

mean of 1100. Children exposed pre-natally may be spared the visual toxicity of vigabatrin. (Lawthom C, Smith PEM, Wild JM. In utero exposure to vigabatrin: no indication of visual field loss. **Epilepsia** Feb 2009;50:318-321). (Respond: Dr John Wild, Cardiff School of Optometry and Vision Sciences, Cardiff University, Maindy Road, Cardiff CF24 4LU, Wales, UK. E-mail: wildjm@cardiff.ac.uk).

COMMENT. Vigabatrin-induced visual field loss manifests as a bilateral concentric constriction. It occurs in 30% of patients treated, and the incidence increases with duration and extent of exposure to the drug. Visual field perimetry examination is unsatisfactory under 9 years of age, but attenuation of the retinal nerve fiber layer thickness, estimated by optical coherence tomography, is a sensitive and specific test for vigabatrin toxicity.(Wild et al, 2006) Unlike the temporal quadrant atrophy seen in optic neuritis, vigabatrin toxicity is characterized by nasal quadrant constriction while the temporal quadrant is spared. Children exposed to vigabatrin by placental transfer only, in a dose 10 times that given to infants with infantile spasms, appear to be spared the visual field defect. Infants exposed after 6 months of age are 2.5 times more likely to show vigabatrin toxicity compared with those exposed before 6 months of age (Westall et al, 2007; cited by Lawthom et al).

Vigabatrin-induced visual field loss and age of exposure. Visual fields of 16 children treated with vigabatrin for infantile spasms were examined by Goldmann kinetic perimetry at age 6-12 years, in a study at Helsinki University Central Hospital, Finland (Gaily E et al. **Epilepsia** Feb 2009;50:206-216). Vigabatrin was started at a mean of 7.6 (range, 3.2-20.3) months. Mean duration of therapy was 21 months. Visual fields were normal in 15 children; a mild visual field loss occurred in one child who was treated with vigabatrin for 19 months. Children treated in infancy are less susceptible to vigabatrin-induced visual field loss than patients treated at a later age.

SEIZURE-INDUCED BRAIN DAMAGE IN THE NEONATE

The pathophysiology of neonatal seizures, and evidence for seizure-induced brain damage are reviewed by researchers from Montreal Children's Hospital, and Universite de Montreal, Quebec, Canada. Electrographically documented seizures with or without clinical manifestations are the most accurate concept of neonatal seizures. Incidence is 1.5-3.5 per 1000 live births, varying with risk factors such as low birth weight, prematurity, perinatal complications, and NICU availability. Etiology is the major determinant of outcome, but the seizure itself may be a factor. In animal models, neonatal seizures impair cognition, alter behavior, increase anxiety, and are associated with epileptogenesis. Clinically, the reported prevalence of epilepsy and abnormal neurodevelopment after neonatal seizures varies, ranging from 6.5% to 56% for epilepsy and from 19% to 67% for neurological abnormalities. Electrographic neonatal seizures, with or without clinical manifestations, correlate with increased morbidity and mortality. Risk factors for epilepsy include diffuse abnormalities on cranial imaging (more than focal), prolonged use of anticonvulsants, poor response of neonatal seizures to phenobarbital, abnormal EEG background, and acquired CNS infections. The efficacy of both phenobarbital and phenytoin in neonatal seizures is 50%, and no randomized controlled trial is reported to show improvement in neurodevelopmental outcome or prevention of epilepsy. Controlled trials of newer anticonvulsants and neuroprotective

agents are needed. (Thibeault-Eybalin M-P, Lortie A, Carmant L. Neonatal seizures: Do they damage the brain? **Pediatr Neurol** March 2009;40:175-180). (Respond: Dr Carmant, Epilepsy Clinic, Hospitalier Universitaire Sainte-Justine, 3175 Cote-Sainte-Catherine, Montreal, Quebec H3T 1C5, Canada. E-mail: lionel.carmant@umontreal.ca).

COMMENT. Although the experimental evidence from animal studies suggests that neonatal seizures can damage the developing brain, clinical reports are less convincing. Nonetheless, given the potential for seizure-induced brain damage, early and more effective treatment of neonatal seizures, including electrographic seizures, is generally advocated.

A study at Boston Children's Hospital on etiology and outcome of neonatal seizures found that global cerebral hypoxic-ischemia is the most frequent cause of neonatal seizures and a strong predictor of poor long-term outcome. (Tekgul H et al. **Pediatrics** 2006;117:1270-1280; **Ped Neur Briefs** April 2006;20:29-30). An abnormal neurologic examination in the neonatal period was an unreliable predictor of outcome.

Perilesional brain oedema and seizure activity: cause or effect? In response to a publication concerning seizures with calcified neurocysticercosis (Nash TE et al. **Lancet Neurol** 2008;7:1099-1105), Das A et al. question the proposed causative correlation of epileptogenesis and perilesional edema as an inflammatory response to calcified granulomas (**Lancet Neurol** 2009;8:225-226). Das et al agree that calcified lesions are seizure-causing foci but attribute the perilesional edema to the effect of the seizure per se. Reversible perictal MRI abnormalities are known to develop immediately after a seizure and may resolve within a few days or weeks. Their precise pathogenesis is unknown.

Hippocampal swelling demonstrated by MRI within 48 hours of a prolonged febrile seizure is transitory and thought to be caused by vasogenic edema. The swelling resolves within 5 days and the shrinkage of the hippocampus that follows at 4-8 months is thought to represent a preexisting developmental hippocampal abnormality that predisposes to the prolonged FS (Scott RC et al. **Epilepsia** 2006;47:1493-1498). Alternatively, the hippocampal shrinkage is consistent with brain damage caused by the seizure with subsequent development of mesial temporal sclerosis and epilepsy. (See **Ped Neur Briefs** Oct 2006;20:77; and Nov 2003;17:83).

UTILITY OF AMPLITUDE-INTEGRATED EEG IN THE NICU

The problem of artifacts in using the amplitude-integrated electroencephalogram (AIE) to assess cortical function in premature infants in the NICU were studied at Weill Cornell Medical College, New York, NY. A pair of standard EEG electrodes were attached to scalp frontotemporal areas of 10 infants. Impedance was maintained at <10 kohms. Continuous AIE recordings were performed for at least 60 min repeatedly in the first month. Artifacts were identified as large amplitude difference between jagged wave peaks and troughs. When the AIE tracing spikes upward in amplitude, the accompanying raw EEG during these segments was classified as artifact. Of 1683 segments of 48 recordings analyzed, 31% were normal brain waves, 60% were artifacts, and 8% indeterminate. No clinical or electrographic seizures were noted. Artifact related to muscle activity and electrode placement detracts from the value of the AIE in assessing cortical function in