

UNUSUAL BRAIN GROWTH PATTERNS IN EARLY LIFE IN PATIENTS WITH AUTISTIC DISORDER: AN MRI STUDY

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Neurology 2001;57:245-254

Objective: To quantify developmental abnormalities in cerebral and cerebellar volume in autism. *Methods:* The authors studied 60 autistic and 52 normal boys (age, 2 to 16 years) using MRI. Thirty autistic boys were diagnosed and scanned when 5 years or older. The other 30 were scanned when 2 through 4 years of age and then diagnosed with autism at least 2.5 years later, at an age when the diagnosis of autism is more reliable. *Results:* Neonatal head circumferences from clinical records were available for 14 of 15 autistic 2- to 5-year-olds and, on average, were normal (35.1 ± 1.3 cm versus clinical norms: 34.6 ± 1.6 cm), indicative of normal overall brain volume at birth; one measure was above the 95th percentile. By ages 2 to 4 years, 90% of autistic boys had a brain volume larger than normal average, and 37% met criteria for developmental macrocephaly. Autistic 2- to 3-year-olds had more cerebral (18%) and cerebellar (39%) white matter, and more cerebral cortical gray matter (12%) than normal, whereas older autistic children and adolescents did not have such enlarged gray and white matter volumes. In the cerebellum, autistic boys had less gray matter, smaller ratio of gray to white matter, and smaller vermis lobules VI-VII than normal controls. *Conclusions:* Abnormal regulation of brain growth in autism results in early overgrowth followed by abnormally slowed growth. Hyperplasia was present in cerebral gray matter and cerebral and cerebellar white matter in early life in patients with autism.

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Comment from Jonathan W. Mink, MD, PhD, FAAN, Associate Editor: This is a large comprehensive study of brain development in autism using volumetric MRI. The finding of different patterns of brain growth at different developmental stages was an important contribution to the understanding of autism as a neurodevelopmental disorder.

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Neurology 2011;76;2111

DOI 10.1212/01.wnl.0000399191.79091.28

This information is current as of June 13, 2011

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