

## Bariatric Surgery Relieves Cardiovascular Symptoms in Obese Patients

Karason K, Lindroos AK, Stenlof K, Sjoström L. Relief of cardiorespiratory symptoms and increased physical activity after surgically induced weight loss: results from the Swedish Obese Subjects study. *Arch Intern Med* 2000;160:1797–802.

### Study Overview

**Objective.** To determine whether various bariatric surgical procedures can decrease dyspnea and chest pain and increase physical activity.

**Design.** Controlled clinical trial.

**Setting and participants.** All patients were part of the ongoing Swedish Obese Subjects (SOS) study. Participating medical facilities include 25 surgical departments, to which surgery patients are referred, and 480 primary health care centers, where control patients receive care. (Control patients are tracked in the SOS registry study.) All SOS subjects must be between 37 and 60 years of age and have a body mass index (BMI) greater than 34 kg/m<sup>2</sup> (men) or 38 kg/m<sup>2</sup> (women). A computer program matches surgical and standard-care patients on 18 variables, including age, height, weight, smoking habits, diabetes, and perceived health. Information was obtained from 1210 surgical patients and 1099 control patients, who were observed for 2 years.

**Intervention.** Surgery patients receive gastric bypass, vertical banded gastroplasty, or gastric banding, while control patients receive conventional dietary recommendations.

**Main outcome measures.** Symptoms of dyspnea and chest pain in various circumstances (eg, climbing stairs) as reported by patients on a self-administered questionnaire. Patients also graded their activity level on a scale of 1 to 4, with 1 signifying physical inactivity.

**Main results.** Women constituted 67% of both groups. At baseline, both groups had a similar prevalence of diabetes and apnea. Members of the surgical group were slightly but significantly younger than controls (47 versus 49 years), weighed more (121 versus 114 kg), had a higher BMI (42.2 versus 39.7 kg/m<sup>2</sup>), and had a higher prevalence of smoking (25% versus 20%) and hypertension (53% versus

38%). The surgical group had a higher prevalence of dyspnea (15% to 87% versus 9% to 69%) and physical inactivity (46% versus 33%). The groups had similar prevalences of chest pain (about 24%).

During the study, both groups experienced decreases in symptoms. The absolute differences were much greater in the surgical group. (For example, for “dyspnea when climbing 2 flights of stairs,” the surgical group’s prevalence dropped from 87% to 19% versus 69% to 57% in the control group [ $P < 0.001$ ].) The likelihood of dyspnea, chest pain, or physical inactivity persisting at 2-year follow-up was strongly related to weight change in both groups. An analysis by quartile (worst, +4.0 kg [range, -1.5 to +30]; best, -41.5 kg [range, -123.3 to -29.1]) revealed a “dose-response” gradient. The odds ratios for the best quartiles versus the worst were 0.02 for dyspnea, 0.08 for chest pain, and 0.18 for physical inactivity.

### Conclusion

Bariatric surgery for morbidly obese adults appears to have dramatic effects on cardiorespiratory symptoms and activity levels.

### Commentary

The major weakness of this study was the lack of randomization, which, the authors noted, was not permitted by their ethics committee. Despite efforts to carefully match subjects (the process was completely computer-driven), patient groups displayed differences that may have biased results in favor of the surgical group. The lack of a substantial control intervention may have further contributed to this bias. While sham surgery was not feasible, an intensive, multidisciplinary behavioral program might have reduced any placebo effect. Better measurement of physical activity levels and/or exercise capacity would also have strengthened findings. Nevertheless, the magnitude of effect demonstrated in this study is impressive. Several other studies have documented benefits for obesity-related type 2 diabetes mellitus, hypertension, symptomatic sleep apnea, and

dyslipidemias along with improvements in cardiopulmonary physiologic measures [1].

#### **Applications for Clinical Practice**

Bariatric surgery should be considered for morbidly obese patients who have pathology and/or symptomatology related to their obesity. This study suggests that patients undergoing such treatment will likely enjoy improved functional

status along with less disease burden and decreased risk for cardiovascular morbidity and mortality.

#### **References**

1. Balsiger BM, Murr MM, Poggio JL, Sarr MG. Bariatric surgery. Surgery for weight control in patients with morbid obesity. *Med Clin North Am* 2000;84:477-89.

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