SHBG May Explain Coffee-Diabetes Link

BY ROBERT FINN

SAN FRANCISCO — Sex hormone–binding globulin may be the key to the protective effect of coffee consumption against development of type 2 diabetes, according to an analysis of the Women's Health Study.

Women who drank at least 4 cups of coffee per day were less than half as likely to develop diabetes than were those who drank no coffee, and after adjustment for sex hormone–binding globulin (SHBG), the interaction disappeared.

It has been known for some time that women who drink coffee are significantly less likely to develop type 2 diabetes than are those who do not, and that the relationship between coffee consumption and diabetes is much less pronounced in men.

SHBG is a glycoprotein with a high affinity for testosterone and estradiol. SHBG levels tend to be substantially higher in women than in men, Atsushi Goto, a doctoral candidate at the University of California, Los Angeles, said at a conference sponsored by the American Heart Association. Previous studies have shown that variations in the genes controlling SHBG have a strong association with the development of diabetes and that coffee consumption increases plasma levels of SHBG.

VITALS

Major Finding: Women who drank more than 4 cups of coffee daily were 56% less likely to develop type 2 diabetes than were those who drank no coffee, a significant difference. After adjustment for SHBG, the difference was not significant.

Data Source: Nested case-control study of 359 women with incident type 2 diabetes and matched controls from the Women's Health Study.

Disclosures: Study supported by a grant from the National Institutes of Health.

To study this association, Mr. Goto and his colleagues used data from the Women's Health Study, in which nearly 40,000 women were followed for a median of 10 years. During that time, 359 of the women developed diabetes. The investigators matched those women by age, race, and time of blood draw with 359 women who had not developed the disease.

After adjustment for age, smoking, alcohol consumption, physical activity, past use of hormone therapy, total energy intake, fiber intake, body mass index, and plasma testosterone and estradiol levels, the investigators found that women who drank at least 4 cups of caffeinated coffee (500 mg caffeine) daily had significantly higher mean SHBG levels than did nondrinkers: 27.3 nmol/L versus 24.5 nmol/L. Decaffeinated coffee was not significantly associated with SHBG levels.

Furthermore, when controlling for all of the above factors plus education levels and family history of type 2 diabetes, the investigators found that women who drank at least 4 cups of caffeinated coffee daily were 56% less likely to develop diabetes than were nondrinkers. However, when the investigators additionally controlled for plasma SHBG levels, the decrease in risk associated with coffee consumption became nonsignificant. This suggests that it is SHBG that mediates the decrease in risk of developing type 2 diabetes, Mr. Goto commented. ■

Model Predicts Effects of Sweetened Drinks

BY ROBERT FINN

SAN FRANCISCO — The increase in the consumption of sugar-sweetened beverages between 1990 and 2000 contributed to 130,000 new cases of diabetes and 14,000 new cases of coronary heart disease between 2000 and 2010, according to estimates from a computer model of the U.S. population.

In addition, the rising consumption of sugar-sweetened beverages, which include soda, sports drinks, and fruit drinks, led to an estimated 1.4 million additional life-years burdened by diabetes and 50,000 additional life-years burdened by coronary heart disease in the first decade of the 21st century.

The relative risk of diabetes related to daily consumption of sugary beverages was 1.32 after adjusting for BMI.

DR. LAMBRAKOS

To derive those estimates, Dr. Litsa K. Lambrakos of the University of California, San Francisco, and her colleagues used data from the 1990-2000 National Health and Nutrition Examination Survey (NHANES) on consumption of sugar-sweetened beverages. She combined that with the Coronary Heart Disease Policy Model, a computer simulation of heart disease in U.S. adults aged 35-84 years.

According to that model, the relative risk of incident diabetes related to the daily consumption of sugar-sweetened beverages was 1.32 after adjusting for body mass index. Dr. Lambrakos presented the findings during a poster session at a conference sponsored by the American Heart Association.

The estimated increase in coronary heart disease related to the increased consumption of sugar-sweetened beverages would have generated an additional $300-$500 million in health care costs between 2000 and 2010.

"The numbers about excess health care costs are very conservative, because they only account for health care costs attributed to coronary heart disease," Dr. Lambrakos said in an interview. "We know we have an increase in diabetes as well that we can attribute to soft drink consumption. And those costs—the cost of caring for and treating patients with diabetes—is a very large number as well."

The investigators also analyzed how a 1 cent per ounce tax on sugar-sweetened beverages might have limited coronary heart disease costs, had it been implemented in the year 2000. Based on economic studies, the computer model assumed that such a tax would decrease consumption by 10%. This would translate to a savings of $170 million in health care costs over 10 years.

Commenting on the study findings, the American Heart Association issued this statement:

"The AHA acknowledges the importance of limiting intake of added sugars, including sugar-sweetened beverages. The association is still evaluating the research to determine which strategies accomplish this best, comparing more punitive strategies like taxation with more positive incentives like subsidies or lowering prices for healthy foods. The AHA will continue to monitor the best available research to more fully understand the connection between taxation policy and consumption trends, and ensure that our public policy positions reflect the best available science. … [R]obust evaluation should be part of any tax measures that are passed and advocates for broader nutrition policy efforts that make healthy foods more affordable and accessible to all consumers and bring food pricing and subsidies in line with federal dietary guidelines and AHA nutrition recommendations."

Asked what message primary care physicians should take from the findings, Dr. Lambrakos said that "what we're talking about here is primary prevention. … It's important for the general public and physicians to understand that these drinks really shouldn't be considered a staple of the American diet." ■

VITALS

Major Finding: Consumption of sugar-sweetened beverages contributed to an estimated 130,000 new cases of diabetes and 14,000 new cases of coronary heart disease between 2000 and 2010.

Data Source: Computer simulation based on the Coronary Heart Disease Policy Model.

Disclosures: Supported by a grant from the American Heart Association Western States Affiliate.

Sleep Apnea Linked With Higher HbA_{1c}

BY SHERRY BOSCHERT

SAN FRANCISCO — The presence and severity of obstructive sleep apnea was associated with worse glucose control in a study of 60 patients with type 2 diabetes.

Polysomnography and hemoglobin A_{1c} tests showed that participants with no obstructive sleep apnea (OSA) had an average HbA_{1c} level of 5.7%. HbA_{1c} levels averaged 7.2% in participants with mild OSA, 7.7% in those with moderate OSA, and 9.4% in those with severe OSA, Dr. Esra Tasali reported.

"These effect sizes are comparable to some medications we use to treat A_{1c} levels," she said, suggesting that "treatment of obstructive sleep apnea may improve glucose control as much as widely used pharmacologic agents."

The linear trend for poorer glucose control with increasingly severe OSA was highly significant after adjustment of the data for the effects of age, gender, race, body mass index, level of exercise, duration of diabetes, number of diabetes medications being taken, and total sleep time, she said at a meeting sponsored by the American Diabetes Association.

Previous studies have shown a high prevalence of OSA in people with type 2 diabetes, and that in nondiabetics OSA is linked with alterations in glucose metabolism and reduced insulin sensitivity. The current study is the first to show the relation between OSA severity and glycemic control in diabetes patients (Am. J. Respir. Crit. Care Med. 2010;181:507-13).

Overall, 77% (46 of 60) of the study cohort had OSA. Three previous studies of diabetic populations found OSA prevalences of 58%, 71%, and 86%, said Dr. Tasali of the University of Chicago.

Six trials of treating OSA in patients with type 2 diabetes using continuous positive airway pressure (CPAP) produced conflicting results, with some showing improvements in HbA_{1c} levels, insulin sensitivity, or glucose levels, some showing no change, and others with split results. The only randomized clinical trial among them found no effect of CPAP therapy on HbA_{1c} or insulin sensitivity. All the studies were small (ranging from 9 to 44 patients), she noted.

Studies by Dr. Tasali and associates on healthy subjects suggest that sleep interruption or deprivation similar to that which occurs with OSA may increase the risk for developing type 2 diabetes. Depriving healthy subjects of short-wave sleep for 3 nights significantly decreased insulin sensitivity and glucose tolerance and elevated cardiac sympathetic nervous activity.

"Sleep duration and quality are potentially modifiable risk factors and therefore might have important clinical implications for the prevention and treatment of diabetes and obesity," she said.

Dr. Tasali said she had no conflicts of interest to disclose. ■