Postprandial Glucose Rise Linked to Cardiac Risk

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The blood glucose excursion that patients with type 2 diabetes experience after a meal correlates strongly with their carotid intima-media thickness, a marker for cardiovascular disease, reported Italian researchers in a large, ongoing study.

The research also showed that the rise in blood glucose level after a meal almost always peaks at about 1 hour, even though 2 hours is the time usually used for measuring postprandial response in patients with diabetes, reported Dr. Katherine Esposito of the division of metabolic diseases at the Second University of Naples (Italy), and colleagues from the Second University and the University of Warwick (England) (J. Clin. Endocrinol. Metab. 2008 Jan. 15 [Epub doi:10.1210/jc.2007-2000]).

The timing of the peak in blood glucose does not appear to be affected by how the diabetes is being treated—that is, with diet or with oral drugs, they wrote.

The American Diabetes Association currently does not recommend that patients monitor postprandial glucose, they noted. But this study—which, along with other studies, showed a correlation between postprandial glucose and a marker for cardiovascular disease—suggests there may be some benefit.

Large epidemiological studies have reported a strong association between hyperglycemia after a meal and cardiovascular risk; an accumulating body of evidence indicates an association between postmeal hyperglycemia and oxidative stress, atherosclerosis, and endothelial dysfunction, all of which are features of cardiovascular disease, according to the investigators.

This analysis used data on 644 patients enrolled in the ongoing study who measured their blood glucose levels at home half an hour before their biggest meal of the day, and then four times after the meal, half an hour apart, on three separate occasions. The patients also had their carotid intima-media thickness measured by ultrasonography. They had been diagnosed with type 2 diabetes at least 6 months prior to enrollment and had had diabetes for not more than 10 years. Their mean age was 57 years, their mean body mass index was 29.8 kg/m^2, and 344 were male.

When the patients were grouped into quintiles, based on their averaged maximal incremental glucose peaks after meals, hemoglobin A_{1c} levels and carotid intima-media thickness increased progressively. In the lowest quintile, in which the incremental glucose peak was from 0 to 40 mg/dL, the mean carotid intima-media thickness was 0.82 mm. In the highest quintile, in which the peak was greater than 130 mg/dL, the mean thickness was 0.94 mm.

Statistical analysis showed that when all glucose parameters were considered, including fasting glucose and HbA_{1c}, the incremental glucose peak had the highest correlation.

In addition, data from the measurements taken before the meals and at different times afterward showed that 95% of the patients had their highest glucose peak at 1 hour after the meals.

The 343 patients who were on drug therapy, rather than on a prescribed diet alone, tended to fall into the higher quintiles of incremental glucose peak. However, the patients on drug therapy did not differ from the patients on diet therapy in the timing of their glucose peak.

The study also discovered that serious excursions in blood glucose after a meal occurred in the majority of the subjects.

Two-thirds of the patients had incremental glucose peaks that exceeded 50 mg/dL, and at some time after the meals, 94% of patients recorded a glucose level that exceeded 159 mg/dL, which is the American Diabetes Association's acceptable threshold for postprandial glucose, the researchers wrote, noting that other studies have shown that drug treatment that targets postprandial glucose increases can affect cardiovascular risk and carotid intima-media thickness.

In one of those studies, which Dr. Esposito conducted, 175 drug-naive patients with type 2 diabetes were randomized to receive either repaglinide, a rapid-acting secretagogue that targets postprandial glucose, or glyburide. Of those assigned to repaglinide, 52% had a regression in their carotid intima-media thickness greater than 0.02 mm, compared with 18% of those assigned glyburide (Circulation 2004;110:214-9).

In this recent study, Dr. Esposito and her colleagues declared that they had no conflicts of interest. ■