Predicting Mortality Risk in Patients Undergoing Bariatric Surgery

MARK H. EBELL, MD, MS, *Athens, Georgia*

This guide is one in a series that offers evidence-based tools to assist family physicians in improving their decision making at the point of care.

A collection of Point-of-Care Guides published in *AFP* is available at http://www.aafp.org/afp/poc.

Clinical Question

What is the risk of death among patients undergoing bariatric surgery?

Evidence Summary

Bariatric surgery has become increasingly common in the United States.[1] Recent randomized controlled trials have shown that mortality is modestly reduced 11 years after bariatric surgery (absolute risk = 5.0 versus 6.3 percent; $P = .04$; number needed to treat = 77).[2] The overall mortality risk within 90 days of surgery is 0.5 percent.[3] However, the mortality risk varies depending on risk factors and patient knowledge of them. How these risk factors impact mortality may help patients become more informed about the risks and benefits of surgery.

A study of 1,465 patients undergoing laparoscopic and open bariatric surgery at a university medical center found that compared with patients who have mild or no comorbidities, patients with major comorbidities have a greater risk of complications (4.1 versus 1.2 percent; $P < .003$) and a greater risk of mortality (2.3 versus 0.2 percent; $P < .003$; number needed to harm = 48).[4] The same researchers collected two additional years of data, increasing the sample size to 2,075 patients.[5] Multivariate analysis was used to identify four independent variables that predict postoperative mortality risk: body mass index (BMI), male sex, hypertension, and a composite variable of pulmonary embolism risk (i.e., previous venous thromboembolism, pulmonary hypertension, preoperative vena cava filter, or hypoventilation due to obesity). Age older than 45 years was added as a fifth variable. These variables make up the Obesity Surgery Mortality Risk Score *(Table 1[6]);* one point is assigned to each variable that is present.[5]

The Obesity Surgery Mortality Risk Score was prospectively validated in four distinct groups of patients undergoing bariatric surgery at one of three university medical centers or at a private medical center; at least 800 patients underwent surgery at each medical center.[6] The overall mortality rate varied from 0.4 to 2.0 percent (interestingly, the medical center with the fewest patients had the highest mortality rate, although it is unclear whether this was the private medical center or one of the university medical centers). The risk score validated well, and three groups of patients with increasing mortality risks were identified.[6]

The validation study had some limitations. Although data were gathered prospectively at each medical center, this was done independently at each location; therefore,

Table 1. Obesity Surgery Mortality Risk Score

Risk factor	*Points*
Age > 45 years	1
Hypertension	1
Male sex	1
Risk factors for pulmonary embolism*	1
Body mass index ≥ 50 kg per m^2	1
Total:	_____

Risk group (score)	*Postoperative mortality risk (deaths/total number of patients who underwent bariatric surgery)*
Low (0 or 1 points)	5/2164 (0.2%)
Moderate (2 or 3 points)	25/2142 (1.2%)
High (4 or 5 points)	3/125 (2.4%)

**—Previous venous thromboembolism, pulmonary hypertension, preoperative vena cava filter, or hypoventilation due to obesity.*

Information from reference 6.

variables may have been defined somewhat differently at different medical centers. Also, the study did not assess the risk of complications.[6] A larger prospective validation study that considers additional end points and more clearly defines risk factors is ongoing. A search of the literature identified one other risk score for bariatric surgery, but it was evaluated in only 20 patients.[7]

Applying the Evidence

A 39-year-old woman is thinking of having bariatric surgery, but she would like your opinion about its safety. She has a BMI of 42 kg per m^2, hypertension, and no risk factors for pulmonary embolism.

Answer: You explain to her that patients generally can expect a small mortality benefit with bariatric surgery. After 11 years, one additional patient is alive for every 77 patients who have the surgery. Using the Obesity Surgery Mortality Risk Score *(Table 1[6])*, the patient receives one point for hypertension. You determine that her risk of postoperative mortality is low (0.2 percent).

Address correspondence to Mark H. Ebell, MD, MS, at ebell@uga.edu. Reprints are not available from the author.

REFERENCES

1. Steinbrook R. Surgery for severe obesity. *N Engl J Med.* 2004;350(11):1075-1079.
2. Sjöström L, Narbro K, Sjöström CD, et al., for the Swedish Obese Subjects Study group. Effects of bariatric surgery on mortality in Swedish obese subjects. *N Engl J Med.* 2007;357(8):741-752.
3. Buchwald H, Avidor Y, Braunwald E, et al. Bariatric surgery: a systematic review and meta-analysis [published correction appears in *JAMA*. 2005;293(14):1728]. *JAMA.* 2004;292(14):1724-1737.
4. Jamal MK, DeMaria EJ, Johnson JM, et al. Impact of major co-morbidities on mortality and complications after gastric bypass. *Surg Obes Relat Dis.* 2005;1(6):511-516.
5. DeMaria EJ, Portenier D, Wolfe L. Obesity surgery mortality risk score: proposal for a clinically useful score to predict mortality risk in patients undergoing gastric bypass. *Surg Obes Relat Dis.* 2007;3(2):134-140.
6. Demaria EJ, Murr M, Byrne TK, et al. Validation of the Obesity Surgery Mortality Risk Score in a multicenter study proves it stratifies mortality risk in patients undergoing gastric bypass for morbid obesity. *Ann Surg.* 2007;246(4):578-582.
7. Cagigas JC, Escalante CF, Ingelmo A, et al. Application of the POSSUM system in bariatric surgery. *Obes Surg.* 1999;9(3):279-281. ■