

# Bariatric Surgery Reduces the Need for Glycemic Control Medications and Related Health Care Costs

Reviewed by Michael Pignone, MD, MPH

## STUDY

Makary MA, Clarke JM, Shore AD, Magnuson TH, Richards T, Bass EB, Dominici F, Weiner JP, Wu AW, Segal JB: Medication utilization and annual health care costs in patients with type 2 diabetes mellitus before and after bariatric surgery. *Arch Surg* 145:726–731, 2010

## SUMMARY

**Design.** A retrospective time series.

**Subjects.** The study included 2,235 adults with type 2 diabetes who underwent bariatric surgery between 2002 and 2005. Mean age was 48.4 years, and 74% were female. Eligible patients had medical and pharmacy coverage through Blue Cross Blue Shield for at least 6 months before and after surgery and were classified as having diabetes based on pharmaceutical claims for diabetes medications filled at least three times in the 6 months before surgery.

**Methods.** To determine the effect of bariatric surgery on the use of diabetes medications, the investigators compared the proportion of patients taking at least one diabetes medication before and after surgery. Multivariate logistic regression was used to adjust for potential confounders. To assess the effect of bariatric surgery on health care costs, the researchers examined direct health care costs measured by the insurer's total payments for each patient. Presurgery median costs from 2 years to 1 year before surgery were compared to postsurgery

median costs from the first, second, and third postoperative years.

**Results.** A total of 1,918 of 2,235 patients (85.8%) were using at least one diabetes medication 3 months before surgery. After surgery, the proportion using at least one diabetes medication decreased to 25.3% at 6 months, 19.4% at 12 months, and 15.5% at 24 months. Reduction in medication use was greatest for metformin and similar for insulin, sulfonylureas, and thiazolidinediones.

Complications of bariatric surgery were relatively low: in-hospital mortality was 0.3%, and 7.5% of patients were readmitted within 30 days.

Costs of health care in the presurgical period averaged \$6,376. The surgical procedure and associated hospital care for bariatric surgery had a mean cost of \$29,959. In the 3 years after surgery, costs increased by ~10% in year 1 compared to the presurgical comparison period; however, costs were 34% lower than the presurgical period in year 2 and 70% lower in year 3.

**Conclusion.** Bariatric surgery is associated with a large reduction in the use of medication for glycemic control and with lower postsurgical health care costs.

## COMMENTARY

This recent analysis of health insurance claims data provides additional evidence about the effectiveness of bariatric surgery in reducing medication usage and health care costs for patients with diabetes. Its findings

are consistent with a recent large meta-analysis that examined the same outcomes.<sup>1</sup>

The use of a time series design, while not optimal for preventing bias, nonetheless suggests that having surgery seems to be associated with decreased use of glycemic control medications and somewhat lower health care costs (at least after the first postoperative year). Because glycemic control usually becomes more difficult over time, it is unlikely that the observed effects are simply the result of a secular trend. It is possible, however, that co-interventions, such as the adoption of dietary changes or increases in physical activity, could have been responsible for some of the observed effect. Of note, the reduction in medication use occurred early after surgery, in advance of the changes that could be expected from the weight loss after surgery, suggesting that other mechanisms are likely responsible for the improvement in glycemia.

In interpreting these results, it is important to note that the analysis examines patients who had the procedure in the early part of the decade, often after a rigorous selection process. Whether the same results (both in terms of efficacy and safety) would be achieved if the procedure were made available today to a larger spectrum of patients is unknown. A recent study has raised concerns, for example, about suicide risk in patients after bariatric surgery.<sup>2</sup>

Costs of care were reduced in the second and third years after surgery for those for whom data were available, suggesting that the procedure might help reduce long-term health care costs through reduction of comorbid conditions. However, these benefits must be weighed up against the relatively high cost of the procedure itself—almost \$30,000 in this analysis—and in consideration of alternate treatments such as intensive behavioral change that might produce similar benefits in terms of weight loss per dollar spent. Another analysis done in the Veterans Administration setting with older patients did not find reductions in overall health care costs over 3 years, suggesting that surgery may be more valuable in younger patients.<sup>3</sup>

A recent rigorous cost-effectiveness analysis examined the effect of bariatric surgery and found the cost per quality-adjusted life-year to be < \$15,000 per year for patients with either newly diagnosed or established

diabetes, making it a relatively good value for health care dollars spent. Their findings were relatively robust to changes in important model parameters, including surgical risk and proportion of patients whose glycemic control returns to normal.<sup>4</sup>

With these caveats in mind, this research by Makary and colleagues suggests that clinicians, payers, and health policy-makers should offer bariatric surgery to patients with severe obesity and diabetes. Additional research is required to determine how patients trade off the potential benefits of surgery in light of its short-term risks. In this setting, the use of a decision-making aid may help providers communicate better with patients about this important health issue so that informed patients can make decisions consistent with their underlying values.

#### REFERENCES

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bariatric surgery: systematic review and meta-analysis. *Am J Med* 122:248–256, 2009

<sup>2</sup>Tindle HA, Omalu B, Courcoulas A, Marcus M, Hammers J, Kuller LH: Risk of suicide after long-term follow-up from bariatric surgery. *Am J Med* 123:1036–1042, 2010

<sup>3</sup>Maciejewski ML, Smith VA, Livingston EH, Kavee AL, Kahwati LC, Henderson WG, Arterburn DE: Health care utilization and expenditure changes associated with bariatric surgery. *Med Care* 48:989–998, 2010

<sup>4</sup>Hoerger TJ, Zhang P, Segel JE, Kahn HS, Barker LE, Couper S: Cost-effectiveness of bariatric surgery for severely obese adults with diabetes. *Diabetes Care* 33:1933–1939, 2010

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