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PRE- AND PERINATAL DISORDERS

OUTCOME PREDICTION OF NEONATAL HYPOXIC-ISCHEMIC ENCEPHALOPATHY

Data for 205 neonates from the multicenter National Institute of Child Health trial of hypothermia in hypoxic-ischemic encephalopathy (HIE) were analyzed by using clinical and laboratory variables obtained in the NICUs within 6 hours of birth, with death or moderate/severe disability at 18-22 months or death as the outcomes. For death/disability as the outcome, the scoring variables in order of highest odds ratios were decerebrate posture, base deficit of >22 mmol/L, 5 min Apgar of <4 , absence of spontaneous activity, and absence of maternal hypertension. For death, the most influential variables were base deficit of >22 mmol/L, decerebrate posture, absence of suck reflex, and absence of antepartum hemorrhage. Prediction rates for death/disability and death were 78% and 71%, respectively, using scoring systems; 80% and 77% by classification and regression tree analysis (CART model); and 67% and 73% by early neurologic examination. Correct classification rates were similar in hypothermia and control groups. The highest predictive variables on the CART decision tree were a cord pH of <6.70 for death/morbidity and a base deficit of >24.5 mmol/L, for death as outcome. CART model was superior to early neurologic examination in predicting death/disability, while the 3 models were comparable in predicting death. (Ambalavanan N, Carlo, WA, Shankaran S, et al. Predicting outcomes of neonates diagnosed with hypoxic-ischemic encephalopathy. *Pediatrics* Nov 2006;118:2084-2093). (Respond: N Ambalavanan MD, University of Alabama, 525 New Hillman Bldg, 619 South 20th St, Birmingham, AL 35249).

COMMENT. These scoring systems and CART models classified correctly $>75\%$ of infants with severe HIE, with respect to death and death or disability. They were equal to or

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better than early neurologic examination in predicting outcome. Score ranges of infants with HIE most likely to benefit from hypothermia were identified, but scores were not considered high enough to exclude hypothermia and not suitable for clinical practice. If validated, the models could prove useful in future clinical trials of hypothermia. The authors found them suitable for risk stratification or assessment of prognosis but not as a basis for withdrawal of support.

Cognitive impairment without cerebral palsy as sequel to perinatal asphyxia. Survivors of overt neonatal encephalopathy are at risk of developing cognitive deficits, even in the absence of functional motor deficits, according to a review of the literature (Gonzalez FF, Miller SP. **Arch Dis Childhood (Fetal and Neonatal Edition)** Nov 2006;91:F454-F459). The cognitive deficits occur in survivors of moderate and severe neonatal encephalopathy, and especially in those with a watershed pattern of injury, involving cortex and white matter in posterior intervascular boundary regions. Advanced MR brain imaging is used to correlate the location and severity of lesions with neurodevelopmental outcome. Whereas cerebral watershed lesions are associated with cognitive impairment without motor deficits, basal ganglia-thalamus injury correlates with severely impaired motor and cognitive outcomes. Cognitive deficits include delays in reading, spelling and arithmetic, and an increased risk of attention deficit hyperactivity disorder.

EEG artifacts, derived from electrical or movement interference, influence the voltage and width of the amplitude-integrated EEG (aEEG) band, when used as a continuous recording at the bedside in the NICU (Hagmann CF et al. **Pediatrics** Dec 2006;118:2552-2554). aEEG is used as a screening tool for selection of infants with neonatal encephalopathy for trials of mild hypothermia. Prediction of neurodevelopmental outcome is possible at 3 to 6 hours after birth and up to 3 days after admission. (Shah DK et al. **Pediatrics** 2006;118:47-55; **Ped Neur Briefs** Aug 2006;20:58). The artifacts may lead to erroneous classification of the aEEG trace.

Caffeine may protect prematures from perinatal white matter injury, according to studies in mice reared in hypoxia from postnatal days 3 through 12 (Back SA et al. **Ann Neurol** Oct 2006;Published Online). Myelination was enhanced and ventriculomegaly reduced in caffeine treated pups. Caffeine is a nonselective adenosine antagonist used to stimulate respiration in premature infants.

ABNORMAL ORBITOFRONTAL GYRI DUE TO PREMATURITY

The depth and volume of the primary olfactory sulcus and secondary orbital sulci in a sample of 22 adolescents with history of very-preterm birth (VPTB), compared to control subjects born at term, were measured, using MRI Anatomist/Brain VISA 3.0.1 package, and possible reductions in gray and white matter analyzed, using voxel-based morphometry (VBM), in a study at University of Barcelona, Spain. Significant reduction was observed in the depth of the secondary orbitofrontal sulci (which begin to develop at 28 weeks' gestation) but not in the primary olfactory sulci (developed at 16 weeks' gestation) of prematurely born compared to term born subjects at adolescence. Orbital sulcal depth reductions were accompanied by reduced gray-matter volume, using VBM analysis. (Gimenez M, Junque C,