

## Epilepsy Comorbidity of Autism in Children

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### Editorial

Autism Spectrum Disorder (ASD) is a group of developmental disorder in children characterized by social interaction difficulties, verbal/nonverbal communication disturbance and stereotyped behaviors. ASD can be found in most countries all over the world, while the prevalence differs among areas. The association between autism and epilepsy has been recognized for a long time, yet the basis of association is little understood [1]. One of the main reasons comes from the fact that various diagnostic subtypes exist in many reports of epilepsy with ASD [2].

The prevalence of epilepsy among all children is estimated as 2-3%, compared to 10-30% in autism [3,4]. In a retrospective review of Electroencephalography (EEG) data and review of medical charts, up to 40% of children with pervasive developmental delay were diagnosed with epilepsy [5]. A meta-analysis of epilepsy in autism from 10-14 studies (1963-2006) found that 21.4% of individuals with an intellectual disability had epilepsy, while 8% of those without an intellectual disability had epilepsy [6]. Therefore, epilepsy in autism was associated with intellectual disability and the prevalence of epilepsy paralleled the intellectual disability. A similar report showed that autistic children without additional neurological disorders have a much lower (approximately 6%) rate of epilepsy [7]. The risk for epilepsy in ASD was significantly higher for females from several studies [1,6,8]. A followed-up study for 150 childhood diagnosed ASD when they were 21 years of age found that 22% had epilepsy [1]. For the majority of participants, seizures first began after the age of 10 years. Epilepsy was significantly more common in those with lower language ability (45% vs. 25% as with epilepsy compared to those without epilepsy) [1]. Another study on patients with ASD and epilepsy was associated with potential gross and fine motor problems, incontinence, social impairments and behavior disorders [8]. Individuals with autism and additional neurological impairment, such as cerebral palsy are at a higher risk for seizures [9]. The earlier studies showed that type of language dysfunction was a risk factor for seizures, with the highest percentage of seizures occurring in children with the deficits in receptive language [10]. They hypothesized that the association of severe receptive language disorders with epilepsy and autism implicated temporal-lobe dysfunction [3].

Several population-based studies exploring the association of ASD & epilepsy have been conducted. The study in Finland of 4705 ASD children from 1987-2005 confirmed the association of epilepsy and ASD, stronger in those with intellectual disabilities, esp. among females [11]. Another nationwide cohort study in Sweden showed individuals with epilepsy were at increased risk of ASD, with the highest in those epilepsy diagnosed in childhood [12]. The recent population-based cohort study in Taiwan demonstrated the bidirectional association between ASD and epilepsy [13]. The adjusted hazard ratio (HR) of

epilepsy in ASD was 8.4 in ASD group compared with non-ASD group, and vice versa, the adjusted HR for ASD was 8.4 in epilepsy group compared with non-epilepsy group. They concluded that ASD and epilepsy shared common risk factors. One important issue is about the necessity of routine screening. A study to screen ASD in 236 children with epilepsy showed 15-82% positive screening results depending on various diagnostic tools. 15 individual (7.2%) was finally diagnosed to be autism. High risk or symptomatic children with epilepsy warrant screening for ASD.

Recently the biological basis of ASD & epilepsy has been speculated. Several biological pathways are commonly involved in both disease process including gene transcription regulation, cellular growth, synaptic channel function and maintenance of synaptic structure [14,15]. A mini-review on neuropathological mechanism of seizures in ASD postulated two findings shared by ASD & epilepsy: Abnormalities in minicolumn architecture and GABA neurotransmission. Both ASD & epilepsy are associated with the excitatory to inhibitory imbalance of the cortex, causing high prevalence of epilepsy in ASD and increased prevalence of ASD in individuals with epilepsy [16].

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