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

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NEONATAL DISORDERS

EARLY BRAIN MRI PREDICTS OUTCOME OF TERM HIE

Researchers at Hammersmith Hospital, London, UK, studied the accuracy of early brain MRI for predicting death, the presence and severity of motor impairment, and ability to walk at 2 years in 175 term infants treated for hypoxic-ischemic encephalopathy (HIE) in the period 1993 to 2007. The severity of basal ganglia-thalamic (BGT) lesions identified within 6 postnatal weeks (median 10 days; range 2-42 days) was strongly associated with the severity of motor impairment staged using the Gross Motor Function Classification System (Palisano RJ et al, 2000). Abnormal signal intensity at the posterior limb of the internal capsule predicted the inability to walk independently by 2 years. Brainstem injury was the only factor with an independent association with death. An early MRI is predictive of outcome of term newborns with HIE and BGT injury. Of 126 surviving infants, 89 (71%) had cerebral palsy, and only 9 with CP were able to walk at 2 years. Severe BGT lesions predict severe motor impairment with a sensitivity of 0.96 and specificity of 0.77. (Martinez-Biarge M, Diez-Sebastian J, Kapellou O, et al. Predicting motor outcome and death in term hypoxic-ischemic encephalopathy. **Neurology** June 14, 2011;76(24):2055-2061). (Response and reprints: Dr Francis M Cowan, Dept of Pediatrics, Hammersmith House, Hammersmith Hospital, Du Cane Rd, London W12 0HS, UK. E-mail: f.cowan@imperial.ac.uk).

COMMENT. Guillet R and Dees R, in their editorial (**Neurology** 2011;76:2048-2049), acknowledge the value of the information provided by this study but list a number of limitations: the study was retrospective; timing of MRI and follow-up assessments were not standardized; only those infants with lesions of the basal ganglia and thalamus were included; neonates who underwent therapeutic hypothermia were excluded; and

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only 33% of infants were scanned between 2 and 7 days, the optimum time for parents and caregivers to make decisions to limit treatment. In the Hammersmith hospital, the decision to withdraw intensive care was based on the history, clinical state, cranial ultrasound findings, EEG data, as well as lesions seen on the MRI scan. Brainstem injury had a similar predictive value for death in infants who died early, after withdrawal of intensive care, or later.

PREDICTIVE VALUE OF EARLY A-EEG IN HIE OUTCOME

Researchers at Wayne State University and other US Pediatric Centers examined the predictive value of the early amplitude integrated electroencephalogram (aEEG) and stage of encephalopathy among infants with hypoxic-ischemic encephalopathy (HIE) eligible for whole-body hypothermia. Neonates were enrolled prospectively if moderate or severe HIE occurred at <6 hours, and a 30-minute aEEG was obtained at <9 hours of age. The primary outcome was death or moderate/severe disability at 18 months. aEEGs were categorized as normal (n=12), discontinuous normal voltage (n=12), or abnormal, with burst suppression (n=22), continuous low voltage (n=26), or flat tracing (n=36). At 18-month follow-up, 53 infants (49%) had died or were disabled. Severe HIE and an abnormal aEEG were related to the primary outcome with univariate analysis, whereas severe HIE alone was predictive of outcome with multivariate analysis. Based on the Sarnat staging criteria at <6 hours of age, of a total of 108 infants enrolled, 71 (66%) had moderate HIE and 37 (34%) severe HIE. The positive predictive value (PPV) of severe HIE was higher than that of an abnormal aEEG, and the PPV of moderate HIE was lower than that of an abnormal aEEG. The addition of aEEG pattern to HIE stage did not add to the predictive value. An abnormal aEEG was not independently associated with death or disability. (Shankaran S, Pappas A, McDonald SA, et al. Predictive value of an early amplitude integrated electroencephalogram and neurologic examination. **Pediatrics** July 2011;128(1):e112-e120). (Respond: Seetha Shankaran MD, Children's Hospital of Michigan, 3901 Beaubien St, 4 H46, Detroit, MI 48201. E-mail: sshankar@med.wayne.edu).

COMMENT. The Sarnat staging system (1976) provides a reliable clinical measure of severity of HIE in neonates that correlates well with neurodevelopmental impairment in infancy and childhood. An objective marker of the severity of HIE would assist in the selection of HIE cases eligible for clinical therapeutic whole-body hypothermia. The above study of the predictive value of an early, short duration aEEG in the outcome of HIE failed to demonstrate a positive effect of sufficient magnitude to be used alone as a marker. The associations are not as strong as those of previous studies of early aEEG and neurologic or developmental outcome. Weaknesses of the study cited by the authors include the brevity of the recordings, central electrode placement only, absence of serial and sleep-wake cycles of aEEG, and effects of seizures and anticonvulsants on the EEG background.