

## **SEIZURE DISORDERS**

### **CONCORDANCE OF MRI AND EEG FOCAL SLOWING IN NONSYNDROMIC EPILEPSY**

Investigators at the Kangwon National University, Korea, and The Epilepsy Center, Lurie Children's Hospital of Chicago, USA studied the correlation and significance of EEG focal slowing and focal MRI abnormalities in 253 children with nonsyndromic epilepsy. EEG (n=5,149) and MRI (n=22,543) reports of patients seen at the Epilepsy Center, Chicago from 2000 to 2010 were reviewed initially by a computer-programmed keyword searching technique. Patients with nonsyndromic epilepsy were manually reviewed and divided into 4 groups: 1) focal slowing and no interictal epileptiform discharge (IED)(n=34); 2) focal IEDs and no focal slowing (n=84); 3) focal slowing and focal IED (n=102); and 4) normal findings (n=33).

MRI abnormalities were found in 59%, 56%, 74%, and 27% in groups 1, 2, 3, and 4, respectively ( $p < 0.0001$ ). Of children with nonsyndromic epilepsy and focal slowing, 70% had a brain MRI abnormality, and of those with focal IEDs on the EEG, 56% had an abnormal MRI. Focal slowing was not restricted to lesions involving cortical white matter only, but was often associated with lesions in multiple layers. One third of structural MRI abnormalities were diffuse, whereas the other two thirds were associated with a focal lesion. Of children with epilepsy and no focal EEG slowing, 20% had a focal structural MRI. In groups with focal slowing (1 and 3), cortical malformation (CM) was the most common pathology. Focal slowing correlated with the laterality of the MRI lesion in 61-70% cases, and with the location in 40%. Cortical malformation was 7 times more common than tumors in children with MRI lesions. Younger children have a higher percentage of cortical malformations whereas older children have a higher proportion of atrophy and tumors. Focal slowing, in addition to focal interictal epileptiform activity, is an important and useful EEG indicator of a brain structural abnormality in children with nonsyndromic epilepsy. (Noh BH, Berg AT, Nordli DR Jr. Concordance of MRI lesions and EEG focal slowing in children with nonsyndromic epilepsy. **Epilepsia** 2013 Mar;54(3):455-60). (Response: Dr Douglas R Nordli Jr, 225 E Chicago Ave, Epilepsy Box 29, Chicago, IL 60611, USA. E-mail: [dnordli@luriechildrens.org](mailto:dnordli@luriechildrens.org)).

COMMENT. Focal slowing in the EEG should be added to the guidelines for imaging children with epilepsy as outlined by Hirtz D, Ashwal S, Berg A, et al. (**Neurology** 2000 Sep 12;55(5):616-23) and by Gaillard WD, Chiron C, Cross JH, et al. (**Epilepsia** 2009 Sep;50(9):2147-53) as cited by the authors. The recommended guidelines are then as follows: 1) when localization-related epilepsy is known or suspected; 2) if epilepsy classification is in doubt; 3) when epilepsy syndrome with remote symptomatic cause is suspected; or 4) when focal slowing is recorded in the interictal EEG. The present study and report should serve to reinstate the utility and importance of the EEG in the localization and etiology of cerebral pathology. To quote Niedermeyer F (The clinical relevance of EEG interpretation. **Clin Electroencephalogr** 2003 Jul;34(3):93-8) of Johns Hopkins University, "There is need to re-emphasize the capabilities of electroencephalography -- the idea that EEG information is limited to epileptology and 'hunting spikes' is erroneous."