ADVANCES IN NUTRITION

Current Developments in Nutrition Support, Dietary Issues, and Weight Management

Surgical Therapy for Obesity

Noel N. Williams, MD
Bariatric Surgery Program Director
University of Pennsylvania Health System
Philadelphia, Pennsylvania

G&H Which obese patients are candidates for surgery?

NNW The criteria for surgery are based on body mass index (BMI), which is calculated via a standardized formula that uses the patient's height and weight. Patients are eligible for surgery if they have a BMI of at least 35 kg/m^2 plus at least 1 comorbidity—such as high blood pressure, diabetes, sleep apnea, or another complication of obesity—or if they have a BMI above 40 kg/m^2 regardless of other factors; however, patients in the latter group typically do have comorbidities, given the severity of their obesity. These guidelines are not only used by surgeons to evaluate patients' eligibility but are also used by insurance companies to determine coverage.

In the United States, approximately 10 million people are morbidly obese (BMI ≥40 kg/m^2) and could qualify for surgery. Having said that, almost all patients try to lose weight using medical weight management and/or commercial weight management programs—such as Nutrisystem, Weight Watchers, etc—before they consider bariatric surgery. Typically, patients have attempted nonsurgical weight loss for 3–4 years before being evaluated for surgery, and many insurance companies actually require that patients attempt medical therapy before being eligible for surgery.

G&H Is bariatric surgery being performed more often now than in the past?

NNW Yes, absolutely. The number of surgical procedures being performed to treat obesity has increased significantly. I began performing these procedures in 1998, and I performed a total of 42 procedures that year; now, I perform about 400 operations per year. Nationally, approximately 250,000 procedures are being performed each year, up from about 40,000 procedures in 2000. To meet this demand, most large hospitals in major cities now have a bariatric surgery program, and many cities have more than 1 hospital with such a program.

G&H Why has bariatric surgery become more common?

NNW The first reason for this increase is the development of a laparoscopic technique. Laparoscopic surgery became much more common in the late 1980s and early 1990s, and by the mid-1990s, a laparoscopic technique was being used for gastric bypass surgery. Before that time, weight loss operations required a very large incision, resulting in a higher complication rate; however, once this procedure could be done laparoscopically, it became much safer.

In addition, new anesthesia techniques have been developed for this patient population, which also make the procedure safer. When I started performing bariatric surgery, every patient went to the intensive care unit postoperatively, and usually the patient remained on a ventilator overnight. Now, bariatric surgery patients go straight to the hospital floor, and they are very rarely on a breathing machine or a ventilator overnight. Indeed, some procedures have become same-day surgeries in certain patients.

G&H Could you briefly describe the main types of bariatric surgery?

NNW The gold standard is a laparoscopic gastric bypass. In this operation, the surgeon first makes a small pouch in the stomach; this causes the patient to feel full after eating a small amount of food. The surgeon then goes down the intestine, divides the small intestine, brings a loop of intestine up to the pouch in the stomach, and attaches the loop to the pouch. The food will now go preferentially in that direction; it no longer goes into the old stomach and the upper part of the small intestine. Gastric bypass is therefore described as being a restrictive operation (because of the small pouch that is created) as well as a malabsorptive operation (because it changes the way that food travels through the intestines).

The second major weight loss operation is sleeve gastrectomy; it is a purely restrictive operation. In this procedure, the surgeon removes approximately six eighths or sometimes seven eighths of the stomach, leaving the patient with just a very thin sleeve of stomach. Patients thus must restrict their portions, and they lose weight because they can only eat a small amount of food.

The third operation involves laparoscopic insertion of an adjustable gastric band. This device, which has an inner tube attached to a reservoir, is placed around the upper portion of the stomach, just below where the esophagus meets the stomach. When the band is first placed, there is no fluid in it; beginning 4–6 weeks after surgery and going out to 12–18 months, the band is adjusted by adding more fluid from the reservoir. As the band is filled with fluid, the patient begins to feel a restriction when he or she eats. Because the band creates a little pouch at the top of the stomach, patients who undergo this procedure feel full quickly, eat less, and lose weight.

G&H Is surgery a last resort for obese patients who need to lose weight?

NNW Because obesity surgery has become quite safe and has impressive results, it is not a last-resort therapy, per se; rather, it is an effective treatment option that can benefit a range of patients. While patients who undergo these procedures are morbidly obese and need to lose weight, many of these patients also have significant medical comorbidities, so the motivation for surgery is usually 2-fold. In addition to the cosmetic and general health benefits of weight loss, the data have shown that surgery improves obesity-related medical conditions in this patient population. For example, if bariatric surgery is performed in a patient with type II diabetes, almost 95% of patients who have had diabetes for less than 10 years will be cured. Thus, surgery not only improves obesity but also addresses some of the associated medical complications. In fact, some clinicians have suggested that patients with type II diabetes should be offered gastric bypass surgery even if their BMI is 35 kg/m^2 or below.

G&H Is surgery typically effective in terms of weight loss?

NNW Yes, these procedures are typically quite effective. When we talk to patients about weight loss, we discuss the results in terms of excess weight loss. For example, if a patient weighs 300 lbs when he should weigh 150 lbs, then he is 150 lbs overweight. That is his excess weight. Patients can lose almost 70% of their excess weight with a gastric bypass procedure, approximately 60–65% of their excess weight with a sleeve gastrectomy, and 50–55% of their excess weight with a Lap-Band (Allergan). If a patient has surgery and he or she loses less than 50% of his or her excess weight, then that procedure is viewed as a failure.

G&H What factors influence the degree of weight loss following surgery?

NNW In order to achieve success with weight loss surgery—especially sleeve gastrectomies and adjustable gastric band procedures—patients must undergo an extensive preoperative education process. Usually this process lasts 2–3 months and involves multiple visits with the surgeon, a dietician, and a psychologist. A key message during these visits is that patients need to do more than just undergo the surgery and have a successful postoperative recovery; they also must come back for routine follow-up visits. In addition, they must pay attention to the nutritional guidelines they have received, and they should exercise if possible. In order for the procedure to be successful, it must be part of a comprehensive behavior modification approach.

G&H How do you determine which of these procedures is most appropriate for a particular patient?

NNW The majority of patients are now very educated about these procedures. Before coming to a bariatric clinic, many patients research these procedures online. If they come to my clinic and express interest in surgery, they are then invited to attend a group information session during which a surgeon or the program coordinator provides information about available procedures, the surgical process, and our program. Thus, most patients often know which procedure they would prefer by the

time they come for a one-on-one surgical consultation. If the patient's preferred procedure is medically appropriate for him or her, then it will often be my choice for that patient. I would not do that operation if I thought it was contraindicated, but, otherwise, patient preference can play a significant role in the selection of a procedure.

G&H How are surgical candidates evaluated for these procedures?

NNW Every patient who comes to our clinic receives a comprehensive work-up. We require cardiac clearance, pulmonary function tests, sleep apnea testing, and usually an upper gastrointestinal series and radiographs of the upper intestines to check for anatomic abnormalities that could contraindicate a particular operation. The patient's overall condition is also taken into consideration; for example, if a patient is on dialysis and is waiting to undergo kidney transplantation, those factors would be assessed as part of the decision process.

G&H What are the potential risks of surgery?

NNW As with any procedure, bariatric surgery carries the risk of complications related to general anesthesia. Similarly, early postoperative complications that can occur in any patient include postoperative collapse of the lung, pneumonia, or blood clots. These complications were formerly common among bariatric surgery patients, but surgeons now take measures to prevent these complications, and they occur much less frequently. With gastric bypass surgery, early postoperative complications can also include bleeding or leaking of the staple line. We discuss these risks with every patient prior to surgery, so their knowledge of the potential complications is very high.

In terms of late postoperative complications, malabsorptive procedures carry a risk of poor nutrition, so these patients must receive follow-up care indefinitely. Gastric bypass patients, in particular, need careful nutritional follow-up. These patients may need to be given certain supplements, such as calcium, vitamin B_{12}, and folate, and these supplements need to be added to the patient's diet at higher-than-normal levels; some patients may need to receive supplements by injection. Sleeve gastrectomy is not a malabsorptive procedure, so the long-term metabolic effects are not as significant, but ongoing monitoring is still required. Risks of laparoscopic banding surgery include band slippages and band erosions.

Twenty years ago, some patients had a gastric bypass procedure but were not followed long term, and a significant percentage of those patients developed nutritional problems. Now, we have a very strict postoperative follow-up regimen; patients must come back to see us within 10–14 days after surgery, again at 6 weeks postoperation, again at 3 months, again at 6 months, and annually thereafter.

G&H How can complementary interventions help to enhance the efficacy of surgery?

NNW All patients who are planning to undergo bariatric surgery at our clinic are seen preoperatively at the Center for Weight and Eating Disorders, which is a psychological obesity center in the department of psychiatry. Patients are evaluated by a psychiatrist at this center prior to surgery, which not only allows us to glean potential psychological problems the patient might have related to the procedure but also provides an opportunity for the psychiatrist to explain the behavior modification that will be necessary following surgery. This preoperative education and evaluation improves the success of the procedure for patients, as they are more aware of ways to make the process successful.

G&H What is the current focus of research in bariatric surgery?

NNW Current research is examining why bariatric surgery cures diabetes. We know that diabetic patients who undergo a gastric bypass procedure often recover from their diabetes—in some cases, their insulin requirement is alleviated before they even leave the hospital—but we do not know why surgery has this effect. There is some speculation that simply changing the flow of nutrients by doing a gastric bypass procedure affects the pancreas in such a way that it changes the patient's insulin requirement; animal studies are now being conducted to delineate that effect. If this benefit could be mimicked without an operation, it could potentially be an effective treatment for diabetes.

G&H What other avenues of research might be pursued soon?

NNW The "magic pill" for weight loss is still probably a long way away. Over the years, there have been many medical attempts to cure obesity, and most of these attempts have failed. Patients may lose weight for a year, but they regain the weight once they stop taking the medication. Nonetheless, bariatric surgery represents a major advance, and future procedures may be even better. We have already progressed from open surgery to minimally invasive surgery—in some cases, laparoscopic procedures are performed with a robotic

surgical system—and researchers are investigating whether these procedures could perhaps be performed endoscopically. Specifically, researchers are considering whether it might be possible to pass an endoscope into the patient's stomach and then suture within the stomach to make a small pouch, to deliver a balloon into the stomach, or to deliver a tube into the stomach. The hope is that such a procedure could mimic the benefit of current operations with fewer risks. Having said that, bariatric surgery is currently very safe and effective; as long as patients are properly prepared and a high standard of care is maintained, then the success rate with these procedures is quite high.

Suggested Reading

Vetter ML, Dumon KR, Williams NN. Surgical treatments for obesity. *Psychiatr Clin North Am*. 2011;34:881-893.

Scheen AJ, De Flines J, De Roover A, Paquot N. Bariatric surgery in patients with type 2 diabetes: benefits, risks, indications and perspectives. *Diabetes Metab*. 2009;35(6 pt 2):537-543.

Chakravarty PD, McLaughlin E, Whittaker D, et al. Comparison of laparoscopic adjustable gastric banding (LAGB) with other bariatric procedures; a systematic review of the randomised controlled trials. *Surgeon*. 2012 Mar 7. Epub ahead of print.

Damms-Machado A, Friedrich A, Kramer KM, et al. Pre- and postoperative nutritional deficiencies in obese patients undergoing laparoscopic sleeve gastrectomy. *Obes Surg*. 2012 Mar 9. Epub ahead of print.

Gibbons LM, Sarwer DB, Crerand CE, et al. Previous weight loss experiences of bariatric surgery candidates: how much have patients dieted prior to surgery? *Surg Obes Relat Dis*. 2006;2:159-164.