

# PEDIATRIC NEUROLOGY BRIEFS

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J. GORDON MILLICHAP, M.D., F.R.C.P., EDITOR

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### NEONATAL DISORDERS

#### CHORIOAMNIONITIS AND EARLY BRAIN DEVELOPMENT

The association of chorioamnionitis and early postnatal risk factors for white matter injury (WMI) and its effect on early brain development were determined in a study at University of British Columbia, Vancouver, Canada. Thirty-one (34%) of 92 preterm newborns (24-32 weeks gestation), studied at a median age of 31.9 weeks and again at 40.3 weeks gestation, were exposed to histopathological chorioamnionitis, and 26 (28%) had WMI. Chorioamnionitis was not associated with an increased risk of noncystic WMI ( $p=0.6$ ) on MR imaging, and did not affect brain development ( $p>0.1$ ) in early life or at term-equivalent age. Culture positive postnatal infections (*Staphylococcus* species) and hypotension requiring therapy were significant risk factors for WMI ( $p=0.03$ ). WMI was associated with lower metabolic (N-acetylaspartate/choline) ( $p=0.009$ ), and lower microstructural (WM fractional anisotropy) ( $p=0.01$ ) development. Neonatal outcomes were similar in newborns with and without chorioamnionitis, but newborns with WMI were neurologically more impaired than those without. (Chau V, Poskitt KJ, McFadden DE, et al. Effect of chorioamnionitis on brain development and injury in premature newborns. *Ann Neurol* Aug 2009;66:155-164). (Respond: Dr SP Miller, British Columbia Children's Hospital, Department of Pediatrics/Division of Neurology, University of British Columbia, K3-180, 4480 Oak St, Vancouver, BC, V6H 3V4, Canada. E-mail: [smiller6@cw.bc.ca](mailto:smiller6@cw.bc.ca)).

COMMENT. Postnatal infections, especially staphylococcal, and hypotension are associated with white matter injury (WMI) in the premature infant, and WMI affects early brain metabolism and development. In contrast to some reports, the above study shows that histopathological chorioamnionitis is not associated with increased risk of WMI or

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abnormalities of brain development. Focal or multifocal noncystic WMI is the most prevalent pattern of brain injury in premature newborns (Hamrick SE et al. 2004, cited by authors).

A previous meta-analysis report from UCSF demonstrates that chorioamnionitis is a risk factor for cerebral palsy and/or cystic periventricular leukomalacia in the term and preterm neonate. (Wu YW, Colford JM Jr. *JAMA* 2000;284:1417-1424). Studies evaluating risk of cerebral palsy following maternal fever or infection were not included in the meta-analysis, a factor possibly accounting for the different conclusion vs the Canadian study.

In an editorial, Linda de Vries (Wilhelmina Children's Hospital, Utrecht, the Netherlands) expands on measurement of cytokines in newborns with WMI, and the finding that chorioamnionitis with or without funisitis makes a very low birth weight infant more susceptible to hypotension at time of birth. (*Ann Neurol* 2009;66:127-129).

## **EARLY EEG FINDINGS AND HI-ENCEPHALOPATHY OUTCOMES**

The value of the EEG as a predictor of outcome in term infants with hypoxic-ischemic encephalopathy (HIE) was determined in a study at Cork University Maternity Hospital and St Vincent's University Hospital, Dublin, Ireland. Continuous video-EEG was recorded from <6 hours to 72 hours after delivery. One-hour EEG segments at 6, 12, 24, and 48 hours of age were analyzed visually, and neurologic outcome was assessed at 24 months. Of 44 infants who completed follow-up, 20 (45%) had abnormal neurodevelopmental outcomes. Clinical Sarnat scoring at 24 hours classified 18 infants with grade I HIE, 17 with grade II, and 9, grade III. EEG abnormalities were greatest on the earliest recordings of all cases and improved with time. Best predictive ability occurred at 6 hours of age. Normal/mildly abnormal EEG at 6, 12, or 24 hours had 100% positive predictive values for normal outcome, and negative predictive values of 67% to 76%. At 24 hours, the number of infants assigned to each EEG grade was 6 normal, 11 moderately abnormal, 9 severe, and 3 isoelectric. Background amplitude of <30 mcV, interburst interval of >30 sec, electrographic seizures, and absence of sleep-wake cycling at 48 hours were associated with abnormal outcome. Normal EEG within 6 hours after birth was associated with normal neurodevelopment at 24 months. (Murray DM, Boylan GB, Ryan CA, Connolly S. Early EEG findings in hypoxic-ischemic encephalopathy predict outcomes at 2 years. *Pediatrics* Oct 2009;124:e459-e467). (Respond: Deidre M Murray MD PhD, Department of Pediatrics and Child Health, Clinical Investigation Unit, Cork University Hospital, Wilton, Cork, Ireland. E-mail: [d.murray@ucc.ie](mailto:d.murray@ucc.ie)).

COMMENT. Early EEG is a reliable predictor of neurodevelopmental outcome in term infants with HIE. EEG abnormalities evolving in the first 48 hours of life predict a poor outcome, and normal EEG at 6 hours of age is predictive of a normal outcome at 2 years. Early EEG study at 6 to 12 hours and repeat study at 48 hours should predict outcomes successfully in 95% of cases. EEG seizures detected by continuous monitoring correlate with poor outcome.

**Neonatal EEG in periventricular leukomalacia (PVL).** In a study at Anjo Kosei Hospital and other centers in Japan, EEG findings varied with the severity of PVL (noncystic, localized cystic, and extensive cystic) and the timing of recording. To detect PVL, >2 EEG recordings are recommended, 1 within 48 hours after birth for acute stage abnormalities, and