



RESPONSE TO COMMENT ON CUMMINGS AND COHEN

Bariatric/Metabolic Surgery to Treat Type 2 Diabetes in Patients With a BMI <35 kg/m². Diabetes Care 2016;39:924–933

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Halpern et al. (1) thoughtfully critique our article (2) on bariatric/metabolic surgery for type 2 diabetes (T2D) in lower-BMI patients. The traditional 35 kg/m² BMI threshold for patients with diabetes to be surgical candidates is arbitrary and particularly unsuitable for Asians. The National Institutes of Health established this threshold 26 years ago based on no randomized controlled trials (RCTs) comparing surgical versus nonsurgical approaches. Nevertheless, a quarter century of worldwide practice governed by those standards has validated that among severely obese patients, bariatric/metabolic surgery is efficacious, safe, and cost-effective (3).

A key question now is whether the well-documented benefits of these operations extend to patients with diabetes whose BMI is <35 kg/m². Among many reasons justifying this question is abundant evidence demonstrating that preoperative BMI does not predict the benefits of surgery on diabetes prevention, remission, or relapse, nor on cardiovascular events, cancer, or death (3).

Halpern et al. (1) emphasize that long-term surgical outcomes data in lower-BMI populations are limited. The relevant database, however, is far from trivial and is growing rapidly. We generated forest plots displaying results from 11 existing RCTs that compared glycemic benefits from bariatric/metabolic surgery against various medical/lifestyle interventions (2). Surgery was universally superior,

yielding similar results among trials with mean preoperative BMI above and below 35 kg/m². Halpern et al. (1) focused on a few of these trials to bolster their assertions, but results from the entire data set seem more relevant. They constitute Level 1a evidence demonstrating that the superiority of surgical over nonsurgical T2D interventions is equally strong with baseline BMI above or below 35 kg/m². A superb RCT (4) cited by Halpern et al. in their critique (1) showed identical postoperative HbA_{1c} reductions throughout 5 years among people with preoperative BMI values above and below 35 kg/m².

Adding to this evidence, we generated another forest plot revealing that among the 11 aforementioned RCTs, the magnitude of surgical superiority over medical/lifestyle interventions remains similar throughout follow-up times from 6 months through at least 5 years (5). These data include four RCTs with longer-term follow-up among patients with baseline BMI <35 kg/m², not one study, as Halpern et al. (1) claim.

An encyclopedic meta-analysis of all publications reporting diabetes remission after bariatric/metabolic surgery (including 94,579 patients with T2D) found that remission rates were equivalent between the group of 34 studies in which mean preoperative BMI was <35 kg/m² and the group of 60 studies with mean preoperative BMI ≥35 kg/m²: 72% vs. 71%, respectively (6).

Admittedly, lower-BMI patients lose less weight postoperatively and thus enjoy fewer weight-dependent antidiabetes benefits. It is abundantly clear, however, that several bariatric/metabolic operations, such as Roux-en-Y gastric bypass (RYGB), engage additional weight-independent antidiabetes mechanisms, including in lower-BMI individuals (7). Among many bodies of evidence demonstrating this is the greater improvement in glucose homeostasis for a given amount of post-RYGB weight loss than for the same magnitude of weight loss achieved through behavioral or purely gastric-restrictive interventions. Challenging that assertion, Halpern et al. (1) cite the Swedish Obese Subjects (SOS) study, a population-based investigation not designed to address this question. They also mention one publication (8) showing that with major weight loss long after surgery (20% of total body weight), glucose homeostasis improvements appeared fairly similar between recipients of RYGB and gastric banding. Such substantial long-term weight loss, however, might mask additional weight-independent glycemic benefits, which are not disproven by this one article. In contrast, numerous studies directly designed to compare the glycemic benefits from equivalent weight loss achieved with RYGB versus diet, exercise, gastric banding, and/or sleeve gastrectomy have shown the former to be greater than the latter (7).

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Importantly, our view that bariatric/metabolic surgery can be considered to treat T2D in lower-BMI patients is supported by highly consensuated new guidelines from a 48-person panel of worldwide diabetes authorities at the 2nd Diabetes Surgery Summit (5). They advocated surgery as an option in the T2D treatment algorithm for patients with a BMI as low as 30 kg/m², or 27.5 kg/m² among Asians. These formal recommendations have been officially endorsed/ratified by 50 worldwide scientific societies to date, including most major international diabetes organizations. They provide powerful new T2D treatment options to hundreds of millions of patients who would not qualify by traditional standards.

Duality of Interest. D.E.C. is a principal investigator on both the Comparison of Surgery vs.

Medicine for Indian Diabetes (COSMID) trial, which is funded by Johnson & Johnson, and the Alliance of Randomized Trials of Medicine vs. Metabolic Surgery in Type 2 Diabetes (ARMMS-T2D) trial, which is funded by Johnson & Johnson as well as Covidien, in conjunction with the National Institutes of Health. R.V.C. is principal investigator for the Microvascular Outcomes after Metabolic Surgery (MOMS) trial, which is funded by Johnson & Johnson as well as the Oswaldo Cruz German Hospital Bioscience Institute. None of these studies are discussed in this article. No other potential conflicts of interest relevant to this article were reported.

References

1. Halpern B, Cercato C, Mancini MC. Comment on Cummings and Cohen. Bariatric/metabolic surgery to treat type 2 diabetes in patients with a BMI <35 kg/m². *Diabetes Care* 2016;39:924–933 (Letter). *Diabetes Care* 2017;40:e71–e72. DOI: <https://doi.org/10.2337/dc16-1482>
2. Cummings DE, Cohen RV. Bariatric/metabolic surgery to treat type 2 diabetes in patients with a BMI <35 kg/m². *Diabetes Care* 2016;39:924–933
3. Sjöström L. Review of the key results from the Swedish Obese Subjects (SOS) trial—a prospective controlled intervention study of bariatric surgery. *J Intern Med* 2013;273:219–234
4. Schauer PR, Bhatt DL, Kirwan JP, et al.; STAMPEDE Investigators. Bariatric surgery versus intensive medical therapy for diabetes—5-year outcomes. *N Engl J Med* 2017;376:641–651
5. Rubino F, Nathan DM, Eckel RH, et al.; Delegates of the 2nd Diabetes Surgery Summit. Metabolic surgery in the treatment algorithm for type 2 diabetes: a joint statement by international diabetes organizations. *Diabetes Care* 2016;39:861–877
6. Panunzi S, De Gaetano A, Carnicelli A, Mingrone G. Predictors of remission of diabetes mellitus in severely obese individuals undergoing bariatric surgery: do BMI or procedure choice matter? A meta-analysis. *Ann Surg* 2015;261:459–467
7. Batterham RL, Cummings DE. Mechanisms of diabetes improvement following bariatric/metabolic surgery. *Diabetes Care* 2016;39:893–901
8. Bradley D, Conte C, Mittendorfer B, et al. Gastric bypass and banding equally improve insulin sensitivity and β cell function. *J Clin Invest* 2012;122:4667–4674