Egypt J Pediatr Allergy Immunol 2007; 5(1): 21-30.

Original article

Antineuronal antibodies in autistic children: relation to blood mercury

Background: *It was recently suggested that autism, a severe neurodevelopmental disorder, may involve an autoimmune pathogenesis. Mercury (Hg) is a potential risk factor for autoimmunity in autistic children.*
Objective: *We sought to investigate the expression of antineuronal antibodies, as an index of autoimmunity to brain, in autistic children. The potential relationship between blood mercury and these antibodies was also investigated.*
Methods: *Forty autistic children (20 with mild to moderate and 20 with severe disease) were studied in comparison to 40 healthy children. After complete clinical and neuropsychiatric evaluation, serum antineuronal antibodies and blood Hg levels were estimated.*
Results: *Autistic children had significantly higher seropositivity for antineuronal antibodies (67.5%) than healthy controls (5%). Similarly, the former group had significantly higher blood Hg levels than the latter ($p<0.0001$). Seropositivity of antineuronal antibodies had a significant positive association with elevated blood Hg, which was found in 70% of autistic children, ($p<0.0001$). In addition, the two markers were positively associated with some parameters such as the family history of autoimmunity, autistic severity and some important clinical manifestations of autism (mental retardation, behavioral abnormalities and autistic regression) as well as EEG abnormalities.*
Conclusion: *Autism may be, in part, one of the pediatric autoimmune neuropsychiatric disorders. Such autoimmunity may be triggered by environmental Hg exposure. Further studies are warranted to enforce these concepts. If these assumptions could be proved, routine assessment of serum antineuronal antibodies and blood mercury in autistic children would be mandatory. Studies assessing the role of immunotherapy and Hg chelators as new therapeutic modalities for autism are also recommended.*

Keywords: Antineuronal antibodies; autism; autoimmunity; children; heavy metals; EEG; mercury.

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INTRODUCTION

Autism is a severe neurodevelopmental disorder characterized by impaired communication, social interaction and imagination that is often accompanied by repetitive and stereotyped behavior[1]. It develops before the 36 month of age and persists into adulthood causing life long disability[2]. The prevalence of autism has surged in recent years[3]. The etiology and pathogenesis of autism is not well understood[4]. In view of the possible multifactorial cause, autism can occur as a result of environmental neurotoxicant mercury (Hg) exposure in presence of genetic predisposition[5].

Several sources of toxic Hg exposure in children have been reported in literature: (1) ethyl mercury, which has been the subject of recent scientific inquiry in relation to the controversial pediatric vaccine preservative thimerosal; (2) methyl mercury, is most commonly the result of consumption of contaminated food, particularly fish; (3) inorganic Hg, through the use of topical Hg-based skin creams and in infant teething powders; (4) metalic Hg in dental amalgams, which release Hg vapors[6]. In 2006, Palmer and associates[7] reported that for each 1.000 Ib of environmentally released Hg, there was a 61% increase in the rate of autism. Thus, a logic step is to identify the source of Hg exposure in the child population and consider prevention and control of environmental pollution[5]. Recently, thimerosal was removed from the vaccines in USA, but it is still present in developing countries[8]. However, the issue of the risk of vaccination remains a philosophical one, since to date, the advantage of this policy have not been refuted, while the risk for autoimmune disease has