnormal synchronization of neuronal rhythmic firing.
Methods: Eyes-closed resting EEG data were recorded in 7 patients affected by focal epilepsy of unknown cause and 15 age-matched subjects in the two conditions of the previous reference studies (Vecchio et al., 2007, 2010). The GSM device was turned on (45 minutes) in the "GSM" condition and was turned off (45 minutes) in the "Sham" condition. The mobile phone was always positioned on the left side both in patients and in control subjects. Spectral coherence evaluated the inter-hemispheric synchronization of EEG rhythms at the following frequency bands: delta (2–4 Hz), theta (4–6 Hz), alpha1 (6–8 Hz), alpha2 (8–10 Hz), and alpha3 (10–12 Hz). The effects on the patients were investigated comparing the inter-hemispheric EEG coherence in the epileptic patients with the control group of subjects evaluated in the previous reference studies (Vecchio et al., 2007, 2010). To check for a possible effect on the epileptogenic neuronal circuit, the count of intercritical epileptiform activity was assessed.
Results: Compared with the control subjects, epileptic patients showed a statistically significant higher inter-hemispheric coherence of temporal and frontal alpha rhythms (about 8–12 Hz) in the "GSM" than "Sham" condition. No effects were found on EEG epileptiform activity.
Conclusions: Our results suggest that GSM-EMFs of mobile phone increase resting inter-hemispheric neuronal synchronization in the dominant (alpha) EEG rhythms in focal epileptic patients.

P2.15
Differential cortical activation during observation and imaging

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Introduction: Mirror activity might be useful in relearning of motor function after stroke. To optimize the effects of therapies inducing mirror activity, cortical activation during observation and observation-and-imaging was investigated in healthy subjects.
Methods: Eight healthy subjects observed and observed-and-imaged a movement of a hand. The movie consisted of fragments showing a hand performing a pincer grip, and fragments containing a baseline condition showing a moving dot. 64-Channel EEG was used to measure brain activity. The synchronization of the lower alpha (8–10 Hz), higher alpha (10–15 Hz) and beta (15–25 Hz) frequency bands was calculated. The temporal changes of the sensorimotor area (C3, C4) and the parietal central cortex (CPz) were analyzed.
Results: During both observation and observation-and-imaging a bilateral desynchronization was found on the sensorimotor cortices. However, during observation-and-imaging, a larger desynchronization in the contralateral sensorimotor area was found compared to observation. The desynchronization of the frequency bands in the sensorimotor area during observation-and-imaging was mainly due to a power decrease during the imaging task, while the desynchronization during observation was caused by a short rebound of the power when the rest fragment started. On CPz, a large synchronization was found during both tasks.

Conclusions: This study shows that observation-and-imaging of a hand movement desynchronizes the higher frequency bands at the sensorimotor cortex to a larger extent than movement observation only. Except for the differences during the activity fragment, also differences were found during a baseline fragment.

P2.16
The usefulness of sleep recording during routine electroencephalography

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Introduction: Electroencephalography (EEG) is an essential test for diagnosing epilepsy. Measures to increase the EEG usefulness includes a short period of sleep (nap) with the aim of provoking epileptiform discharges in patients with epilepsy. As part of ongoing study that is reviewing all EEG data in our department, interictal abnormalities were investigated during the sleep period of the routine EEG.
Objective: To investigate the usefulness of a short period of sleep recording in routine EEGs requested for a variety of reasons.
Methods: All EEGs performed in patients older than 13 years at Clinical Physiology/ Neurophysiology Dept at SQUH-Oman during the period of 2006–2007 were reviewed. All EEGs were recorded over an average period of 30–40 minutes using Grass Telefactor; model: CMXLE-230 with 16 recording channels utilizing scalp electrodes and applying 10/20 international montage system. Abnormal EEGs were identified and those with sleep were analysed.
Results: A total of 918 EEGs from patients with age range of 13–90 years were reviewed. There were 274 abnormal EEGs (29.85%). Sleep was obtained in 112 of these EEGs (40.88%). There were 12 EEGs that showed an abnormality during both sleep and the awake resting background (4.38%). Out of those there were only 4 EEGs (1.45%) that were abnormal during sleep alone which form 0.44% of the total unselected EEGs.
Conclusion: The contribution of a very short period of sleep period to the pickup rate of interictal abnormalities in EEG is minimal in an unselected population. This suggests that the procedure should be targeted at specific patients and the duration of sleeping and the sleep stage reached may be important.

P2.17
Non invasive functional mapping in children with symptomatic perirolandic seizures: the contribution of functional MRI during passive motor tasks

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Introduction: The possibility to perform an accurate functional mapping prior to epilepsy surgery in small children is challenged by the lack of collaboration to functional neuroimaging and refractoriness to electrical cortical stimulations.
Objectives: To describe 2 small children with seizures arising from perirolandic lesions, who underwent successful tailored resections after a complete non invasive workup, including functional MRI (fMRI) during passive motor tasks.
Materials and Methods: Two children had their initial partial motor seizures, which were very frequent from the beginning, at age of 5 months and 1 month. The MRI showed in both cases a perirolandic lesion with contrast enhancement. The presurgical evaluation protocol included preoperative video-EEG monitoring, neuropsychological evaluation and functional MRI (fMRI) during passive movement of hands and feet.
Results: The non invasive presurgical protocol assessed that, in both children, seizures originated from the lesion. The fMRI during passive motor tasks allowed to define the relationship between the lesion and the areas of functional activation. The children underwent a complete lesionectomy at the age of 10 months and 23 months. Histopathology revealed focal cortical dysplasia type IIB and a low-grade ganglioglioma, respectively. The youngest child developed a very mild motor deficit of the right leg that recovered in one month. At two years follow-up he is seizure free and exhibits normal psychomotor development. The second child showed a severe postoperative motor deficit of the right arm that significantly improved at 6 months follow-up. The postoperative functional MRI, performed 4 months after surgery, demonstrated in both children the reallocation of the activated pixels posterior to the post-operative vacuum.
Conclusions: A non invasive presurgical protocol including the fMRI during passive motor task may help guiding surgical planning in small children.

P2.18
Familial cortical myoclonic tremor. A Spanish case report

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Introduction: Familial cortical myoclonic tremor (FCMT) is a rare autosomal dominant disease characterized by involuntary oscillatory myoclonic jerks and generalized epilepsy. In papers are described Japanese and European families. It is usually misdiagnosed as Essential tremor.
Objective: We present a Spanish case of FCMT in order to emphasized the role of the neurophysiological test in the clinical diagnosy.
Material and Methods: A 67 year-old woman who has been suffering of tremor in both arms for ten years and in low extremities for the last year. The tremor is present during writting and carrying out motor activities. Sensitivity to bright contrast was disabling. She had increased myoclonic jerks when driving on tree-line roads and looking at intense visual contrast. The neurological examination showed postural tremor in arms with intentional component in low members. The brain CT scan and MRI were normal. Additionally she was diagnosed of retinosis pigmentary and has had two episodes of loss of knowledge. The Valproate treatment improved the clinical symtoms. Her older sister is also affected.
Results: The EEG showed normal background with generalized Spike and polyspike-wave complexes. The intermittent photic stimulation provoked phtomyoclonic response with cortical myoclonics. These responses persisted with red, blue and yellow color filtres, but was not present with green color filter. The arm SSEPs were giants (range 14.5–18), with normal latency and morphology.
Conclusion: Electrophisiological Studies, including EEG, SSEPs and tremor recording can be easily elicited and are mandatory to confirm the diagnosis of FCMT.

P2.19
Electro-clinical characteristics and prognosis of patients with status epilepticus

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Status Epilepticus (SE) is a neurological emergency associated with a significant morbidity and mortality. Older age and acute symptomatic etiology are related to poor outcome. Aim of this study is to describe a 3-years experience in SE diagnosis and management in our University Hospital, analyzing demographic data, SE type and outcome. We conducted a prospective study enrolling consecutive adult inpatients, from January 1st 2007 to December 31st 2009, admitted in Emergency Room or hospitalized in other divisions and in whom we diagnosed SE. In all patients we classified SE according to (1) Clinical features: Convulsive/Non-Convulsive SE (CSE/NCSE); (2) EEG pattern: Focal/Generalized SE (F-SE/G-SE); (3) Electro-Clinical findings: Focal/Generalized and Convulsive/Non-convulsive SE (NCSE-F; NCSE-G; CSE-F; CSE-G); (4) clinical outcome after 30 days considered as: (a) good; (b) poor); (c) dead. We identified 56 SE (29/27 men/women) mean age 64.05±20.4 years. We identifiend CSE in 35/56 pts (62.5%), NCSE in 21/56 pts (37.5%), G-SE in 17/56 (30.3%) and F-SE in 39/56 (69.7%) pts. Considering clinical and EEG SE characteristics, no differences were observed for sex. A significant difference for age was observed, being patients with focal SE (CSE or NCSE) older. Outcome was good in 35/56 (62.5%) patients, poor in 12/56 (21.4%) patients and 9/56 (16.1%) patients died. No difference was observed for sex and age.