

Behavioral Consequences in Children with Epilepsy

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Suffering from epilepsy is not limited to having seizures. Some epilepsy is, in general, often associated with behavioral problems that can also affect a patient's adaptive functioning. Though there remains some controversy on this subject, it is accepted by most researchers in the field that the degree of behavioral problems associated with epilepsy is greater than would be expected on the basis of the existence of a chronic illness alone in children [1]. Children and adolescents with epileptic abnormalities involving the frontal lobe show significant impairment of executive abilities (abilities primarily processed by the frontal lobe), but a uniform neuropsychological and behavioral profile has yet to be established [2]. In our previous studies, a longer active seizure period of frequent spike-waves coupled with the occurrence of frequent seizures may be associated with prefrontal lobe growth, which relates to behavioral problems in children with benign childhood epilepsy with centrotemporal spikes (BCECTS) and epilepsy with continuous spike and wave during slow sleep (CSWS) [3,4]. Accordingly, damage to the frontal regions during childhood may interrupt normal maturational processes and organization, resulting in impairments of neurobehavioral development. Integrative executive functions may thus rely on the health of frontal lobe tissue and connectivity with the rest of the cortex [5].

Frontal lobe dysfunctions not only affect the higher cognitive functions, but they also cause emotional and behavioral problems. Frontal lobe epilepsy (FLE) is one of the most complicated and least understood forms of epilepsy. Seizures originating from the frontal lobe may be difficult to control. The discussion regarding the possible consequences of seizures in the immature brain has been long and contentious. However, recent studies suggest that repeated seizures may lead to cognitive and behavioral impairments. More frequent and severe seizures can affect behavioral functions. Possible explanations for this relationship are summarized as follows: a) seizures and behavioral problems are associated because both are related to an underlying factor; b) seizure activity per se disrupts behavior; and c) children have a negative psychological response to seizures [6]. In our previous study using three-dimensional magnetic resonance imaging (MRI)-based volumetry, the prefrontal-to-frontal lobe volume ratio increased serially in FLE children without cognitive/behavioral problems as in controls, but it was stagnant or decreased in FLE children presenting with intractable clinical courses and behavioral problems [7]. These findings suggest that repeated seizures may lead to prefrontal growth disturbance, and that the occurrence of frequent seizures in children with FLE may be associated with prefrontal lobe growth retardation, which relates to neuropsychological problems and the ultimate neuropsychological outcome. In addition, these results may support the second suggestion of Austin et al. [6] that seizure activity per se disrupts behavior. Based on these studies, management to remit seizures as soon as possible may be required to achieve optimal prognosis in FLE with behavioral involvement.

Behavioral problems can affect the quality of life (QOL) of children with not only epilepsy, but also other chronic illnesses. As Engel et al. [8] mentioned, just as seizures are not constant over time and are often reactive to circumstance, so too the behavioral problems are not constant and reactive. In contrast, there may be a relationship

between current seizure frequency and perceived impact of epilepsy, perceived stigma, and levels of anxiety and depression, which may relate to behavioral changes and reduced QOL. Thus, seizures can alter brain function in a manner that influences behavior just as behavior influences seizures. Current seizure activity emerged as the most important predictor, because achieving remission from seizures was a key factor in improving psychosocial functioning. Achieving better seizure control is a key to improving QOL in children with epilepsy. In considering outcomes for children with epilepsy, control of seizures must be weighed against the incidence of behavioral impairments, either transitory or persistent. From the perspective of decreased behavioral problems and improving QOL, management may be required to remit seizures as soon as possible to achieve optimal prognosis in epilepsy. Further investigations of behavioral manifestations in children with epilepsy will clarify the mental state, behavioral changes, serious psychoses in general, and their causes.

References

1. Taylor DC (1996) Psychiatric aspects. Epilepsy in children. London: Chapman and Hall: 601-616.
2. Vago C, Bulgheroni S, Franceschetti S, Riva D (2011) Frontal lobe epilepsies: neuropsychological and behavioral consequences in children. Epilepsy in children-Clinical and social aspects: 187-212.
3. Kanemura H, Hata S, Aoyagi K, Sugita K, Aihara M (2011) Serial changes of prefrontal lobe growth in the patients with benign childhood epilepsy with centrotemporal spikes presenting with cognitive impairments/behavioral problems. Brain Dev 33: 106-113.
4. Kanemura H, Aihara M (2011) Sequential prefrontal lobe volume changes in epileptic patients with continuous spikes and waves during slow sleep. Epilepsy in children - Clinical and social aspects: 13-24.
5. Aihara M, Aoyagi K, Goldberg E, Nakazawa S (2003) Age shifts frontal cortical control in a cognitive bias task from right to left: part I. Neuropsychological study. Brain Dev 25: 555-559.
6. Austin JK, Dunn DW, Caffrey HM, Perkins SM, Harezlak J, et al. (2002) Recurrent seizures and behavior problems in children with first recognized seizures: a prospective study. Epilepsia 43: 1564-1573.
7. Kanemura H, Sano F, Tando T, Sugita K, Aihara M (2012) Repeated seizures induce prefrontal growth disturbance in frontal lobe epilepsy. Brain Dev 34: 175-180.
8. Engel Jr. J, Taylor DC, Trimble MR (2008) Neurobiology of behavioral disorders. Epilepsy: a comprehensive textbook. Lippincott Williams & Wilkins: 2077-2083.

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