

SEIZURE DISORDERS

EPILEPSY AND HIPPOCAMPAL INJURY

The relationship between hippocampal cell loss and mossy fiber sprouting (MFS), and the occurrence of spontaneous seizures (epilepsy) following early-life status epilepticus was investigated in laboratory studies at the Division of Neurology, Children's Hospital of Philadelphia and University of Pennsylvania School of Medicine, Philadelphia, PA. Status epilepticus (SE) was induced in rat pups using lithium-pilocarpine injections on day 20 of postnatal development. The animals were examined in adulthood (>90 days postnatally) for the occurrence of spontaneous seizures and histological changes in the hippocampus. Of 18 animals monitored, 12 (67%) developed spontaneous seizures in adulthood, 45.2 +/- 9 days after induction of SE. Seizures consisted of running, facial clonus, head bobbing, and tail stiffening lasting 8 to 20 seconds. Some had generalized tonic-clonic seizures associated with handling. EEG correlates began in the hippocampus and spread to the frontal cortex. No interictal epileptiform discharges or handling-induced seizures occurred in the nonepileptic pilocarpine-treated animals. Of 9 animals with spontaneous seizures studied histologically using light microscopy and Timm's staining, only 3 (33%) had MFS and hippocampal cell loss in the dentate nucleus. Most epileptic rats and rats that did not develop spontaneous seizures showed no evidence of hippocampal structural damage. (Raol YSH, Budreck EC, Brooks-Kayal AR. Epilepsy after early-life seizures can be independent of hippocampal injury. *Ann Neurol* April 2003;53:503-511). (Respond: Dr Brooks-Kayal, Division of Neurology, Abramson Pediatric Research Center, Room 502, 3615 Civic Center Blvd, Philadelphia, PA 19104).

COMMENT. Laboratory studies in developing rats are a well-established method for the elucidation of seizures and their EEG, histological, and clinical correlates. Dr Brooks-Kayal and her associates have demonstrated that the hippocampal structural changes that follow early-life status epilepticus induced by chemical methods are not necessary prerequisites for later development of epilepsy. The extension of these studies to effects of early-life experimental febrile seizures induced by artificial fever on later development of hippocampal pathology and epilepsy would be of interest. (Millichap JG. Studies in febrile seizures. I. Height of body temperature as a measure of the febrile seizure threshold. *Pediatrics* 1959;23:76-85; *idem*. *Febrile Convulsions*. Macmillan, 1968).

Febrile convulsions, hippocampal sclerosis and temporal lobe epilepsy.

Complex febrile seizures in infancy or early childhood are antecedents of mesial temporal lobe sclerosis (TLS) and temporal lobe epilepsy (TLE) (Falconer, 1974). TLE is expected in 7.5% of patients following infantile febrile SE when followed for 5 to 21 years (Ohtsu M et al. 2002; *Ped Neur Briefs* June 2002;16:43). The association between febrile seizures and TLS is controversial. No association was found, even with prolonged febrile seizures, in a long-term follow-up study at University of Oulu, Finland (Tarkka R, et al. *Neurology* Jan (2 of 2) 2003;60:215-218). In 24 patients with prolonged FS and 32 with simple FS, MRI volumetry of amygdala and hippocampus showed no evidence of TLS.

In a study of 292 patients with temporal lobe epilepsy associated with hippocampal sclerosis (HS), 47% had a history of FC. In those with right-sided HS, FC had occurred in 59.6%, whereas in patients with left HS, a history of FC was found in 37.5% ($p=0.0002$).

FC risk factors may have an affinity to the right hemisphere. (Janszky J, Woermann FG, Barsi P et al. *Neurology* April 8, 2003;60:1209-1210).

The pathological basis of temporal lobe epilepsy (TLE) was studied in 22 children undergoing temporal lobectomy for refractory seizures at Hôpital Ste-Justine, Université de Montréal, Canada (Bocti C, Robitaille Y, Diadori P, et al. *Neurology* Jan (2 of 2) 2003;60:191-195). Significant antecedents, including complex febrile seizures, meningitis, encephalitis, and trauma, occurred in 10 (45%) patients. Mesial temporal sclerosis occurred in 12 of 15 with available hippocampal tissue, and cortical dysplasia of the temporal neocortex was found in 14 of 22 patients. These findings coexisted in 7 children. The high incidence of dual pathology may explain the early age of seizure onset.

DIAGNOSIS OF EPILEPSY FOLLOWING PAROXYSMAL EVENT

The accuracy of the initial diagnosis after one or more paroxysmal events is described as part of the Dutch Study of Epilepsy in Childhood (DSEC), a prospective hospital-based study of children with newly diagnosed possible single or multiple seizures. A panel of 3 pediatric neurologists classified events as epileptic seizures, unclear episodes, or events of definitely other origin. Children with unclear events were followed for 1 year and children with a diagnosis of seizures were followed for 2 years to assess the accuracy of the diagnosis. Single events in 224 children were classified initially as epileptic in 170(76%) and unclear in 54(24%). An epileptic diagnosis proved correct on follow-up in all 170 patients. Recurrent episodes permitted a definite epilepsy diagnosis in 4(7.4%) of the 54 children with unclear events. Multiple events in 536 children were classified initially as epilepsy in 412(77.7%), and after follow-up the diagnosis was probably incorrect in 19(4.6%). In contrast, 7(5.6%) of 124 children with multiple episodes initially diagnosed as unclear were later classified as epilepsy. A false-positive diagnosis of epilepsy was made in 4.6%, whereas a definite diagnosis of epilepsy was delayed in 5.6% of children with multiple unclear events and in 7.4% of children with a single unclear event. The sensitivity of the diagnosis of an epileptic seizure after a single paroxysmal event was 97.7% and the specificity 100%; after multiple events, the epilepsy diagnosis sensitivity was 98.3% and specificity 86%. Epileptiform abnormalities in the EEG confirm the diagnosis of epilepsy after multiple events in 90.1%, and their absence negates the diagnosis in 46.9%. (sensitivity, 70.3%; specificity, 77.2%). (Strink H, van Donselaar CA, Geerts AT et al. The accuracy of the diagnosis of paroxysmal events in children. *Neurology* 25 March 2003;60:979-982). (Reprints: Dr H Strink, Department of Neurology, St Elizabeth Hospital, PO Box 90151, 5000 LC Tilburg, the Netherlands).

COMMENT. The authors advise a conservative approach in children with paroxysmal events of uncertain nature. A false-negative diagnosis of epilepsy is considered less harmful for the patient than a false positive. It is of interest that in two events associated with teeth brushing and hair combing, despite an epileptiform EEG, a diagnosis of reflex epilepsy was rejected in favor of "hairdresser's syncope."