

# Bypassing Duodenum Seen to Resolve Diabetes

*Improvements in HbA<sub>1c</sub>, lipids, and insulin were greater with gastric bypass than with restriction.*

BY MARY ANN MOON

FROM THE ARCHIVES OF SURGERY

For non-morbidly obese patients with poorly controlled type 2 diabetes, gastric bypass surgery with exclusion of the duodenum was much more likely to resolve diabetes than was a simpler, purely restrictive procedure that does not exclude the duodenum, according to a double-blind, randomized trial.

However, the relative safety of the purely restrictive procedure may make it a better first choice than gastric bypass surgery for many patients, the study's authors said.

Diabetes resolved in 28 of 30 (93%) patients who underwent gastric bypass, which prevents contact between ingested food and the duodenum, compared with 14 of 30 (47%) who underwent sleeve gastrectomy, which does not prevent such contact. The study is the first randomized trial to examine surgical treatment's effect on non-morbidly obese patients with a body mass index (BMI) of less than 35 kg/m<sup>2</sup> and poorly controlled type 2 diabetes, the researchers said.

Both groups of patients showed significant weight loss and improvement in such metabolic measures as waist cir-

cumference, hemoglobin A<sub>1c</sub> levels, and insulin levels. But those improvements were more frequent and more extensive in the patients who underwent full gastric bypass.

The findings strongly support the hypothesis that the duodenum plays a large role in the resolution of diabetes following bariatric surgery. "The mechanism seems to relate to postprandial glucose metabolism rather than to an increase in insulin secretion, and is independent of weight reduction," said Dr. Wei-Jei Lee of Min-Sheng General Hospital, National Taiwan (China) University, and associates (*Arch. Surg.* 2011; 146:143-8).

In the double-blind study, 60 patients aged 34-58 years were randomly assigned to undergo one of the two operations using standard laparoscopic techniques. The mean BMI was 30.3, and the average age was 45 years. All patients had been seeing an endocrinologist for type 2 diabetes for at least 6 months but continued to have poorly controlled disease, with a mean HbA<sub>1c</sub> level of 10% (range, 7.5%-15%).

The primary end point – glycemic control at 12 months without the use of oral hypoglycemic agents or insulin – was achieved by significantly more patients in the gastric bypass group (93%)

than in the sleeve gastrectomy group (47%).

"These results corroborate previous reports that gastric bypass may achieve an 80% diabetes mellitus remission and pure restrictive-type procedures may achieve a rate of approximately 50%," the researchers wrote.

Although weight loss was similar between the two groups, patients who underwent full gastric bypass also showed a smaller waist circumference, lower fast-

lications, and minor complications developed in three patients in each group.

However, it is important to note that restrictive procedures such as sleeve gastrectomy or gastric banding are 10-fold safer than the more-complex gastric bypass procedures, the investigators cautioned. In addition, those two restrictive procedures avoid the long-term sequela of micronutrient deficiency that sometimes follows duodenum exclusion. Thus should be considered the first choice for many patients, Dr. Lee and colleagues said.

In contrast, gastric bypass might be a better choice for patients with metabolic syndrome or hyperlipidemia, they noted.

The mechanism by which exclusion of the duodenum and upper jejunum reverses diabetes (the so-called foregut theory) has not been fully explained, and "without data regarding the change in gut hormones, such as glucagon, gastric inhibitory peptide, and glucagon-like peptide 1, we cannot elucidate the underlying mechanisms," the researchers added.

Given the 1-year follow-up of the study, the study's authors said they also could not confirm the durability of diabetes remission in such patients, or the influence of future changes in weight. ■

## VITALS

**Major Finding:** Type 2 diabetes resolved in 93% of patients who underwent gastric bypass surgery, compared with 47% of patients who underwent sleeve gastrectomy.

**Data Source:** A double-blind, randomized trial comparing gastric bypass surgery, which excludes the duodenum, against sleeve gastrectomy, which does not bypass the duodenum, in 60 patients with poorly controlled type 2 diabetes and a BMI of 25-35 kg/m<sup>2</sup>.

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ing plasma glucose levels, lower HbA<sub>1c</sub> levels, and lower blood lipid levels – in short, a higher rate of remission of the metabolic syndrome (93% vs. 40%). Their blood pressure, insulin levels, and C-peptide levels also were lower than were those in the sleeve gastrectomy group.

There were no deaths or major com-

# Bariatric Surgery Effective in Minorities at 3-Year Follow-Up

BY MICHELE G. SULLIVAN

FROM THE ANNUAL MEETING OF THE SOUTHERN SURGICAL ASSOCIATION

PALM BEACH, FLA. – Bariatric surgery resulted in complete remission of type 2 diabetes and prediabetes in a group of mostly Hispanic and black patients.

Within 1 year of surgery, 100% of patients with those disorders experienced a normalization of fasting blood glucose and hemoglobin A<sub>1c</sub>, and they lost a mean of 40 kg, Dr. Alan Livingstone said at the meeting.

By the end of the 3-year follow-up period, all patients still had normal levels of blood glucose and insulin, he said.

"Uncontrolled type 2 diabetes is highly prevalent among ethnic minorities," said Dr. Livingstone, the Lucille and DeWitt Daughtry Professor and Chairman of Surgery, University of Miami Miller School of Medicine, and chief of surgery Jackson Memorial Hospital, Miami.

"Bariatric surgery helps to effectively treat these diverse minority groups and is a safe and effective option for permanent weight loss and chronic disease

risk improvement in this population," he added.

Dr. Livingstone reported on a cohort of 1,603 adult bariatric surgery patients. Sixty-six percent of the patients were Hispanic, 17% were black, and the rest were other ethnicities. They were prospectively entered into a research database and then retrospectively studied.

"Minorities are at a particularly high risk for type 2 diabetes and its associated complications," Dr. Livingstone said. "While only 6% of whites have [the disorder], it's present in 10% of Hispanics and 12% of blacks – a huge burden of disease."

The patients' mean age was 45 years; most (77%) were female. The mean preoperative weight was 130 kg; the mean body mass index, 47 kg/m<sup>2</sup>.

Most of the group already had some insulin abnormality; 377 had diagnosed type 2 diabetes, 107 had undiagnosed type 2 (fasting blood glucose of more than 126 mg/dL), and 276 had prediabetes (fasting blood glucose of 100-125 mg/dL). Among those with elevated blood glucose, the mean HbA<sub>1c</sub> was 8%. The rest of the group had a normal insulin profile.

Most patients underwent gastric bypass (90%); the rest had gastric banding. "The amount of weight loss was profound in the first year, as expected," Dr. Livingstone said.

**Three years may not be long enough to proclaim bariatric surgery as a cure for type 2 diabetes in any population. To say there is no weight regain 'is a little premature.'**

There was no significant difference in weight loss between the diagnostic groups. Body mass index also fell quickly, correlating with weight loss. By the end of the first 6 months, the mean BMI had dropped to 35 kg/m<sup>2</sup>, and by the end of the first postoperative year, it was 30 kg/m<sup>2</sup>.

Among the 57% of patients with full 3-year follow-up, there was no significant regain of weight, Dr. Livingstone reported.

Fasting blood glucose and HbA<sub>1c</sub> also improved rapidly and significantly in all those with preoperatively elevated levels.

"It's important to note how quickly this happened," Dr. Livingstone said. "Within the first year, all of these patients had normal fasting blood glucose and an HbA<sub>1c</sub> of 6% or below." Again, these values remained steady and in the normal range in the entire 3-year follow-up cohort. "This is a tremendous accomplishment," he said.

However, Dr. Bruce Schirmer of the University of Virginia, Charlottesville, cautioned that a 3-year follow-up period may not be long enough to proclaim bariatric surgery as a cure for type 2 diabetes in any population.

"In mostly Caucasian populations, if you follow the patients for up to 5 years, you see that 15%-20%, at least, have some weight regain and with it, a return to diabetes," Dr. Schirmer said. "So to make this statement that there is no weight regain and no return to the disorder is a little premature." ■

## VITALS

**Major Finding:** In patients undergoing bariatric surgery who had a mean HbA<sub>1c</sub> of 8%, all patients had an HbA<sub>1c</sub> of 6% within 1 year of surgery.

**Data Source:** A review of 1,603 patients who underwent either gastric bypass (90%) or gastric banding, of whom 47% had elevated blood glucose and insulin, over 3 years.

**Disclosures:** Dr. Livingstone had no financial disclosures. Dr. Nestor F. De La Cruz-Munoz Jr., a coauthor, is a consultant and proctor for Ethicon.