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Brain & Development 33 (2011) 335–338

BRAIN & DEVELOPMENT
Official Journal of the Japanese Society of Child Neurology

www.elsevier.com/locate/braindev

Case report

Augmented startle responses in opsoclonus-myoclonus syndrome

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Received 12 April 2010; received in revised form 4 June 2010; accepted 4 June 2010

Abstract

We report a 3-year-old boy with opsoclonus-myoclonus syndrome (OMS) who presented with exaggerated startle responses to unexpected auditory stimuli during an episode of myoclonic status. An augmented blink reflex was also observed clinically and electrophysiologically. Based on the assumption that hyperexcitability in the lower pontine tegmentum may be responsible for the acoustic startle and blink reflex in OMS, we considered that increased excitability of independent but neighboring structures, including the pontine paramedian reticular formation, may cause OMS symptoms.

Keywords: Opsoclonus-myoclonus syndrome; Startle response; Blink reflex

1. Introduction

Opsoclonus-myoclonus syndrome (OMS) is a rare neurologic manifestation that is linked to infections, toxic-metabolic disorders, and paraneoplastic processes. Subcortical lesions, which include those of the cerebellum, midbrain, pons, and medulla oblongata, were assumed to be responsible for the chaotic eye movements, incessant myoclonia, and ataxia in OMS [1]. Specifically, pontine tegmentum lesions have been identified in a couple of cases on magnetic resonance imaging (MRI) [2,3]. We report a patient with OMS who presented with exaggerated startle responses to unexpected auditory stimuli during an episode of myoclonic status. An augmented blink reflex was also observed. We also discuss the pathophysiology of these findings with a focus on hyperexcitability in the lower pontine tegmentum, where fundamental structures for conjugate ocular movements and the central pattern generator for the startle response as well as the reflex pathway of acoustic blinking are closely located.

2. Case report

A boy aged 1 year and 2 months, who had developed normally, showed ataxia and abnormal ocular movements a few weeks after experiencing gastroenteritis. Furthermore, myoclonia also appeared 6 months later. He was diagnosed with OMS, and neuroblastoma was ruled out because of negative findings on ^{131}I-MIBG scintigraphy and normal levels of urinary catecholamine metabolites. He was administered intravenous immunoglobulins (400 mg/kg/day) for 5 days followed by oral prednisolone (2 mg/kg/day). Partial remission of clinical symptoms was observed. As the patient experienced a relapse of OMS symptoms during dosage tapering, he was further treated with low-dose prednisolone. Subsequently, clinical symptoms improved significantly and

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doi:10.1016/j.braindev.2010.06.005

opsoclonus was scarcely noted after 2 years of age. He could crawl but not walk because of ataxia and action-induced myoclonia/tremor, and he did not gain the ability to utter meaningful words. Some of the clinical data from this period, particularly the cortical evoked potentials, have been published previously [4, patient 3]. The patient's condition was stable, and prednisolone was terminated at 3 years of age. Increase in the frequency and intensity of myoclonia were noted subsequently.

One month later, aggravation of OMS symptoms appeared abruptly during a dinner. Continuous polymyoclonia in the extremities in resting postures were accompanied by irritability and a generalized increase in muscle tone, as well as sustained ocular deviation and intermittent opsoclonus. The patient was admitted to our hospital after he showed relentless myoclonia and conjugate ocular deviation to the left. He showed little response to his surroundings, but acoustic stimuli with clapping elicited a massive and polyphasic startle response with staring of the eyes. Subsequent to these motions, the intense myoclonia disappeared for several seconds, followed by a gradual increase in myoclonia and muscle tone to the previous levels within 1 min. These responses were not provoked by visual or painful stimuli. The OMS symptoms repetitively re-emerged despite intravenous injection of diazepam or thiopental, but were suppressed completely under continuous intravenous administration of midazolam at 0.2 mg/kg/h. The next morning, the severity of neurologic manifestations was comparable to previous levels, although the patient appeared quite irritable. The augmented startle response was not elicited at this time. The blink reflex showed laterality with augmented amplitudes of R1 components with left-sided predominance, which had been noticed in a previous examination at the age of

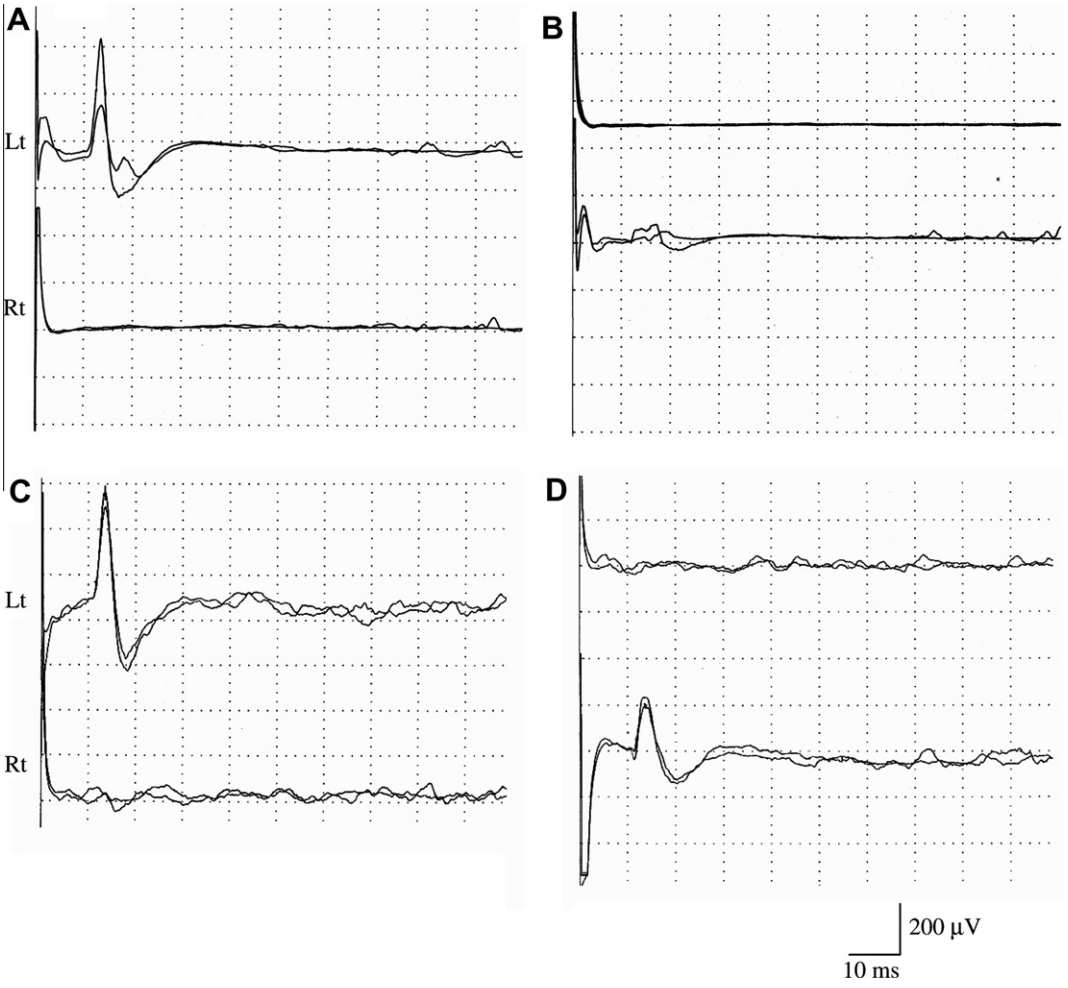

Fig. 1. Blink reflex following a trigeminal sensory stimulation (A and C, left-sided stimulation; B and D, right-sided stimulation). Left-sided predominance of R1 amplitudes is noted at the age of 1 year and 9 months (A and B), and 3 year and 1 month (C and D; examined during the admission due to myoclonic status) with comparable latencies on both sides. The R1 amplitudes on the latter recording increased markedly with left-sided predominance (normal amplitude for age, 160 ± 65 μV). R2 and R2′ components in A and B show delayed latency and attenuated amplitude, and are not clearly identifiable in C and D possibly due to the motion of this irritable patient.