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EEG Indispensability in Migraine Management

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Abstract

Electroencephalographic changes occurring in patients with migraines have received much attention.

EEG abnormalities in migraine sufferers have been reported by a number of authors over the last 50 years, but prevalence varies considerably in the older literature. A number of unspecific rhythms related to migraines have been counted as "abnormal," and the reported numbers of definitely abnormal EEG rhythms have been consistently low.

In a few controlled and blinded studies; however, a slight excess of various EEG rhythms have been found in migraine patients. Similar prevalence of interictal EEG abnormalities has generally been found in patients with a classic and common migraine, but the diagnostic classification may not have been precise enough in some studies.

During the visual aura, either slow waves depression of background activity amplitude and normal EEG have been reported. The most definitely abnormal EEGs; with unilateral or bilateral delta activity, have been recorded during attacks of hemiplegic migraines, and during attacks of a migraine with disturbed consciousness.

The relationship between a migraine and epilepsy has still not been adequately clarified. The connection seems to exist in several small entities (e.g. a migraine-like headache as an epileptic manifestation, epileptic seizures triggered by epileptic attacks, and possibly in epilepsies with occipital-spike waves), but it is seemingly not "fundamental".

Introduction

Brain Scientific's quantitative EEG (QEEG), EEG frequency analysis and topographic brain mapping, overcomes many of the obstacles in assessing migraine pathophysiology and its diagnosis while showing great promise in this field. Moreover, features like continuous, ambulatory and sleep monitoring methods, achievable with our home-based BrainBit EEG device (www.brainbit.com), add additional layers of validation in diagnosing and understanding the nature of migraines headaches.

So far, mostly small studies have been published with somewhat inconsistent results. A pattern of increased alpha rhythm variability (and/or asymmetry) in the headache-free phase seems to emerge, however.

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Significant asymmetry of alpha and theta during a migraine has been reported in one topographic brain mapping study. QEEG studies of migraine patients have demonstrated slow wave-shifts (similar to those observed in patients with spreading depression).

The EEG patterns observed in migraine patients seem to suggest a possible physiological connection between sleep and a migraine headache. The EEG patterns provide accurate, reliable and reproducible sleep assessment paramount in uncovering the causes of migraine headaches.

The study of such relationships may shed new light on migraine pathophysiology. Few studies have shown that during headache attacks, an increase of slow rhythmic activity of the theta and delta range and a decrease of activity in the alpha and beta range were observed.

These abnormalities disappeared 30 minutes after a sumatriptan (a vasoconstrictor) injection. This suggests that a common migraine is associated with disturbances of cortical electrogenesis (via vasodilatation) and may provide insight into the causes of a migraine and aid in the development of effective therapies. All such maneuvers, methods, and interventions can be achieved with a combination of Brain Scientific and BrainBit technology.

Conclusion

Brain Scientific serves as the gold-standard for any existing tools or methods in diagnosing, researching, and treatment-monitoring of migraine headaches.

Furthermore, through the cloud-based infrastructure of the EEG/QEEG data acquisition subjected to deep-data mining, data structuring, predictive analytics, and data-modeling leading to efficient machine learning and artificial intelligence; creates an environment capable of synthesis of more refined and targeted migraine neural correlates and biomarkers, making our technologies indispensable tools of migraine intervention.