Reappraisal of abnormal EEG findings in children with ADHD: On the relationship between ADHD and epileptiform discharges.

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Abstract
INTRODUCTION:
Attention-deficit hyperactivity disorder is suggested to be closely related to epilepsy. A recent large-scale study revealed that ADHD in children is often accompanied by epilepsy. In Japan, methylphenidate (MPH) as a sustained-action tablet and atomoxetine (ATX) became commercially available as medications for children recently. Since then, the number of prescriptions of both medicines has increased rapidly. Methylphenidate, as a psychostimulant, has been a source of concern because of the perceived lowered threshold for convulsions in children. Based on this background, reappraisal of EEG findings in children with ADHD is important in order to detect indications of potential comorbid epilepsy and to investigate the developmental mechanisms of the neurophysiological manifestations in patients with ADHD.

MATERIAL AND METHOD:
EEG findings in children newly diagnosed with ADHD and their relationship with clinical findings were investigated. The author evaluated 208 patients with ADHD newly diagnosed between 2008 and 2013. Of these, there were 145 patients for whom EEG findings were obtained along with a clinical follow-up for at least three months. Patients with IQ<70 were excluded in order to obtain a homogenous group of patients with ADHD. The male-to-female ratio was 130:15, and the age range was between 5 years, 9 months and 19 years, 9 months, with mean age of 11 years, 4 months.

RESULTS:
The results revealed that about half (48.3%) of the children with ADHD had abnormal EEG findings and that 22.1% of them had epileptiform discharges. Patients without comorbidity of autism spectrum disorder (or homogenous group with ADHD) were especially likely to show abnormal EEG findings (51.0%) including epileptiform discharges (24.5%). Afebrile seizures, that is, epileptic seizures, occurred in a boy three days after commencement of administration with MPH as a sustained-action tablet. In four patients with a past history of epilepsy, neither relapse of EEG abnormality nor epileptic seizures were observed during the follow-up period.

CONCLUSION:
There was to be a significantly close relationship between ADHD and epileptiform discharges. Therefore, in patients with ADHD, it is important to obtain more precise information about seizures and presence of epilepsy from the personal and family histories, as well as to undertake a thorough EEG examination.