Fructose May Be Driving Increase in CV Disease

BY SHERRY BOSCHERT

SAN FRANCISCO — Modern diets full of fructose may be a driving force in the epidemic of cardiovascular disease, according to Dr. Richard J. Johnson.

Both human and animal studies have shown that high levels of fructose intake induce features of the metabolic syndrome, which in turn can lead to the development of diabetes and hypertension, he said at the sixth annual World Congress on the Insulin Resistance Syndrome.

Each year, Americans ingest an average of 150 pounds of sugar, and 25% of the U.S. population eats more than 200 pounds of sugar, data from the National Health and Nutrition Examination Survey (NHANES) suggest.

"In modern societies, we're on high sugar," said Dr. Johnson, professor of medicine and chief of the division of renal diseases and hypertension at the University of Colorado, Denver.

Sugar consists of sucrose and fructose. Fructose- and purine-rich foods increase uric acid levels, induce oxidative stress, decrease nitric oxide in cells, and raise blood pressure, he said. Fructose consumption can raise uric acid levels within a 30-minute period. At least 17 published studies have shown that hyperuricemia is an independent risk factor for hypertension.

"If uric acid is driving hypertension, it would be most likely to be elevated in newly diagnosed hypertension," he said at the conference, which was sponsored by the International Committee for Insulin Resistance.

Dr. Johnson and his associates randomized 30 adolescents with newly diagnosed stage 1 essential hypertension and serum uric acid levels at or greater than 6 mg/dL to treatment with allopurinol or placebo for 4 weeks, followed by a 2-week washout period, after which they were switched to the other treatment group.

The 24-hour ambulatory systolic blood pressure decreased by an average of 6.3 mm Hg on allopurinol and increased by 0.8 mm Hg on placebo.

Mean 24-hour ambulatory diastolic measurements decreased by 4.6 mm Hg on allopurinol and by 0.3 mm Hg on placebo. The differences between the groups were statistically significant (JAMA 2008;300:924-32).

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"The results were dramatic," he said. Only 1 of the 30 teenagers became normotensive on placebo, but 20 became normotensive on allopurinol. "In those who lowered the uric acid to less than 5 ng/dL, 86% became normotensive."

Two subsequent, unpublished studies confirmed the findings. The National Institutes of Health have invited Dr. Johnson and his associates to conduct a multicenter trial to see if lowering uric acid can prevent the development of hypertension in adolescents, he said.

In a study to be published February in the International Journal of Obesity, Dr. Johnson and his associates gave 200 g/day of fructose with or without allopurinol to 76 healthy overweight men for 2 weeks. Fructose intake without allopurinol increased daytime and nighttime systolic blood pressure, raised triglyceride levels, lowered HDL cholesterol levels, increased uric acid levels, and added a pound in weight on average. "We could induce metabolic syndrome in 30% of individuals in just 2 weeks with fructose," he said.

Taking allopurinol with the fructose blocked the increase in blood pressure but did not significantly affect changes in lipids, Dr. Johnson said.

Dr. Johnson and his associates also published their case for excessive fructose as a driver in the diabetes and cardiovascular disease epidemics in a recent review of the literature (Endocr. Rev. 2009;30:96-116).

Dr. Johnson has been a speaker for Merck & Co. and coauthored (with Timothy Gower) a book about the effect of fructose on health. ■