Postop Care Driven by Bariatric Surgery Method

BY JEFF EVANS

Bariatric surgery procedures in patients with type 2 diabetes have varying effects on the hormones that control insulin secretion and sensitivity, and these effects must be taken into consideration to maintain glycemic control after surgery, according to a review of bariatric surgery studies that reported diabetes-related outcomes.

"Caloric intake is minimal after any bariatric procedure, and patients are at high risk for hypoglycemia if their preoperative regimens are not appropriately adjusted," Dr. Marion L. Vetter and her associates at the University of Pennsylvania, Philadelphia, wrote.

Bariatric procedures that have been broadly classified as malabsorptive, such as biliopancreatic diversion (BPD), with duodenal switch have been reported to have greater effect on the gastrointestinal hormones known as incretins (which stimulate insulin release after enteral nutrition) than do so-called restrictive procedures, such as laparoscopic adjustable gastric banding (LAGB) and vertical banded gastroplasty (VBG).

Roux-en-Y gastric bypass (RYGB) incorporates both malabsorptive and restrictive properties. In one large meta-analysis of bariatric studies, type 2 diabetes resolved in 84% of patients after RYGB, whereas it resolved in 98% of patients after BPD and in 48%-72% of patients after LAGB or VBG (Ann. Intern. Med. 2009;150:94-103).

Dr. Vetter and her colleagues found that decreased caloric intake has an immediate impact on insulin sensitivity but does not alone account for lower blood glucose levels because studies have shown that complete diabetes resolution occurs within days of intestinal bypass procedures but takes months to occur after LAGB. Even with the same postoperative caloric intake, blood glucose levels have been shown to drop further and faster after RYGB than after VBG.

Changes in the levels of the incretins called glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic peptide (GIP), as well as the levels of nonincretin gut peptides known as peptide YY (PYY) and ghrelin, appear to occur rapidly after gastric bypass. GLP-1 is known to slow gastric emptying. It acts on pancreatic β islet cells to augment glucose-dependent insulin secretion and on the central nervous system to induce satiety and decrease food intake. GLP-1 remains elevated for 1 year after gastric bypass.

GIP is secreted by cells in the proximal gut and also acts on beta islet cells to increase insulin secretion, but it is less potent than GLP-1 and does not affect gastric emptying or satiety. Lower levels of GIP have been reported, albeit inconsistently, several months after RYGB. Studies of restrictive procedures have not found altered GIP levels.

Specialized cells in the distal ileum produce PYY, which increases satiety and delays gastric emptying. PYY is known to increase as early as 2 days after RYGB and remain elevated for at least 6 weeks, which "may account for the immediate decrease in appetite after surgery," the researchers wrote. The response of PYY is blunted after meals in patients who underwent gastric banding, but no data exist about its level in the weeks after banding or other restrictive procedures.

Because insulin requirements often rapidly decline after bariatric surgery, the authors suggested that "patients may require only long-acting basal insulin in the immediate postoperative period, with rapid-acting insulin for correction of hyperglycemia as necessary." They recommended avoiding sulfonylureas and meglitinides until patients begin eating regularly. Thiazolidinediones are safe once regular eating is occurring.

The senior author of the review, Dr. Nayyar Iqbal, is employed by Bristol-Myers Squibb. No other authors reported potential financial conflicts of interest. ■

Continuous Glucose Monitoring Bests Conventional Type 1 Methods

BY MITCHEL L. ZOLER

NEW YORK — Continuous glucose monitoring has become the standard of care for managing patients with type 1 diabetes, based on results from three controlled trials, including two published last year.

Continuous glucose monitoring (CGM) has several advantages over self monitoring of blood glucose, Dr. Jay S. Skyler said at a meeting sponsored by the American Diabetes Association.

CGM provides real-time glucose information, and can provide an alarm if the patient becomes hypo- or hyperglycemic. It also gives patients and their physicians insight into glucose-level trends and into a patient's reaction to food and insulin. In addition, CGM is a tool for prompting behavior modification in patients with type 1 diabetes, said Dr. Skyler, a professor of medicine and director of the division of endocrinology, diabetes, and metabolism at the University of Miami.

CGM 'improves outcomes and helps patients learn. I'm convinced that it is now the standard of care.'

DR. SKYLER

"CGM is a useful tool because it improves outcomes and helps patients learn. I'm convinced that it is now the standard of care," he said in an interview.

Dr. Skyler reported serving on the board of directors and being a shareholder in DexCom, which markets a continuous glucose monitor; he had similar relationships with MiniMed, another CGM device maker since was acquired by Medtronic. A third CGM device available in the United States is the Navigator unit marketed by Abbott.

The superiority of CGM to more conventional self monitoring of blood glucose was proven in three randomized studies.

The first assessed the HbA_{1c} outcome in 156 patients who were randomized to continuous capillary blood glucose monitoring, biweekly capillary blood glucose monitoring for 3 days per week, or standard self monitoring. After 3 months, daily CGM led to an average reduction in HbA_{1c} of 1.0%, compared with baseline, a significantly greater reduction than was seen in the control group. Intermittent CGM also led to a reduction in HbA_{1c}, but the change was not significantly different from the control patients (Diabetes Care 2006;29:2730-2).

The second study randomized 138 patients to CGM or self monitoring. After 6 months, there was no significant difference in the extent of HbA_{1c} reduction in the two treatment arms. But the patients on CGM had significantly fewer episodes of hypo- and hyperglycemia than did patients in the control group (Diabetes Technol. Ther. 2008;10:377-83).

The largest study so far reported randomized 322 adults and children with type 1 diabetes to management based on either CGM or SMBG. After 6 months, CGM led to a 0.5% cut in HbA_{1c} compared with the control group in patients age 25 years or older, a statistically significant difference.

Among the patients aged 24 years or younger, no such difference developed between groups. This difference by age may have been due to more diligent use of the CGM devices and better use of the CGM information in self management by older patients, the researchers concluded (N. Engl. J. Med. 2008;359:1464-76). ■

Lipids Linked to Albumin Excretion in Type 1 Teens

BY HEIDI SPLETE

Long-term lipid abnormalities were significantly associated with higher albumin excretion in a study of 895 adolescents aged 10-16 years with type 1 diabetes.

Data on lipid levels and the possible association between lipids and albumin excretion in teens with type 1 diabetes are limited. But previous studies suggest that the relationship between these values can help clinicians predict the risk of diabetic neuropathy in these patients, wrote Dr. Maria Loredana Marcovecchio of the University of Cambridge (England) and her colleagues.

The researchers reviewed data from 490 boys and 405 girls, whose mean age at baseline was 14.5 years, with type 1 diabetes who were enrolled in an ongoing juvenile diabetes study in the United Kingdom. The data included three consecutive early morning urine samples to determine albumin-creatinine ratios, collected each year for an average of 2.3 years. Nonfasting blood samples were taken to assess lipids. They defined microalbuminuria (MA) as an albumin-creatinine ratio in the 3.5-35 mg/mmol range for boys and in the 4.0-40 mg/mmol range for girls in two of three consecutive urine samples at an annual collection (Diabetes Care 2009 [Epub ahead of print: http://care.diabetesjournals.org]).

During the follow-up period, 115 teens developed MA. The average concentrations of total cholesterol and non-HDL cholesterol were significantly higher in the teens with MA, compared with teens with normal albumin levels (4.7 mmol/L vs. 4.5 mmol/L and 3.2 mmol/L vs. 2.9 mmol/L, respectively).

Age-related changes in total cholesterol and non-HDL cholesterol in teens older than age 15 or 16 years were higher in the 28 teens with persistent MA compared with the 87 teens with transient MA and compared with teens without MA, the researchers noted. The average age of onset for MA was 15 years, which supports the link between lipids and MA, but the worse glycemic control in teens with MA could be a factor, they added.

During the follow-up period, an average of 19% of the teens had abnormal total cholesterol, 20% had abnormal triglycerides, 26% had abnormal HDL cholesterol, and 10% had abnormal LDL cholesterol. In addition, an average of 2.5% had low HDL cholesterol, 35% had borderline triglycerides, and 13% had borderline LDL cholesterol.

Overall, the association between average lipid levels and average hemoglobin A_{1c} levels was significant (with the exception of HDL cholesterol). The associations were significantly stronger in girls compared with boys. Older age and longer duration of diabetes were significant predictors of all types of lipid abnormalities, and higher body mass index was significantly associated with all lipid abnormalities, except total cholesterol.

The researchers had no financial conflicts to disclose. ■