

ATYPICAL PATTERN RELATED TO 14 HZ POSITIVE SPIKES

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SUMMARY - We studied two children with a history of headache and a normal physical and neurological examination whose EEG showed an electroencephalographic pattern recently published, the N-shape potential associated with the 14 Hz positive spikes. This graphoelement was observed only during the asleep state.

KEY WORDS: N-shape potential, 14 Hz positive spikes, EEG.

Padrão atípico associado às pontas positivas 14 Hz

RESUMO - Estudamos duas crianças com história de cefaléia, exame físico e neurológico normais, cujos EEG mostraram padrão eletrencefalográfico recentemente publicado, o potencial N associado às pontas positivas 14 Hz. Este novo grafoelemento foi observado somente durante o estado de sonolência.

PALAVRAS-CHAVE: potencial N, pontas positivas 14 Hz, EEG.

The 14 and 6 Hz positive spikes were first described by Gibbs and Gibbs⁵. The term "ctenoids" was introduced by Lombroso et al.¹⁰ and had also been used for this phenomenon. The preferred term now is "fourteen and six Hz positive bursts"⁸. In the past these bursts were associated with various clinical features^{5,14,20,21}, but presently is considered a benign EEG variant^{1,17,19}. More recently the minuscule 28 per second positive spikes and the huge N-shape potential were published¹⁵. The term N-shape potential was first coined by Reiher and Carmant¹⁵ in 1991 to describe the EEG pattern in 28 patients who had widely distributed and stereotyped diphasic N-shape potentials, measuring up to 200 uV and usually followed a burst of 14 Hz positive spikes and then a single negative spike.

Our but in this paper is to describe two cases with this atypical pattern related to 14 Hz positive spikes. This report summarizes their clinical and EEG characteristics.

REPORT OF CASES

Case 1: PAS, a female child, was first seen at the age of 13 years when she was referred with a history of headaches. The antenatal and birth histories had been unremarkable. Neurological examination revealed no abnormality. A conventional EEG (CEEG) done for 30 min with the child awake and asleep showed only during the sleep state widely distributed diphasic N-shape potential, preceded by 14 Hz positive spikes (Fig 1).

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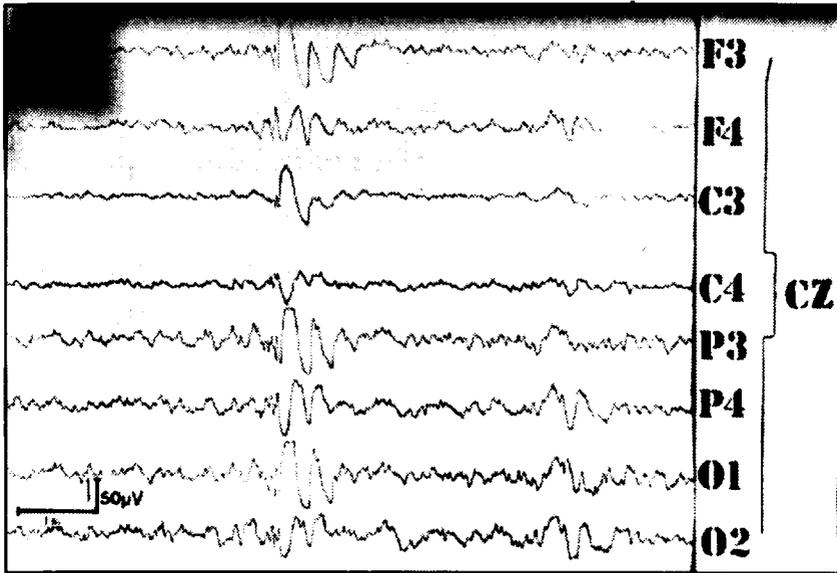


Fig 1. Case 1. This EEG showed the 14 per second positive spikes mainly in the posterior regions and then a low amplitude single negative spike followed by a slow wave with a N-shape.

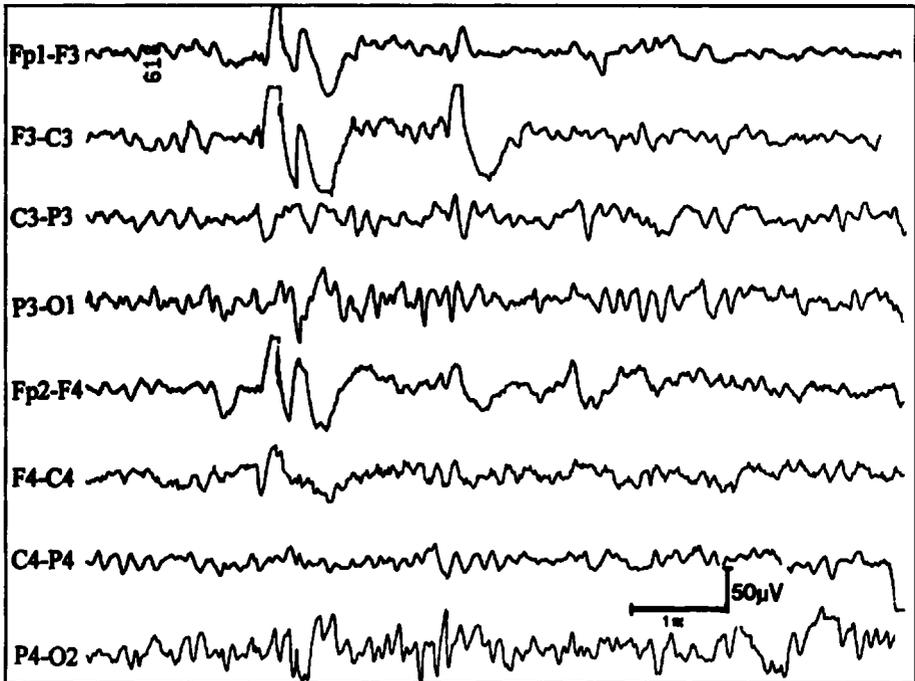


Fig 2. Case 2. High N-shape potentials are best seen in anterior regions and are preceded by a small and single negative spike.

Case 2: ENA, a 13-year-old boy had onset of headaches at the age of 6 years. Pregnancy and birth were normal. Physical and neurological examination were also normal. A CEEG performed for 30 min during the awake and sleep state showed the huge N-shape potential only when the child was asleep (Fig 2).

COMMENTS

Over the years, the 14 and 6 Hz positive spikes have been associated with different clinical diagnosis, as the "thalamic" and "hypothalamic" epilepsy⁵, autonomic nervous system dysfunctions, behavioural disorders, metabolic encephalopathies, especially in hepatic coma¹⁸, Reye's syndrome^{20,21} and comatose patients^{3,4}. A genetic determination has been presumed on the basis of some works^{2,11,16}. However, it became clear that this pattern is too often found in normal individuals¹⁰ and now is considered a benign variant that occurs as a nonspecific finding in the EEG¹. Little is known about the origin of the 14 and 6 Hz positive spikes. In a study with combined depth and scalp recording, this pattern was seen at different levels, especially in the thalamo-capsular region and in the neighborhood of the putamen¹².

The 14 and 6 per second positive spikes may be observed independently⁴ or associated with other patterns. Little⁹ reported two types of atypical sleep patterns (sharp sleep transients and intertemporal sleep spindles) in association with the 14 and 6 Hz positive spikes, but without showing the pictures. Silverman¹⁸ has reported an exceedingly common association between the 14 and 6 Hz positive spikes and the typical and atypical phantom 6 Hz spikes-wave complexes⁷. Okada et al.¹³ noted 14 and 6 Hz positive spikes in association with simultaneous negative spikes over the frontal area, suggestive of a dipole formation. More recently, Reiher and Carmant¹⁵, reported the N-shape potential, which was identified exclusively in the EEG of patients with 14 and 6 Hz positive spikes.

Previous study¹⁵ focused primarily on clinical features and electrographic characteristics of patients with N-shape potential. Our study confirms this previous report: the early age of onset of N-shape potential (our two patients were aged < 15 years), occurring mainly during sleep state, widely distributed and lack of clinical significance. Our Figure 2 is similar to the Figure 4 (F4-F3 and P4-P3 derivations) published by Reiher and Carmant¹⁵.

The N-shape potential is a new pattern on EEG and it was recently published, then it is early to make conclusions about this graphoelement. In the paper of Reiher and Carmant¹⁵ there were 28 patients with different diseases: seizures, headache, behavioural disorder, syncope, infection and head injury. However, it was not established the number of patients by each disease mainly those with seizures. Our two patients had the diagnosis of headache.

The common relationship of this pattern with the 6 and 14 Hz positive spikes makes it with a probable sign of lack of clinical significance. The familiarization with the N-shape potential is important to avoid misconstructions with atypical spike-wave complexes.

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