

Abstract

Neurology. 2003 Jan 14;60(1):100-7.

Regional brain chemical alterations in young children with autism spectrum disorder.

Friedman SD, Shaw DW, Artru AA, Richards TL, Gardner J, Dawson G, Posse S, Dager SR.

Department of Radiology, University of Washington School of Medicine, Seattle 98105-6099, USA.

OBJECTIVE: The authors evaluated regional brain chemistry for evidence of increased neuronal packing density in autism.

METHODS: Forty-five 3- to 4-year-old children with autism spectrum disorder (ASD), 13 children with typical development (TD), and 15 children with delayed development (DD) were studied using dual-echo proton echoplanar spectroscopic imaging (32 x 32 matrix-1 cm(3) voxels) to measure brain chemical concentrations and relaxation times. Chemical quantification was corrected for tissue partial volume and relative measures of chemical relaxation (T(2r)) were calculated from the paired echoes. Measures from averaged and individual regions were compared using analysis of variance corrected for multiple comparisons.

RESULTS: ASD subjects demonstrated reduced N-acetylaspartate (NAA) (-10%), creatine (Cre) (-8%), and myo-inositol (-13%) concentrations compared to TD controls and prolonged NAA T(2r) relative to TD (7%) and DD (9%) groups. Compared to DD subjects, children with ASD also demonstrated prolonged T(2r) for choline (10%) and Cre (9%). Regional analyses demonstrated subtle patterns of chemical alterations in ASD compared to the TD and DD groups.

CONCLUSIONS: Brain chemical abnormalities are present in ASD at 3 to 4 years of age. However, the direction and widespread distribution of these abnormalities do not support hypothesis of diffuse increased neuronal packing density in ASD.

PMID: 12525726

