Bariatric surgery

(NOVEMBER 2006)

TO THE EDITOR: Dr. Brethauer and colleagues are to be commended for their review of the risks and benefits of bariatric surgery.[1] As noted by Dr. Cefalu in the same issue,[2] obesity, with its complications leading to morbidity and death, is becoming epidemic, and effective tools available to combat obesity are scant. However, it is important for physicians and patients to be aware of the risks as well as the benefits of this elective surgery.

In that vein, one of the risks of the surgery, especially the Roux-en-Y procedure, is the long-term potential for hyperinsulinemic hypoglycemia. Dysregulation of glycemic control due to hyperinsulinemia as a result of bariatric surgery has been known for some time,[3,4] but is seen to be not prevalent and therefore not important. However, the syndrome can be life-threatening because it entails impairment of cognitive function with risk of loss of consciousness.

The hypoglycemia is not simply due to adrenergic stimulation. Reports as early as 1990 linked disruption of normal incretin regulation and nesidioblastosis in this process.[3] Recent reports by Service et al[5] and Patti et al[6] have postulated and have provided evidence that nesidioblastosis or islet hyperplasia or both, due to elevated glucagon-like peptide 1 (GLP-1) after the surgery, may cause the syndrome. Long-term effects of dysregulated incretins, especially GLP-1, could lead to islet neogenesis and hyperinsulinemia. These proposals have been rebutted by Meier et al,[7] who concluded that hyperinsulinemic hypoglycemia is probably due to a combination of dumping and inappropriate insulin regulation, either as a failure to adapt to decreased insulin need or as an acquired phenomenon. However, elevated GLP-1 and islet neogenesis could contribute to the 83% reversal of type 2 diabetes described by Schauer et al.[8] Further supporting a role for incretins and islet neogenesis, Won et al[9] recently reported 10 patients with hyperinsulinemic hypoglycemia, 5 of whom had had bariatric surgery, who were responsive to diazoxide therapy, suggesting that hyperinsulinemia is the key feature of the syndrome.

In summary, hyperinsulinemic hypoglycemia is a significant clinical complication of bariatric surgery and therefore bears inclusion in a review describing the long-term risks of Roux-en-Y bariatric surgery.

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IN REPLY: Drs. Pittenger and Vinik raise the issue of hyperinsulinemic hypoglycemia after gastric bypass and suggest that it should be included as a long-term risk of this procedure. While we agree that this is a potentially debilitating, albeit rare, problem, there are several points to discuss regarding this syndrome.

First, the mechanisms of islet cell hyperplasia after foregut bypass are not clear. While GLP-1, a hormone produced in the hindgut, is probably a major contributor to improved glucose metabolism after gastric bypass, there are potentially many other factors involved.[1]

Alteration of other gut hormones such as ghrelin can affect counterregulatory hormones after bypass. Other foregut hormones likely play a role in improving glucose homeostasis after bypass. Rubino and colleagues[2] conducted a series of experiments in rodents supporting the theory that exclusion of the duodenum and proximal jejunum directly ameliorates type 2 diabetes independently of food intake, body weight, malabsorption, or nutrient delivery to the hindgut. They suggested that "anti-incretin" signals normally produced in the foregut may be suppressed with a surgical bypass.

Further investigation is warranted in this area to better define the biochemical links between gastric bypass surgery and improvement in—and potentially excess secretion of—insulin postoperatively.[3]

Second, gastric bypass was introduced in the late 1960s, and since then several hundred thousand gastric bypass operations have been performed. After nearly 40 years of experience with this operation, nesidioblastosis has not emerged as a clearly defined or common complication of the procedure.

Finally, the rarity of this problem is offset by the enormous benefit to patients with type 2 diabetes and insulin resistance who undergo gastric bypass surgery. The small number of case reports of nesiodoblastosis after gastric bypass does suggest a relationship between hyperinsulinemic hypoglycemia and surgery that bypasses the foregut. A true causal relationship, though, has not been established, and the benefit of the surgery with regards to diabetes resolution far exceeds the risk of developing nesidioblastosis.

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CORRECTIONS

Drug-eluting stents

(FEBRUARY 2007)

In the review article entitled "Understand-ing and minimizing late thrombosis in drug-eluting stents" published in the February 2007 issue of the *Cleveland Clinic Journal of Medicine* (2007; 74:129–136), a callout in the margin of page 132 was incorrectly included during copy editing, implying worse clinical outcomes with stent thrombosis after drug-eluting stenting compared with bare metal stenting. Although, as described, formation of collateral blood vessels may be inhibited, there is no clinical evidence to date documenting any excess risk in this regard.

Glycemic control (dosage error)

(FEBRUARY 2007)

The article by Dr. Stephen Clement, "Better glycemic control in the hospital: beneficial and feasible" (*Cleve Clin J Med* 2007; 74:111–120) contained a dosage error. The second sentence on page 118, first column, first paragraph, stated "For prolonged NPO status, insulin drip is preferred, with a starting dose of 0.2 units/kg/hour perioperatively." The correct dose should be 0.02 units/kg/hour.