Autism, a prenatal disorder
Autism is a prenatal disorder: Evidence from late gestation brain overgrowth

Abstract

This retrospective study aimed to specify the critical period for atypical brain development in individuals with autism spectrum disorder (ASD) using prenatal and postnatal head growth parameters. The sample consisted of 80 Caucasian, unrelated, idiopathic patients with ASD born after 1995. Fetal ultrasound parameters (head circumference [HC], abdominal circumference, and femur length) were obtained during the second and third trimesters of gestation. HC at birth and postnatal parameters at 12 and 24 months of age were also collected. Head overgrowth, assessed by HC, was highlighted during the second (20-26 weeks of amenorrhea) and third (28-36 weeks of amenorrhea) trimesters. Normal growth of body fetal parameters indicated that head overgrowth was not because of overall body overgrowth. Moreover, postnatal results replicated previously and reported head overgrowth. A critical time window for atypical
brain development in autism is hypothesized to begin from the 22nd week of amenorrhea. This period is critical for cortical lamination and glial activation. A pathophysiological cascade is suggested with interactions between candidate genes and environmental factors. Autism Research 2018, 11: 1635-1642. © 2018 International Society for Autism Research, Wiley Periodicals, Inc. LAY SUMMARY: It is now widely acknowledged in the scientific community, that autism is a neurodevelopmental disorder. Recent evidence from animal and pathological studies has implicated the in utero period. However, the precise time of onset of abnormal brain development remains unknown. This retrospective study reports novel findings, identifying an atypical head growth trajectory in children with autism, during the in utero period (after the 22nd week of amenorrhea). In the same children, postnatal head overgrowth was also observed. Late gestation is identified as a critical period for atypical brain development underlying autism symptoms.

**Keywords**

Brain growth; head circumference; neurodevelopmental disorder; ultrasound.

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