Adolescent Bariatric Surgery

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DEMOGRAPHICS OF CHILDHOOD OBESITY

The so-called obesity epidemic among adults in the United States has been well documented. Based on data from the American Heart Association, between 2003 and 2006, 36.8\% of African American men and 52.9\% of African American women were obese, indicated by a body mass index (BMI) of 30 kg/m\textsuperscript{2} or greater. For Caucasians, 32.3\% of men and 32.7\% of women fell into this category, and for Hispanics 26.8\% of men and 41.9\% of women had a BMI of 30 kg/m\textsuperscript{2} or greater.\textsuperscript{1} The American Academy of Pediatrics (AAP) classifies children with a BMI between 85th and 95th percentile as overweight, based on 1973 norms for age and gender. The AAP defines pediatric obesity as a BMI greater than the 95th percentile based on these norms.\textsuperscript{2} Over the past 30 years, the United States has seen an almost threefold increase in the incidence of children who fall into the category of overweight as defined by the AAP criteria. Among children aged 2 to 19 years, 12 million (>20\% of the pediatric population) are currently considered obese.\textsuperscript{3}

The factors that may be driving this epidemiologic surge in overweight and obesity rates have come under intense research. Several groups have shown that children of lower socioeconomic status and minority status are disproportionately affected by this epidemic.\textsuperscript{3–5} The effects of socioeconomic status and culture on childhood obesity are complex and multifaceted. Over the past 30 years, economic forces have resulted in an increase in the incidence of dual-earner households, and with this change in household dynamics, families are increasingly relying on the availability of fast food or processed food for daily consumption. These industrially prepared foods have
become ubiquitous in our society and are often more affordable than other, more nutritious home-prepared meals. Furthermore, many public school systems have been offering meals that are of high caloric and low nutritional value. Many educational systems have entered into attractive contracts with beverage companies in exchange for much-needed financial support. Schools have also been reducing structured physical education programs from their high school and junior high school curriculums. Because of the lack of adequate supervision, many families do not allow prolonged outdoor activities, and therefore entertainment often is provided in the form of "electronic babysitters," or technology, such as television and video games, which have largely replaced afterschool physical activity.6–10

**HEALTH IMPACT OF CHILDHOOD OBESITY**

Dietary and lifestyle choices that result in childhood obesity are difficult to reverse and have life-long implications. Morbid obesity is typically associated with numerous life-threatening medical conditions, and adolescents are not immune. As the prevalence of obesity increases in adolescents, a parallel rise occurs in the prevalence of obesity-related comorbidities, such as diabetes, nonalcoholic fatty liver disease, obstructive sleep apnea, and metabolic syndrome with resultant cardiovascular complications.

The incidence of diabetes is rapidly rising, representing a potential for serious complications in the future. Type 2 diabetes mellitus (DM) is a metabolic disease that is difficult to control, and for which various therapies, including insulin, promote additional weight gain through their anabolic effects, thereby furthering a dangerous cycle. Furthermore, the incidence of diabetes-related complications, such as retinopathy, renal disease, and small vessel disease, is directly related to the duration of the disease, therefore adding an important incentive for early treatment. In 1992, type 2 DM was a rare occurrence in most pediatric centers. By 1994, it represented up to 16% of new cases, and by 1999 the incidence of new diagnoses ranged between 8% and 45%, depending on geographic location.11

Nonalcoholic fatty liver disease (NAFLD), has also been rising at an alarming rate in adolescents. This progressive disease advances through a spectrum of severity that includes steatohepatitis and ends with liver cirrhosis. NAFLD is rapidly becoming the most common indication for liver transplantation among young adults. A recent study found that 23% of 127 obese 12th graders in the United States had elevation in alanine transaminase attributable to NAFLD.12 NAFLD was found to be present in 43% of a group of 181 obese adolescents in Brazil, and this was found to correlate with degree of visceral body fat and insulin resistance.13

Obstructive sleep apnea (OSA) has been shown to be an independent risk factor for cardiovascular disease in adults and is associated with left ventricular hypertrophy and abnormal ventricular geometry in children.14 OSA has been shown to correlate with severity of obesity in adults.15 Marcus and colleagues16 reported that 36% of obese children and adolescents had abnormal polysomnograms, and they also showed a positive correlation between the degree of obesity and the severity of OSA.

Based on a 17-year cohort study following obese adolescents, Freedman and colleagues17 extrapolated that 77% of children who are obese at age 15 to 17 years will be obese adults. Because the cardiovascular complications of metabolic syndrome result from many years of exposure, the early onset of obesity portends significant risk for cardiovascular disease later in life. Becque and colleagues18 found that among 36 children presenting for a supervised weight loss program, 35 had four or more serious cardiovascular risk factors. Bibbins-Domingo and colleagues found that the
incidence of coronary artery disease in young adults is expected to increase by 5% to 10% within the next 10 years, which will lead to more than 100,000 excess cases of coronary artery disease attributable to increased obesity in teenagers and young adults.\textsuperscript{19}

Important behavioral consequences are also associated with obesity in the teenage years. Adolescents with obesity are more likely to be bullied and, according to surveys, are typically viewed by teachers and fellow students as lazy and often experience discrimination at the hands of their educators.\textsuperscript{20} Attention deficit hyperactivity disorder and depression are found at increased rates in obese adolescents compared with peers who are not overweight, and obese children are at greater risk of not completing their education.\textsuperscript{21} One recent adolescent socialization study surveyed children on their views regarding peer relationships and found that obese children had an average of 3.4% fewer friendship nominations (ie, when one child in a survey names the other child as a friend) than did their nonoverweight peers. Obese adolescents were also more likely to receive zero friendship nominations.\textsuperscript{22} In a retrospective review of psychological data collected on the first 40 adolescents presenting for laparoscopic adjustable gastric band at an adolescent bariatric clinic in Chicago, 32% were found to be clinically depressed, 13% had current suicidal ideation, 15% had previously attempted suicide, 50% reported bullying, and 10% had dropped out of school.\textsuperscript{23}

**BEHAVIORAL AND MEDICAL THERAPY**

The obesity crisis in children has recently reached national prominence as a result of heightened political attention, including high-profile campaigns such as Michelle Obama’s “Let’s Move” task force on childhood obesity. Politicians, educators, pediatricians, and sociologists have called for reforms in the home, the fast food industry, grocery stores, and the public school system, but changing this complex social and medical problem is difficult and expensive, and much work remains. Although preventative strategies and anticipatory guidance are emphasized in the primary care community, solving the problem of how to help children who are already obese is even more complicated. The mainstay of primary care physicians is to institute and reinforce behavior and dietary modification, but many have found it difficult to counsel at-risk patients and their families and get them to adhere to these programs. Epstein and colleagues\textsuperscript{24} published a 10-year experience of children who were counseled on behavioral and dietary approaches to weight loss, finding that at the end of the study period, 34% of children had experienced 20% excess weight loss (EWL) and 30% were no longer obese. The majority opinion in the primary care literature is that the best programs for dietary and behavioral modification are multidisciplinary school-based programs for adolescents that incorporate behavioral counseling, dietary counseling, nutrition education, scheduled physical activity, and parent training.

However, these multicomponent school-based programs are costly and difficult to initiate and maintain. Therefore, many health care providers have considered other solutions, such as medical management combined with lifestyle changes. Few drugs are approved by the U.S. Food and Drug Administration (FDA) to facilitate weight loss in adolescents. Sibutramine is a serotonin and norepinephrine reuptake inhibitor that causes satiety. It was approved for children aged 16 and older, and in one large, randomized, controlled, prospective series, resulted in a mean weight loss of 7.8 kg in the study group compared with 3.2 kg in the placebo group ($P = .001$) at 6 months.\textsuperscript{25} Unfortunately, because of serious cardiac complications that have occurred in adults, the FDA recently prohibited the marketing and sale of this drug.
Orlistat is a reversible inhibitor of pancreatic and gastric lipase that leads to a significant reduction in the absorption of fat-based components of the diet. It is approved by the FDA for children aged 12 and older and, in a meta-analysis of randomized controlled clinical trials, was found to result in a loss of BMI of 0.6 kg/m$^2$ at 54 weeks.$^{26}$ Patients on orlistat must be kept under surveillance because fat malabsorption may also reduce the absorption of fat-soluble vitamins (A, D, E, and K) and, by extension, can contribute to various forms of metabolic bone disease.

Other drugs that have been studied, but are not FDA-approved, include metformin, topiramate, and rimonabant. Metformin is a biguanide antidiabetic drug that suppresses hepatic glucose production and decreases insulin resistance, causing abdominal fat loss in patients who also have insulin resistance, but it can result in troublesome hypoglycemia. Topiramate is an antiseizure medication that causes weight loss via an unknown mechanism. Side effects include drowsiness and impaired cognition, and it is not approved for weight loss in adolescents. Rimonabant is a cannabinoid receptor antagonist that is not approved in the United States because of increased risk for depression and suicide.$^{27}$

INDICATIONS FOR BARIATRIC SURGERY

The National Institutes of Health (NIH) published criteria for bariatric surgery for adults that are widely followed by physicians and insurance providers (Box 1).$^{28}$ However, the appropriate referral criteria for adolescents have been widely debated among the surgical community.

In 2009, the International Pediatric Endosurgery Group (IPEG) published a series of guidelines that advocate surgery for adolescents with a BMI greater than 35 kg/m$^2$ with type 2 DM, moderate OSA, or pseudotumor cerebri, or patients with a BMI of 40 kg/m$^2$ or greater with one of several other comorbidities. In addition, to address concerns about the potential for bariatric surgery to interfere with a child’s growth

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**Box 1**

Summary 1991 NIH consensus statement for patient selection criteria for bariatric surgery

The patient is an adult (specifically, not an adolescent)

The patient’s BMI is:
- Greater than 40 kg/m$^2$
- Between 35 and 40 kg/m$^2$, with related comorbidities
- Between 35 and 40 kg/m$^2$, with functional limitations because of body size or joint disease

If, after evaluation by a multidisciplinary team, the patient is judged to:
- Have a low probability of success with nonoperative weight-loss measures
- Be well informed about the long- and short-term risks and benefits of surgery
- Be highly motivated to lose weight through surgery
- Have an acceptable operative risk
- Be willing to undergo lifelong medical surveillance

and development, candidates should have attained or nearly attained 95% of their anticipated adult stature as measured with bone age. Patients should also be able and willing to adhere to postoperative nutritional guidelines, have the intellectual maturity for decision making, and be able to provide informed consent for their surgical management and long-term care (Box 2).29

Although many bariatric and pediatric surgeons accept these criteria, the opinions of many pediatricians and family physicians differ drastically regarding patient referral and eligibility. Woolford and colleagues30 surveyed 275 pediatricians and 375 family physicians regarding indications for bariatric surgery in adolescents, and 48% of

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**Box 2**

**IPEG guidelines for adolescent bariatric surgery**

**Adolescents being considered for bariatric surgery should:**

- Be very severely obese (BMI ≥35 kg/m²) with serious obesity-related comorbidities
- OR
- Be morbidly obese (BMI ≥40 kg/m²) with less-serious obesity-related comorbidities

**AND**

- Have attained or, depending on the severity of comorbidity, nearly attained adult stature
- Have at least 6 months of failed organized conventional attempts at weight management
- Shown commitment to comprehensive pediatric psychological evaluation both before and after surgery and agree to avoid pregnancy for at least 1-year postoperatively
- Be capable of and willing to adhere to nutritional guidelines postoperatively
- Have decisional capacity and provide informed assent for surgical management

**Serious comorbid conditions:**

- Type 2 DM
- OSA (apnea-hypopnea index [AHI] >5 events per hour)
- Pseudotumor cerebri

**Less-serious comorbidities:**

- Weight-related arthropathy
- OSA (AHI>5 events per hour)
- Hypertension
- Dyslipidemia
- Venous stasis disease
- Panniculitis
- Urinary Incontinence
- Significant impairment in activity of daily living
- NAFLD (includes steatohepatitis)
- Gastroesophageal reflux
- Severe psychosocial distress
- Significantly impaired quality of life

This Guideline was prepared by the IPEG Guidelines Committee and was reviewed and approved by the Executive Committee of the IPEG, November, 2008.
respondents said that they would never refer an obese adolescent for bariatric surgery. Most of them endorsed a minimum age of 18 years for referral and 99% endorsed participation in a weight management program before surgery. In another study, Igbal and colleagues31 surveyed 61 primary care physicians on their referral practices of adolescents for bariatric surgery, and found that 42% of respondents had referred an adult or pediatric patient for bariatric surgery and 88% were satisfied with the result of the referral. However, 88% also said that they would never refer a child younger than 13 years for a bariatric procedure, whereas only 44.3% said that they would be somewhat or very likely to refer an adolescent. Reasons cited include unknown long-term effects (n = 51), concern over perioperative risks (n = 44), age alone (n = 37), poor social support for the patient (n = 34), poor patient cognitive function (n = 27), lack of an existing local pediatric bariatric program (n = 21), and the opinion that nonoperative options for weight loss are superior (n = 5). These same respondents said they would consider surgery for significant weight-related comorbidities (n = 45), failure of medical therapy (n = 40), need for durable weight loss (n = 37), and psychosocial issues (n = 37).31

The prevalence of these reservations in the primary care community may account for the numerous adult patients who give a history of childhood obesity and chronic comorbidities that have existed since their late teens and early 20s. Although the concerns of the primary care physicians are understandable, delay in referral until adulthood may not be in the patient’s best interest. Adult patients who are super morbidly obese (BMI >55 kg/m²) or super-super morbidly obese and who undergo bariatric surgery do not attain the same nadir BMIs as less-obese patients who undergo these procedures. Inge and colleagues32 studied this phenomenon in 61 adolescents undergoing gastric bypass. Patients who presented with an initial BMI between 40 and 54.9 experienced a 37.2% decrease in BMI and reached a nadir BMI of 31. Patients who presented with an initial BMI between 65 and 95 also experienced a 37.7% decrease in BMI, nadiring at a BMI of 47 (still morbidly obese). The group concluded that the best results from weight loss surgery occur with timely referral, and that severely obese teenagers should receive early referral for surgical consideration and not be delayed.

OUTCOMES OF BARIATRIC SURGERY IN ADOLESCENTS

The successes of bariatric surgery in adults are well described and extensively published. One recent meta-analysis of 136 studies, incorporating 22,094 patients, describes the results of adult bariatric surgery. The mean percentages of excess weight loss achieved at 1 year with an adjustable gastric band, gastric bypass, and biliopancreatic diversion/duodenal switch were 47%, 62%, and 70%, respectively. Operative mortality was 0.1% for purely restrictive procedures, 0.5% for gastric bypass, and 1.1% for biliopancreatic diversion or duodenal switch. Diabetes completely resolved in 77% of patients, hypertension resolved in 62%, and hyperlipidemia improved in 70%.33

Much less is known about the long-term results of bariatric surgery in adolescents. Surgical weight loss procedures were performed for adolescents as early as the 1970s, but initially these were only performed for “extreme cases.” In 1974, Randolph and colleagues34 published a small series on jejunoileal bypass for morbidly obese adolescents, and 10 years after this, Silber and colleagues35 reviewed medical records and contacted these patients to obtain long-term follow-up. Of 11 patients who underwent jejunoileal bypass between 1972 and 1974, 8 survived at 10-year follow-up. Two patients with Prader-Willi syndrome who were considered to have
A very high surgical risk at the time of operation died within a year. A third patient died of liver failure within the first year of follow-up. Patients experienced significant weight loss and reported improved quality of life and psychosocial functioning, but many experienced serious complications, including nephrolithiasis, renal cortical nephropathy, progressive hepatic structural abnormalities, and multiple nutritional deficiencies. These complications are now known to be the long-term sequelae of jejunoileal bypass and led to the demise of the procedure. As a result of this series, few reports of bariatric surgery in adolescents were published for many years.

As safer weight loss operations were developed and as laparoscopic techniques became more widely available, public demand for bariatric surgery increased. By the late 1990s, the number of adolescent bariatric operations performed nationally increased fivefold, and a 2005 review of members of the American Society of Metabolic and Bariatric Surgeons found that 53% of responders had performed bariatric surgery in an obese adolescent, 70% planned to start a regular surgery program for adolescents, and 84% were interested in multicenter studies in this area. In 2003, a survey of the Kids' Inpatient Database, a national database of inpatient stays for children, determined that more than 100 hospitals performed bariatric surgical procedures on adolescents; 87% performed four or fewer adolescent cases annually, and 39% of these cases were performed at centers that performed fewer than 200 total cases annually. The mean age of patients undergoing surgery was 16 years, with a minimum age of 12 years, and a 6% in-hospital overall complication rate was reported.

Adolescent bariatric surgery remains controversial because of concerns about the immediate risks of surgery, the ethical implications of consenting an adolescent for a life-altering procedure, and potential long-term complications associated with these procedures. Uncertainty exists about the efficacy of these operations in young adults and whether young patients will be able to comply with the postoperative dietary and lifestyle regimens necessary to maintain success of bariatric procedures. Many pediatricians are concerned about growth and development and the nutritional implications that restrictive and malabsorptive procedures may have on adolescents. Concerns also exist about family dynamics and the presence of a supportive environment that will foster an adolescent's adherence to the necessary lifestyle changes.

The two most common weight loss operations in adolescents in the United States are the adjustable gastric band and the Roux-en-Y gastric bypass. The band facilitates weight loss through a restrictive device in which a saline-filled chamber is placed around the stomach and can be adjusted to achieve optimal satiety without dysphagia. The gastric bypass works using both a restrictive component (the small gastric pouch) and a malabsorptive component – diversion of enteric contents away from biliopancreatic secretions via the Roux limb. Appetite is suppressed in both operations but to a larger degree with the gastric bypass. The adjustable gastric band is not currently approved by the FDA as a device for implantation in adolescent patients, but data from many participating centers are available from a recently completed FDA study, and approval of the gastric band is pending.

The clinical data currently available on the efficacy and complication rates of these procedures in adolescents are based on several small series, some of which are prospective. O'Brien and colleagues published a prospective randomized trial in which 50 adolescents between ages 14 and 18 years with BMIs greater than 35 kg/m² were assigned to medically supervised lifestyle intervention or gastric banding. At 2 years postoperatively, mean percent EWL in the band group was 78.8% versus 13.2% in the lifestyle group. At study entry, 36% of band patients and 40% of lifestyle patients had metabolic syndrome, and at 24 months no band patients had metabolic
syndrome compared with 44% of the lifestyle modification patients. Notably, the band group had a 33% reoperative rate at 2 years because of band slippage, pouch dilation, and injury to port site tubing.

Nadler and colleagues\textsuperscript{38} published a retrospective review of 53 patients aged 13 to 17 years who underwent placement of a laparoscopic adjustable gastric band as part of an FDA-approved study. Mean percent EWL for these patients was 37.5% at 6 months, 62.7% at 1 year, and 48.5% at 18 months. Two patients experienced band slippage requiring laparoscopic repositioning. Two patients required repair of hiatal hernia, 1 patient developed nephrolithiasis and cholelithiasis, 4 patients developed iron deficiency, and 5 had mild hair loss. A report on the postoperative complications associated with adjustable gastric band is available from a meta-analysis published in 2008, which included six studies with long-term follow-up, encompassing 352 adolescents undergoing laparoscopic adjustable gastric banding. At 3 years postoperatively, 8% of patients required reoperation (28/352) for band slippage, gastric dilation, intragastric band migration, psychological intolerance of the band, hiatal hernia, cholecystitis, and tube damage. Band slippage was the most common complication, occurring in 3% (12/352) patients. Patients also experienced small rates of iron deficiency (8/352) and mild hair loss.\textsuperscript{39}

The available series evaluating the outcomes of gastric bypass in adolescents examine smaller populations. Stanford and colleagues\textsuperscript{40} followed the outcomes of four adolescents undergoing laparoscopic Roux-en-Y gastric bypass with an average preoperative BMI of 55 kg/m\textsuperscript{2}. At a median follow-up of 17 months, patients experienced an average of 87% EWL with an average postoperative BMI of 35 kg/m\textsuperscript{2}. Adolescents experienced nearly complete resolution of asthma, hypertriglyceridemia, and gastroesophageal reflux. Another series by Strauss and colleagues\textsuperscript{41} included 10 children aged 17 years or younger with a follow-up of greater than 1 year after Roux-en-Y gastric bypass. One patient experienced a weight gain of 14 kg at 144 months postoperatively. Of the remaining 9, mean percent EWL was 62% at 60 months. Two patients required cholecystectomy for stone formation, one required exploratory laparotomy for small bowel obstruction, and one required operative repair of an incisional hernia. Five adolescents developed postoperative iron deficiency anemia and three had folate deficiency. The gastric bypass has particularly good rates of diabetes resolution for adolescents. In 2004, Inge and colleagues\textsuperscript{42} compared 11 adolescents with type 2 DM undergoing Roux-en-Y gastric bypass with 67 treated medically. At 1 year after surgery or initiation of therapy, BMI decreased by 34% in the bypass group, and these patients experienced an average change in fasting glucose of 81%. Medically managed adolescents had no change in their baseline BMI and no change in diabetic medication use.

In their meta-analysis, Treadwell and colleagues\textsuperscript{39} reviewed post-gastric bypass complications in six studies that included a total of 131 patients. No operation-related hospital deaths occurred, but one death occurred in a child 9 months after gastric bypass who contracted severe \textit{Clostridium difficile} colitis and experienced multisystem organ failure. Shock, pulmonary embolism, postoperative bleeding, severe malnutrition, and bowel obstruction occurred postoperatively, but because of variability in the way these complications were reported, the authors of the meta-analysis were unable to calculate actual incidences. Protein-calorie malnutrition and micronutrient deficiency were also reported, but their overall incidence in adolescents is unclear.

Sleeve gastrectomy recently became of interest to adolescent bariatric surgeons. The procedure involves creating a tubular J-shaped stomach through resection of the greater curve of the stomach alongside a bougie used for calibration. Sleeve gastrectomy also markedly diminishes appetite, but its mode of function remains
under investigation. It is believed to work through restriction because of the smaller capacity and less-distensible lesser curve-based pouch and through alterations in the level of ghrelin (a hormone that regulates appetite control and is produced predominantly in the fundus). In adults the procedure typically results in an EWL of 50% to 65%. The procedure may be of benefit to adolescents because it does not involve a malabsorptive component or placement of a foreign body, or require any adjustments.

To date, only a few small relevant series have been published. Till and colleagues published a series of four children aged 8 to 17 years with obesity and serious medical comorbidities who underwent sleeve gastrectomy. No postoperative complications occurred, and at mean follow-up of 12 months, mean BMI had decreased from 48.4 to 37.2 kg/m². Baltasar and colleagues describe a 10-year-old boy with a BMI of 42 kg/m² and Blount disease who was wheelchair-bound and underwent laparoscopic sleeve gastrectomy. At 8 months postoperatively, his BMI decreased from 42 to 28 kg/m² and no metabolic complications were detected. Although the procedure shows some promise in the adolescent population, no large clinical series have been published on sleeve gastrectomy for adolescents, and further data on long-term outcomes and complications are needed.

A current multiinstitutional prospective study is the Teen-LABS (Longitudinal Assessment of Bariatric Surgery) program. This study includes prospectively collected data from four high-volume institutions. The goals of the project are to collect outcomes of weight loss, comorbidity resolution, psychosocial status, and complications of 200 obese adults who were obese before 18 years of age and did not receive surgery, and compare them to a group of adolescents who were obese and did undergo a weight loss procedure. Data collection for this study is ongoing.

ETHICAL ISSUES

Understandably, ethical concerns exist regarding weight loss surgery in adolescents. In a commentary summarizing the issues involved, Dr Donna Caniano emphasized the principles of beneficence, nonmaleficence, autonomy, and justice. The surgeon must be assured that the procedure is in the patient’s best interest: preoperatively the medical team should confirm that adequate medical and psychological evaluation of the patient is performed, sufficient effort has been made to achieve weight loss through nonsurgical means, and the surgical team and hospital are appropriately experienced and equipped to provide safe perioperative and long-term care.

To preserve patient autonomy, informed consent must take into account that the patient and family may have an overly optimistic view of the results of bariatric surgery because of media reports and advertisements for bariatric procedures. To ensure that families understand the actual risks and benefits of surgery, an extensive preoperative discussion that includes the teenager, parents, and family should be conducted. The bariatric surgeon should pay careful attention to understanding the adolescent’s values and behavior patterns and whether the teenager has a habit of not keeping promises and not meeting goals. Informed consent should include disclosure of patient’s obesity and the extent of it and a description of the extent of their medical comorbidities and why they are related to their obesity. The adolescent and the parents or guardians should also understand the nature of the proposed operation, the risks and benefits of surgery, and the impact that these could have on their lives and quality of life. Patients and families should understand the actions and behaviors that they will need to continue postoperatively, and the short- and long-term follow-up schedule should be outlined before the procedure. Financial aspects of treatment,
complications, and short-and long-term care should also be explained. Caniano also suggests that the family be given data about the outcomes for the surgical team and how these compare with published outcomes.

Additional areas of debate are where bariatric procedures should be performed and who should perform them. Currently, adolescent bariatric surgery is being offered by fellowship-trained adult bariatric and minimally invasive surgeons, fellowship-trained pediatric surgeons, and general surgeons. Surgery is performed either at children’s hospitals by pediatric surgeons or at adult hospitals, with adolescents staying on adult inpatient postsurgical wards. Regardless of who is performing these procedures and where they are performed, the authors believe that these operations should only be conducted at centers that adhere to the bariatric Centers of Excellence model. Bariatric surgical programs should be thorough and comprehensive, they should involve extensive preoperative evaluation and counseling by a multidisciplinary team, and the surgeons performing the procedure should have extensive technical experience in the procedure. Having a pediatrician or family physician involved in the preoperative and postoperative management of these teenagers is also very important. In an opinion letter, Spear and colleagues described the ideal adolescent program: it should have an affiliation with a pediatric hospital, specific guidelines for the preoperative evaluation and candidacy of adolescents should be available, and a multidisciplinary team should be involved, which includes a surgeon, pediatrician, dietitian, mental health specialist, exercise therapist, and case manager. The program should offer procedures that are approved in adolescents, and organized comprehensive postoperative care should be provided and involve the surgeon and the patient’s primary care provider.

SUMMARY

To conclude, the authors believe that anticipatory guidance, prevention, and behavioral intervention are first-line therapy for adolescent obesity. However, when these fail, bariatric surgery has a role in the obese adolescent patient. Although bariatric surgery has associated risks and recognized complications, the risks and complications of obesity-related comorbidities are definite and life-threatening. When an adolescent is referred for consideration of surgery, extensive preoperative evaluation and counseling should be conducted with the patient and family. No consensus exists regarding the optimal weight loss operation for an adolescent. The authors recommend that these operations be tailored to the adolescent, their medical history, and their needs, just as they are for adult patients. Surgery should be performed by surgeons with technical experience and within institutions that have a high clinical volume and a profound commitment to the bariatric program. Postoperatively, patients and families should receive long-term counseling and care from a multidisciplinary team that includes a pediatrician, nutritionist, psychologist, and social worker.

The problem of adolescent obesity is relevant to all surgeons and physicians, not just those who care for children. The authors know from their collective clinical experience that obesity in childhood is not something patients just “grow out of,” and that recognition of this problem and optimizing treatment early can provide patients with healthier and longer lives.

REFERENCES


