

MRI CAUDATE AND CINGULATE VOLUMETRIC CHANGES RELATED TO ADHD TREATMENT

Caudate and anterior cingulate cortex (ACC) volumes, measured by structural MRI, were compared in children with ADHD, previously treated and untreated, and controls, in a study at the University of Texas, San Antonio and Austin; and researchers from the UK and Canada. Caudates were smaller bilaterally in both ADHD groups compared to controls. The right ACC was significantly smaller in the ADHD-treatment naïve (-TN) group compared to the ADHD-treated and control groups. In contrast, the left ACC showed no significant difference in size among the 3 groups; however, it was smaller in the ADHD-TN group compared to controls ($p=0.07$). Smaller left caudate volume was associated with more restlessness/impulsivity on the parent Conners scale for ADHD groups. Smaller caudates bilaterally were found in children with ADHD, and smaller caudates were associated with inattention on the Behavior Assessment Parent scale. Volume of ACC was not related to attention scores. (Pliszka SR, Lancaster J, Liotti M, Semrud-Clikeman M. Volumetric MRI differences in treatment-naïve vs chronically treated children with ADHD. *Neurology* (September 2 of 2) 2006;67:1023-1027). (Reprints: Dr Margaret Semrud-Clikeman, University Station, D 5800, University of Texas, Austin, TX 78712).

COMMENT. Caudate and anterior cingulate volumes are different in children with ADHD-combined type compared to controls. Parent-rated behavioral measures of attention and response inhibition are correlated with caudate, but not cingulate, size in ADHD patients. Restless/impulsive behavior is correlated with a smaller left caudate, whereas inattentiveness is associated with bilateral caudate volume reduction. A small right cingulate is a feature of untreated ADHD children compared to those treated and normal controls, whereas the left cingulate shows no significant difference in ADHD patients, treated or untreated, and controls. Long-term stimulant therapy for ADHD may be expected to normalize ACC volume.

EFFECTS OF OROS-MPH VERSUS DL-AMPHETAMINE-XR ON DRIVING PERFORMANCE OF ADHD ADOLESCENTS

Driving performance of 35 adolescent ADHD patients (19 boys/16 girls; mean age 17.8 years) on a driving simulator was compared while taking OROS methylphenidate (Concerta, 72 mg), mixed dl-amphetamine salts (Adderall XR, 30 mg), or placebo in a randomized, double-blind, crossover study at University of Virginia, Charlottesville. Both treatments led to better overall driving performance. A comparison of treatments showed that Concerta was associated with significantly better driving performance than placebo or Adderall XR, and resulted in better steering (less driving across midline and off road), better speed control (less speeding and less erratic speeds), and less impulsive driving (less inappropriate breaking and indecision at intersections and left turns). Comparing driving performance tested at 5, 8, and 11 PM, the worst performance occurred at 8.00 PM, and the best performance for both Concerta and Adderall XR was at 11.00 PM, 15 hours after taking the medication. Participants' subjective ratings were not significantly different from the

simulator scores. They were aware of improved driving on Concerta compared with placebo, but not aware of improved performance on Adderall XR compared to placebo. Improvements in driving performance on the laboratory simulator corresponded with fewer lifetime collisions. (Cox DJ, Merkel RL, Moore M et al. Relative benefits of stimulant therapy with OROS methylphenidate versus mixed amphetamine salts extended release in improving the driving performance of adolescent drivers with attention-deficit/hyperactivity disorder. **Pediatrics** September 2006;118:e704-e710). (Respond: Daniel Cox PhD, Box 800-223, University of Virginia Health System, Charlottesville, VA 22908).

COMMENT. Long acting stimulant medication in adolescent ADHD patients who drive results in improved performance and fewer collisions. Both stimulant preparations, OROS MPH (Concerta) and dl-amphetamine (Adderall)-XR, are effective. The greater improved performance with MPH versus amphetamine in this study is probably a reflection of the choice of dosage, which seems to favor Concerta. If further studies are planned, a dose optimization design should be included. It is also surprising that the best driving performance with medication in this study is at 15 hours after taking a dose, when lower blood levels of drug would be expected. The use of stimulants in adolescents with ADHD should not be limited to daytime and school hours, if patients are regular drivers. These findings confirm several previous reports showing a correlation between ADHD in adolescents and an increased rate of motor vehicle collisions, especially in untreated patients. (Barkley RA et al. **Pediatrics** 1993;92:212-218; Weiss G, Hechtman LT. *Hyperactive Children Grown Up*. New York, NY, Guilford Press, 1986; **Ped Neur Briefs** Aug 1993; Millichap JG. *Attention Deficit Hyperactivity and Learning Disorders*. Chicago, PNB Publishers, 1998;172-3). ADHD young adults are twice as likely to be cited for unlawful speeding, have more crashes, and more accidents involving bodily injury, when compared to non-ADHD adult control subjects.

SEIZURE DISORDERS

COGNITIVE DYSFUNCTION AND BRAIN VOLUME ABNORMALITIES IN NEW-ONSET IDIOPATHIC EPILEPSY

Neuropsychological function and quantitative volumetric measurement of grey and white matter of cerebrum were determined in 53 children (ages 8-18 years) with recent-onset idiopathic epilepsy and compared to controls in a study at University of Wisconsin, Madison. Children with recent-onset epilepsy have mild diffuse cognitive impairment, regardless of epilepsy syndrome. In a subset of children, academic difficulties antedated the first seizure and were present at time of diagnosis. Children with a history of academic problems at onset of epilepsy have the most impaired cognition and also, significant volumetric reductions in the left occipital and parietal lobe grey matter. In contrast, in the epilepsy group as a whole, no overall differences in magnetic resonance morphometric analyses of total cerebral or lobar volumes were recognized. (Hermann B, Jones J, Sheth R et al. Children with new-onset epilepsy: neuropsychological status and brain structure. **Brain** October 2006;129:2609-2619). (Respond: Bruce Hermann PhD, Department of Neurology, University of Wisconsin, Madison, WI 53792).