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## Bariatric Surgery and Long-Term Mortality

*Two studies showed that long-term mortality was lower among extremely obese patients who underwent bariatric surgery than among those who didn't, but we still need trials in which aggressive medical therapy is compared with surgery for this group.*

The prevalence of obesity (body-mass index  $>30$  kg/m<sup>2</sup>) is increasing dramatically in the U.S. and in other developed nations. Obesity increases risk for medical problems, including diabetes and cardiovascular disease. However, observational studies have not demonstrated conclusively that patients who lose weight live longer than those who do not, possibly because separating involuntary from voluntary weight loss is difficult. A consequence of the increasing prevalence of extreme obesity is an increase in the number of bariatric surgery procedures performed. Two groups now address the effect of bariatric surgery on long-term mortality.

Investigators in Sweden studied 4047 obese patients prospectively. Patients who elected to undergo bariatric surgery (2010) were matched on 18 factors with control patients who did not undergo surgery. Participants were followed for a mean of 10.9 years. During follow-up, average weight for the control patients changed by less than 2%. In surgery patients, lowest mean weight occurred during the first 2 years; then, mean weight increased until it stabilized at about 10 years. Patients who underwent gastric bypass exhibited a mean maximal weight loss of 32% and reached a steady state at 75% of baseline body weight. Patients who underwent vertical-banded gastroplasty or gastric banding had maximal weight losses of 25% and 20%, respectively, and steady-state weight losses of 16% and 14%, respectively. During follow-up, 129 deaths occurred in the control group, and 101 occurred in the surgery group (6.3% vs. 5.0%). Compared with controls, the surgery group had an unadjusted hazard ratio of 0.76 (95% CI, 0.59–0.99) and an adjusted HR of 0.71 (95% CI, 0.54–0.92). The most common causes of death were cancer and cardiovascular disease, both of which were less common in surgery patients. The authors concluded that bariatric surgery is associated with both long-term weight loss and lower 10-year mortality.

Investigators in Utah retrospectively evaluated a cohort of 9949 extremely obese patients who underwent gastric bypass surgery, performed by a single practice of six surgeons, during an 18-year period. Matched controls (7925) were selected based on age, weight, and height information that was provided on driver's license or identity card applications. After a median follow-up of 7 years, mortality rates in each group were determined using the National Death Index. The mortality rate per 10,000 population was 37.6 for surgery patients and was 57.1 for the control group (40% difference; HR for matched surgery patients, 0.60; 95% CI, 0.45–0.67). Cause-specific mortality rates in the surgery cohort were 59% lower for coronary artery disease, 92% lower for diabetes, and 60% lower for cancer, compared with rates in the control group. Non-disease-related (including accident and suicide) mortality rates were 58% higher in the surgery group. The authors concluded that gastric bypass surgery in extremely obese patients lowered long-term mortality from cardiovascular disease, diabetes, and cancer.

**Comment:** Both these studies are limited by lack of randomization, which introduces the possibility that, compared with controls, patients who elect to undergo surgery have lifestyle differences that affect mortality. In the Swedish study, both groups were followed prospectively, and data were collected on a host of variables, whereas, in the retrospective Utah study, data were collected on mortality but not on weight loss. Most patients in the Swedish study underwent vertical-banded gastroplasty, whereas the Utah study included only patients

who underwent gastric bypass. Neither study included any patients with long-term weight loss without surgery, so we cannot conclude that surgery is superior to successful medical therapy. Short-term mortality rates were not higher in the surgery groups; however, the Swedish investigators reported surgical revision rates of 17% to 31%, depending on the specific procedure.

Taken together, these two studies provide compelling evidence that bariatric surgery in extremely obese patients can lower long-term mortality; however, the magnitude of this effect is small (number needed to treat, 100–500). Randomized trials in which aggressive medical therapy is used as a control would provide better information about which patients are the best candidates for bariatric surgery, the effect of surgery on mortality rates, and limitations of surgical approaches.

— *David J. Bjorkman, MD, MSPH (HSA), SM (Epid.)*

Dr. Bjorkman is employed at the same institution as the authors of the second study, but he was not involved in the research presented here.

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