

High-fat ketogenic diet to control seizures is safe over long term

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Current and former patients treated with the high-fat ketogenic diet to control multiple, daily and severe seizures can be reassured by the news that not only is the diet effective, but it also appears to have no long-lasting side effects, say scientists at Johns Hopkins Children's Center.

A study report supporting their conclusion, and believed to be one of the first analyses of the long-term safety and efficacy of the diet, appears online in the February edition of the journal *Epilepsia*.

The ketogenic diet, consisting of high-fat foods and very few carbohydrates, is believed to trigger biochemical changes that eliminate seizure-causing short circuits in the brain's signaling system. Used as first-line therapy for [infantile spasms](#) and in children whose seizures cannot be controlled with drugs, the diet is highly effective but complicated and sometimes difficult to maintain. It can temporarily raise cholesterol, impair growth and, in rare cases, lead to kidney stones, among other side effects.

"Despite its temporary side effects, we have always suspected that the ketogenic diet is relatively safe long term, and we now have proof," says senior investigator Eric Kossoff, M.D., a pediatric neurologist and director of the ketogenic diet program at Hopkins Children's. "Our study should help put to rest some of the nagging doubts about the long-term safety of the ketogenic diet," he adds.

The evidence is based on a study of 101 patients ages 2 to 26 years

treated with the ketogenic diet for a minimum of 16 months and for up to eight years at Hopkins Children's between 1993 and 2008. At the time of the follow-up, patients were off the diet anywhere between eight months and 14 years. Nearly 80 percent of the patients remained either seizure-free or had their seizures reduced by half. Most patients' seizures did not worsen even years after stopping the diet.

Researchers caution it is possible that some effects may not show up for decades. However, the evidence, especially among patients who were off the diet for more than 10 years, suggests no long-term harm.

During interviews, none of the patients reported adverse cardiovascular side effects such as heart attacks, enlargement of the heart or abnormal plaque buildup in their arteries. One patient reported having high blood pressure.

Only two of the 101 patients reported [kidney stones](#) after stopping the diet, the same rate found in the general population not treated with the ketogenic diet, the researchers say.

None of the 25 patients who had liver and kidney function tests had abnormal results. Among the 26 patients who had their cholesterol tested, the average level was 157 milligrams per deciliter of blood (less than 200 is considered normal), with three of the 26 having abnormal levels. Most patients' [cholesterol](#) levels go up while on the diet, but are believed to return to normal thereafter. The Hopkins study now confirms that this is the case.

Most patients older than 18 at the time of the study had normal body mass index of 22 on average (25 and below is considered normal). And most of them were within a few inches of their expected heights, based on their parents' heights. Patients 18 years and younger at the time of the study were, on average, in the 25th percentile for height and in the 36th

percentile for weight for their age. While this is below average, the investigators say, it is also much higher than the usual 5th-to-10th percentile while on the diet.

"We have every reason to believe that most children will start catching up once they are off the diet as they grow up because this is what we see in older former patients," Kossoff says.

Contrary to the fear of many parents, the [diet](#) does not appear to alter patients' food preferences, the researchers say. Only 8 percent of those in the study said they continued to eat predominantly high-fat foods.

More information: Journal Epilepsia www.epilepsia.com/

Provided by Johns Hopkins Medical Institutions

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