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Abnormal Brain Connectivity Spectrum Disorders Following Thimerosal Administration: A Prospective Longitudinal Case–Control Assessment of Medical Records in the Vaccine Safety Datalink

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Abstract

Background: Autism spectrum disorder (ASD), tic disorder (TD), and hyperkinetic syndrome of childhood (attention deficit disorder [ADD]/attention deficit hyperactivity disorder [ADHD]) are disorders recently defined as abnormal connectivity spectrum disorders (ACSDs) because they show a similar pattern of abnormal brain connectivity. This study examines whether these disorders are associated with exposure to thimerosal, a mercury (Hg)-based preservative.

Methods: A hypothesis testing case-control study evaluated the Vaccine Safety Datalink for the potential dose-dependent odds ratios (ORs) for diagnoses of ASD, TD, and ADD/ADHD compared to controls, following exposure to Hg from thimerosal-containing *Haemophilus influenzae* type b vaccines administrated within the first 15 months of life. Febrile seizures, cerebral degeneration, and unspecified disorders of metabolism, which are not biologically plausibly linked to thimerosal, were examined as control outcomes.

Results: On a per 25 μg Hg basis, cases diagnosed with ASD (OR = 1.493), TD (OR = 1.428), or ADD/ADHD (OR = 1.503) were significantly ($P < .001$) more likely than controls to have received increased Hg exposure. Similar relationships were observed when separated by gender. Cases diagnosed with control outcomes were no more likely than controls to have received increased Hg exposure.

Conclusion: The results suggest that Hg exposure from thimerosal is significantly associated with the ACSDs of ASD, TD, and ADD/ADHD.

Keywords
Asperger, autism, ethylmercury, PDD-NOS, thimerosal, Tourette, ADD/ADHD, Mercury

Introduction

Autism spectrum disorder (ASD), tic disorder (TD), and hyperkinetic syndrome of childhood (also known as attention deficit disorder [ADD]/attention deficit hyperactivity disorder [ADHD]) are neurodevelopmental disorders.[1] Evidence suggests these children share similar neuropathology, symptomatology, and comorbid conditions. Moreover, these disorders present with a similar pattern of abnormal brain connectivity of long-range underconnectivity and short-range overconnectivity.[1] As a consequence, it was suggested that these disorders may be subsets in what could be termed an abnormal connectivity spectrum disorder (ACSD).

It has also been hypothesized that the etiological basis of ACSDs is plausibly related to neuronal insult (eg,

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