

Children with hypertension have trouble with thinking, memory

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Children with high blood pressure are not as good at complicated, goaldirected tasks, have more working memory problems and are not as adept at planning as their peers without hypertension, according to recent research. If they are both hypertensive and obese, they are also more likely to have anxiety and depression.

Considering the demands on a child's brain - both in continued development and in education - and the fact that up to 10 percent of the increasing population of obese children have hypertension, these novel findings could give physicians and parents more impetus to diagnose and treat high blood pressure in children.

"These results were very surprising to me, despite similar findings in adults," said Marc Lande, M.D., a pediatric nephrologist at the University of Rochester Medical Center and author of the paper published in the *Journal of Pediatrics* this month. "Adults with hypertension often have other problems that might affect cognition such as chronic disease, smoking or alcohol use. However, children with hypertension usually do not have these comorbidities."

In adults, high blood pressure can lead to stroke, heart disease, heart attack, heart failure and kidney failure. Lande postulates that the cognitive changes demonstrated in this study may represent very early manifestations of hypertensive damage to the brain, which may long precede more overt damage such as stroke.



In addition, more than half the children with both hypertension and obesity demonstrated clinically significant anxiety and depression. Lande said he was initially looking at anxiety and depression only to rule out its interplay with executive function, which is a collection of cognitive abilities that help plan for and respond to complex situations; he did not expect to tease out this new finding.

"Children with only obesity or only hypertension did not have the anxiety and depression that children with both obesity and hypertension did," Lande said. "With further study, screening for anxiety and depression could end up being routine when an obese child is diagnosed with hypertension."

Lande said preliminary results suggest that treatment of hypertension in children may improve their cognitive executive functions, indicating that the changes in cognition associated with hypertension may be reversible with treatment to normalize the blood pressure.

Lande was inspired to conduct the study after finding a correlation between high blood pressure and lower scores on neurocognitive tests in a nationally representative dataset, NHANES III, the National Health and Nutrition Examination Survey conducted from 1988 to 1994. To dig deeper, Lande enrolled 32 newly diagnosed hypertensive children and adolescents (10 to 18 years old) from the Pediatric Hypertension Clinic at the University's Golisano Children's Hospital. Children who didn't have sustained hypertension or had previous medical issues that affected learning or sleeping were excluded. Thirty-two children with normal blood pressure were recruited from the hospital's pediatric practice and other area pediatric practices and were matched with the hypertensive children by age, weight, sex, race IQ and socioeconomic level.

The parents of both sets of 32 children answered a series of surveys to determine their children's executive function. (Testing the children



through parental assessments can be a more valid test because these assessments evaluate the child's abilities in real-life situations better than directly testing a child, one-on-one in a lab setting) Although the hypertensive group did not perform poorly enough to require clinical intervention, the results were significantly different than the group without hypertension.

"We don't know the long-term implications of these subtle changes, but the potential for these differences in cognitive function to affect children is certainly concerning enough to warrant further study," Lande said.

Source: University of Rochester Medical Center

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