

# Bariatric Surgery in Patients With Obesity and Latent Autoimmune Diabetes in Adults (LADA)

Ali Aminian<sup>1</sup>, Gautam Sharma<sup>1</sup>, Rickesha L. Wilson<sup>1</sup>, Stacy Brethauer<sup>2</sup>, Philip R. Schauer<sup>3</sup>, Sangeeta R. Kashyap<sup>4</sup>, Roman Vangoitsenhoven<sup>1,5</sup>

<sup>1</sup>Bariatric and Metabolic Institute, Department of General Surgery, Cleveland Clinic, Cleveland, OH, <sup>2</sup>Department of Surgery, Ohio State University Wexner Medical Center, <sup>3</sup>Pennington Biomedical Research Center, Louisiana State University, Baton Rouge, LA, <sup>4</sup>Endocrinology and Metabolism Institute, Cleveland Clinic, Cleveland, OH,, <sup>5</sup>Department of Endocrinology, UZ Leuven, Leuven, Belgium

## Background

Bariatric surgery induces weight loss and restores glucose metabolism in patients with obesity and type 2 diabetes (T2D). In patients with autoimmune diabetes that eventually results in beta-cell failure, the glycemic effects of bariatric surgery are limited. Adult patients with latent autoimmune diabetes in adults (LADA) have a slower decline in beta-cell function and lower requirement for insulin therapy than patients with classical young-onset type 1 diabetes (T1D). They are often misdiagnosed as having T2D and might have unrealistic expectations of diabetes remission after bariatric surgery with additional risk for development of postoperative diabetic ketoacidosis (DKA).

## Aim

To characterize the safety and efficacy of bariatric surgery in patients with obesity and LADA.

## Methods

We retrospectively analyzed medical records of patients with obesity and LADA who underwent bariatric surgery at the Cleveland Clinic Health System in the U.S. LADA status was defined as adult-onset diabetes with presence of GAD antibodies. We compared pre- and post-surgery BMI, glycemic control (HbA<sub>1c</sub>), daily insulin dose, and blood pressure and lipid profile using a paired Student t test, with a P value of 0.05 considered significant.

## Results

| Patient Baseline Characteristics (n = 10)  |                                 |
|--------------------------------------------|---------------------------------|
| Surgery Dates                              | October 2006 – March 2018       |
| Roux-en-Y Gastric Bypass (n)               | 5 (all female)                  |
| Sleeve Gastrectomy (n)                     | 5 (4 female, 1 male)            |
| Median Age (years, range)                  | 52 (40 – 66)                    |
| Median BMI (kg/m <sup>2</sup> , range)     | 38.6 (34.8 – 53.7)              |
| Median Duration of Diabetes (years, range) | 12 (4 – 31)                     |
| Median HbA <sub>1c</sub> (% ± SD)          | 9.4 ± 1.7% (79 ± 18.6 mmol/mol) |
| Average Insulin Use (IU/kg/day)            | 0.84 ± 0.50                     |
| Elevated GAD antibodies (n)                | 10                              |
| Elevated C-peptide (n)                     | 2                               |

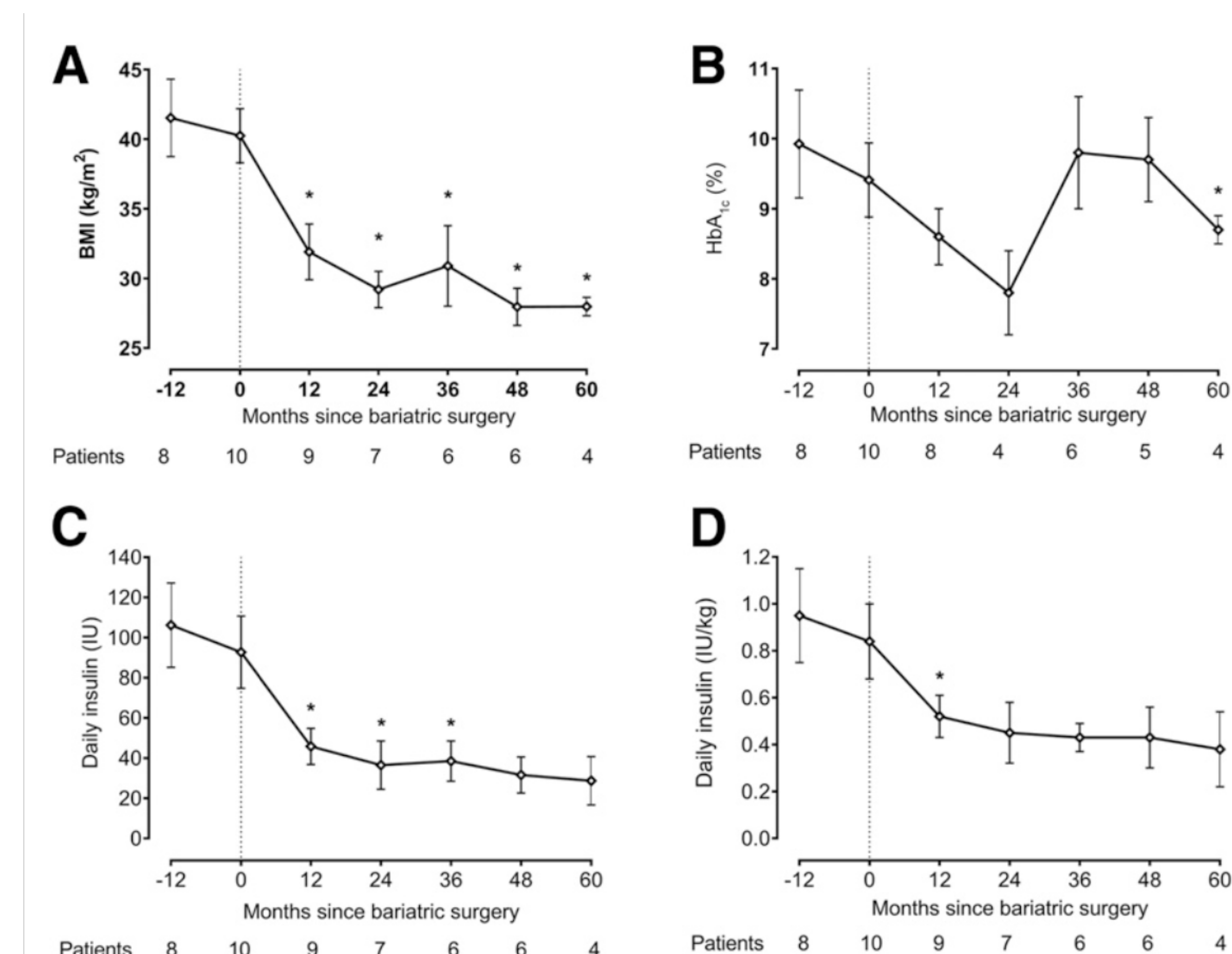


**Figure 1**—Changes in BMI (kg/m<sup>2</sup>) (A), HbA<sub>1c</sub> (%) (B), and daily insulin requirement (C and D) before and after bariatric surgery in patients with obesity and LADA. Data are presented as mean ± SEM. Number of patients with data at each time point is shown beneath x-axis. \*P < 0.05.

## Results

There were no significant changes in:

- LDL (10 6 45 mg/dL)
- HDL (6 6 12 mg/dL)
- triglycerides (213 6 72 mg/dL)
- systolic blood pressure (2 6 31 mmHg), or diastolic blood pressure (26 6 20 mmHg) following surgery.

Other Patient Outcomes:

- Two patients with pre-existing albuminuria showed regression after surgery:
  - Urinary albumin-to-creatinine ratio decreased from 329 to 66 mg/g and from 183 to 27 mg/g.
- Four patients developed DKA (postoperative day [POD] 0, 8, 9, and 16).
- One patient was diagnosed with deep venous thrombosis on POD 9.
- One patient with an anastomotic ulcer on POD 30.

## Conclusions

- Metabolic bariatric surgery induces weight loss and reduces daily insulin requirement in patients with LADA
- The current study did not show improvement in glycemic control.
- Recognizing different subtypes of diabetes is warranted when considering bariatric surgery for treatment of diabetes, including awareness for specific postoperative complications such as DKA.
- The main reason for considering metabolic bariatric surgery in patients with LADA should be treatment of severe obesity and potentially its multitude of comorbid conditions, not primarily for better glycemic control.

This e-presentation was accepted for publication following abstract submission. The content of this e-poster and Figure 1 have been adapted from the article cited below.

Aminian A, Sharma G, Wilson RL, et al. Bariatric Surgery in Patients With Obesity and Latent Autoimmune Diabetes in Adults (LADA). *Diabetes Care*. 2020;43(5):e56-e57. doi:10.2337/dc19-2388