Could ketogenic diet be helpful with brain cancer?

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A modified ketogenic diet may be worth exploring for people with brain tumors, according to a new study published in the July 7, 2021, online issue of *Neurology*. The diet is high in fat and low in carbohydrates.

The small study found that the diet was safe and feasible for people with brain tumors called astrocytomas. All of the people had completed radiation treatment and chemotherapy. The diet led to changes in the metabolism in the body and the brain. The study was not designed to determine whether the diet could slow down tumor growth or improve survival.

"There are not a lot of effective treatments for these types of brain tumors, and survival rates are low, so any new advances are very welcome," said study author Roy E. Strowd, MD, MS, MEd, of Wake Forest School of Medicine in Winston-Salem, N.C., and a Fellow of the American Academy of Neurology.

"These cancer cells rely on glucose, or sugar, to divide and grow. Since the ketogenic diet is low in sugar, the body changes what it uses for energy—instead of carbohydrates, it uses what are called ketones. Normal brain cells can survive on ketones, but the theory is that cancer cells cannot use ketones for energy."

The study involved 25 people with astrocytomas. They followed a type of ketogenic diet, the modified Atkins diet with intermittent fasting, for eight weeks. The diet includes foods such as bacon, eggs, heavy cream, butter, leafy green vegetables and fish. Participants met with a dietician at the start of the study and then every two weeks. Five days a week they followed the modified Atkins diet, which combined carbohydrate restriction with high amounts of fats. Two days a week they fasted, eating up to 20% of their recommended daily calorie amount.

The main goal of the study was to see if people were able to follow the diet with no serious side effects. A total of 21 people completed the study, and 48% followed the diet completely, according to their food records. But urine tests showed that 80% of the people reached the level where their body was primarily using fats and protein for fuel, rather

than carbohydrates.

The diet was well-tolerated. Two people had serious side effects during the study—one was not related to the diet and one was possibly related.

By the end of the study, changes in the metabolism in the body and the brain were seen. Hemoglobin A1c levels, insulin levels, and fat body mass all decreased. Lean body mass increased. Specialized brain scans that detect changes in brain metabolites showed an increase in concentrations of ketones and metabolic changes in the tumor.

"Of course more studies are needed to determine whether this diet can prevent the growth of brain tumors and help people live longer, but these results show that the diet can be safe for people with brain tumors and successfully produce changes in the metabolism of the body and the brain," Strowd said.

A limitation of the study is that study team members provided a high amount of contact with participants, which may not be feasible in a larger study or in routine clinical care.

Provided by American Academy of Neurology

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