Laparoscopic Sleeve Gastrectomy

The Newest Front in the Surgical Battle Against Obesity

It is well-established that procedures such as gastric bypass surgery and gastric banding surgery have treated hundreds of thousands of patients worldwide. Despite the apparent success of these operations, they are certainly not without risk and they both have negative attributes as well. Gastric bypass patients, for example, must supplement their diets with vitamin and mineral replacements to prevent deficiencies in critical nutrients such as Vitamin B_{12}, folic acid, thiamine, calcium, and iron. Gastric banding patients have a prosthetic device placed inside of them that can become infected or erode through to the inside of their stomachs, requiring revisional surgery, and they require a multitude of patient visits to the doctor's office for manipulation of the band to produce a successful result. Despite these drawbacks, both operations have proliferated exponentially as surgeons become more experienced with these techniques to produce a safe and effective surgical option for patients.

2006 represents a dawning of a new era in weight loss surgery. Laparoscopic sleeve gastrectomy is a new and exciting operation that may become a major part of the bariatric surgeon's armamentarium in the near future. Indeed, a search of PubMed[1] for "laparoscopic sleeve gastrectomy" yields 39 articles – 17 of which were published in 2006 as of the time of this writing (October, 2006). Early results have exceeded expectations as far as weight loss; and although further studies are needed to show long-term efficacy, initial results are beginning to get surgeons and patients alike interested in this procedure – one that avoids the malabsorptive complications of gastric bypass and the multiple invasive adjustments of gastric banding.

There are two major types of weight loss operations: those that restrict caloric intake, and those that cause malabsorption of food, leading to inefficient digestion and an overall reduction in calories. Gastric banding surgery is a purely restrictive operation, which works by forced reduction in portion size by the creation of early satiety in a meal. Digestion below the band, however, proceeds normally. Weight loss is typically in the 50-60% of excess body weight (%EBW lost) range over 3-5 years. Gastric bypass is both restrictive and malabsorptive. A small gastric pouch is created that restricts the amount of food able to be eaten, and the pouch is connected to the jejunum. The remainder of the stomach and duodenum are bypassed by food, creating a malabsorptive condition. Weight loss results typically range from 60-80% EBW lost over 1-2 years. Biliopancreatic diversion with duodenal switch is considered to be primarily malabsorptive; it has the highest %EBW lost ranging from 70-90%, but is not performed by many surgeons due to severe side effects and complications.

The concept of sleeve gastrectomy is not new: surgeons were performing sleeve gastrectomy as part of the biliopancreatic diversion with duodenal switch. Recognizing that a malabsorptive operation alone with no element of nutrient restriction was unlikely to be sustainable, surgeons initially performed a distal gastrectomy. This had too many long-term problems, however, and the technique was later revised to a sleeve gastrectomy. Put simply, a sleeve gastrectomy is a resection of the greater curvature and fundus of the stomach. Approximately two-thirds of the stomach is surgically removed when this is performed. This leaves the patient with a tube-shaped stomach that does not distend well. The result is early satiety during a meal, with reduction of overall caloric intake.

Early results of the sleeve gastrectomy are promising. A Belgian group led by Dr. Jacques Himpens demonstrated[2] that sleeve gastrectomy patients lost 56.3% EBW at one year – comparable to the maximum of a gastric banding patient. Their results at three years have shown a 71.3% EBW lost – comparable to gastric bypass. These results compared to 36.2% and 45% for gastric banding patients. Another study from a group in San Francisco[3] showed a 58.6% EBW lost at one year – and 77.9% at two years. This same study showed a major complication rate of 1.5% in 216 patients who underwent sleeve gastrectomy – compared to 2.6% for gastric banding patients, 6.5% for gastric bypass patients, and 22.7% for duodenal switch patients. In addition, their mean operative time was significantly shorter (66 minutes) than the times of gastric banding (92), gastric bypass (142), or duodenal switch (229).

The comorbid conditions of morbid obesity can also be improved with sleeve gastrectomy. Dr. McMahon from the United Kingdom has shown that in his series,[4] 100% of pa-

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tients with hypertension, diabetes, impaired glucose tolerance, obstructive sleep apnea, asthma, or arthritis were all cured or improved after surgery. In addition, the patients reported excellent quality of life improvement in the same study. This study is one of the few reported thus far with longer-term outcomes: at six years, patients maintained an excess body weight loss over greater than 70%.

Authors have shown that sleeve gastrectomy is a relatively safe option in the high-risk setting. One study[5] out of France demonstrated in ten high risk patients that the procedure could be done safely (no complications or deaths) with acceptable weight loss results (1 year EBW% = 51%). Another study[6] looked at the same procedure in multiple groups, some of which were equally high risk. They reported EBW lost greater than 60% in all groups, although they did have a 3.2% mortality rate.

Perhaps the most impressive weight loss reported so far with sleeve gastrectomy comes from a study in Korea.[7] They report an EBW lost of 71.6% at six months and 83.3% at one year. They also showed a 100% resolution of diabetes within six months of surgery, and 92.9% resolution of hypertension over the similar time frame. While no one else has published results that are this dramatic, one must allow for cultural and dietary differences to account for the variability seen in the medical literature.

One of the exciting areas of research in weight loss surgery is in the field of gut hormones. It is a sad reality that medical science has yet to discover exactly what mechanisms lead to hunger and satiety. Many believe that the key to unlocking cures for obesity come from understanding what drives hunger (or lack thereof) at the cellular level. A newly-discovered hormone called ghrelin may play a key role in the physiology of hunger and satiety. Ghrelin is a hormone secreted by the fundus of the stomach which stimulates the hypothalamus and pituitary gland in the brain. It has been postulated that procedures in which food can not go into the fundus of the stomach (e.g. gastric bypass), ghrelin levels will fall;[8] whereas procedures where the fundus still sees food (e.g. gastric banding), they do not. Other studies have confirmed that levels can actually rise after gastric banding surgery,[9-10] and this may account for the difference in weight loss results between gastric bypass and banding. Happily, a new study[10] has shown that ghrelin levels decrease markedly after sleeve gastrectomy. This makes intuitive sense as the fundus of the stomach is removed during sleeve gastrectomy.

Laparoscopic sleeve gastrectomy is emerging as a new and exciting option for patients seeking weight loss surgery. Unfortunately, at the current time, few if any insurers will pay for this procedure, rendering this an attractive but not yet feasible approach to consider. Further data and persuasive doctors and patients may change this coverage decision in the future. It is indeed quite possible that this latest front in the surgical battle against obesity may represent the best long-term, safest option for patients to achieve weight loss. ■

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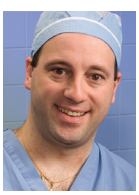

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