

Don't Stop at Premeal Control

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ommended a 2-hour postmeal glucose value of 140 mg/dL or less for all diabetic patients, while the American Diabetes Association advocates a target of below 180 mg/dL at any nonfasted measurement.

The IDF document, developed by an 18-member international committee, recommends the following:

► **Postmeal hyperglycemia is harmful and should be addressed.** The highest-level evidence for this comprises four epidemiologic studies that indicate postmeal and postchallenge hyperglycemia are independent risk factors for macrovascular disease. Other supporting evidence suggests that postmeal hyperglycemia is also associated with increased risks for retinopathy and cancer, and for impaired cognitive function in elderly patients with type 2 diabetes. Postmeal hyperglycemia has also been linked to greater carotid intima media thickness and decreased myocardial blood volume and flow, and has been shown to cause oxidative stress, inflammation, and endothelial dysfunction.

► **Implement treatment strategies to lower postmeal glucose in people with postmeal hyperglycemia.** Although no completed studies have specifically examined the effect of controlling postmeal glycemia on macrovascular disease, there are data to support the use of both dietary and pharmacologic treatment. Among those are the findings that treatment with medications that target postmeal plasma glucose reduces vascular events, and that targeting both postmeal and fasting plasma glucose is an important strategy for achieving optimal glycemic control.

Data suggest that the relative contribution of postprandial glucose to overall glycemic control increases with hemoglobin A_{1c}. At levels below 7.3%, postmeal glucose values contribute about 70%, compared with just 40% when HbA_{1c} is above 9.3% (Diabetes Care 2003;26:881-5). In practical terms, "to achieve A_{1c} levels below 7.3%, you need to target the postmeal glucose. Otherwise, you'll be 'stuck' at 7.2%-7.3%," remarked Dr. Jellinger, professor of medicine and a voluntary faculty member at the University of Miami.

► **A variety of both nonpharmacologic and pharmacologic therapies should be considered to target postmeal plasma glucose.** Diets with a low glycemic load have been shown beneficial in controlling postmeal plasma glucose, while several pharmacologic agents are available that preferentially lower postmeal plasma glucose.

These agents include the α -glucosidase inhibitors acarbose and miglitol, the amylin analog pramlintide, the dipeptidyl peptidase-4 inhibitor sitagliptin phosphate, the glinides nateglinide and repaglinide, the glucagon-like peptide-1

derivative exenatide, and rapid-acting, biphasic, and inhaled insulins.

► **Two-hour postmeal plasma glucose should not exceed 7.8 mmol/L (140 mg/dL), as long as hypoglycemia is avoided.** Postmeal plasma glucose levels rarely rise above 7.8 mmol/L or 140 mg/dL in people with normal glucose tolerance, and typically return to basal levels within 2-3 hours after eating.

► **Self-monitoring of blood glucose (SMBG) should be considered.** It is currently the most practical method for monitoring postmeal glucose. While there is controversy and conflicting data about the benefits of SMBG in people with type 2 diabetes who don't use insulin, most diabetes organizations and other medical associations do advocate its use. For patients with type 1 and type 2 diabetes who do use insulin, the IDF advises SMBG at

least three times a day. The IDF does not call for patients to measure glucose levels after every meal.

Dr. Jellinger typically asks patients to perform one 2-hour postmeal glucose test a

day—after different meals—in the 2 weeks prior to an office visit, in addition to their usual premeal measurements. He also checks patients' nonfasted glucose levels when they're in the office. "Never miss an opportunity to check a random blood sugar when they're in the office, because you can learn a lot," he advised.

► **Efficacy of treatment regimens should be monitored as frequently as needed to guide therapy toward achieving postmeal plasma glucose targets.** But that doesn't mean fasting levels should be ignored. Indeed, despite all the emerging data on postprandial glucose toxicity, Dr. Jellinger has found that it's just more practical to start out treatment by targeting fasting and premeal glucose levels. "My first target is the fasting plasma glucose. I don't try to bring down postmeal excursions until my patient has achieved waking euglycemia and then premeal euglycemia. ... I find that it's very difficult to achieve effective 2-hour postmeal control when the patient enters the meal with a high blood glucose. You may have to give such high doses of medication for the meal that you begin to risk hypoglycemia."

It is clear that a major determinant of postmeal glucose is premeal glucose, he noted. "The point now is that you don't stop when the premeal glucoses are under control, which is the old thinking. Now you start looking at postmeal glucose (values) and start targeting therapy toward that parameter."

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To achieve A_{1c} levels below 7.3%, target postmeal glucose. 'Otherwise, you'll be "stuck" at 7.2%-7.3%.'

DR. JELLINGER

Type 1 Teens Report Skipping Insulin to Control Weight

BY MIRIAM E. TUCKER
Senior Writer

AMSTERDAM — More than 90% of all teenagers with type 1 diabetes omit insulin doses at least occasionally to prevent weight gain, according to the results of an international observational study presented by Dr. Soren E. Skovlund at the annual meeting of the European Association for the Study of Diabetes.

The practice is associated with significantly poorer glycemic control. "Screening for and dialog with adolescents about omission of insulin injections may be particularly warranted in those who exhibit concern about their weight or engage in weight-reducing activities," said Dr. Skovlund, global director of patient-focused programs at Novo Nordisk A/S, Bagsvaerd, Denmark.

A total of 2,062 adolescents aged 11-18 years with type 1 diabetes of at least 1 year's duration completed the survey, conducted in 2005 by the Novo Nordisk-funded Hvidoere Study Group. The respondents were from 21 centers in Europe, Australia, Japan, and North America. There was one U.S. center, at Children's Hospital, Los Angeles.

The study group was equally divided between genders. Both genders had a mean age of 14.5 years, and mean diabetes duration of 6.3 years for the females and 5.9 years for the males. Mean body mass indices were 22.8 kg/m² for the females and 21.7 kg/m² for the males, and mean HbA_{1c} levels were 8.3% for the females and 8.1% for the males.

Each was asked to complete an extensive questionnaire covering topics such as lifestyle, self-management and health behaviors, treatment goals, family dynamics, well-being and quality of life, diabetes burden, and weight perception/dieting. Also included was the question: "How often do you miss insulin to control your weight?" Possible responses were "never," "once a month," "once a week," or "every day."

The majority—91.7% of the females and 93.0% of the males—checked "once a month." "Never" was a distant second,

reported by 5.1% of females and 4.2% of males, followed by "once a week" (2.5% female/1.9% male) and "every day" (0.7% female/0.9% male).

"This was not just in general, but specifically to avoid weight gain. Clearly, people are connecting the two aspects," Dr. Skovlund said.

The nearly equal proportion of males and females is striking. "A lot of the insulin omission literature has focused on this being a female phenomenon. ... But we have certainly also seen it in boys."

Those who reported omitting insulin doses either daily or weekly ("high omitters") had poorer metabolic control, and averaged a significant difference of half a percentage point in hemoglobin A_{1c} values, compared with the "low omitters,"

those who omitted never or monthly (8.99% female/8.61% male vs. 8.24% female/8.08% male). Insulin omission remained significantly correlated with HbA_{1c} after controlling for age and diabetes duration, but not gender.

Insulin omission also was highly correlated with other weight-loss behaviors, such as fasting, restricting certain food groups, vomiting, and use of diet pills/laxatives, as well as reduced well-being and quality of life. None of the associations significantly differed by center. Insulin omission was reported both by patients on multiple daily injections as well as those on insulin pumps (who made up approximately 20% of the overall group).

Dr. Francine R. Kaufman, a pediatric endocrinologist who heads the Los Angeles center said: "Kids miss doses all the time. ... The question is why." In the United States the practice of omitting insulin for weight control has been dubbed "diabulemia," she noted in an interview.

But the thought process may not always be straightforward. Teens might rationalize that they didn't eat as much as they did, or that they don't need as much insulin as they actually do. Often, it's not about completely omitting a dose but of not taking enough for the amount of food consumed. "A lot of it is not totally willful, [more like] miscalculating the dose." ■



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DR. SKOVLUND

