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Epilepsy in Children Diagnosed with Attention Deficit/Hyperactivity Disorder

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ABSTRACT

Attention Deficit/Hyperactivity Disorder is one of the most common neuro-developmental disorders seen in child and adolescent psychiatry practice. In addition to its negative effects on the psychological, academic and social development of the child, in case of a comorbidity, response to treatment and prognosis may be negatively affected. This study presents prevalence, clinical presentation and treatment options in children diagnosed with Attention Deficit/Hyperactivity Disorder in case of epilepsy comorbidity.

INTRODUCTION

Attention Deficit/Hyperactivity Disorder (ADHD) occurs in 2–7% of all children [1] whereas the prevalence of epilepsy in school-age children is 0.6% in females, 0.9% in males and 0.8% in both groups together [2]. ADHD and epilepsy may occur as comorbid conditions, and a number of studies in different settings have indicated a reciprocal relationship between epilepsy and ADHD/ADHD symptoms [3-5].

ADHD is a chronic disorder which persists into adulthood in about two-thirds of patients and causes a negative impact on familial and social relationships, academic achievement, and occupational status [6]. However, it might be difficult to differentiate the symptoms of ADHD from those caused by the seizure disorder itself. Clinical studies have suggested that the prevalence of ADHD in epilepsy patients may be as high as 30–40%, with predominantly inattentive subtype (ADHD-I) of ADHD more common than combined subtype of ADHD (ADHD-C, Inattentive/Hyperactive-Impulsive subtype) [7]. Some researchers have suggested that 12 to 60% of children with epilepsy have ADHD [8,9].

The mechanisms underlying the comorbidity are unclear but likely involve genetic factors [10]; frequent seizures, epileptiform discharges, and the effects of Antiepileptic Drugs (AEDs) may also combine to trigger ADHD symptoms [11].

Both conditions have been independently associated with low quality-of-life scores (Davis SM et al, 2010). However, ADHD symptoms often appear before seizure onset, suggesting that the seizures and their treatment may not have much to do with the psychiatric comorbidity [12]. Hermann et al. [13] have reported 23 patients with ADHD and new-onset epilepsy: in 19, ADHD symptoms preceded seizure onset. An epidemiologic study have showed that the risk of epilepsy was 2.5 times greater in children who had already developed ADHD symptoms [14].

In a study, a total of 607 children (82.4% males) aged 6–14 years with ADHD were identified. Of these 14 (2.3%) had a history of epilepsy and 13 of these had active

epilepsy. These children had been diagnosed with epilepsy on average 1.8 years before the ADHD assessment. Of the 14 patients with a history of epilepsy, 11 (78.6%) had focal seizures, 7 also had secondary generalized tonic-clonic seizures and 3 patients had only primary generalized seizures. Benign Childhood Epilepsy with Centro-Temporal Spikes (BCECTS) was found in 2 cases and childhood absence epilepsy (CAE) in 2 cases. Methylphenidate was the pharmacological treatment for ADHD in all 14 children with a history of seizures and initial response to methylphenidate was achieved in 12 (85.7%) [15].

One study from Germany has reported an association between ADHD, rolandic spikes and BCECTS [16], and another study has also reported that children with BCECTS exhibited attention problems and aggressive behavior more frequently than healthy controls [17]. An equal male / female ratio has been reported in studies on epilepsy patients with ADHD [18].

In a study in which results have represented the child psychiatry population (patients with ADHD and epilepsy), it has noted that 71.4% children in the sample with epilepsy and ADHD had ADHD-C (Combined subtype, Inattentive/Hyperactive-Impulsive subtype) , a figure that differs from studies of ADHD in epilepsy samples that have found more than 50% of children had ADHD-I (Inattentive subtype) [15].

ADHD symptoms may precede, occur simultaneously with, or occur subsequent to a diagnosis of epilepsy. From a clinical perspective, it is important to be able to differentiate between the onsets of epilepsy and ADHD, and to be able to determine whether a patient with both conditions should receive AEDs treatment or pharmacological treatment for ADHD, or both, and on what time scale [15].

Treating ADHD is crucial to improve quality of life for patients and families [19]. Although a number of psychosocial interventions have been proposed, the cornerstone of treatment for ADHD is stimulant medication (Methylphenidate [MPH] or Amphetamine [AMP]).Both stimulant groups have been found useful in the ADHD treatment. Stimulants have been demonstrated to be highly efficacious in double-blind, placebo-controlled trials with 65%–75% of healthy adult and child subjects responding to stimulants compared to 4%–30% on placebo [20].

However, in the presence of comorbid epilepsy, a clinical dilemma ensues because of the long held view that methylphenidate may reduce the seizure threshold and interfere with seizure control [21]. Nonetheless, this view has been challenged on several accounts. First, methylphenidate is as effective in alleviating ADHD symptoms in patients who have associated epilepsy as it is in patients with ADHD without epilepsy [22,23]. Furthermore, available data has not indicated loss of seizure control with methylphenidate in patients with well-controlled epilepsy [24,25], and the limited data suggesting otherwise are not conclusive [26].

While it is well-established that children with comorbid ADHD and difficult-to-treat epilepsies face educational, physical, social, and emotional difficulties that directly impact quality of life [22], it is not known whether treatment of ADHD with stimulants improves quality of life in these patients. In an open-label study, results have suggested that low to moderate doses of methylphenidate significantly reduce ADHD symptoms and improve quality of life in children and adolescents with difficult-to-treat epilepsies. Moreover, treatment with methylphenidate was an adjuvant to AEDs in reducing seizure frequency and severity instead of an obstacle to seizure alleviation [27].

In the literature, there is less information on efficacy and tolerability of AMP, atomoxetine, and alpha-2 adrenergic agonists in epilepsy. In one study, a retrospective medical records review has allowed a comparison of MPH and AMP in a population of 36 epilepsy and ADHD treated with stimulants. A higher response rate in the treatment of ADHD was seen in the MPH group (12/19, 63%) versus the AMP group (4/17, 21%). Within the group before treatment with stimulant, 47% were considered seizure free and 53% had active seizures, and there were no significant differences in the number of patients in each group prescribed MPH versus AMP. During the trial, one patient on MPH and two patients on AMP had increased seizure frequency that returned to baseline with discontinuation of stimulants [28].

While psychopharmacology is the primary treatment modality for ADHD, behavioral treatment may be recommended for use in combination with medication treatment or in children with minimal impairment or when medication is not an option due to contraindications or parental objections. Behavioral therapies would not be expected to differ significantly in implementation or efficacy in children with ADHD with and without epilepsy.

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However, in epilepsy, compared to otherwise healthy children with ADHD, there may be a higher likelihood for medical contraindications or parental objections (eg, a desire to minimize the number of overall medications) to medication treatment of ADHD, and thus, behavioral therapies may present an important avenue for treatment [29].

REFERENCES

1. Sayal K, Prasad V, Daley D, Ford T, Coghill D. (2018). ADHD in children and young people: prevalence, care pathways, and service provision. The Lancet Psychiatry. 5: 175-186.
2. Canpolat M, Kumandas S, Poyrazoglu HG, Gumus H, Elmali F, et al. (2014). Prevalence and risk factors of epilepsy among school children in Kayseri City Center, an urban area in Central Anatolia, Turkey. Seizure. 23: 708-716.
3. Alexopoulos AV, Kotagal P, Loddenkemper T, Hammel J, Bingaman WE. (2006). Long-term results with vagus nerve stimulation in children with pharmacoresistant epilepsy. Seizure. 15: 491-503.
4. Austin JK, Perkins SM, Johnson CS, Fastenau PS, Byars AW, et al. (2011). Behavior problems in children at time of first recognized seizure and changes over the following 3 years. Epilepsy & Behavior. 21: 373-381.
5. Cohen R, Senecky Y, Shuper A, Inbar D, Chodick G, et al. (2013). Prevalence of epilepsy and attention-deficit hyperactivity (ADHD) disorder: a population-based study. Journal of child neurology. 28: 120-123.
6. Jones JE, Watson R, Sheth R, Caplan R, Koehn M, et al. (2007). Psychiatric comorbidity in children with new onset epilepsy. Developmental Medicine & Child Neurology. 49: 493-497.
7. Dunn DW, Kronenberger WG. (2005). Childhood epilepsy, attention problems, and ADHD: review and practical considerations. In Seminars in pediatric neurology. 12: 222-228.
8. Kaufmann R, Goldberg-Stern H, Shuper A. (2009). Attention-deficit disorders and epilepsy in childhood: incidence, causative relations and treatment possibilities. Journal of child neurology. 24: 727-733.
9. Hermann B, Seidenberg M, Jones J. (2008). The neurobehavioural comorbidities of epilepsy: can a natural history be developed?. The Lancet Neurology. 7: 151-160.
10. Hesdorffer DC, Caplan R, Berg AT. (2012). Familial clustering of epilepsy and behavioral disorders: evidence for a shared genetic basis. Epilepsia. 53: 301-307.
11. Gonzalez-Heydrich J, Weiss M, Connolly M, Wambera K, Jan JE, et al. (2006). Pharmacological management of a youth with ADHD and a seizure disorder. Journal of the American Academy of Child & Adolescent Psychiatry. 45: 1527-1532.
12. Dunn DW, Austin JK. (2004). Differential diagnosis and treatment of psychiatric disorders in children and adolescents with epilepsy. Epilepsy & Behavior. 5: 10-17.
13. Hermann B, Jones J, Dabbs K, Allen CA, Sheth R, et al. (2007). The frequency, complications and aetiology of ADHD in new onset paediatric epilepsy. Brain. 130: 3135-3148.s
14. Hesdorffer DC, Ludvigsson P, Olafsson E, Gudmundsson G, Kjartansson O, et al. (2004). ADhd as a risk factor for incident unprovoked seizures and epilepsyin children. Archives of general psychiatry. 61: 731-736.
15. Socanski D, Aurlien D, Herigstad A, Thomsen PH, Larsen TK. (2013). Epilepsy in a large cohort of children diagnosed with attention deficit/hyperactivity disorders (ADHD). Seizure. 22: 651-655.
16. Holtmann M, Becker K, Kentner-Figura B, Schmidt MH. (2003). Increased frequency of rolandic spikes in ADHD children. Epilepsia. 44: 1241-1244.
17. Völkl-Kernstock S, Bauch-Prater S, Ponocny-Seliger E, Feucht M. (2009). Speech and school performance in children with benign partial epilepsy with centro-temporal spikes (BCECTS). Seizure. 18: 320-326.
18. Dunn DW, Austin JK, Perkins SM. (2009). Prevalence of psychopathology in childhood epilepsy: categorical and dimensional measures. Developmental Medicine & Child Neurology. 51: 364-372.
19. Tan M, Appleton R. (2005). Attention deficit and hyperactivity disorder, methylphenidate, and epilepsy. Archives of disease in childhood. 90: 57-59.
20. Pliszka S, AACAP Work Group on Quality Issues. (2007). Practice parameter for the assessment and treatment of

children and adolescents with attention-deficit/hyperactivity disorder. Journal of the American Academy of Child & Adolescent Psychiatry. 46: 894-921.

21. Gonzalez-Heydrich J, Whitney J, Waber D, Forbes P, Hsin O, et al. (2010). Adaptive phase I study of OROS methylphenidate treatment of attention deficit hyperactivity disorder with epilepsy. Epilepsy & behaviour. 18: 229-237.
22. Yoo HK, Park S, Wang HR, Lee JS, Kim K, et al. (2009). Effect of methylphenidate on the quality of life in children with epilepsy and attention deficit hyperactivity disorder. Epileptic Disorders. 11: 301-308.
23. Santos K, Palmini A, Radziuk AL, Rotert R, Bastos F, et al. (2013). The impact of methylphenidate on seizure frequency and severity in children with attention-deficit–hyperactivity disorder and difficult-to-treat epilepsies. Developmental Medicine & Child Neurology. 55: 654-660.
24. Baptista-Neto L, Dodds A, Rao S, Whitney J, Torres A, et al. (2008). An expert opinion on methylphenidate treatment for attention deficit hyperactivity disorder in pediatric patients with epilepsy. Expert opinion on investigational drugs. 17: 77-84.
25. Van der Feltz-Cornelis CM, Aldenkamp AP. (2006). Effectiveness and safety of methylphenidate in adult attention deficit hyperactivity disorder in patients with epilepsy: an open treatment trial. Epilepsy & Behavior. 8: 659-662.
26. Hemmer SA, Pasternak JF, Zecker SG, Trommer BL. (2001). Stimulant therapy and seizure risk in children with ADHD. Pediatric neurology. 24: 99-102.
27. Radziuk AL, Kieling RR, Santos K, Rotert R, Bastos F, et al. (2015). Methylphenidate improves the quality of life of children and adolescents with ADHD and difficult-to-treat epilepsies. Epilepsy & Behavior. 46: 215-220.
28. Gonzalez-Heydrich J, Hsin O, Gumlak S, Kimball K, Rober A, et al. (2014). Comparing stimulant effects in youth with ADHD symptoms and epilepsy. Epilepsy & Behavior. 36: 102-107.
29. Williams AE, Giust JM, Kronenberger WG, Dunn DW. (2016). Epilepsy and attention-deficit hyperactivity disorder: links, risks, and challenges. Neuropsychiatric disease and treatment. 12: 287.