European Journal of Paediatric Neurology
In Press, Corrected Proof - Note to users
doi:10.1016/j.ejpn.2011.08.004 | How to Cite or Link Using DOI
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Original article
A potential pathogenic role of oxalate in autism

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Received 21 February 2011; Accepted 21 August 2011. Available online 10 September 2011.

Abstract

Background

Although autistic spectrum disorders (ASD) are a strongly genetic condition certain metabolic disturbances may contribute to clinical features. Metabolism of oxalate in children with ASD has not yet been studied.

Aim

The objective was to determine oxalate levels in plasma and urine in autistic children in relation to other urinary parameters.

Method

In this cross-sectional study, plasma oxalate (using enzymatic method with oxalate oxidase) and spontaneous urinary calcium oxalate (CaOx) crystallization (based on the Bonn-Risk-Index, BRI) were determined in 36 children and adolescents with ASD (26 boys, 10 girls) aged 2–18 years and compared with 60 healthy non-autistic children matched by age, gender and anthropometric traits.

Results

Children with ASD demonstrated 3-fold greater plasma oxalate levels [5.60 (5th–95th percentile: 3.47–7.51)] compared with reference [(1.84 (5th–95th percentile: 0.50–4.70) μmol/L ($p < 0.05$)] and 2.5-fold greater urinary oxalate concentrations ($p < 0.05$). No differences between the two groups were found in urinary pH, citraturia, calciuria or adjusted CaOx crystallization rates based on BRI. Despite significant hyperoxaluria no evidence of kidney stone disease or lithogenic risk was observed in these individuals.

Conclusions

Hyperoxalemia and hyperoxaluria may be involved in the pathogenesis of ASD in children. Whether this is a result of impaired renal excretion or an extensive intestinal absorption, or both, or whether Ox may cross the blood brain barrier and disturb CNS function in the autistic children

remains unclear. This appears to be the first report of plasma and urinary oxalate in childhood autism.

Keywords: Childhood autism; Autism spectrum disorders; Hyperoxalemia; Oxalate

Abbreviations: ASD, Autistic spectrum disorders; Ox, oxalate; CaOx, calcium oxalate; BRI, Bonn-Risk-Index