

Commentary

Bariatric Surgery—A Surgeon's Perspective

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The prevalence of obesity has increased steadily during the past several decades, and this has become an important public health concern. More than one third of the population of the United States is considered obese, and approximately 15 million (5%) Americans now have a body mass index (BMI) >40 (1). Obesity has been linked to numerous chronic health conditions, including hypertension, hyperlipidemia, sleep apnea, type 2 diabetes mellitus, and heart disease (2). Obesity-associated conditions significantly increase hospital length of stay and overall health care costs and markedly decrease life expectancy (3). Furthermore, there are many quality-of-life and adverse psychosocial aspects associated with obesity (4). Bariatric surgery currently appears to be the only effective treatment for severe obesity and its associated comorbidities. In addition, evidence is accumulating that bariatric surgery provides a survival benefit for patients with morbid obesity. Two recent cohort studies have showed that bariatric surgery compared with medical management reduced long-term mortality in patients with morbid obesity (5,6). After adjustment for population characteristics, the decrease in mortality rates in the two studies amounted to 29% (95% confidence interval 8% to 46%) and 40% (95% confidence interval 33% to 55%), respectively.

INCIDENCE OF BARIATRIC SURGERY

During the past several years, the number of bariatric surgeries in the United States has increased dramatically; it was estimated that 220,000 bariatric procedures were performed in 2008 (7). Several events have contributed to the increase in bariatric surgery numbers: accumulation of numerous outcome-based studies that provide reliable information on both short-term and long-term results, development of minimally invasive laparoscopic techniques, increased public awareness of obesity, and failure of non-surgical treatments to provide effective sustained weight loss. Still, only approximately 1% of individuals with morbid obesity undergo bariatric surgery. There are nu-

merous reasons for the failure to deliver care to those who need it. There remain mixed attitudes among patients and providers regarding bariatric surgery and some perceive it to be highly dangerous. Also, the lack of or denial of insurance coverage remains a major obstacle. In an effort to improve both patient access and overall quality of care, the American Society of Metabolic & Bariatric Surgery and the American College of Surgeons have each established bariatric surgery Centers of Excellence. The establishment of Centers of Excellence has been an important step forward toward accurately tracking outcomes, defining clinical criteria, enhancing the quality of care, and improving patient access to this life-saving operation. It appears that these efforts are beginning to pay dividends; Medicare now endorses bariatric surgery as a safe and effective treatment for morbid obesity. This decision is not only a victory for Medicare patients, but also for many patients who have been unnecessarily denied bariatric surgery because of outdated and overly restrictive policies by some private insurers. As the biggest insurer in the United States, Medicare decisions often cause private insurers to follow suit. In addition, Medicare mandates that bariatric surgery be performed only at certified Centers of Excellence. Having moved beyond the learning curve for laparoscopic techniques and as more surgeries are being performed at high-volume centers, bariatric surgery has become safer—the risk of death from bariatric surgery is about 0.1% (7). It appears that we are approaching an era that will allow the appropriate patients access to bariatric surgery, and at the highest possible quality. The need for dietetics practitioners to counsel and treat these patients in appropriate dietary behaviors is also likely to increase.

SURGICAL OPTIONS

Bariatric surgery is appropriate for adult patients with a BMI ≥ 40 , or with a BMI between 35 and 40 with obesity-related comorbidities such as type 2 diabetes, hypertension, cardiomyopathy, sleep apnea, asthma, pseudotumor cerebri, osteoarthritis, or hyperlipidemia (8). These criteria have remained unchanged since 1991, but recently O'Brien and colleagues (9), in a well-designed randomized study (albeit a small one), showed that the BMI threshold should possibly be lowered to 30 (9). The two most common procedures worldwide are adjustable gastric banding (AGB) and Roux-en-Y gastric bypass (RYGB). Both are performed laparoscopically and both approaches have strong support among bariatric surgeons. Laparoscopic AGB is generally considered to be more flexible, less invasive, and safer, but the results are both less reliable and less effective. In addition, long-term outcomes of AGB beyond 5 to 7 years remain unclear. On the other hand, RYGB is generally considered more durable, reliable, and effective. RYGB also provides beneficial alter-

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Manuscript accepted: December 28, 2009.

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0002-8223/10/11004-0001\$36.00/0

doi: 10.1016/j.jada.2010.01.007

ations in gut hormones as they relate to insulin resistance and satiety. Although RYGB can be performed safely, particularly at high-volume centers, it remains more technically challenging with more potential serious complications. Recently, laparoscopic sleeve gastrectomy as a stand-alone primary bariatric procedure has been promoted by some centers. Sleeve gastrectomy drastically reduces the capacity of the stomach without altering the anatomy of the gastrointestinal tract. In addition, by removing the majority of the stomach, ghrelin hormone levels are decreased, which helps control hunger (10). The biggest drawback of this procedure is the lack of long-term data and concerns of gastric sleeve dilatation and subsequent weight regain. Biliopancreatic diversion with duodenal switch (BPDS) is a pure malabsorptive operation that provides excellent weight loss results and may be particularly valuable for patients with BMI >50. However, BPDS is only performed at a few centers in the United States because of its higher rate of potential complications. In general, patients with more severe obesity (eg, BMI >50) are generally considered better candidates for RYGB or BPDS, whereas AGB or sleeve gastrectomy may be most beneficial in milder degrees of obesity. Optimally, the choice of which surgical procedure should center on individual risk–benefit considerations and candidates should receive full information about each of the different procedures. The role of diet, new eating behaviors, and meeting nutrient needs should be addressed.

METABOLIC EFFECTS OF SURGERY

The effectiveness of bariatric surgery has been traditionally measured only in terms of excess weight loss, for which data clearly indicate the effectiveness of all procedures (11). Today, research emphasis is more focused on the effects of surgery on obesity-related comorbidities. Evidence suggests that at least some bariatric procedures exert their beneficial metabolic effects not only by weight loss but also through a change in gut hormone release (ie, ghrelin, peptide YY, and glucagon-like peptide 1). These findings have extended the field of bariatric surgery beyond weight loss and toward the field of metabolic surgery. Metabolic surgery refers to surgically modifying the gastrointestinal tract to alter the underlying pathophysiology and treat a disease traditionally treated medically. One of the earliest observations of the relationship between the gastrointestinal tract and metabolic disease was the improvement in type 2 diabetes following gastrectomy for peptic ulcer disease. Another prime example is the treatment of hyperlipidemia with partial ileal bypass. In the 1990s, Pories and colleagues (12) found that RYGB in morbidly obese patients improved type 2 diabetes within days after surgery, suggesting that the improved insulin resistance was independent of weight loss. Multiple theories have been proposed, and although the exact mechanism is not known, most concur that changes in gut hormones play a major role. In addition, animal studies in nonobese rats with type 2 diabetes have reinforced the idea that exclusion of the duodenum and proximal jejunum is responsible for the glycemic control by altering gut hormones and the enteroinsulinic axis (13). These findings, as well as the overwhelming evidence that bariatric surgery is an effective treatment for type 2 diabetes (up to 90% remission), have led to the new ex-

panded thinking that metabolic surgery may also be appropriate for individuals with diabetes who have a BMI <35. This possibility calls into question the National Institutes of Health guidelines established in 1991 that hold BMI of 35 as an absolute lower limit for suitability for bariatric surgery. This new thinking is further fueled by the ineffectiveness of medical therapy and the fact that bariatric surgery has become increasingly safer. When considering the risks-to-benefits ratio, one is more likely to die from complications of diabetes than from complications of bariatric surgery. Most research into metabolic surgery has been restricted to patients with a BMI >35, and data in patients with a BMI <35 is limited to small series with short follow-up. Cohen and colleagues (14), in a series of 37 patients (BMI of 32 to 35) and poorly controlled comorbidities, reported resolution of type 2 diabetes and dyslipidemia in 100% of patients and hypertension in 97% after laparoscopic RYGB. A small but compelling randomized controlled trial comparing laparoscopic AGB to conventional medical therapy for the treatment of early type 2 diabetes in patients with BMI between 30 and 40 was recently published (15). After 2 years of follow-up of 60 patients, 73% of the surgery patients achieved complete remission of diabetes, compared with 13% of those treated medically. Although the study was not powered sufficiently to compare complication rates between the two groups, no serious adverse events occurred in either group.

LONG-TERM SUCCESS

One of the greatest challenges facing bariatric surgery is maintaining long-term patient follow-up, which is critically important for both the bariatric surgery program and patients. The success of any bariatric surgery is largely dependent on proper patient selection with particular attention to commitment and compliance. Bariatric surgery patients are at risk for potential nutritional complications such as protein malnutrition and certain vitamin deficiencies. The most common micronutrient deficiencies following RYGB include iron, folate, vitamin B-12, and vitamin D. Lifelong vitamin supplementation and monitoring is required. A recent retrospective study that included a 2-year follow up of post-RYGB patients noted that despite supplementation with a standard multivitamin, 98% of patients required additional specific vitamin supplements by 24 months. On average, each of their patients required 2.9 ± 1.4 specific supplements in addition to a multivitamin (16). Recent studies have suggested the benefit of systematic assessment of the micronutrient status of all gastric bypass candidates before surgery, and regular monitoring of vitamin levels is strongly encouraged in the postoperative period and for several years beyond (17). Dietetics practitioners who work with bariatric surgery patients play an important role in identifying and addressing nutritional deficiencies.

Weight regain after bariatric surgery is another long-term challenge; significant weight regain may occur in up to 20% of patients following RYGB. This weight regain after bariatric surgery supports the concept that obesity is a chronic and progressive disease. Weight regain occurs probably due to anatomical and physiological adaptations that occur over time that may permit a patient to return

to bad old habits. The consumption of high-energy-density liquids and the presence of abnormal eating patterns, such as binge-eating and snack-eating patterns, as well as a progressive increase in total energy intake, seem to be related to weight regain. A comprehensive team concept is most appropriate to help support the patient in making the necessary lifestyle changes. Some patients may perceive surgery as the easy way out when in fact lifelong behavior modification and, often, continued emotional support are needed to maintain a successful long-term outcome. Most patients have been battling the disease of obesity for many years, if not a lifetime, and have only sought out surgery after having failed multiple diet and exercises programs. It is best to be honest and acknowledge that it can be difficult to make changes and modify habits. In addition, it is important to highlight that the surgery will not make these changes, but rather is a tool that will help maintain compliance. Obesity is a complex disease that goes way beyond a simple lack of self control. Letting patients know that this concept is understood is an excellent way to build a strong and trusting relationship. It is important that bariatric surgery programs create environments where patients feel comfortable coming, not only when they are doing well, but also when they are struggling.

FUTURE DEVELOPMENTS

In light of the obesity epidemic, which threatens to redefine the nature of medical care, bariatric surgery will continue to thrive. Much research is focused on the development of safer and less invasive techniques to battle the disease of obesity. Many of the more prominent new technologies are incisionless and utilize either an endoscopic approach or via a natural orifice such as the mouth or vagina. Clinical trials are underway to investigate endoscopic suturing and stapling devices to perform both primary and revisional bariatric surgeries (18). Another novel technology involves an endoscopically delivered impermeable sleeve to achieve duodenal-jejunal exclusion and biliopancreatic diversion without the need for an incision or anastomosis (19). Advancements in neuro-modulation involving a pulse generator to deliver an electrical impulse to the stomach or duodenal wall and/or the vagal nerve continue to grow. The impulse can be programmed to either stimulate or block normal electrical activity (20). Although these technologies are in their infancy, preliminary data suggest that they are safe and may actually work.

CONCLUSIONS

Bariatric surgery is the most effective treatment for severe obesity, producing durable weight loss, improvement of comorbid conditions, and longer life. The choice of which specific operation is right for a particular patient should be individualized with a full understanding of the pros and cons of each. Bariatric care should be delivered within credentialed multidisciplinary systems to ensure the best possible outcomes. Lifelong preventive actions, such as supplementation, regular follow-up, and thorough patient education are mandatory. In addition, the challenge to health care providers remains to educate the

public that bariatric surgery goes well beyond simply weight loss.

STATEMENT OF POTENTIAL CONFLICT OF INTEREST:
No potential conflict of interest was reported by the author.

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