



COMMENT ON CUMMINGS AND COHEN

## Bariatric/Metabolic Surgery to Treat Type 2 Diabetes in Patients With a BMI $<35$ kg/m<sup>2</sup>. Diabetes Care 2016;39:924–933

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In a recent article, Cummings and Cohen (1) compared glycemic outcomes after bariatric surgery in patients with BMI  $\geq 35$  or  $<35$  kg/m<sup>2</sup>, concluding that there was no clear difference in outcomes between these BMI thresholds. To strengthen their argument, they discussed possible weight-independent effects of bariatric surgery on glycemic outcomes.

Their article correctly recognized the 35 kg/m<sup>2</sup> threshold used as an indication for bariatric surgery, based on a 1991 National Institutes of Health Consensus Statement (2), as arbitrary and probably not suitable for Asian patients, and it discussed the fact that initial BMI does not predict outcome in larger cohorts. However, many points discussed in the article should be analyzed with caution, given the limited number of less obese patients with long-term follow-up after metabolic surgery and the few existing comparisons of BMI extremes. Additionally, many studies have demonstrated that diabetes remission is associated with the amount of weight loss and that, when the amount of weight loss is the same, restrictive techniques have similar remission rates to “metabolic” procedures such as Roux-en-Y gastric bypass/vertical sleeve gastrectomy (RYGB/VSG) (3–5).

To compare outcomes in patients with BMI above and below 35 kg/m<sup>2</sup>,

the authors used a forest plot (Fig. 3 in ref. 1) including different studies in patients with mean BMI above or below 35 kg/m<sup>2</sup>. However, we believe it would be more appropriate to compare individuals rather than studies. Only one randomized controlled trial (RCT) has directly compared patients with a baseline BMI above or below 35 kg/m<sup>2</sup> (6). At 36 months after randomization, subjects in the lower BMI range took approximately twice as many diabetes medications as subjects with a BMI above 35 kg/m<sup>2</sup>. Although this was one of the few studies not considering medication discontinuation as a criterion for diabetes remission, it was nonetheless included in the meta-analysis with studies using different criteria.

The plot in Fig. 3 (1) included a single long-term study in patients with mean BMI  $\leq 35$  kg/m<sup>2</sup> who underwent RYGB/VSG. Although the mean baseline BMI was not predictive of remission, there was a clear relationship between weight loss and glycemic control (7). After 3 years, there was a clear increase in rates of diabetes relapse and clinically significant adverse events; moreover, the overall results in this study were inferior to those in studies of patients with higher mean BMI (3,8).

Among the other four studies of patients with mean BMI  $\leq 35$  kg/m<sup>2</sup>, two had a follow-up of only 1 year and

one assessed laparoscopic adjustable gastric banding (LAGB) (as the authors claim weight-independent effects of surgery related to incretin changes, they should have analyzed RYGB/VSG and LAGB separately). The fourth study, by Courcoulas et al., was erroneously allocated, as it included patients with a mean BMI of 35.6 kg/m<sup>2</sup> (1). A critical review of the RCTs listed in both plot columns found only about 70 individuals with class I obesity and type 2 diabetes who underwent RYGB and had at least 2 years of follow-up, a number obviously too negligible to prompt a change in public health policies (1).

Lack of studies with long-term follow-up is a major concern in less obese patients, considering that these patients lose less weight and their small weight regain could cause glycemic deterioration. The current data should prompt caution given the increased rates of diabetes relapse seen in all studies of bariatric surgery with extended follow-up (6–8).

We would like to emphasize that, in our opinion, the indication for bariatric surgery should not rely solely on BMI or on a dichotomous threshold value. On the basis of a myriad of currently available RCTs, we should amplify access to surgery for higher-BMI patients with shorter diabetes duration who are more likely to achieve glycemic improvement

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(due to higher insulin secretory capacity) and several other clinical benefits associated with more pronounced weight loss. However, owing to the lack of information, until more definitive long-term data become available in less obese patients, public health policies should not change based on such limited scientific information.

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