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Trimming Adolescent Obesity: Is Surgery the Answer?

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Introduction:

Without a doubt, the number of obese adolescents is reaching epidemic proportions. The amount of obese children and adolescents in the United States has almost tripled in the past 30 years, and current conservative estimates indicate that 15.5% of children and adolescents are obese (defined as body mass index [BMI] of 95th percentile for age)¹. The health care system consequences of this epidemic are enormous, as annual hospital costs for obesity-related diagnoses in the pediatric population tripled between 1979–1981 and 1997–1999². Conditions frequently associated with severe adolescent obesity include premature death, heart disease, obstructive sleep apnea, hypertension, dyslipidemia, low reported quality of life, and type 2 diabetes mellitus, which has significant cardiac, renal, and ophthalmic complications for young adults^{2,3}. Furthermore, studies show that 50% to 77% of obese children and adolescents remain obese into adulthood, thus increasing their risks of developing serious and often life-threatening conditions².

Given this alarming increase in the number of obese adolescents, as well as the comorbid conditions this population will face in the future, it is necessary to identify whether new treatments exist for this population. One option that has recently generated a lot of interest and controversy is bariatric surgery for obese adolescents. Because of the recognized long-term deleterious effects of obesity, bariatric surgery is commonly performed for adults with BMI values of ≥ 35 with comorbidities and for adults with BMI values of ≥ 40 with or without comorbidities, as suggested by the 1991 National Institutes of Health consensus conference guidelines⁴. However, there is no general consensus or definitive data to indicate bariatric surgery in adolescents using the same criteria, or whether such surgery should be used at all. Therefore, it is useful to survey the literature to determine whether bariatric surgery should be used for obese adolescents.

Potential Procedures:

There are two bariatric surgery procedures that have been used to treat severely obese adolescents, the Roux-en-Y gastric bypass (RYGB) and adjustable gastric banding (AGB). First, while there are multiple variants on the RYGB procedure, all share a common theme of intrabdominal end-to-side gastrojejunal anastomosis constructed with a linear cutting stapler⁵. AGB consists of laparoscopic placement of a silicone band that encircles the most proximal stomach, just beyond the gastroesophageal junction. The band is adjustable and removable if necessary².

Evaluation of Current Surgical Methods:

A recent retrospective, long-term study by Stanford et al examined RYGB on four adolescents between the ages of 17 and 19 years old, who underwent a laparoscopic RYGB for morbid obesity at the University of Pittsburgh Medical Center⁵. All patients had previously attempted and failed to lose weight by conventional means (presumably caloric restriction and exercise, but no specifics were given). In this patient population, the mean BMI prior to surgery was 55.14 with a range of 45 to 66. The mean weight of patients was 350 lbs, range, 268 to 431 lbs; the range of patient height was 5 feet 4 inches to 5 feet 9 inches. With the RYGB procedure, the patients lost an average of 87% of their excess body weight combined, resulting in a mean BMI of 35. Excluding one patient who was lost to long term follow-up, the mean BMI after two year follow-up was 28, and the patients had maintained their weight loss. Many patients incorporated physical activity and moderate eating habits into their lifestyles⁵.

On the surface, this study depicts RYGB as extremely successful, since patients experienced a dramatic drop in BMI, and 22 months post-operation they managed to keep the weight off. However, this study had an extremely small sample size ($n = 4$) and still lost one patient before complete follow-up could be attained. Furthermore, there was only one female in the study, so any conclusions drawn from this study are not necessarily applicable to both genders. Most importantly, this article fails to explore the extremely complex nature of how this procedure can affect adolescents physically and mentally before, during, and after the surgery. This may in part be due to the fact that there were no physical complications from surgery in these patients (the authors do mention complications seen in adults), which may have been a fortunate byproduct of the small sample size. Likewise, the authors casually insert at the conclusion the need to involve parents, counselors, and other guidance figures throughout the treatment plan, but they fail to give specifics for implementing a comprehensive nutritional and behavioral post-operation plan. This is potentially dangerous, because one study reported that after gastric bypass surgery, less than 15% of adolescents were compliant with multivitamin, vitamin B12, and calcium regimens, along with demonstrating poor adherence to dietary and exercise regimens⁶.

A more promising and complete approach involving the RYGB procedure can be found in a study done by Inge et al. This study defined a comprehensive weight management center (CWMC), the principle behind this center being that bariatric surgery for adolescents should not occur in isolation, but instead in a context that meets the unique physical, medical, nutritional, behavioral, psychosocial, and emotional needs of adolescents and their families. The CWMC team provided behavioral and psychological counseling, as well as nutritional meal planning post-surgery. A child psychiatrist was on staff as part of the CWMC program to help with post-operative adjustments in lifestyle. This was especially important because after bariatric surgery, the adolescent patient's welfare depends on complex interactions between the patient and his or her family, and family unit dysfunction can manifest in this patient population as poor compliance with postoperative diet and supplement plans⁶.

As with all the studies, surgery was done as a last option after other weight-loss programs failed. Pediatric psychologists were on hand to help with rehearsal of postoperative practices and encourage further behavioral support. All patients ($n = 10$) who underwent RYGB were greater than 100% over the 50th percentile of BMI for age. Those who were six to nine months after operation had lost 47% of excess weight, and patients who were nearing two years after operation had realized 53% excess weight loss, on average⁶.

This study described complications in the subjects, ranging from purely medical and surgical issues like obstructions that needed correcting, to behavioral and psychosocial issues. Non-surgical issues were delegated to the CWMC and monitored throughout the treatment plan⁶. As demonstrated by the results, this study clearly established the efficacy of combining RYGB with psychosocial guidance as an effective means of weight loss in obese adolescents. While the sample size for this study was also low, all patients experienced significant weight loss. Furthermore, the size was large enough to generate some of the expected side effects, as well as clearly define a method for actually dealing with such side effects through the CWMC program. In this fashion, the authors more realistically portray the procedure and detailed one methodology for providing the nutritional and behavioral support for these adolescents. One aspect of the CWMC that this article does not address is how such a program would be funded when applied elsewhere, but it is undeniable that this type of program could greatly help with long-term management of obese adolescents.

Shifting focus from RYGB to AGB, Abu-Abaid et al addressed the potential for laproscopic AGB in obese adolescents. Over a mean follow-up period of 23 months (range of 6 to 36 months) investigating 11 patients who underwent AGB, the mean BMI dropped from 46.6 to 32.1 with marked improvement in medical conditions. No late complications developed in any patient, and all were given strict guidelines on diet, vitamin intake, and exercise routines they should maintain⁷. However, no information was given about what those guidelines actually were or how one might implement a similar post-operative management. The authors remarked that all the adolescents reported an improvement in overall well being; they were more physically active, more socially involved with their peers and reported feeling happier than before surgery⁷.

In a similar study, Widhalm et al also investigated laproscopic AGB. In eight morbidly obese patients, the mean weight loss after a mean follow-up period, which included post-surgical weight management sessions, of 10.576 months was 25.073.8 kg, which corresponds to 15.9% reduction of the initial body weight⁸. Like the Abu-Abaid et al article, this study makes reference to the major nutritional and psychological problems that many obese adolescents have prior to and following surgery, but neither study makes any specific recommendation on what type of regimen to undertake to ensure that weight loss remains permanent or that the adolescent does not experience post-surgical problems. While these studies show that AGB reduces body weight, neither gives insight into the overall health status of the patient post-surgery.

Discussion:

The above review represents the most recent research in two methods of bariatric surgery in adolescents. It is clear that in every study encountered, obese adolescent patients in these studies experienced dramatic weight loss and lowering of BMI after their procedure. Furthermore, many of the studies indicated that the patients reported improved quality of life, both physically and psychologically, after undergoing the procedure.

However, many lingering questions remain that have yet to be explored by physicians and their patients, making it difficult to draw any serious conclusions or make any strong recommendations for bariatric surgery in adolescents. First, a complete literature search yielded no papers comparing the efficacy of RYGB versus AGB in adolescents. It is not clear from the separate studies whether one procedure might be superior to the other, or whether a third option that is currently only used in adults might be equally or more suitable for adolescents.

More critically, none of the studies compared surgery with non-surgical interventions; each study simply mentioned as inclusion criteria that the patient must have failed non-surgical means of weight loss, but no specific non-surgical means were mentioned. Epstein et al demonstrated that 6 to 8 months of family-centered, multidisciplinary, behavior-based weight-management programs can result in normal weight among 30% of participants at 10-year follow-up^{9,10}. Although this program was applied to younger children with less severe obesity, their principles are sound and at this point are considered to be the gold standard for behavior-based weight management¹¹. Therefore, it is vital that research is done comparing surgery to non-surgical weight loss plans in order to establish a clear reason for pursuing potentially life-threatening surgery versus pursuing noninvasive forms of weight loss. Also, none of these studies were applied to large populations of adolescents, and bigger studies are needed to assess the full impact surgery may have on patients and to avoid bias.

On top of these concerns, there is a serious deficit that is avoided by almost every article on the subject that must be more clearly addressed. Namely, there are currently no proven recommendations for how to effectively and efficiently manage adolescents and their families

before, during, and after the surgical operation from a nutritional, behavioral, and psychological point of view. Surgery by itself will not ensure that these patients maintain the weight loss, and long-term guidance is necessary⁶. One paper did cite the importance of using a child psychologist in the treatment team for long-term follow up⁶. Moreover, no study addressed the fiscal impact surgery could have on the families and health care providers, with and without long-term psychological and nutritional counseling.

Conclusion:

It is evident that bariatric surgery (RYGB and AGB procedures) represents a potentially curative tool for morbidly obese adolescents who have not responded to traditional forms of weight loss. However, conclusive long-term studies are still necessary to prove the efficacy of surgery in large populations and when compared to other forms of weight loss therapy. Also, further research is necessary to identify what forms of counseling are needed for patients before, during, and after the surgery. Until such research is done, it is recommended that bariatric surgery be used only as a last resort in morbidly obese adolescents for which all other forms of weight loss therapy have failed, and for which adequate long term counseling is available to ensure nutritional and psychological stability.

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