

Brain changes may accompany type 1 diabetes diagnosis in kids

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Photo: U.S. Department of Health and Human Services

Complication called ketoacidosis can affect memory, thinking for six months, reports study.

(HealthDay)—A serious complication of type 1 diabetes called diabetic ketoacidosis (DKA) can cause temporary changes to the brain matter of children newly diagnosed with the disease, researchers say.

What's more, those changes may cause a decrease in memory and attention that persists for at least half a year following the diagnosis of type 1 [diabetes](#), the new study reports.

"Children and adolescents diagnosed with [type 1 diabetes](#) with diabetic ketoacidosis have evidence of brain gray matter shrinkage and white matter swelling," said the study's lead author, Dr. Fergus Cameron, head

of diabetes services at Royal Children's Hospital in Victoria, Australia. "While these changes resolve within the first week, there are associated residual cognitive changes—memory and attention—that are present six months after diagnosis."

Even if they're subtle, these variations "have the potential to affect higher-level learning tasks," he added.

Each year, approximately 30,000 U.S. adults and [children](#) are diagnosed with type 1 diabetes, according to JDRF (formerly the Juvenile Diabetes Research Foundation). And the incidence of type 1 diabetes has increased dramatically in recent years.

Type 1 diabetes occurs when the immune system mistakenly destroys the insulin-producing cells in the body. This leaves the person with type 1 diabetes with little or no insulin, a hormone needed to convert food into fuel for the body's cells.

As time passes without treatment, the body begins to burn fat for fuel. Byproducts of this process are acids called ketones, according to the American Diabetes Association. High levels of ketones can poison the body and cause diabetic ketoacidosis.

Cameron said between 20 and 30 percent of people newly diagnosed with type 1 have diabetic ketoacidosis. The condition can also develop later in type 1, when problems with [diabetes management](#) arise.

The current study, released online May 22 in *Diabetes Care*, included 36 children and teens with diabetic ketoacidosis and 59 without it. All were newly diagnosed with type 1 diabetes and between 6 and 18 years old.

All had MRIs done of their brains at two days, five days, 28 days and six months after diagnosis. They also took tests of memory and attention at

similar time points.

The researchers found decreased gray matter volume in the children with diabetic ketoacidosis as well as swelling in the [white matter](#). These brain changes resolved quickly.

But children who'd experienced these brain changes had more delayed memory recall and poorer sustained and divided attention scores for at least six months after the diabetic ketoacidosis, the study found.

"Changes in memory and attention are subtle, and may or may not be noticed by a parent or teacher on a daily basis," said Cameron.

"However, any decrement in attention or memory in children is a concern as children are acquiring new knowledge and learning new skills all the time."

Cameron said he was concerned that repeated episodes of diabetic ketoacidosis might lead to cumulative damage.

Although this study only looked at a six-month period, Cameron said previous research hints these changes may be longer lasting.

Aaron Kowalski, vice president of treatment therapies for JDRF, said parents shouldn't be overly concerned by these findings. A number of studies have looked at brain function and diabetes, he said. "The question is whether diabetes has a long-term lasting effect on thinking and reasoning, and the data isn't there. Long-term studies suggest there is not a long-term effect," he said.

But the topic warrants further research, Kowalski added, and highlights the continuing need to prevent [diabetic ketoacidosis](#) from occurring.

"DKA still kills people, so we need to do better. We need better tools. And we need to educate doctors more on the symptoms of type 1

diabetes," he said.

Signs and symptoms of type 1 diabetes include:

- Extreme thirst and hunger
- Frequent urination, including bedwetting accidents in children who don't normally have them
- Sudden weight loss
- Mood changes
- Drowsiness
- Vision changes
- Fruity breath odor

If you notice any of these signs, a simple finger-stick blood test at the doctor's office can diagnose type 1 diabetes.

More information: Learn more about diabetic ketoacidosis from the [American Diabetes Association](#).

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