MS is more aggressive in children but slower to cause disability than in adults

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Magnetic resonance images (MRI) of patients diagnosed with multiple sclerosis in childhood show that pediatric onset multiple sclerosis is more aggressive, and causes more brain lesions, than MS diagnosed in adulthood, researchers at the University at Buffalo have reported.

Interestingly, however, patients with pediatric-onset MS -- which comprise up to 5 percent of total MS cases -- develop disabilities at a slower pace than patients with adult-onset MS, the data showed.

"Patients with pediatric-onset MS have three times as many relapses annually than patients with adult-onset disease, which suggests there is greater disease activity in this population," said Bianca Weinstock-Guttman, MD, associate professor of neurology in the UB School of Medicine and Biomedical Sciences and corresponding author.

"But surprisingly, the average time to reach the secondary progressive phase of the disease is longer in patients who develop MS in childhood than in adult onset MS," she continued. "Reaching the next stage of disability is almost 10 years longer in pediatric-onset patients."

Weinstock-Guttman directs the Pediatric Multiple Sclerosis Center of Excellence located at Women and Children's Hospital, and the William C. Baird MS Center in Buffalo General Hospital (BGH), both Kaleida Health affiliates and UB teaching hospitals.

Eluen A. Yeh, MD, UB assistant professor of neurology and co-director in the Pediatric Multiple Sclerosis Center, is first author on the study, which was published online Nov. 5 in *Brain*.

The National Multiple Sclerosis Society estimates that 8,000 to 10,000 children (defined as up to 18 years old) in the U.S. have multiple sclerosis, and another 10,000 to 15,000 have experienced at least one symptom suggestive of MS. The disease causes demyelination -- destruction of the sheath that protects and insulates nerve fibers. Breaks in the myelin sheath disrupt the flow of electrical impulses, causing loss of sensation and coordination.

The UB study involved four sets of patients:

- 17 children with an average age of 13.7 who were diagnosed with MS 2.7 years earlier
- 33 adults with an average age of 36.5 years who were diagnosed with pediatric MS 20 years earlier
- 81 adults with an average age of 40 who have had MS for an average of 2.6 years
- 300 adults with an average age of 50.5 who've had MS for 20 years

All participants underwent a brain MRI scan at facilities at BGH and at Women and Children's Hospital, while the specific MRI metric analysis was performed at the Buffalo Neuroimaging Analysis Center (BNAC), part of the UB Department of Neurology/Jacobs Neurological Institute, located in BGH. Robert Zivadinov, MD, PhD, UB associate professor of neurology, is director of the BNAC.

The MRI measured two types of brain tissue damage: T1-lesion volume, which shows "black holes," or hypointense lesions, which are areas of permanent axonal damage; and T2-lesion volume, which shows the total number of lesions (lesion load) and overall disease burden.

Both of these measures indicated that MS is more aggressive in children in the early stages, said Yeh.

"This corresponds with recent data that suggest a

higher lesion burden in pediatric MS than adult-onset MS. These findings are somewhat surprising, considering we have assumed that children generally have a greater capacity for central nervous tissue repair."

"Our findings, which are limited to a cross-sectional study design, suggest that children have a somewhat better reserve and functional adaptability than adults, but less support for a better remyelination process," added Weinstock-Guttman. "However, the remyelination process may require a more in-depth prospective analysis"

Weinstock-Guttman said the data support the need for early diagnosis and therapeutic intervention in pediatric MS patients.

Murali Ramanathan, PhD, associate professor in the departments of Pharmaceutical Sciences and Neurology in the UB School of Pharmacy and Pharmaceutical Sciences and School of Medicine and Biomedical Sciences, respectively, also contributed significantly to the research. Additional contributors were Jennifer L. Cox, PhD, research assistant professor and BNAC's director of neuroimaging, and neurology research assistants Deepa Preeti Ramasamy and Laura M. Willis.

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