were demonstrated in reports from Johns Hopkins Hospital (Reiss AL et al, 1996). A lack of normal asymmetry of regional brain structures, and decreased volume of the prefrontal cortex, caudate nucleus, and globus pallidus on the right side were demonstrated in MRI studies of 57 boys with ADHD at the National Institutes of Health, Bethesda, MD (Castellanos FX et al, 1996). Underdevelopment of the splenium of the corpus callosum was found in an MRI study of 15 children with ADHD at the Massachusetts General Hospital, Boston (Semrud-Clikeman M et al, 1994). Further studies should include attempts to distinguish patients with subtypes of ADHD. (see Progress in Pediatric Neurology III, PNB Publishers, 1997;pp212 and 294).

ABNORMALITIES OF RHYTHMIC FINGER-TAPPING IN ADHD

A finger-tapping test requiring rhythmic responses to frequencies from 1 to 6Hz was performed in 27 children (21 males, 6 females; aged 6 to 14 years, mean 11 years) diagnosed with ADHD, and in 33 controls at the Shaare Zedeck Medical Center, Jerusalem, Israel. Patients treated with methylphenidate (n=22) received no medication on the day of the test. Simultaneous computer-generated visual and auditory stimuli were presented at different frequencies over a 7-minute session. Children with ADHD responded at a faster rate than the stimulus, unlike control subjects who tapped in tandem with the stimulus. Fifteen of 27 children with ADHD demonstrated the "hastening" phenomenon (a tendency to exceed the stimulus frequency at the higher frequencies), compared to only 2 of the 33 controls ($p<0.05$). Children demonstrating the hastening response made recurrent errors in tapping, their responses were faster than controls, and the response frequency was constant (mean 3.8Hz, range 2.8-4.7Hz) regardless of the stimulus. Age and fast tapping responses for ADHD children were correlated inversely ($p<0.05$). The hastening phenomenon was not correlated with sex or handedness. (Ben-Pazi H, Gross-Tsur V, Bergman H, Shalev RS. Abnormal rhythmic motor response in children with attention-deficit-hyperactivity disorder. Dev Med Child Neurol Nov 2003;45:743-745). (Respond: Hilla Ben-Pazi MD, Neuropediatric Unit, Shaare Zedeck Medical Center, PO 3235, Jerusalem 91031, Israel).

COMMENT. This hastened voluntary response, termed *hastening phenomenon*, is also characteristic of patients with Parkinsonism. It may reflect an abnormal oscillatory mechanism mediated by dopaminergic frontal-striatal circuits that is released by cortical inhibitory frontal lobe deficits peculiar to ADHD. The authors propose that children with ADHD can follow slow rhythmic stimuli but at higher frequencies, their voluntary motor response is deranged by a disturbed central oscillatory mechanism. Impairments of handwriting and typing skills, both rhythmic voluntary movements, are often affected in ADHD and may be amenable to therapeutic intervention. Dysgraphia is frequently responsive to methylphenidate (MPH) as an adjunct to coordination exercises. (Millichap, 1973). The effect of MPH on the hastening phenomenon would be of interest.

A dose-response study of OROS-MPH showed that increasing doses (36-54 mg) were associated with a clear dose-response relationship, with improvements in 66-75% of ADHD-CT children. Parent ratings were more sensitive than teacher ratings. In children with ADHD-PI, improvements in attention occurred at lower doses, and less benefit was derived from higher doses. In both ADHD subtypes, higher doses were associated with

increased insomnia and decreased appetite. (Stein MA et al. Pediatrics Dec 2003;112:1173-4). Biederman J reports that 54 mg of OROS-MPH (Concerta) is equivalent to 20 mg Adderall XR (Today's Therapeutic Trends 2002;20:311-328).

NEONATAL DISORDERS

CHORIOAMNIONITIS: A RISK FACTOR FOR CEREBRAL PALSY

The association between clinical chorioamnionitis and increased risk of cerebral palsy (CP) in term and near-term infants was determined in 109 children with CP not due to postnatal brain injury or developmental abnormalities compared to 218 controls, in a study at University of California, San Francisco, and Kaiser Permanente Division of Research, Oakland, CA. CP was a hemiparesis in 40% and quadriparesis in 38%. Neuroimaging had been obtained in 83%; focal infarct, white matter abnormalities, hypoxic-ischemic injury, and atrophy were the most common findings. Chorioamnionitis or endometritis had been diagnosed clinically in 14% of cases compared to 4% of controls (OR 3.8, CI 1.5-10.1; p=0.001). Independent risk factors for CP in addition to chorioamnionitis included maternal fever, prolonged rupture of membranes, intrauterine growth restriction, maternal black ethnicity, maternal age older than 25 years, and nulliparity. Other factors strongly associated with CP were a 5-minute Apgar score <7, birth asphyxia, and neonatal seizures. The population-attributable fraction of chorioamnionitis for CP is 11%, and for spastic quadriplegic CP, 27%. (Wu YW, Escobar GJ, Grether JK, et al. Chorioamnionitis and cerebral palsy in term and near-term infants. JAMA November 26, 2003;290:2677-2684). (Reprints: Yvonne W Wu MD, MPH, Division of Child Neurology, Box 0136, University of California, San Francisco, 500 Parnassus Ave, MUE #411, San Francisco, CA 94143).

COMMENT. Clinical chorioamnionitis is independently associated with a 4-fold increased risk of CP in term infants. Chorioamnionitis may initiate or exacerbate brain injury from hypoxia-ischemia by leading to an elevation of inflammatory cytokines in the fetus. Prevention of perinatal inflammatory disorders may lower the incidence of CP in term infants.

VEIN OF GALEN MALFORMATION: OUTCOME AFTER EMBOLIZATION

The neurodevelopmental outcome after endovascular treatment of vein of Galen malformation (VOGM) in 27 patients seen between 1983 and 2002 was assessed by chart review and parental questionnaires at the University of California, San Francisco. The presentation with congestive heart failure (CHF; 16/27) or hydrocephalus (8/27) was prenatal (diagnosed by ultrasound) in 5, neonatal in 16, and post-neonatal in 6. Patients with CHF presented either prenatally or neonatally, 4 died acutely, 6 were significantly delayed, and 6 had no or minor developmental delay. Of 5 presenting perinatally without CHF, all survived, 2 were significantly delayed, and 3 had no delay. Of 6 presenting after the neonatal period, all survived and only 1 was delayed. Those with choroidal VOGM by