

SOUTHWESTERN NEWS

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LOW-CARBOHYDRATE, HIGH-PROTEIN DIETS INCREASE RISK OF KIDNEY STONES AND MAY RAISE BONE LOSS RISK

DALLAS – Aug. 1, 2002 – Popular low-carbohydrate, high-protein diets may result in rapid weight loss, but researchers at UT Southwestern Medical Center at Dallas report that they also pose serious health problems, including an increase in the risk of kidney stones and a possible higher risk of bone loss.

Significant factors related to the increased kidney stone risk, according to the study, are the acidic content of animal meat and the lack of alkaline foods in the diet. The findings are included in the August issue of *The American Journal of Kidney Diseases*.

Researchers report that acid excretion – a marker for the acid load in the blood – increased as much as 90 percent while subjects were on diets that severely restricted carbohydrates. Levels of urinary citrate, which inhibits kidney stones, fell by almost 25 percent in the group during the six-week study.

“People may lose weight on this diet, but this study shows that this is not a healthy way to lose weight,” said Dr. Chia-Ying Wang, a co-author of the study and an assistant professor of internal medicine at UT Southwestern.

“When you restrict the amount of carbohydrates you can go into a state called ketoacidosis,” Wang said. “Our body needs a certain source of energy and a quick source are carbohydrates, which are readily available. When you restrict carbohydrates the body then turns to other sources, one of which is fat. Ketone bodies are formed when the body is forced to burn fat for energy which may result in a state of ketoacidosis.”

Ketoacidosis is a condition resulting from an accumulation of ketone bodies in the blood and increased blood acidity.

Ten healthy subjects ate a regular diet for two weeks at the start of the study. They followed that with a highly restrictive diet that included some vegetables but no fruits and less than 20 grams of carbohydrates for two weeks. Participants then ate a less-restrictive diet for the final four weeks. During the last five days of each of these stages, the study subjects stayed overnight in UT Southwestern’s General Clinical Research Center for testing. Each member

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of the group also took a daily multivitamin tablet.

Urinary citrate levels fell from 763 milligrams per day to 449 mg per day during intake of the severely carbohydrate-restricted diet, researchers report in the journal. Subject readings improved to 581 mg per day during intake of the moderately carbohydrate-restricted diet.

The researchers also report that net acid excretion rose from baseline levels of 61 milliequivalents per day to 116 mEq per day during the severely carbohydrate-restricted diet phase. Levels were 112 mEq per day when the group switched to a moderately carbohydrate-restricted diet. Chronic acid load suppresses the function of osteoblasts, bone-forming cells, and stimulates the function of osteoclasts, a cell associated with bone resorption.

“This type of diet increases the propensity to develop kidney stones,” Wang said. “On the basis of this study alone, there was an increased risk of developing kidney stones and a possible increase in the risk of bone loss. We already know that osteoporosis is going to be a major issue as the population ages and if people are going to eat this kind of diet on a long-term basis, it’s unknown what the implications would be for your bones.”

Researchers are now studying the effects of this protein- and fat-heavy diet on the bones and are developing methods to counteract the higher risk of kidney stones.

“We are not questioning the value of this diet in producing weight loss,” said Dr. Kashayer Sakhaee, co-author of the study and a professor of internal medicine “We are investigating a countermeasure so that subjects can benefit from weight loss without experiencing the side effects of increased risk of stones and bone loss.” Sakhaee holds the BeautiControl Cosmetics Inc. Professorship in Mineral Metabolism and Osteoporosis.

Other UT Southwestern researchers who participated in the study include Dr. Charles Pak, senior author of the study and director of the Center for Mineral Metabolism and Clinical Research, and Linda Brinkley, a registered dietitian and research scientist in the Center for Mineral Metabolism and Clinical Research. Dr. Shalini Reddy, formerly of UT Southwestern and presently with the University of Chicago, is the study’s lead author.

The study was funded in part by grants from the U.S. Public Health Service.

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