# Altered brain development found in children with newly diagnosed epilepsy

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A newly published study reported that children with new/recent onset epilepsy have significantly slowed expansion of white matter volume compared to healthy children over a two year interval. The reduced white matter volume may affect brain connectivity and influence cognition. Results of this study conducted by researchers from the University of Wisconsin School of Medicine and Public Health are now available online and will appear in the July issue of *Epilepsia*, a journal published by Wiley-Blackwell on behalf of the International League Against Epilepsy.

Epilepsy, a common nervous system disorder, frequently develops in early childhood and causes recurrent seizures. Seizures can range from mild staring spells to major convulsions. According to the Epilepsy Foundation there are 326,000 children under the age of 15 with epilepsy in the U.S. More than 45,000 new cases of epilepsy are diagnosed in children each year.

A research team, led by Bruce Hermann, Ph.D., investigated the neurodevelopmental changes in brain structure in children with new or recent-onset epilepsy. Thirty-four healthy children (control group) and 38 with new/recent onset epilepsy were enrolled in the study. The epilepsy group contained 21 children with localization-related epilepsy and 17 with idiopathic generalized epilepsy. Children in both groups had a mean age of 12.9 years and underwent magnetic resonance imaging (MRI) at baseline and 2 years later.

At the 2 year follow-up, seizure frequency was evaluated. During the prior year, 53% of children with epilepsy were seizure free; 34% reported only one seizure. In the remaining children with epilepsy, 5% reported monthly, 5% weekly, and 3% daily seizures.

"Our study determined that children with new or recent-onset epilepsy exhibited an altered brain development pattern characterized by delayed age-appropriate increase in white matter volume," said Dr. Hermann. The research team found that total cerebral white matter volume increased significantly in the healthy control group over the 2-year period. However, the epilepsy group did not show significant change in white matter volume in the total cerebrum and across all lobes—the difference from normal controls being most pronounced in the frontal lobes.

Researchers suspect that the delayed white matter volume increase in children with epilepsy may affect cognitive development by reducing brain connectivity. With altered brain development, children with epilepsy may also experience impaired executive function—mental tasks such as organizing, planning, and paying attention which are commonly reported in people with epilepsy.

"Research into the symmetry between patterns of cognitive change and age-appropriate brain development remains to be addressed in childhood epilepsy," concluded Dr. Hermann. "Further exploration of how subtle neurodevelopmental alterations in brain development affect cognition is needed. Longer term follow-up is also needed to determine whether this finding represents a temporary delay in brain development versus a fixed difference."

**More information:** "Brain development in children with new onset epilepsy: A prospective controlled cohort investigation." Bruce P. Hermann, Kevin Dabbs, Tara Becker, Jana E. Jones, Adan Myers y

Gutierrez, Gary Wendt, Monica A. Koehn, Raj Sheth, and Michael Seidenberg. Epilepsia; Published Online: April 2, 2010; (DOI: 10.1111/j.1528-1167.2010.02563.x ); Print Issue Date: July 2010.