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ATTENTION DEFICIT HYPERACTIVITY DISORDER

TIMING OF STIMULANT TREATMENT FOR ADHD AND EFFECT ON ACADEMIC PROGRESS

Investigators at University of Iceland, Reykjavik, and other centers in Iceland and in USA studied the probability of academic decline (drop of >5.0 percentile points) in ADHD children according to drug exposure and timing of treatment start between National Scholastic Examinations. Medications recorded for each person with ADHD in the Icelandic Medicines Registry included amphetamine, methylphenidate, and atomoxetine; the majority (96%) were treated with methylphenidate in extended-release formulation. Of 13,617 children registered in the Icelandic school system, 11,872 took standardized tests, and 1029 (8%) were treated with ADHD drugs at any time during the study period. Medicated children scored lower on their fourth-grade tests (taken before their start of treatment) than the nonmedicated general population. Those children starting treatment between their fourth (age 9) and seventh-grade (age 12) tests were more likely to decline in test performance, in contrast with nonmedicated children. The mean decline was 9.4 percentile points in mathematics for those with delayed treatment initiation. The probability of academic decline was 72.9% in mathematics and 42.9% in language arts for children who started treatment 25 to 36 months after the fourth-grade test. Compared to those starting treatment earlier (<12 months after tests) the risk ratio (RR) for decline was 1.7 (1.2-2.4) in mathematics and 1.1 (0.7-1.8) in language arts. The adjusted RR of mathematics decline with later treatment was higher among girls (RR 2.7; [1.2-6.0]) than boys (RR 1.4 [0.9-2.0]). (Zoega H, Rothman KJ, Huybrechts KF, et al. A population-based study of stimulant drug treatment of ADHD and academic progress in children. *Pediatrics* 2012 Jul;130(1):e53-62). (Respond: Helga Zoega PhD, Institute for Translational Epidemiology, Mount Sinai School of Medicine, One Gustave L Levy Place, Box 1057, New York, NY 10029. E-mail: Helga.zoega@mssm.edu).

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COMMENT. ADHD is generally associated with relatively impaired academic outcome (Molina BS et al. *J Am Acad Child Adolesc Psychiatry* 2009 May;48(5):484-500). The above study shows that when initiation of drug treatment is delayed, the academic performance generally declines with time, especially in mathematics. Earlier treatment of ADHD between ages of 9 and 12 years is associated with a lower risk of a decline in academic performance, particularly in mathematics. Girls benefit more than boys by early treatment but only in mathematics. Boys show marginal benefits in both mathematics and language arts when ADHD is treated early.

Limitations of this study, some discussed by the authors, include lack of information regarding type and severity of ADHD diagnosis, comorbid learning or psychiatric disorders, and concurrent behavioral or educational school services. Academic outcome is difficult to predict since ADHD is a heterogeneous syndrome with both hereditary and environmental factors in etiology. A favorable outcome is less likely in children with a low average or borderline IQ, global perceptual deficits, learning disability, inadequate academic accommodations (eg IEP, individual education plan), unstructured or dysfunctional home environment, and dietary inadequacy. (Millichap JG, Yee MM. The diet factor in ADHD. *Pediatrics* Feb;129(2):330-7).

GABA-ERGIC DEFICIT IN ADHD

Neuroradiologists from the Johns Hopkins University School of Medicine investigated the GABAergic component of ADHD using magnetic resonance spectroscopy to measure GABA concentration in somatosensory and motor cortices. Children (age range, 8-12 years) in a control group (n=19) were compared with an ADHD group of 13 children (11 boys and 2 girls) with a mean age of 10.2 years (range, 8.2-12.5 years). Children with IQ scores below 80 were excluded. Seven of 13 children with ADHD had received stimulant medication up to a day before the testing. In both medicated and unmedicated children, GABA concentration was reduced in children with ADHD compared with controls. This finding is concordant with known deficits in intracortical inhibition in ADHD and suggests a GABAergic deficit in ADHD. (Edden RAE, Crocetti D, Zhu H, Gilbert DL, Mostofsky SH. Reduced GABA concentration in attention-deficit/hyperactivity disorder. *Arch Gen Psychiatry* 2012 Jul 1;69(7):750-3). (Respond: Richard AE Edden PhD, Division of Neuroradiology, Johns Hopkins University School of Medicine, Baltimore, MD. E-mail: rae2@jhu.edu).

COMMENT. Deficit in behavioral inhibition is considered a basis for the symptoms of ADHD (Barkley RA. Behavioral inhibition, sustained attention, and executive functions: constructing a unifying theory of ADHD. *Psychol Bull* 1997 Jan;121(1):65-94). Reduced GABA concentration in the cortex of both medicated and unmedicated children with ADHD is considered strong evidence for a GABAergic deficit in ADHD. Also, see GABA-ergic dysfunction in Tourette syndrome (*Pediatr Neurol Briefs* 2012 July;26(7):54).