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The EEG Profile of Patients with
Uncontrolled vs. Controlled Seizures
John R. Hughes, John J. Fino and Yevgenya Kaydanova

ABSTRACT

The goal of this study was to provide an EEG profile of patients (150) with uncontrolled (U) seizures, in contrast with those (150) with controlled (C) attacks. In the U group 804 EEGs were done and in the C group 674 were performed, all with both waking and sleep recordings; the range of EEG records on a given patient was 2-23. The number of spikes and the amount of abnormal slowing was quantified in each record. Two different peaks of age were evident, appearing at 10-19 yrs and 40-49 yrs. The number of patients with a spike discharge on the first EEG was 64% in the C and 92% in the U group with an increasing incidence to 83% (C) and 100% (U) in later records. If spikes were absent in the first EEG in the C group, the majority showed only rare discharges later. The spike profile of the U patient initially was that 1/2 showed a typical number of spikes and nearly 1/2 many or very many spikes. Over time a decrease was seen in those with many-very many discharges, resulting in an increase with a typical number. Still later, a reversal occurred in the U patients with an increasing number with many or very many spikes. The slow wave profile of the U patient was that 2/3 showed some abnormal slow waves on the first record, increasing to 100% in later records. The increase was from delta, not theta activity. The spike profile of the C patient was that a typical number of spikes was seen at first in nearly 1/2, but only a small minority showed many-very many discharges. The slow wave profile for the C patient was that theta, not delta waves, increased in time. The (median) time between a unilateral spike discharge to a bilateral discharge was 4-5 yrs, and the U group much more often than the C group showed this change to bilateral spikes. The time between unilateral to bilateral slow waves varied between 4-9 yrs.

Event-Related Potentials Elicited by
Visual Stimulus-Duration Discrimination Tasks
Wei Mao, Yuping Wang, Lixia Shi and Dequan Wang

ABSTRACT

Event-related potentials (ERPs) were recorded on subjects who discriminated the stimulus duration of two sequentially presented spots (S1 and S2). Four kinds of trials were included: short-duration match (S1 and S2 lasting 300 ms), short-duration conflict (S1 and S2 lasting 300 ms and 600 ms, respectively), long-duration match (S1 and S2 were 600 ms) and long-duration conflict (S1 and S2 were 600 ms and 900 ms, respectively). When S1 was equal to S2, components of P1, N1, P2, N2 and a delayed late positive component were recorded after the onset of S2. The other three negativities were elicited in both short and long duration conflict conditions. The three negative components peaked at 475, 600 and 900 ms in the short-duration condition, and they peaked at 805, 900 and 1200 ms in the long-duration condition. The first negativity was considered a visual mismatch negativity (vMMN), followed by a delayed N270 reflecting the conflict processing for duration in the brain. The last negativity, similar to N270, possibly reflects the second conflict processing activity evoked by stimulus offset.

INTRODUCTION

The perception of dimensions, such as intensity, pitch, color and shape or spatial location of auditory and visual stimuli have been well documented. Some authors stated that time is not a perceptual dimension but a "derived entity" in the conscious experience.¹ Time is a source of information that shapes one's behavior. In everyday life, we are often confronted by a wide range of duration to which we frequently adapt. For example, when we drive, we have to know the duration of the traffic lights and anticipate the right moment to start again. In spite of its importance, the question of how duration is processed by the information processing system in the human brain remains a matter of debate.² Some recent studies suggested that three main brain regions might be involved in the temporal information processing: cerebellum, basal ganglia, and frontal cortex.²⁻⁴

N270 is a negative event-related potential (ERP) and peaks at around 270 ms after the onset of the second stimulus (S2) when it differs from the first stimulus (S1) in some attributes.^{5,6} When S2 is compared to S1, the inconsistency between the two stimuli reflects a kind of cognitive conflict. Because N270 is only evoked by the stimulus pairs with conflicts, it may reflect the activity of a conflict processing system that exists in the human brain. Evidence suggests N270 is different from N2b and N400.⁷ Cross-modal information conflicts can evoke N270.⁸ In previous studies, the conflicting information evoking N270 can be derived from physical attributes, such as color,⁹ shape,⁵ 3-dimensional contours,¹⁰ position,¹¹ or from mental features, such as arithmetic,⁷ or numbers.⁶ It is unknown if duration discrepancy can also elicit such a similar component. In this experiment, we were interested in determining whether an N270 occurs in a visual duration discrimination task, and if it occurs, how does it relate to the duration of two stimuli to be discriminated.

"Mu Rhythm Status" and Clinical Correlates
E. Niedermeyer, Adrian Goldszmidt and Dawn Ryan

ABSTRACT

Rolandic mu rhythm is usually limited to brief stretches of 0.5 to 2 sec duration. Two observations of status-like enhancement of mu rhythm have prompted this report. In both cases, 4-hour EEG-Video-Monitoring was used.

Clinically, the reported cases differed considerably. Case 1 showed nearly continuous mu activity associated with general motionlessness: akinesia/amimia but without rigidity, caused by frontal lobe impairment due to multiple sclerosis. In Case 2, an impressive mu-status started in drowsiness and was presumably attributable to levitiracetam (which had rendered seizure-free the patient's formerly severe case of temporal lobe epilepsy).

Mu rhythm status, thus far, is an unknown EEG entity. It can be caused by impaired fronto-motor input and may also constitute a medication-effect (levitiracetam).

Structural Lesions in Periodic
Lateralized Epileptiform Discharges (PLEDs)
Gunfer Gurer, Muge Yemisci, Serap Saygi and Abdurrahman Ciger

ABSTRACT

In this study we investigated the structural lesions of patients with periodic lateralized epileptiform discharges (PLEDs) to determine the possible relationship of lesions to PLEDs' localization on EEG and to metabolic abnormality. Clinical findings and electroencephalography (EEG), computerized tomography (CT) and magnetic resonance imaging (MRI) of the 71 adult patients with PLEDs were evaluated.

Stroke, herpes encephalitis and intracranial tumor or abscess were the most common etiological factors. Cortical gray matter and adjacent subcortical white matter lesions were detected in 64.7%, cortical gray matter lesions in 11.3% and subcortical white matter lesions in 4.2% of the patients. Although it is thought that PLEDs occur mostly with acute lesions, chronic lesions causing PLEDs were found in 35.2% of the patients. Bilateral lesions were detected in 19.7% and 33.8% of the patients had metabolic abnormality.

PLEDs localized the region of the lesion in 63.4% of the patients. PLEDs are usually self-limited features, but chronic PLEDs were detected in 5 patients in this study. Acute structural lesions involving cortical gray matter with adjacent subcortical white matter were found in most of the patients with PLEDs, but the lesion localization and age, acute or chronic, varied.

Benign Focal Epilepsy of Childhood: Epileptic Seizure During Somatosensory Evoked Potential: A Case Report Gloria M.A.S. Tedrus #and Lineu Corrêa Fonseca

ABSTRACT

A 6-year-old girl with a history of partial seizures had parietal spontaneous spikes, and high-voltage paroxysms, evoked by tapping of the hands and feet, in the parietal contralateral region during the electroencephalogram. The girl underwent a somatosensory evoked potential study, when she had a seizure, with tonic contraction rising of the right leg then followed by clonic jerks of the right leg, version of the head to the right, followed by a tonic contraction of the ipsilateral arm with flexion at the elbow. The seizure lasted 20-30 seconds. We believe this is the first description of a seizure during a somatosensory evoked potential procedure.

Tonic-Clonic Seizures in a Patient with Primary Hypoparathyroidism: A Case Report C. Armelisasso, M. L. Vaccario, A. Pontecorvi and S. Mazza

ABSTRACT

Hypoparathyroidism, a life threatening disorder, occurs when insufficient parathyroid hormone is produced to maintain extracellular calcium levels within the normal range. The acute clinical signs and symptoms of hypoparathyroidism are the same as those of hypocalcemia, ranging from tingling to intractable generalized tonic-clonic seizures; therefore, it can be mistaken for epilepsy. We report the case of a 36-year-old man who presented two tonic-clonic seizures, characterized by sudden loss of consciousness with a fall and diffuse tonic contractions and clonic jerks. At first diagnosis of epilepsy was established and therapy with valproate was commenced. In the following days, the patient presented typical signs of hypocalcemia and the diagnosis of hypoparathyroidism was made. In the 4 months follow up, antiepileptic drug therapy was reduced until suspension and calcium supplementation was initiated. We briefly review the most recent reports in the literature.

Encephalopathy Secondary to Imipenem Therapy J. L. Fernández-Torre, M. Velasco, R. Gutiérrez and M. Fernández-Sampedro

ABSTRACT

We describe the case of an 84-year-old woman who developed a confusional state and suffered from a generalized tonic-clonic seizure while she was treated with imipenem, a b-lactam antibiotic. Focal and generalized epileptiform discharges and a photoparoxysmal response were prominent with transient changes on the EEG.

Quantitative EEG Findings of a Temporal Lobe

Abnormality Not Detected by Magnetic Resonance
or SPECT Imaging in a Patient with Dementia

Roy R. Reeves, Frederick A. Struve, Guy E. Brannon and Harold B. Pinkofsky

ABSTRACT

The last three decades have seen significant advances in structural neuroimaging techniques such as computerized tomography and magnetic resonance imaging. These seem to have surpassed EEG as modalities for the identification of focal CNS lesions. Reported here is the case of a patient with a temporal lobe lesion not evident with magnetic resonance imaging or single photon emission computerized tomography but detected by EEG and positron emission tomography. EEG, particularly quantitative EEG, remains a valuable tool for the demonstration of the degree of dysfunctional changes associated with a cerebral lesion

Quantitative Electroencephalography in Frontotemporal Dementia with Methylphenidate Response: A Case Study

Harold W. Goforth, Lukasz Konopka, Margaret Primeau,
Amity Ruth, Kathleen O'Donnell, Roopal Patel,
Teresa Poprawski, Parvez Shirazi and Murali Rao

ABSTRACT

Frontotemporal dementia is an underdiagnosed illness with predominant behavioral and executive manifestations. Historically, diagnosis has been based on a combination of clinical history, neuropsychological testing, and brain imaging. No effective treatment currently exists for this disorder. A case is presented using quantitative EEG with methylphenidate challenge correlated with SPECT.

The patient underwent neuropsychological testing, a SPECT brain study, and a quantitative EEG, which was repeated after methylphenidate administration. SPECT was significant for hypoperfusion to the bilateral frontotemporal regions, with left-sided hypoperfusion greater than homologous right as demonstrated by LORETA analysis. QEEG correlated with SPECT, and demonstrated profound left greater than right bi-frontotemporal slowing, which normalized partially after methylphenidate administration. The patient has remained on methylphenidate as an outpatient, and has had significant behavioral improvement.

Quantitative EEG may provide both diagnostic and therapeutic data with regard to frontotemporal dementia. Further studies of methylphenidate in this population are needed to confirm these data.

The Electrocerbellogram

E. Niedermeyer

ABSTRACT

A revisit of EEG studies derived experimentally from the cerebellum confirms the predominance of ultrafast activities but also shows various degrees of underlying slower frequencies (from the beta down to the delta range).

Earlier personal work was based upon recording from the human cerebellum (and especially from fastigial and dentate nucleus) in connection with therapeutic cerebellar electrical stimulation. These patients suffered from intractable seizures (advanced cases of Lennox-Gastaut syndrome). Naturally, our recording technique in 1974 excluded the ultrafast range above 80/sec but failed to show activities in the upper beta range. In these cases, the severity of the seizure disorder caused structural impairment and ictal activity invaded the cerebellum.

The electrocerbellogram is still insufficiently understood. An attempt at an analysis of known facts is being made. Further research in this field is needed.