

For Soft Drink Guzzlers, Pancreatic Cancer Is Greater Risk

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STOCKHOLM, Nov. 9 -- Habitually downing one soft drink after another may nearly double the risk of pancreatic cancer, according to investigators here.

Among more than 75,000 men and women without cancer or diabetes who were followed for more than seven years, those who reported eating more added sugar, soft drinks, and sweetened fruit soups or stewed fruit were significantly more likely to develop cancer of the pancreas, found Susanna C. Larsson, M.Sc., of the Karolinska Institute, and colleagues.

The increased risk may be related to sugar's effects on insulin action and glucose metabolism, the investigators suggested in the November issue of the *American Journal of Clinical Nutrition*.

"Evidence is mounting that abnormal glucose metabolism and hyperinsulinemia may be involved in the development of pancreatic cancer," they wrote. "Conditions such as diabetes mellitus, a high body mass index (BMI, in kg/m²), and physical inactivity, all hallmarks of insulin resistance, have been directly related to the risk of this malignancy."

Previous studies have reported that people in the highest categories of post-load plasma glucose, fasting serum glucose, or fasting insulin concentrations had about twice the risk of pancreatic cancer as people in the lowest categories, the authors noted.

To test the hypothesis that sugar in soft drinks -- the leading source of added sugar in American diets -- and other sweetened food could contribute to a pancreatic cancer risk, Dr. Larsson and colleagues drew on data collected in two large population-based studies. These were the Swedish Mammography Cohort and the Cohort of Swedish men.

In both studies, participants filled out a 96-item food-frequency questionnaires and other highly detailed questionnaires on lifestyle, health, and medical history. Potentially confounding the results of the study, however, was the fact that the questionnaires did not nail down whether participants drank sugar-sweetened or artificially sweetened beverages.

The authors calculated sugar consumption using standard serving sizes, such as one teaspoon or one lump of sugar (5 to 7 g), and one glass of soda (250 to 300 g).

A total of 77,797 men and women ages 45 to 83 had completed the questionnaires by 1997, and were followed through June of 2005. At the time they filled out the questionnaires the participants had not

had a diagnosis of cancer or diabetes.

In all, 131 incident cases of pancreatic cancer were reported during the mean 7.2-year follow-up.

"The consumption of added sugar, soft drinks, and sweetened fruit soups or stewed fruit was positively associated with the risk of pancreatic cancer," the investigators found.

In multivariate analysis, the hazard ratio for pancreatic cancer among those who had five or more servings of added sugar per day (the highest consumption category) was 1.69 (95% confidence interval, 0.99-2.89, P for trend = 0.06) compared with those who reported using no added sugar at all.

Participants who reported drinking five or more soft drinks per day had a nearly twofold risk for cancer of the pancreas (hazard ratio 1.93, 95% CI, 1.18,-3.14; P for trend = 0.02). Any significant elevated risk associated with soft-drink consumption pertained only to people who drank at least two servings per day, the authors noted.

In addition, those who took their fruit soups or stewed fruits with extra sugar had about a 50% greater risk for pancreatic cancer (hazard ratio 1.51, 95% CI, 0.97,-2.36; P for trend = 0.05).

The investigators did not, however, find any associations between consumption of jams, marmalades, or candies and pancreatic cancer risk, possibly because people tend to eat such food less frequently and in smaller portions.

They pin the blame for the elevated risk on sugar's ability to induce hyperinsulinemia.

"Consumption of sugar-sweetened soft drinks, which contain large amounts of rapidly absorbable sugars, induces a rapid and dramatic increase in both blood glucose and insulin concentrations," they wrote. "A state of relative postprandial hyperglycemia and primary hyperinsulinemia may cause insulin resistance, which in turn usually leads to compensatory hyperinsulinemia."

They noted that hyperinsulinemia has been shown to increase local blood flow and cell division within the pancreas, and that the condition exposes the exocrine cells of the pancreas to extremely high insulin concentrations, because their blood supply passes through the beta-islet cells.

In addition, sugar-induced elevated insulin levels could allow for more freely available insulin-like growth factor 1, which has been shown to stimulate growth of pancreatic cancer cells in vitro, they wrote.

The authors acknowledged that although the prospective design of the study avoids the problem of recall bias, their findings are limited by the relatively short follow-up and small number of incident cases.

They also noted a major limitation of the study related to composition of soft drinks. The study did not distinguish between the use of regular sugar-sweetened soft drinks and artificially sweetened soft drinks (diet sodas), and relied on self-reported questionnaires, which were non-specific and could lead to

misclassification of food consumption.

Action Points

Explain to patients who ask that this study found an association between the consumption of high levels of refined sugars or five or more average-size soft drinks a day and increased risk for cancer of the pancreas.

Point out that the study is based upon the unproven assumption that the reported consumption of soft drinks was that of sugar-sweetened soft drinks, not artificially sweetened diet drinks.

Explain that cancer of the pancreas accounts for about 2% of all new cancer cases in the United States, and about 6% of all cancer deaths annually, according to the American Cancer Society.

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Larsson SC et al.

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"Consumption of sugar and sugar-sweetened foods and the risk of pancreatic cancer in a prospective study." *Am J Clin Nutr* 2006;84:1171- 6.