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Epilepsy in Children with ADHD

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Abstract

Epilepsy is increasingly recognized as an important association with Attention Deficit/Hyperactivity Disorder (ADHD) in children. Previous studies reported the seizure occurrence in children with ADHD as 2~7%. Epilepsy in children with ADHD appears to be earlier in age onset and more difficult in seizure control than those without. The genetic and clinical information might refer to a common neurobiological basis for epilepsy and ADHD.

Keywords: Attention deficit/hyperactivity disorder; Epilepsy; Comorbidity; Children

Introduction

Epilepsy and Attention Deficit/Hyperactivity Disorder (ADHD) are common pediatric neurological disorders. The incidence of epilepsy is up to 1% of childhood, while ADHD affects the children around 7.5~16% [1,2]. Several epidemiological studies have showed more inattention, hyperactivity and impulsivity in children with epilepsy compared to healthy controls, reported as 2.5~5.5-fold increased risk [3,4].

Contrarily, seizure occurrence in children with ADHD has been less mentioned. Several small, uncontrolled studies reported the seizure occurrence in children with ADHD as 2~7% [5,6,7]. A population-based cohort study [8] in Rochester, Minnesota showed that ADHD cases were 2.7 times more likely to have epilepsy than controls (95% CI, 0.94-7.76; p=0.066). Their seizures were earlier in age of onset (5.5 vs. 15 years) and more frequent in occurrence (63% vs. 17%). Children with ADHD appeared to be reluctant to diagnose and initiate treatment for ADHD. Epilepsy in children with ADHD appears to be more severe and more difficult to control than those without. More neurological and EEG abnormalities have been reported in children with ADHD [9].

What comes first: ADHD or epilepsy? The relationship is probably bidirectional. Several studies have showed that ADHD symptoms sometimes started before the first seizures. However, in fact, many epileptic syndromes occur in early life of children before the onset of ADHD. It is likely that there is a common neurobiological basis for seizure activities and ADHD behaviors involving both genetic and environmental factors [8]. Another possibility is that one disorder or treatment causes the other. Status epilepticus, frequent seizures or frequent interictal epileptiform discharges are associated with cognitive or behavior impairment [10].

Some concerns may arise whether the pharmacological treatment of ADHD such as CNS stimulants will aggravate seizure activities in children with epilepsy. A recent multi-center prospective observational study [11] demonstrated that ADHD symptoms were not associated with underlying epilepsy syndrome, severity of epilepsy and/or use of anti-epileptic drugs. While methylphenidate resulted in clinically significant decrease of ADHD symptoms in 75% patients, it was not associated with increased risk of seizure relapse. Nevertheless, further randomized, double-blind controlled studies to clarify the specific association of ADHD and epilepsy as well as the efficacy and safety of treatment are mandatory.

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